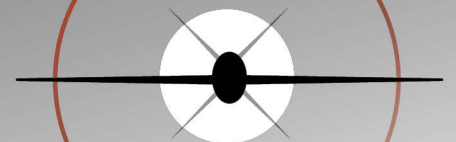


THE DRONE DATABOOK

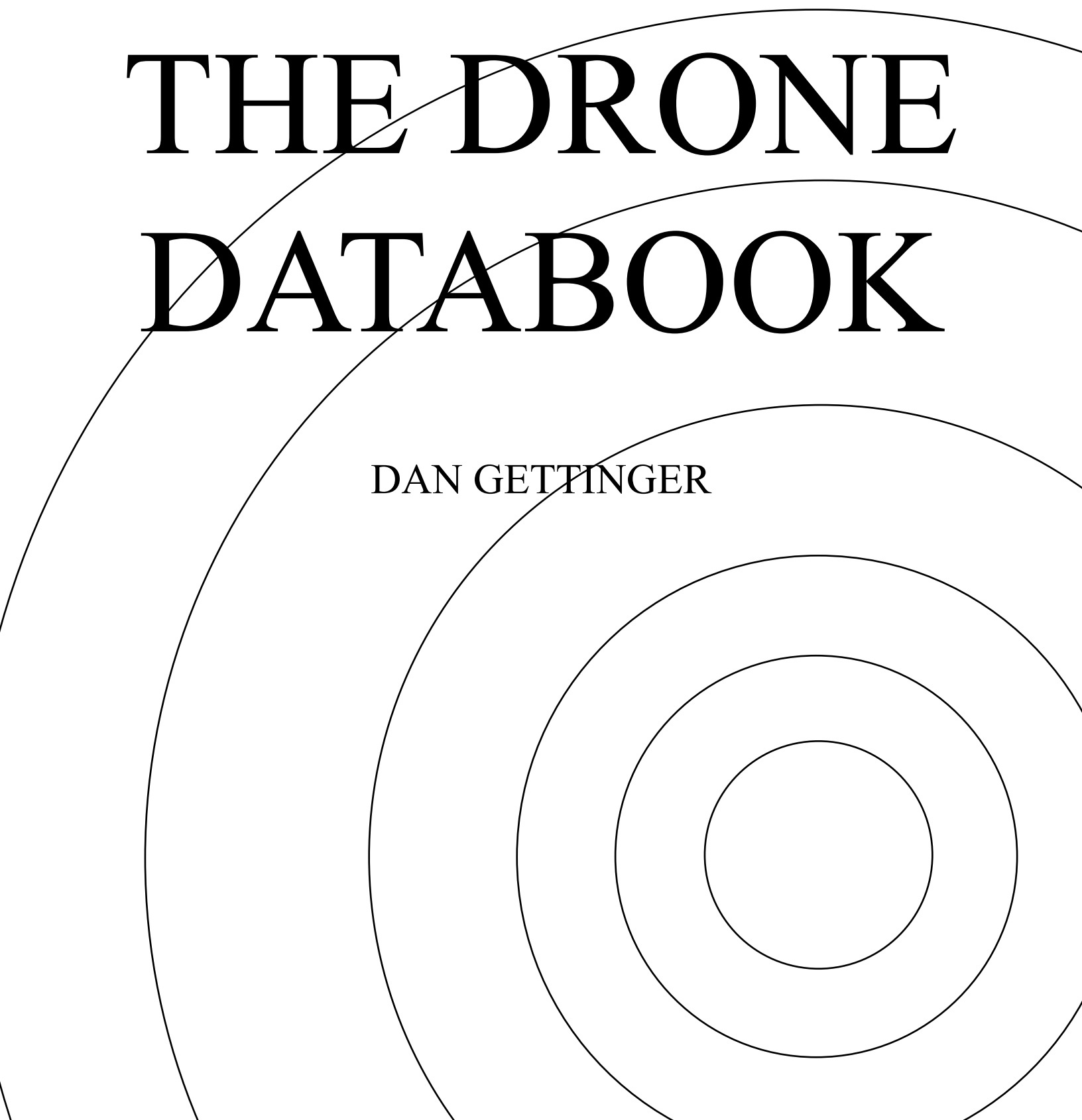
DAN GETTINGER



THE CENTER FOR THE STUDY OF THE DRONE AT BARD COLLEGE

THE DRONE DATABOOK

DAN GETTINGER



ABOUT THE CENTER FOR THE STUDY OF THE DRONE

The Center for the Study of the Drone at Bard College is an interdisciplinary research institution that examines the novel and complex opportunities and challenges presented by unmanned systems technologies in both the military and civilian sphere. By conducting original, in-depth, and inquiry-driven projects, we seek to furnish stakeholders, policy-makers, and the public with the resources to engage in a robust public debate and develop policies that best address those opportunities and challenges.

ABOUT THE AUTHOR

Dan Gettinger is the founder and co-director of the Center for the Study of the Drone.

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PREFACE

Once a novelty, drones have become standard military equipment, spawning a global network of units, bases, and test sites. Battlefields in Ukraine, Syria, and Yemen, as well as zones of geopolitical conflict such as the Persian Gulf and the East China Sea, are increasingly crowded with drones of varying size and sophistication. Whether they are used for intelligence gathering, aerial strikes, artillery spotting, or electronic warfare, drones are a leading contributor to the changing character of modern war.

The Drone Databook is a study of military drone capabilities. It is comprised of profiles of 101 countries in seven regions – Asia and Oceania, Eurasia, Europe, Latin America, the Middle East and North Africa, North America, and Sub-Saharan Africa – as well as two appendixes that address military drone infrastructure around the globe and the technical specifications of more than 170 drones currently in use by these countries. The *Databook* evaluates the military drone capabilities of each country in terms of six categories: inventory and active acquisition programs, personnel and training programs, infrastructure, operational experience, aircraft research and development programs, and exports.

CONTENTS

Introduction

Methodology and Scope	.....	I
Profiles Guide	.....	II
Systems Guide	.....	IV
Key Findings	.....	VI

Part 1: Country Profiles

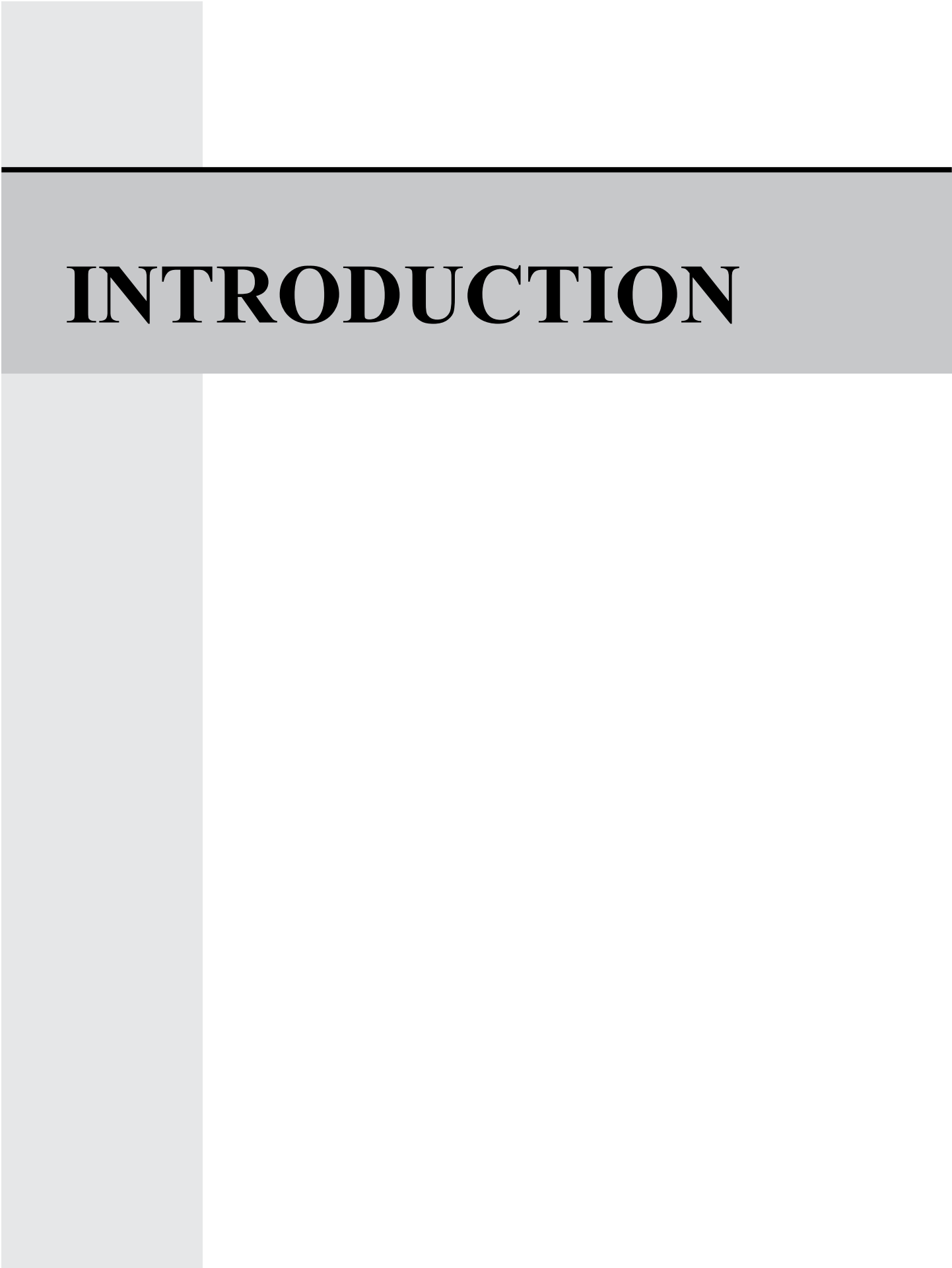
Asia	.....	2
Eurasia	.....	56
Europe	.....	81
Latin America	.....	155
Middle East and North Africa	.....	174
North America	.....	210
Sub-Saharan Africa	.....	258

Part 2: References

System Specifications	.....	270
Infrastructure	.....	284

FIGURES

1.	Countries with an Active Military Drone Inventory	VIII
2.	Countries with Military Drones in 2010 and 2019	IX
3.	UAV Exports by Country of Origin	X
4.	Drone Units by UAV Equippage	XI
5.	Drone Units by Activation Year	XI
6.	Drone Operations in the Middle East by Theater	XII
7.	Selection of International Incidents Involving Drones	XIV
8.	Summary of UAV Capabilities by Country	XVII
9.	German UAV Operational Flight Hours between 1990 to 2019	110
10.	Turkey's UAV Outposts	205
11.	U.S. Defense Spending on Unmanned Aircraft between FY2013 and FY2020.	220



INTRODUCTION

METHODOLOGY AND SCOPE

The Drone Databook is the result of a year-long study of open source literature on the development, acquisition, organization, and use of unmanned aerial vehicles in a military and security context. The *Databook* does not address drone acquisitions by non-military agencies or entities, most military drones that existed prior to the 1980s, or military unmanned ground or maritime vehicles. Primary sources cited in the *Databook* include official government statements and records, photographs and videos, social media, geospatial imagery, and technical data. Secondary sources include books, newspaper and journal articles, and research papers. Multilingual search methods were used to access certain primary and secondary sources. Free, public databases of military equipment exports, such as that of the Stockholm International Peace Research Institute, were consulted in some cases. Regional experts advised on the organization of forces and the translation of names and places.

Research into drone proliferation—and military capabilities in general—can be challenging. Different governments have varying degrees of transparency and sources may reflect conflicting, out-of-date, or partial information. It can be difficult to know with certainty whether, for example, a particular system or air base is in active use. As a general matter, the author has attempted to take a conservative approach when it comes to evaluating the status of a particular entity. The author has also added explanatory notes throughout to highlight areas of uncertainty and to place the available source material in context.

Part One of the *Databook* is comprised of country profiles for each of the 101 countries. Each country profile is organized according to region. Depending on the extent of a country's military drone activity and the available information, each profile contains up to six sections: Personnel, Inventory, Infrastructure, Operations, Development, and Exports.

Part Two is comprised of two reference sections. The System Specifications section lists the technical specifications for approximately three-quarters of the drones that are either active or in development. The bases reference contains satellite images for 85 airports and test sites.

The terms “unmanned aerial vehicle,” or “UAV,” and “drone” are used interchangeably in this study.

PROFILES GUIDE

INVENTORY

This section is comprised of tables for both active and inactive inventories, and a bulleted list of acquisition goals and programs. For each active and inactive system, the table contains the name of the manufacturer, country of origin of the manufacturer, system class (see “Systems Guide”), year of introduction (and deactivation, if an inactive system), user, and, whenever possible, the approximate number of aircraft and/or systems (which consist of multiple aircraft) acquired. (The number of systems is always within parentheses.)

The Active Acquisitions sub-section identifies ongoing procurement programs and/or plans, including:

- Acquisition programs in the pre-selection phase;
- Acquisition programs that have selected a system but will not introduce this aircraft for several years;
- Unconfirmed reports of plans to acquire unmanned aircraft.

PERSONNEL

The section lists the various units equipped with drones in the country’s military forces. Within the tables, two categories may cause confusion and so warrant some explanation:

- While most drone units in the *Databook* are dedicated solely to operating drones, some units have other roles such as operating radar or manned aircraft. “Type” refers to the degree to which drones are this unit’s primary responsibility.
 - » Drones are the primary responsibility of the “Dedicated” units;
 - » Drones are among the primary responsibilities of the “Partial” units;
 - » Drones are not among the primary responsibilities of “Not Dedicated” units either because these units have acquired a small number of systems or it is unclear how these systems are organized within the unit.
- “Activation” refers to the year in which this unit was formed or the year in which it began operating drones.
 - » If a unit has undergone a major reorganization in the time since it or one of its elements began operating drones, the “Activation” year reflects the year in which the new, reformed unit was stood up. Examples of major changes include a merger with another unit or a transfer to a different military branch. (If a unit was renamed without significant reorganization, the “Activation” year remains the year in which it was formed or the year it began operating drones.)

The Training sub-section describes the country’s principal training programs and academies for drone operators.

INFRASTRUCTURE

This section lists the bases, test sites, and training grounds that support drone operations. Each location here contains some piece of physical infrastructure—runways, hangars, training ranges—that is used in drone operations. As a result, this section typically only reflects infrastructure for larger Class II and III drones. This section does not usually include, for example, the location of the garrison for units operating Class I drones.

- “Primary” sites host a recent or sustained drone presence. For example, a base where there is a constant drone activity over a period of several years (such as a headquarters) or a base where there is repeated, intermittent drone activity (such as a test site). Unless there is evidence to the contrary, deployments within a year prior to publication are considered current.
- “Other” sites have hosted drone operations that are relevant to that country’s UAV operations or development, but may not host sustained or recent activity as of this writing. A common example of an “Other” site is an airport that was the site of a seemingly isolated series of drone flight tests. Some bases may be included in the “Other” table because their current status is unclear—if this is the case, it will be noted in the table.

OPERATIONS

The Operations section addresses the country’s record of using military drones in real operations, including both overseas and domestic deployments.

DEVELOPMENT

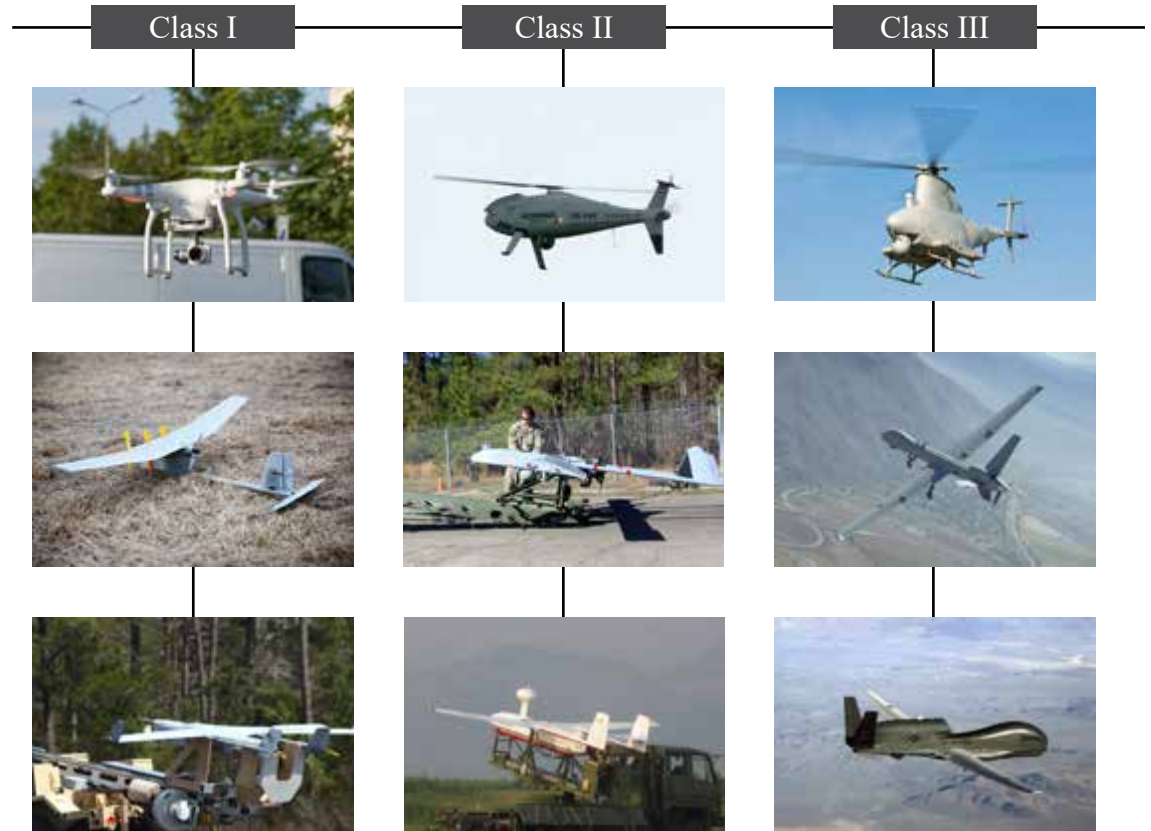
This section is comprised of a bulleted list of ongoing research and development projects that appear to be mostly or wholly defense-related. Each project description includes, where possible, the year the aircraft was unveiled, the year it made its maiden flight, and the official or reported timeline for the continuation of the program. This section generally does not address past R&D projects.

SYSTEM CLASSIFICATION GUIDE

Each of the drones in *The Drone Databook* are assigned a classification ranging from I to III based largely on their maximum take-off weight: Class I (less than 150 kilograms), Class II (150 to 600 kilograms), and Class III (more than 600 kilograms). These classifications are drawn from NATO Standardization Agreement 4670—NATO’s guidance for training drone operators.

- Class I encompasses an array of designs ranging from tiny handheld drones to larger, multirole systems. A typical Class I aircraft has an endurance of between one and three hours, a maximum range of approximately 80 kilometers, a payload capacity of 5 kilograms, and a top speed of 100 kilometers-per-hour. Class I aircraft are launched by hand or pneumatic rail and typically come equipped with an electro-optical and infrared sensor package. Class I includes both fixed- and rotary-wing aircraft, as well as a small number of hybrid UAVs that combine vertical take-off and landing and horizontal flight. The majority of Class I aircraft are used to carry out reconnaissance and surveillance missions and do not carry weapons. Loitering munitions—drones armed with a small explosive warhead and designed to explode on impact—are included in the *Databook* as Class I systems. The NATO definition of Class I includes three sub-categories—Micro, Mini, and Small—which, for the sake of simplicity, are treated equally as Class I systems in the *Databook*.
- Class II aircraft are sometimes referred to as “tactical” UAVs. A typical Class II aircraft has an endurance of 10 hours, a maximum range of between 100 and 200 kilometers, a payload capacity of up to 70 kilograms, and a top speed of 200 kilometers-per-hour. Class II systems may be fixed-wing—which typically require a small runway for launch or recovery—or rotary-wing in layout. A single Class II aircraft can be equipped with multiple payloads, such as electro-optical and infrared sensors, laser designators or illuminators for targeting, and communications relay equipment. While the majority of Class II aircraft are unarmed, some models can be equipped with lightweight ordnance, typically air-to-ground guided missiles similar to those used by manned attack helicopters.
- Class III aircraft are sometimes referred to as “medium-altitude long-endurance” (MALE) or “high-altitude long-endurance” (HALE) UAVs. A typical Class III system has an endurance of up to 24 hours or more, a payload capacity of several hundred kilograms, and a top speed of up to 300 kilometers-per-hour or more. Some Class III drones can be operated at a range of several thousand kilometers or more, though this depends on the communications equipment used. Class III includes both fixed-wing—which require a runway for launch and recovery—and rotary-wing aircraft. Many Class III aircraft are capable of carrying a mix of weapons, though some UAVs in this class are designed solely for intelligence-gathering. The NATO definition of Class III includes three sub-categories—MALE, HALE, and Strike/Combat—which, for the sake of simplicity are treated equally as Class III systems in the *Databook*.

Examples of Unmanned Aircraft According to Classification



Summary of Aircraft and Unit Classifications in the *Databook*

Aircraft Class	
I	< 150 kg
II	150 - 600 kg
III	> 600 kg
Unit Type	
D	Dedicated
P	Partial
ND	Not Dedicated

Commonly Used Acronyms and Abbreviations in the *Databook*

Btn	Battalion
DoD	Department of Defense
FW	Fixed-Wing
HQ	Headquarters
MoD	Ministry of Defense
MTOW	Max Take-Off Weight
Regt	Regiment
RW	Rotary-Wing
Sqn	Squadron
UAV	Unmanned Aerial Vehicle
VTOL	Vertical Take-Off and Landing

Country/Region-Specific Terms for “UAV” and “Drone”

طائرة بدون طيار	Arabic
PUA	Azerbaijan
SARP	Brazil
БЛС	Bulgaria
无人机	Chinese
SANMT	Colombia
BZS	Croatia
dronove	Croatian
RPAS	Europe
پهپاد	Farsi
drohne, unbemannte Luftfahrzeuge	German

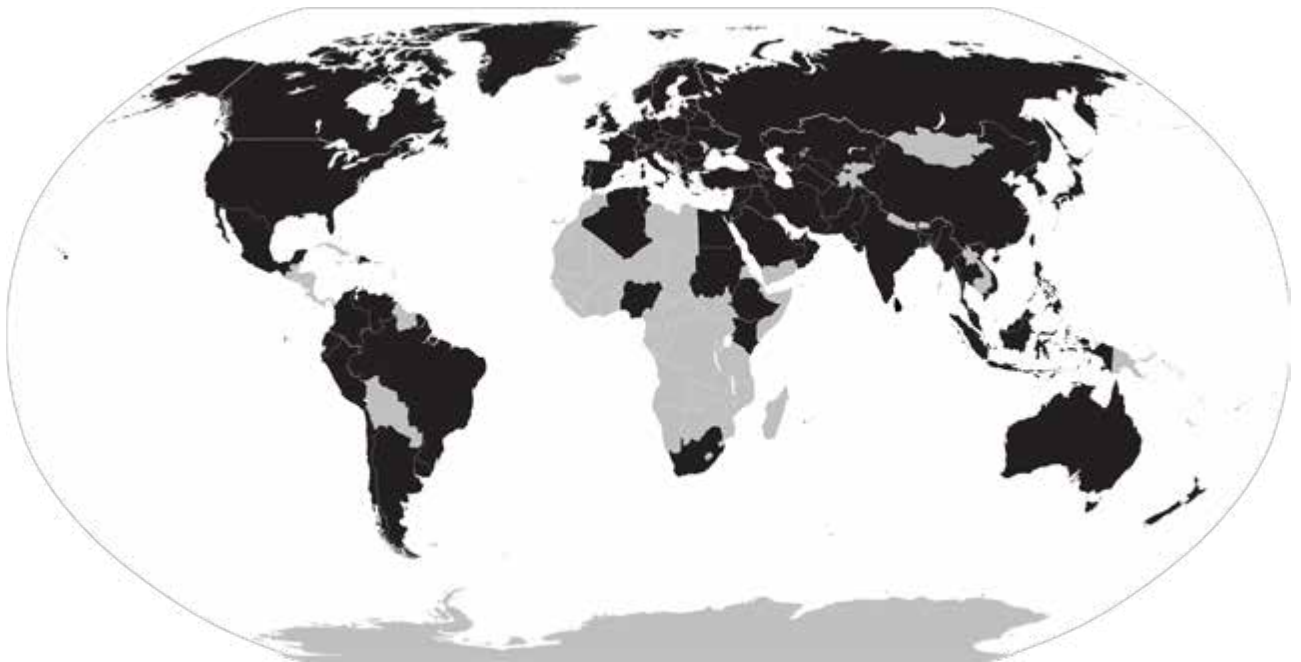
MEA	Greece
pilóta nélküli légi jármű	Hungarian
RPAV	Israel
ט"ל"מ	Hebrew
RPV	Israel, Europe
APR	Italy
無人航空機	Japanese
드론, 무인기	Korean
ұшқышсыз әуе көлігі	Kazakh
ART	Latin America
Dron	Spanish
VANT	Latin America
Bepilotis orlaivis	Lithuanian
BSP	Poland
Drony	Polish
БПЛА, БЛА	Russian, Eurasia
BLS	Slovenia
無人機	Taiwan
โดรน	Thai
İHA, SİHA	Turkey
дрон	Ukrainian
ANT	Uruguay
RPA	USA
SANT	Venezuela
Máy bay không người lái	Vietnamese

KEY FINDINGS

INVENTORY

Of the 101 countries in the *Databook*, 95 are believed to have an active inventory. The number of countries operating military drones of any kind has increased by an estimated 58 percent in the past decade.

Figure 1: Countries with an Active Military Drone Inventory



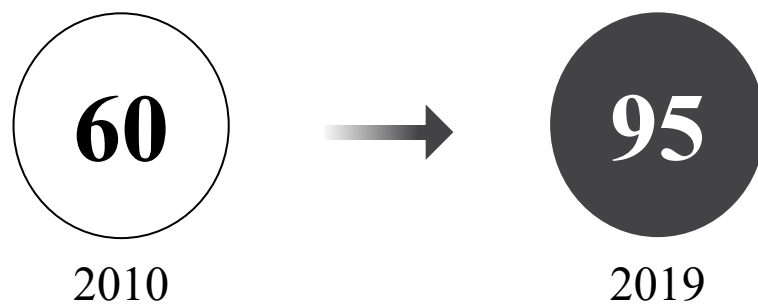
Aircraft Type and Class

Eighty-five countries currently operate Class I UAVs, 44 countries operate Class II UAVs, and 31 countries operate Class III UAVs. At least seven countries that do not currently operate Class III systems are believed to be in the process of acquiring a Class III capability. Of the 95 countries with an active inventory, 49 countries operate at least one from two or more classes, while 18 countries operate at least one drone from each class.

The *Databook* found 171 types of UAVs in active inventories. (For the purposes of this analysis, variants of the same system such as the IAI Searcher Mk 1 and the Searcher Mk 2 are considered as a single type unless there is a significant difference between the two in terms of physical characteristics or performance.) An additional 34 types of drones in the *Databook* are no longer active in any country.

Of the 171 active types of UAVs, 107 are Class I types, 36 are Class II types, and 28 are Class III types. There are 141 fixed-wing active types of drones and 30 rotary-wing UAVs. These 171 active drone types are produced by 108 entities in 43 countries. Eighty-two entities in 33 countries produce active Class I systems, 27 entities in 21 countries produce active Class II systems, and 18 entities in 7 countries produce active Class III systems.

Figure 2: Countries with Military Drones in 2010 and 2019



Aircraft Quantity

There are 21,000 confirmed unmanned aircraft currently in service around the world, though the actual number is likely more than 30,000. The *Databook* contains quantity estimates for approximately two-thirds of the systems in active inventories. It does not include quantity estimates for the active inventories of several countries including China and Iran, which both maintain significant stocks of unmanned aircraft.

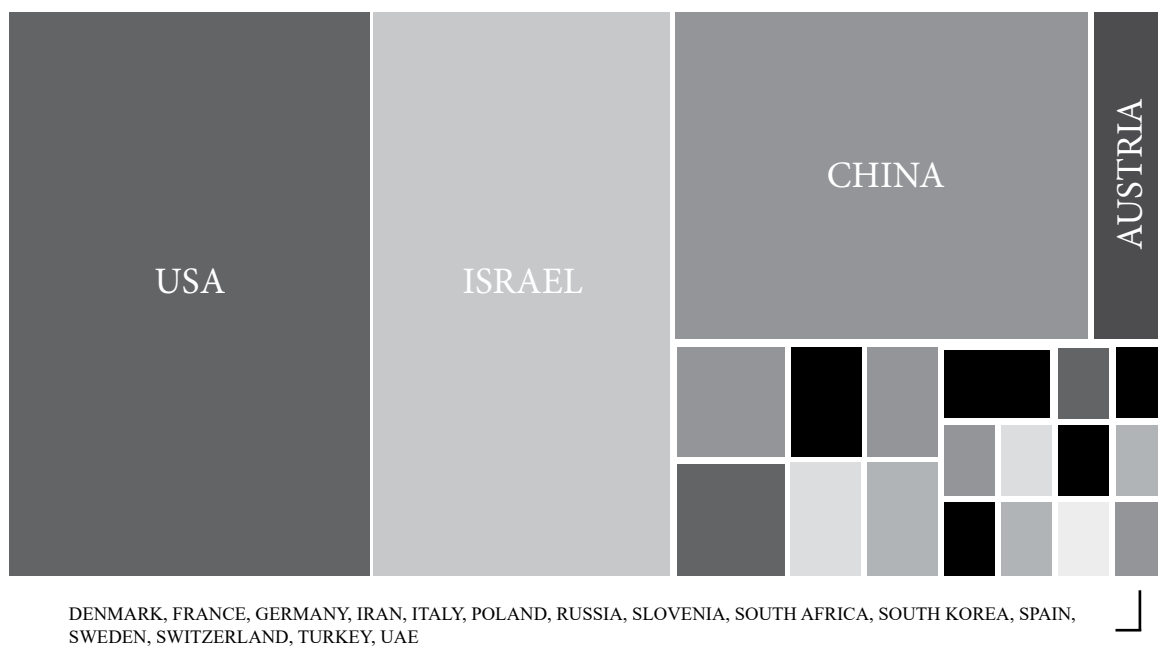
Aircraft Origin

Sixty-three countries are believed to have an active inventory comprised mostly or wholly of foreign-made unmanned aircraft systems. Twenty countries maintain a mixed inventory of domestic and imported systems, while 12 countries maintain an inventory comprised largely of domestically-produced systems.

Nineteen countries have exported drones that are currently in active military service. Most foreign-made systems are acquired from China, Israel, or the U.S. Aside from the military services in these three countries, a total of 79 countries—83 percent—operate at least one active drone type made in China, Israel, or the U.S. Thirty-two countries operate at least one drone made in China, 39 countries operate at least one from Israel, and 49 operate at least one from the U.S.

Figure 3: UAV Exports by Country of Origin

Reflects the number of countries that are believed to have acquired at least one UAV of any class from one of the following countries of origin.



PERSONNEL

The *Databook* lists 269 drone units from 59 countries. Of these, more than three-quarters—217 units—are believed to be dedicated mostly or wholly to drone operations. Thirty-three units are believed to be partially dedicated to drone operations, while 19 units are not dedicated.

Eighty-seven units are equipped with only Class I systems. Sixty-six units are equipped with only Class II UAVs and 89 units are equipped with only Class III UAVs. Another 27 units are equipped with multiple classes of drones.

Of the 173 units for which an activation date is available, approximately two-thirds, or 113 units, are believed to have been activated in the past decade. Nineteen units were activated in 2018, the most of any year on record.

The oldest continually serving drone unit that remains active today is Israel's 200th Squadron, also known as the First UAV Squadron, which was stood up in 1971. Other drone units such as the U.S. 6th Reconnaissance Squadron also began operating drones in the mid-to-late 20th Century, but may have undergone one or more significant reorganizations since then.

At least 15 countries have established dedicated training academies for drone operators, though more countries may have UAV programs within other training schools. Ten countries have activated UAV training schools in the past decade.

Figure 4: Drone Units by UAV Equippage

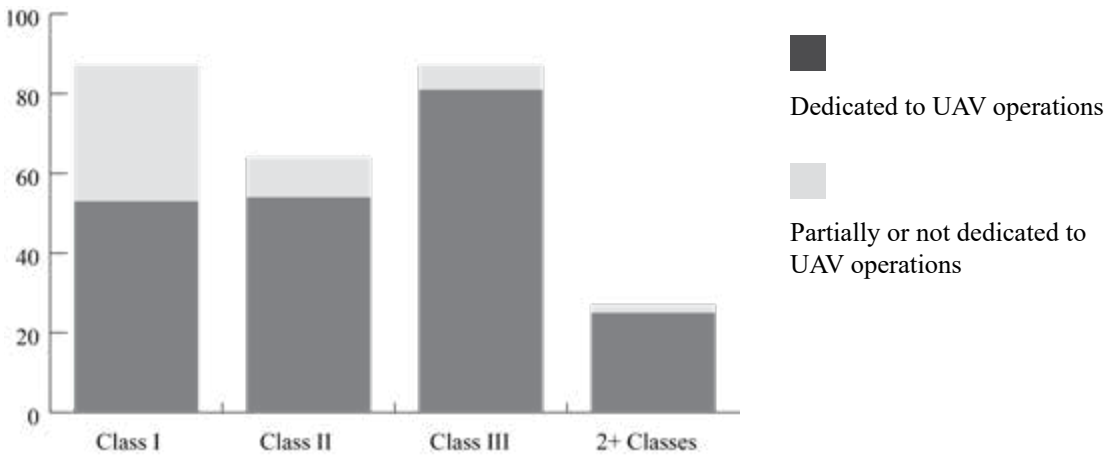
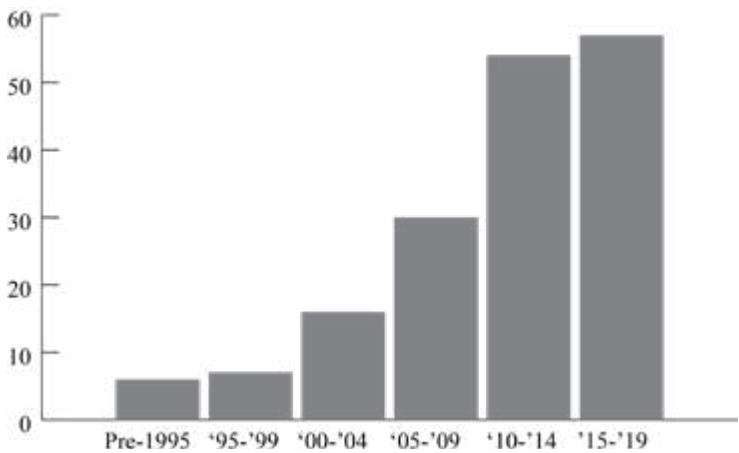


Figure 5: Drone Units by Activation Year*



**The Activation Year is available for 173 of the 268 UAV units in the Databook.*

INFRASTRUCTURE

The *Databook* identifies 236 airports, bases, and test sites in 61 countries. Of these, 193 are “primary” sites and 43 are “other” sites. (For the definition of “primary” and “other” sites, please see page III.) Seven countries—France, Germany, Italy, Russia, UAE, U.K., and U.S.—maintain active drone bases outside of their own borders. The U.S. has drones based in 13 countries.

At least 12 countries—Argentina, Azerbaijan, China, India, Iran, Israel, Poland, Russia, South Korea, Turkey, the U.K, and the U.S.—have established test sites or operational bases that appear to be mostly or wholly dedicated to military drones. These separate facilities may be created out of a concern about the safety of intermingling manned and unmanned air traffic or out of a need to meet operational or strategic requirements.

Figure 6: Drone Operations in the Middle East By Theater



OPERATIONS

Military drones have been deployed around the world in a variety of operations, including counterterrorism and counterinsurgency missions, peacekeeping, border security, counter-piracy, counter-narcotics, counter-smuggling, firefighting, and environmental protection.

At least 28 countries have deployed UAVs beyond their borders since the 1980s. Twenty-one countries—in addition to the Afghan National Army—have deployed drones over Afghanistan. At least eight countries have deployed drones for peacekeeping missions,

most prominently in deployments to the Balkans, Mali, and the Democratic Republic of Congo.

At least 10 countries—Azerbaijan, Israel, Iraq, Iran, Nigeria, Pakistan, Turkey, UAE, U.K., and U.S.—are believed to have used UAVs to conduct aerial strikes. Another 30 countries are believed to have acquired or are in the process of acquiring drones that are capable of conducting strikes, though many drones that can carry weapons are predominantly used for surveillance or for spotting targets for manned aircraft. The use of armed drones, particularly by the U.S., has spawned a global debate over the risks that remotely-operated weapons pose to civilians and to the stability of the nation in which the strikes take place. Many drones that carry weapons are predominantly used for surveillance and for spotting targets for manned aircraft.

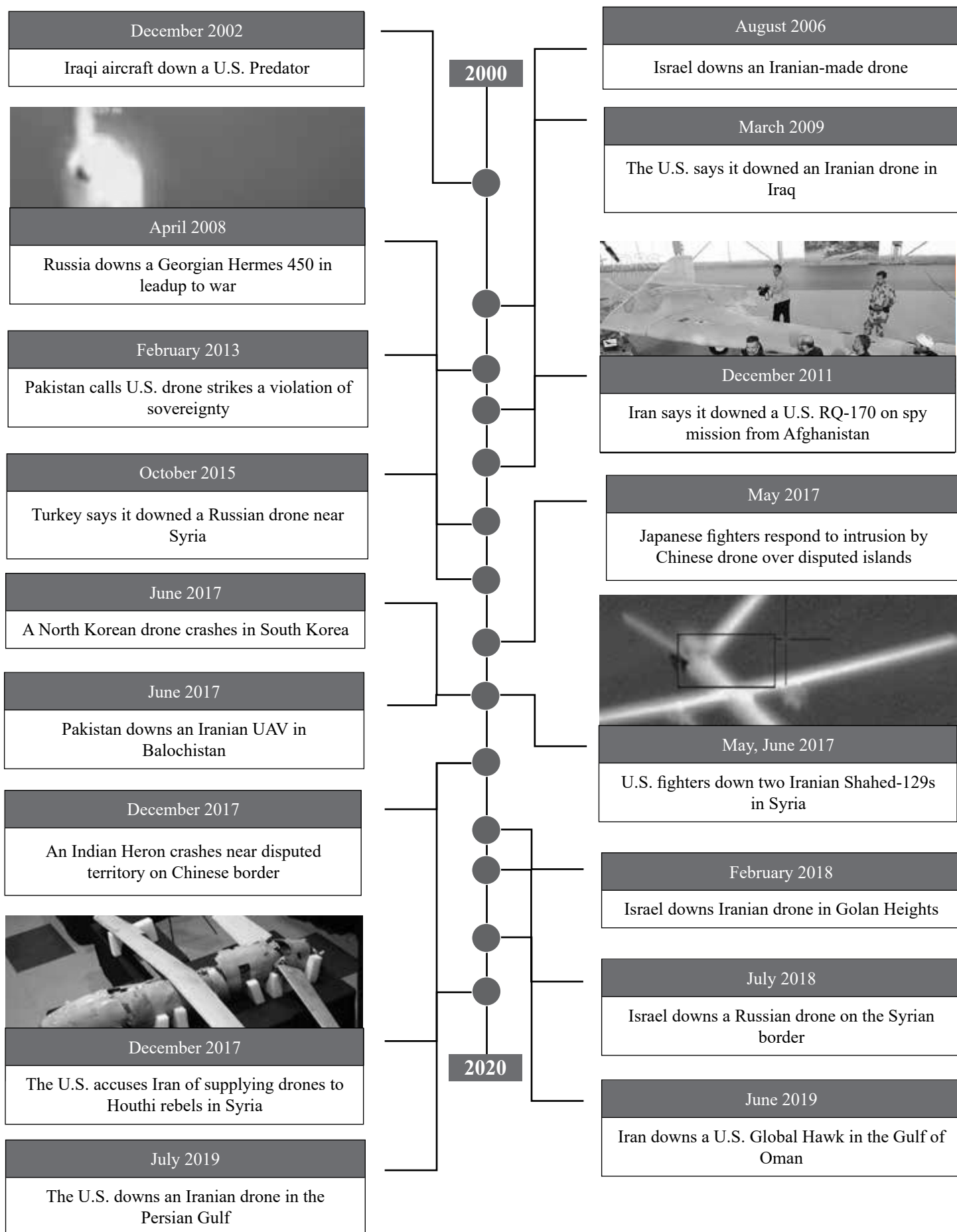
At least 16 countries are believed to be currently engaged in some sort of overseas military drone deployment as of this writing. Eight countries—Iran, Italy, Iraq, Russia, Syria, Turkey, the U.K., and the U.S.—are believed to be operating drones in Iraq and Syria. The U.S. is believed to be operating drones in eight other theaters, in addition to Syria and Iraq: Afghanistan, West Africa and the Sahel, Somalia, Yemen, the Philippines, the Korean Peninsula, Libya, and eastern Europe.

Drones have become a fixture of military operations in and around disputed border regions. Since 2013, China's East Sea Fleet has conducted periodic drone patrols over the Senkaku/Daiyou Islands, which are also claimed by Japan and Taiwan. Iran has established at least four drone bases bordering the Persian Gulf and has conducted regular overflights of U.S. naval traffic moving through the Gulf. In December 2017, an Indian Heron crashed inside China on the Doklam plateau, where India and China have competing territorial claims.

Military drones have been deployed to quell domestic uprisings and suppress minority populations in several countries. Turkey has made extensive use of Bayraktar-TB and Anka drones for surveillance and strikes in its military campaign against Kurdish militants. At least six—and as many as eight—bases have been established in southern Turkey for these drone operations. At various times since 2014, the PLA Air Force has based Wing Loong 1s and, later, Wing Long 2s, at Kashi Air Base and Hotan Airport in China's western Xinjiang province, where the Chinese government has been engaged in a massive campaign to repress the Uighur minority population.

Military drones are used in several different ways for non-military applications. At least seven countries—Chile, China, Croatia, Greece, Russia, Spain, and the U.S.—have used military drones to support firefighting operations. Croatia, Belgium, Italy, and Thailand have deployed drones to enforce environmental regulations. Colombia, Ecuador, and Mexico deploy drones in counter-narcotics and counter-smuggling operations. Brazil and France have used drones to provide surveillance during high-profile events.

Figure 7: Selection of International Incidents Involving Drones



DEVELOPMENT

At least 24 countries are currently developing new military unmanned aircraft. These projects include 10 Class I systems, 12 Class II systems, and 36 Class III systems. At least seven countries are exploring potential designs for next-generation drones, including stealthy aircraft (U.S., China, Russia, and France), high-altitude pseudo-satellites (U.S., China, U.K.), swarms (U.S., China, U.K.), and manned-unmanned teaming systems (Australia, Japan, U.K., China, and the U.S.). China appears to have the most active drone development programs of any country, with at least 11 parallel projects underway as of this writing.

At least 24 countries are believed to have licensed foreign drone technology for domestic production. These agreements can lead to the development of new variations of the original system. Russia, for example, is working on a strike-capable variant of the Israeli Searcher known as the Forpost-M. Pakistan has developed variants of China's CH-3 known as the Burraq and Shahpar.

A few countries have partnered with other countries to develop new drones or variants of existing systems. The largest partnership on an active drone development program is the EuroMale project, which involves five countries—the Czech Republic, France, Germany, Italy, and Spain—and is seeking to produce a Class III UAV. A mockup of the drone was unveiled in 2018 and a demonstrator aircraft is expected to fly in 2023. Other active development projects include a partnership between Spain and Colombia to develop the Atlante 2, a Class III UAV.

PREVIOUS PROLIFERATION STUDIES

At least a dozen extensive reports on military drone proliferation have been published in the past decade, several of which include estimates of the number of countries that have acquired drones. Given variances in scope and methodology, these figures may not track with the estimates offered in the *Databook*, or with each other. Nevertheless, each of these studies offers a valuable perspective on military drone proliferation.

Aniseh Bassiri Tabrizi and Justin Bronk, “Armed Drones in the Middle East: Proliferation and Norms in the Region,” Royal United Services Institute, 2018, https://rusi.org/sites/default/files/20181207_armed_drones_middle_east_web.pdf.

Don Ressler, “Remotely Piloted Innovation: Terrorism, Drones, and Supportive Technology,” Combating Terrorism Center at West Point, 20 October 2018, <https://ctc.usma.edu/remotely-piloted-innovation-terrorism-drones-and-supportive-technology/>.

George Woodhams, “Weapons of Choice? The Expanding Development, Transfer, and

Use of Armed UAVs,” UNIDIR, 2018, <http://www.unidir.org/programmes/conventional-arms/increasing-transparency-oversight-and-accountability-of-armed-unmanned-aerial-vehicles-phase-ii>.

Johanna Frew, “Drone Wars: The Next Generation,” Drone Wars UK, May 2018, <https://dronewarsuk.files.wordpress.com/2018/05/dw-nextgeneration-web.pdf>.

Johanna Polle, “MALE-Drone Proliferation in Europe: Assessing the Status Quo Regarding Acquisition, Research and Development, and Employment,” Interdisciplinary Research Group on Disarmament, 2018, https://ifsh.de/file-IFAR/pdf_english/Polle_MALE-Drone_Proliferation_in_Europe.pdf.

John Borrie, Elena Finckh, and Kerstin Vignard, “Increasing Transparency, Oversight and Accountability of Armed Unmanned Aerial Vehicles,” UNIDIR, 2017, <http://www.unidir.org/programmes/gender-and-disarmament/increasing-uav-transparency-oversight-and-accountability>.

Kelley Saylor, “A World of Proliferated Drones: A Technology Primer,” Center for a New American Security, 2015, http://drones.cnas.org/wp-content/uploads/2016/03/CNAS-World-of-Drones_052115.pdf.

Lynn E. Davis, Michael J. McNerney, James S. Chow, Thomas Hamilton, Sarah Harting, Daniel Byman, “Armed and Dangerous? UAVs and U.S. Security,” RAND Corporation, 2014, https://www.rand.org/pubs/research_reports/RR449.html.

Michael C. Horowitz, “Droning on: Explaining the Proliferation of Unmanned Aerial Vehicles,” *International Organization*, 71(2), 2015, 397-418.

Micah Zenko and Sarah Kreps, “Limiting Armed Drone Proliferation,” Council on Foreign Relations, 2014, https://cfrd8-files.cfr.org/sites/default/files/pdf/2014/06/Limiting_Armed_Drone_Proliferation_CSR69.pdf

Peter Bergen, David Sterman, Melissa Salyk-Virk, Christopher Mellon, Alyssa Sims, and Albert Ford, “World of Drones: Examining the Proliferation, Development, and Use of Armed Drones,” New America Foundation, 2015, <https://www.newamerica.org/in-depth/world-of-drones/>.

Wim Zwijnenburg and Foeke Postma, “Unmanned Ambitions: Security implications of growing proliferation in emerging military drone markets,” PAX, July 2018, <https://www.paxforpeace.nl/publications/all-publications/unmanned-ambitions>.

United States, Government Accountability Office, *Agencies Could Improve Information Sharing and End-Use Monitoring on Unmanned Aerial Vehicles*, by Thomas Meito, GAO-12-536, Washington, D.C.: 2012, <https://www.gao.gov/products/GAO-12-536>.

Figure 8: Summary of UAV Capabilities by Country

	Class I	Class II	Class III	Class III R&D or Acquisition*	Profile Pg.
Afghanistan					4
Algeria					176
Argentina					157
Armenia					58
Australia					5
Austria					84
Azerbaijan					59
Bangladesh					10
Belarus					61
Belgium					84
Bolivia					159
Botswana	<i>Inactive intentory and/or planned acquisition.</i>				260
Brazil					159
Bulgaria					87
Burundi					260
Cameroon					261
Canada					212
Chile					162
China					11
Colombia					163
Cote D'Ivoire	<i>Inactive intentory and/or planned acquisition.</i>				261
Croatia					88
Cyprus	<i>Inactive intentory and/or planned acquisition.</i>				89
Czech Republic					90
Denmark					92
Dominican Republic					167
Ecuador					168
Egypt					177
Estonia					94
Ethiopia					262
Finland					95
France					96
Georgia					62
Germany					105
Greece					112
Guyana	<i>Inactive intentory and/or planned acquisition.</i>				169

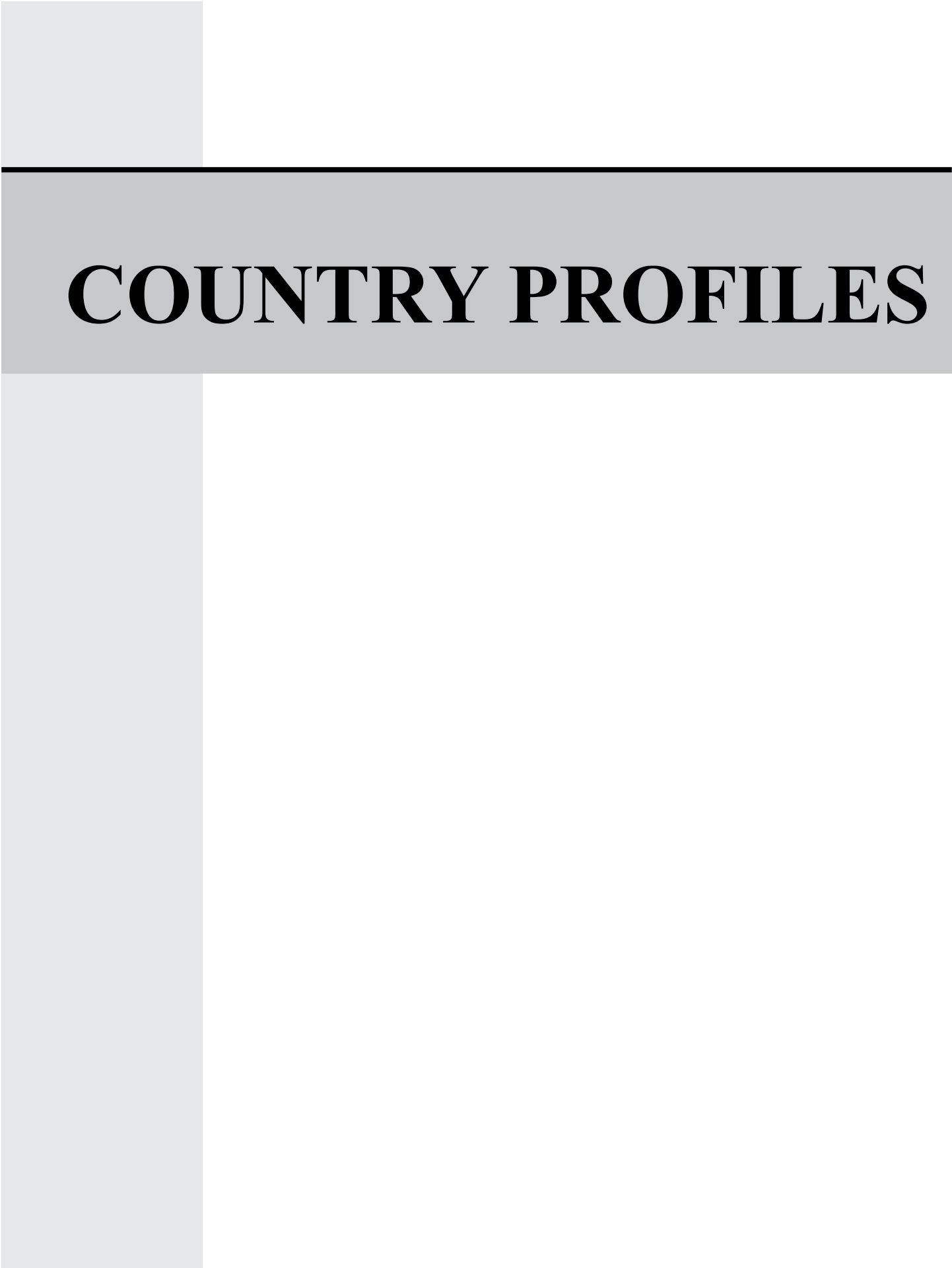
**This country is currently developing or has plans to acquire a Class III UAV.*

	Class I	Class II	Class III	Class III R&D or Acquisition*	Profile Pg.
Honduras					169
Hungary					114
India					21
Indonesia					26
Iran					179
Iraq					185
Ireland					115
Israel					187
Italy					116
Japan					28
Jordan					194
Kazakhstan					63
Kenya					262
Latvia					122
Lebanon					196
Lithuania					122
Luxembourg					123
Malaysia					31
Mexico					215
Morocco	<i>Inactive intentory and/or planned acquisition.</i>				196
Myanmar					33
Netherlands					124
New Zealand					34
Nigeria					263
North Korea					35
North Macedonia					126
Norway					127
Oman					197
Pakistan					36
Paraguay					170
Peru					170
Philippines					39
Poland					129
Portugal					132
Qatar					197
Romania					133
Russia					64
Saudi Arabia					198
Serbia					135

**This country is currently developing or has plans to acquire a Class III UAV.*

	Class I	Class II	Class III	Class III R&D or Acquisition*	Profile Pg.
Singapore					40
Slovakia					136
Slovenia					137
South Africa					265
South Korea					43
Spain					138
Sri Lanka					48
Sudan					267
Sweden					145
Switzerland					148
Syria					200
Taiwan					50
Thailand					52
Tunisia					200
Turkey					201
Turkmenistan					76
Uganda					268
Ukraine					76
United Arab Emirates					207
United Kingdom					149
United States					217
Uruguay					171
Uzbekistan					80
Venezuela					172
Vietnam					54
Zambia					269

**This country is currently developing or has plans to acquire a Class III UAV.*



COUNTRY PROFILES

ASIA

Afghanistan	.....	4
Australia	.....	5
Bangladesh	.....	10
China	.....	11
India	.....	21
Indonesia	.....	26
Japan	.....	28
Malaysia	.....	31
Myanmar	.....	33
New Zealand	.....	34
North Korea	.....	35
Pakistan	.....	36
Philippines	.....	39
Singapore	.....	40
South Korea	.....	43
Sri Lanka	.....	48
Taiwan	.....	50
Thailand	.....	52
Vietnam	.....	54

AFGHANISTAN

INVENTORY

Model	Make	Origin	Class	Intro	Qty	Operator	Notes
ScanEagle ^{1,2,3}	Insitu	USA	I	2016	128 (16)*	Army	

PERSONNEL

ARMY⁴

Name	HQ	Type	Equipment	Activated
ScanEagle Detachment, 215th Corps	FOB Shorab, Helmand Province	D	ScanEagle	2016
ScanEagle Detachment, 209th Corps	Camp Pamir, Kunduz Province	D	ScanEagle	2017
ScanEagle Detachment, 205th Corps	Kandahar Airfield, Kandahar Province	D	ScanEagle	2017
ScanEagle Detachment, 201st Corps	FOB Gamberi, Laghman Province	D	ScanEagle	2017

TRAINING

- In 2016 the U.S. military opened the ScanEagle Training Facility at Camp Shaheen in northern Balkh Province to train members of the Afghan National Defense and Security Forces on the operation and maintenance of the ScanEagle, as well as to provide instruction in imagery interpretation.⁵ The school relocated to Kandahar Airfield in July 2018. Instruction is provided by U.S. military personnel and Boeing Insitu contractors.

OPERATIONS

- The Afghan National Army has deployed ScanEagles in operations against the Taliban and ISIS. Afghan Tactical Air Coordinators use drones to surveil targets and friendly forces, coordinate air-to-ground aerial fires, and conduct post-strike assessments. The Afghan National Army first deployed drones in an operational capacity with the 215th Corps in Helmand and the 209th Corps in Kunduz in mid-2017.⁶

INFRASTRUCTURE

Name	Country	Latitude	Longitude	Affiliation	Activity	Notes
Kandahar Airfield	Afghanistan	31°30'21"N	065°50'52"E	205th Corps	HQ, Training	

NOTES

1. Bill Carey, "Insitu to Supply ScanEagle Surveillance Drones to Afghanistan," *Aviation International Online*, 3 December 2015, <https://www.ainonline.com/aviation-news/defense/2015-12-03/insitu-supply-scanagle-surveillance-drones-afghanistan>.
2. Michael Peck, "Afghanistan orders more ScanEagles," *Army Times*, 27 July 2017, <https://www.armytimes.com/unmanned/uas/2017/07/27/afghanistan-orders-more-scanegles/>.
3. Gareth Jennings, "Afghanistan to receive additional ScanEagle UASs," *IHS Jane's Defence Weekly*, 29 March 2018, <https://www.janes.com/article/78931/afghanistan-to-receive-additional-scanagle-uass>.
4. U.S. Department of Defense, *Enhancing Security and Stability in Afghanistan*, Washington: Government Printing Office, 2017.
5. Phillip Walter Wellman, "Afghans build drone program to improve surveillance capabilities," *Stars and Stripes*, 16 November 2016, <https://www.stripes.com/news/afghans-build-drone-program-to-improve-surveillance-capabilities-1.439703>.
6. U.S. Department of Defense, *Enhancing Security and Stability in Afghanistan*, (D-F54BED1) Washington: Government Printing Office, 2018.

AUSTRALIA

INVENTORY

Model	Make	Origin	Class	Intro	Qty	Operator	Notes
PD-100 Black Hornet 2 ¹	FLIR Systems	USA	I	2017	161	Army	
Phantom ²	DJI	China	I	2018	350	Army	
RQ-12 WASP AE ³	AeroVironment	USA	I	2015		Army	
ScanEagle ⁴	Insitu	USA	I	2007	4	Navy	Previously in service with the Army
CamCopter S-100 ⁵	Schiebel	Austria	II	2017	2	Navy	Trial system

RQ-7B Shadow ⁶	AAI/Textron	USA	II	2011	18	Army	Est. 15 aircraft remain in service
MQ-4C Triton ⁷	Northrop Grumman	USA	III	2023	6	Navy	
MQ-9 Reaper ⁸	General Atomics	USA	III	2022	12-16	Air Force	

ACTIVE ACQUISITIONS

- The Army's Land 129 Phase 3 is a program to replace the RQ-7B Shadow with a new, runway-independent Class II tactical UAV that weighs less than 250 kilograms.⁹ As of May 2019, the Army was in the final stages of preparing an request for proposals for the \$282 million program.¹⁰ Once a new system is acquired, the Army plans to expand the 20th STA Regiment from two to three batteries by the mid-2020s.
- With the Land 129 Phase 4B program, the Army is evaluating a replacement for the Wasp AE. In April 2018, the Army awarded three Australian organizations—JAR Aerospace, SYPAQ Systems, and the University of Sydney—contracts to develop a next generation small UAV.¹¹ In February 2019 SYPAQ Systems announced that the Army had selected its Corvo X for additional development and capability demonstration.¹²
- Project Sea Phase 5 Maritime Tactical UAS program is evaluating the acquisition of a Class I or Class II aircraft for each of the Navy's surface warfare units. It is the successor program to the Navy Minor Project 1942, which managed the acquisition and evaluation of a limited number of CamCopter S-100s and ScanEagles.¹³ In February 2019 the Navy announced that it was streamlining its process for procuring a maritime drone; instead of a two-stage process for the Offshore Patrol Vessels and Future Frigates, it will seek one contractor to provide a UAV capable of operating onboard both types of vessels.¹⁴ The Navy is currently evaluating potential systems. The estimated total cost of this project is \$500 to \$750 million.
- The Air Force's Project Air 7000 Phase 1B is a program to acquire high-altitude long-endurance drones for maritime surveillance to supplement Australia's fleet of Boeing P-8A Poseidon manned patrol aircraft. In June 2018, Prime Minister Malcolm Turnbull announced that Australia would purchase six MQ-4C Tritons, although it may add a seventh aircraft at some point.¹⁵ Deliveries are expected to begin in 2023. As of early 2019, Australia had already invested over \$1 billion in the procurement of the aircraft and control systems; the total estimated acquisition cost is approximately \$5 billion.¹⁶
- The Air Force's Project Air 7003 Phase 1 is a program to acquire medium-altitude long-endurance UAVs to replace the Heron 1, which the Air Force leased for operations in Afghanistan and training between 2010 and 2017.¹⁷ In November 2018, the RAAF selected the MQ-9 Reaper over the Heron TP, though the exact Reaper variant that will be acquired remains unclear as of this writing.¹⁸ The RAAF expects the Reaper to enter into service between 2022 and 2023; the estimated cost of the project is between \$1 and \$2 billion.

INACTIVE

Model	Make	Origin	Class	Period	Qty	Operator	Notes
Aerosonde	Aerosonde	Australia	I	2003-Unknown	4	Army	
Avatar CX1	Cordarra	Australia	I	2000-Unknown	5		

Skylark	Elbit	Israel	I	2005-Unknown		Army	
Heron	IAI	Israel	III	2009-2014	2	Air Force	Leased

PERSONNELARMY

Name	HQ	Type	Equipment	Activated
20th Surveillance and Target Acquisition Regiment, 6th Combat Support Brigade, Royal Australian Artillery ¹⁹	Gallipoli Barracks	D	RQ-7B Shadow, WASP AE	2006

The 20th STA Regt is comprised of the Regimental Headquarters, 131st Surveillance and Target Acquisition Battery, 132nd Unmanned Aerial Vehicle Battery, and Combat Service Support Battery. It is tasked with providing the Army with artillery spotting and tactical reconnaissance, as well as training other Army units in Class I UAV operations.²⁰ The 20th Regt is the successor to the 131st Bty, which had, served as the Army's primary, independent UAV unit before it was subordinated to the newly-created 20th Regt in 2006.²¹

NAVY

Name	HQ	Type	Equipment	Activated
822X Squadron, Fleet Air Arm	HMAS Albatross	D	ScanEagle, Camcopter S-100	2018

Initially stood up in 2011 as the Navy Unmanned Aerial Systems Unit (NUASU) to test drones for the Royal Australian Navy. In October 2018 it was redesignated the 822X Squadron in the Royal Australian Navy's Fleet Air Arm.²²

TRAINING

- Training of WASP AE operators takes place at the School of Artillery in Puckapunyal.²³
- Operator training for the RQ-7B Shadow consists of an 8-week course at the School of Artillery in Puckapunyal followed by 13 weeks of instruction at the 20th STA Regiment headquarters at Gallipoli Barracks.²⁴

INACTIVE

- The Royal Australian Air Force's No. 5 Squadron was responsible for flying the IAI Heron 1 in Afghanistan and, for a brief time, at RAAF Base Woomera. It was active from early 2009 until the expiration of the Heron I lease in 2017.

OPERATIONS

Country	Base	Equipment	Period	Operation
Solomon Islands		Aerosonde	2003	Anode
In 2003 the 131st Surveillance and Target Acquisition Battery, the precursor to the 20 STA Regiment, deployed to participate in Operation Anode, Australia's contribution to the Regional Assistance Mission to the Solomon Islands (RAMSI). ²⁵ It was the first operational deployment for Australia's Aerosonde, which flew 22 sorties and accumulated 106 flight hours over the course of the operation. ²⁶				
East Timor		Avatar, Skylark	1999-2001,2006	
Between 1999 and 2001, and again in 2006 and 2007, the 131st STA Battery deployed to East Timor for the International Force East Timor peacekeeping mission. ²⁷ The 131st was equipped with a small number Skylarks as well as four Aerosonde drones and several Codarra Avatars. ²⁸				
Iraq	Camp Terendak	Skylark, Scan-Eagle	2005-2007	Catalyst
In 2005 a portion of the 131st STA Battery deployed with the Al Muthanna Task Group, the Australian contribution to the Multi-National Force – Iraq. These troops were initially equipped with the Skylark. Following the 20th STA Regt's activation in 2006, the 131st Bty redeployed with the Skylark and ScanEagle. ²⁹ In an after-action review of the operation, the Australian Department of Defence reported that the units used drones to accompany convoys and to search for improvised explosive devices. ³⁰ The ScanEagles provided medium-range reconnaissance, augmenting the RAAF's manned Lockheed Martin P-3C Orion aircraft. Skylarks provided short-range reconnaissance capabilities.				
Afghanistan	Tarin-Kowt, Kandahar Airfield	Skylark, RQ-7 Shadow	2007-2014	Slipper
Between 2007 and 2014, the 20th STA Regiment deployed to Tarin Kowt, Afghanistan with the International Security Assistance Force, the NATO-led mission to Afghanistan. The unit was equipped with leased ScanEagles and Skylarks. The RQ-7B Shadow replaced the ScanEagle in mid 2012. ³¹ Separately, between 2009 and 2014, the No. 5 Squadron deployed to Kandahar Airfield with three Herons, which went on to accumulate over 27,100 flight hours before the deployment ended in 2014. ³²				
Middle East Region	HMAS Newcastle	ScanEagle	2017	Manitou
In 2018 the Royal Australian Navy deployed ScanEagles on board the HMAS Newcastle for Operation Manitou, the RAN's designation for all Australian maritime operations in the Middle East region since 1990. ³³ It was the first operational deployment for the Navy Unmanned Aerial Systems Unit.				

INFRASTRUCTURE

Name	Country	Latitude	Longitude	Affiliation	Activity	Notes
Gallipoli Barracks	Australia	27°25'30"S	152°59'00"E	Army	HQ, Training	

School of Artillery, Puckapunyal	Australia	36°59'29"S	145°01'14"E	Army	Training

DEVELOPMENT

- The Airpower Teaming System is a Class III fixed-wing concept drone designed by Boeing in partnership with the Royal Australian Air Force. The “loyal wingman” system is designed to accompany manned fighters in combat operations, providing off-board sensing to the aircraft pilot. It was unveiled at the Australian International Airshow at Avalon in February 2019.³⁴ Flight testing will reportedly begin in 2020. Australia will invest \$28.7 million into the development of the drone. It will be Australia’s first domestically-produced aircraft since World War II.

NOTES

1. Gabriel Dominguez, “Australian Army to roll out Black Hornet micro UAVs,” *IHS Jane’s Defence Weekly*, 24 May 2018, <https://www.janes.com/article/80312/australian-army-to-roll-out-black-hornet-micro-uavs>.
2. Gabriel Dominguez, “Australian Army acquires DJI Phantom 4 UAVs,” *IHS Jane’s Defence Weekly*, 20 August 2018, https://www.janes.com/article/82472/australian-army-acquires-dji-phantom-4-uavs?from_rss=1.
3. Richard Tomkins, “Australian troops receive small UAS from AeroVironment,” *UPI*, 18 June 2015, <https://www.upi.com/Defense-News/2015/06/18/Australian-troops-receive-small-UAS-from-AeroVironment/6561434649731/>.
4. Boeing, “Boeing Provides ScanEagle UAV to Australian Army,” news release, 5 January 2007, <https://boeing.mediaroom.com/2007-01-05-Boeing-Provides-ScanEagle-UAV-to-Australian-Army>.
5. Ryan Mass, “Schiebel to supply S-100 UAV for Australian navy,” *UPI*, 6 February 2017, <https://www.upi.com/Defense-News/2017/02/06/Schiebel-to-supply-S-100-UAV-for-Australian-navy/8681486401158/>.
6. “A43 AAI Corporation RQ-7B Shadow 200 UAV,” ADF-Serials, accessed on 26 October 2018, <http://www.adf-serials.com.au/3a43.htm>.
7. Sonali Paul, “Australia to buy six U.S. Triton drones for \$5.1 billion,” *Reuters*, 25 June 2018, <https://www.reuters.com/article/us-australia-defence/australia-to-buy-six-u-s-triton-drones-for-5-1-billion-idUSKBN1JL30I>.
8. “Reaper chosen as ADF’s first armed UAS,” *Australia Defence Magazine*, 16 November 2018, <https://www.australiandefence.com.au/defence/air/reaper-chosen-as-adf-s-first-armed-uas>.
9. “Army Looks Ahead to Replace Shadow UAV,” *Australian Aviation*, 7 May 2018, <http://australianaviation.com.au/2018/05/army-looks-ahead-to-replace-shadow-uav/>.
10. Damian Kemp, “Xponential 2019: Australia expects Shadow Tactical UAV solicitation soon,” *Jane’s Defence Weekly*, 2 May 2019, <https://www.janes.com/article/88257/xponential-2019-australia-expects-shadow-tactical-uav-solicitation-soon>.
11. “Army, Defence Innovation Hub Select Three Small UASs for Development,” *Australian Aviation*, 13 April 2018, <http://australianaviation.com.au/2018/04/army-defence-innovation-hub-select-three-small-uass-for-development/>.
12. SYPAQ Systems, “SYPAQ continues developing future SUAS for Army,” press release, 28 February 2019, <https://www.sypaq.com.au/blog/2019/02/28/sypaq-continues-developing-future-suas-for-army/>.
13. Kym Bergmann, “SEA 129 phase 5: Navy Unmanned Aerial Systems (UAS),” *Asia-Pacific Defence Reporter*, 2018, <https://search.informit.com.au/documentSummary;dn=351801888361537;res=IELBUS>.
14. Mike Yeo, “Australia changes how it will buy drones for shipborne operations. How is the industry reacting?,” *Defense News*, 27 February 2019, <https://www.defensenews.com/digital-show-dailies/avalon/2019/02/27/australia-changes-how-it-will-buy-drones-for-shipborne-operations-how-is-industry-reacting/>.
15. Nigel Pittaway, “Australia commits to Triton in \$5 billion deal,” *Defense News*, 27 June 2018, <https://www.defensenews.com/global/asia-pacific/2018/06/27/australia-commits-to-triton-in-5-billion-deal/>.
16. Nigel Pittaway, “Northrop to deliver Triton drone to Australia in 2023, says Air Force official,” *Defense News*, 28 February 2019, <https://www.defensenews.com/digital-show-dailies/avalon/2019/02/27/northrop-to-deliver-triton-drone-to-australia-in-2023-says-air-force-official/>.
17. Nigel Pittaway, “Suppliers from Israel and US battle to supply to ADF drones,” *The Weekend Australian*, 27 October 2017, <https://www.theaustralian.com.au/national-affairs/defence/suppliers-from-israel-and-us-battle-to-supply-to-adf-drones/news-story/d062f3d30b30e7458c352ec2e07c97b4?nk=9e83bd2a4e1a54b-1b9e5f8f6f6e15737-1533073114>.
18. Nigel Pittaway, “Australia makes its pick for drone fleet,” *Defense News*, 16 November 2018, <https://www.defensenews.com/global/asia-pacific/2018/11/16/australia-makes-its-pick-for-drone-fleet/>.
19. “20th Surveillance and Target Acquisition Regiment, Royal Australian Artillery,” Army, accessed on 26 October 2018, <https://www.army.gov.au/our-people/units/forces-command/6th-combat-support-brigade/20th-surveillance-and-target-acquisition>.
20. Raymond Brin, “20 Surveillance and Target Acquisition Regiment,” Lecture, 3 May 2018, <https://aaous.wildapricot.org/resources/Documents/CIVSEC%202018/AAUS%20CIVSEC%202018%20-%20Maj%20Brin.pdf>.

21. Lt. Col. P.R. Swinsburg, "Development of the 20th Surveillance and Target Acquisition Regiment," The Royal Australian Artillery Liaison Letter, 2006, http://australianartilleryassociation.com/liaison_letter/2006/raa-liaison-letter-2006-spring/31/#zoom=z.
22. Owen Zupp, "Navy Commissions 822X Squadron to Operate UAVs," *Australian Aviation*, 26 October 2018, <http://australianaviation.com.au/2018/10/navy-commissions-822x-squadron-to-operate-uavs/>.
23. "Drone Operator," Defence Jobs, accessed on 24 October 2018, <https://www.defencejobs.gov.au/jobs/Army/drone-operator>.
24. Ibid
25. "Unmanned aerial vehicle (UAVs), Nautilus Institute, <https://nautilus.org/publications/books/australian-forces-abroad/solomon-islands/unmanned-aerial-vehicles-uavs/>.
26. Mjr. Keirin Joyce, "The Australian Army and Unmanned Aerial Vehicles... 20 Years On and Still Nothing In-service," Royal Australian Artillery Liaison Letter, 2010, http://australianartilleryassociation.com/liaison_letter/2010/raa-liaison-letter-2010-autumn/54/.
27. "Unmanned aerial vehicle (UAVs), Nautilus Institute, <https://nautilus.org/publications/books/australian-forces-abroad/solomon-islands/unmanned-aerial-vehicles-uavs/>.
28. Mjr. Keirin Joyce, "The Australian Army and Unmanned Aerial Vehicles... 20 Years On and Still Nothing In-service," Royal Australian Artillery Liaison Letter, 2010, http://australianartilleryassociation.com/liaison_letter/2010/raa-liaison-letter-2010-autumn/54/.
29. *The Eyes and Ears*, 30 June 2015, http://www.1stbn83rdartyvietnam.com/Websites_of_Interest/Eyes_&_Ears_Files/Eyes_&_Ears_Vol_8_No_6_June_2015_063015.pdf.
30. Dr. Albert Palazzo, *The Australian Army and the War in Iraq 2002-2010*, <http://apo.org.au/node/74411>.
31. "Shadow 200 Operational in Afghanistan," *Australian Aviation*, 7 May 2012, <http://australianaviation.com.au/2012/05/shadow-200-operational-in-afghanistan/>.
32. "RAAF Retires 'Legacy' Heron UAV," *Australian Aviation*, 9 August 2017, <http://australianaviation.com.au/2017/08/raaf-retires-legacy-heron/>.
33. Max Blenkin, "FIRST CONTACT – The Royal Australian Navy has taken its first tentative steps into unmanned aerial system operations," ADBR, 11 January 2018, <http://adbr.com.au/first-contact-the-royal-australian-navy-has-taken-its-first-tentative-steps-into-unmanned-aerial-system-operations/>.
34. Nigel Pittaway, "Boeing unveils 'loyal wingman' drone," *Defense News*, 27 February 2019, <https://www.defense-news.com/digital-show-dailies/avalon/2019/02/27/boeing-unveils-loyal-wingman-drone/>.

BANGLADESH

INVENTORY

Model	Make	Origin	Class	Intro	Qty	Operator	Notes
Bramor ¹	C-Astral	Slovenia	I	2017*			

*Estimate

ACTIVE ACQUISITIONS

- In December 2017, as part of the Forces Goal 2030 modernization program, the Bangladesh Air Force released a request for proposals for a medium-altitude long-endurance drone with a minimum endurance of 15 hours and range of 1,000 kilometers.² According to a February 2018 report by FlightGlobal, Bangladesh is reportedly in active discussions with Turkish Aerospace Industries to acquire the Anka system to fulfill this requirement.³
- In March 2019 the U.S. Department of State pledged to provide Bangladesh with \$13 million in assistance to acquire drones that could be deployed in United Nations peacekeeping operations.⁴ As of this writing, it is not clear how this assistance relates to Bangladesh's plans to acquire a MALE system as described above.



The Bramor on display at the 2017 Bangladesh Victory Day Parade. Credit: Shadman Samee/Flickr

NOTES

1. Shadman Samee, “Bangladesh Army Toyota Land Cruiser 70 pickup and Bramor UAV,” Flickr, 14 December 2017, https://www.flickr.com/photos/shadman_samee/24189726667/
2. Bilal Khan, “Bangladesh Releases RFP for MALE UAV,” *Quwa*, 18 December 2017, <https://quwa.org/2017/12/18/bangladesh-releases-rfp-for-male-uav/>.
3. Aaron Chong, “Singapore: TAI eyes Asia-Pacific deals with T129s, Anka UAVs,” *FlightGlobal*, 7 February 2018, <https://www.flightglobal.com/news/articles/singapore-tai-eyes-asia-pacific-deals-with-t129s-a-445587/>.
4. Rebecca Wallace, “United States Promotes Performance and Accountability in UN Peacekeeping,” DipNote (blog), 29 March 2019, <https://blogs.state.gov/stories/2019/03/29/en/united-states-promotes-performance-and-accountability-un-peacekeeping>.

CHINA

INVENTORY

Model	Make	Origin	Class	Intro	Qty	Operator	Notes
Blowfish ¹	Ziyan	China	I	2018		Navy	
BZK-206	Beihang	China	I			Airborne	
Harpy ²	IAI	Israel	I	1999		Air Force	“JWS01” or “ASN-301”
CH-802 ³	CASC	China	I			Army, Navy, Air Force	
ASN-206	Xi’an ASN Technology Group	China	II	Mid-1990s		Army	

ASN-207	Xi'an ASN Technology Group	China	II	Early 2000s		Army	
ASN-209	Xi'an ASN Technology Group	China	II	2011		Navy	"Silver Eagle"
Camcopter S-100 ⁴	Schiebel	Austria	II	2010*	18	Navy	
BZK-007	GAIC	China	III			Army	
BZK-005	Beihang	China	III	2007		Navy, General Staff	
Wing Loong 1	AVIC	China	III	2011*		Air Force	"GJ-1"
Wing Loong 2	AVIC	China	III	2018		Air Force	"GJ-2"
Xianglong ⁵	GAIG	China	III	2017		Air Force	"Soar Dragon" "WZ-9"



A BZK-005 and two ASN-209 UAVs at a 2015 military parade commemorating World War II. Credit: Voice of America / Wikimedia

PERSONNEL

GENERAL STAFF

Name	HQ	Type	Equipment	Activated
Strategic UAV Scout Force, Intelligence Bureau, Joint Staff Department ⁶	Beijing-Shahe Air Base	D	BZK-005	Late 2000s

AIR FORCE

Name		HQ	Type	Equipment	Activated
178th UAV Brigade (Unit 95835) ⁷	178无人机旅驻地 (95835 部队)	Malan Air Base	D	Wing Loong 1, Wing Loong 2	2011

The 178th UAV Brigade is responsible for training pilots and sensor operators and expanding the integration of drones into the PLAAF. It is likely equipped with both Wing Loong 1 and 2s, which are known in the PLAAF as Gongji-1 and Gongji-2, respectively. Media reports suggest that the 178th may also be equipped with other systems, such as the Divine Eagle or the Xianglong.

151st UAV Brigade ^{8,9}	151无人机旅驻地	Cangzhou/ Cangxian Air Base	D	Wing Loong 1	

Not much is known about the 151st UAV Brigade except that it may serve as a training unit for Wing Loong 1 pilots and sensor operators.

NAVY

Name		HQ	Type	Equipment	Activated
UAV Regiment, East Sea Fleet	无人机团	Daishan Air Base	D	BZK-005, BZK-007, ASN-209	Mid-2010s
The East China Fleet's UAV Regiment is primarily based at Daishan Air Base on Daishan Island, although operations were temporarily relocated to Ningbo Air Base in 2016 while Daishan underwent renovations. Operations at Daishan restarted in 2018 or 2019. A March 2019 satellite image of Daishan shows seven BZK-005s and two BZK-007s at the base.					
UAV Regiment, South Sea Fleet	无人机团	Lingshui Air Base, Sanya Air Base	D	BZK-005	Mid-2010s

OTHER

- In The PLA's Unmanned Aerial Systems, Elsa Kania notes that it is probable that the PLAAF will activate new Wing Loong 1 units in the near future.¹⁰ Photos published to social media in February 2019 indicated that a new unit may have already been activated. The photos, which were taken at Mangshi Airport, depicted a Wing Loong 1 with a serial number that suggested it belonged to a unit in the Western Theater Command.¹¹
- The PLAAF may have activated one or more units equipped with the Xianlong and other drones. A unit equipped with the Xianglong may have been activated with the Northern Theater Command at Yishuntun Air Base.¹² Meanwhile, another unit equipped with the BZK-005 or BZK-007 may have been activated at Xintai Air Base.¹³ It is not clear whether these deployments are associated with a new or existing unit.

TRAINING

- Multiple PLA academies offer training courses for UAV personnel.^{14,15} As of 2016, these include the Air Force Early Warning College, Air Force Engineering University, Armored Force Engineering College, Army Officer Academy, Naval Aviation Engineering Academy, PLA Institute for International Relations, PLA Ordnance Engineering College, and PLA Special Operations Academy.

OPERATIONS

- Since 2013, the East Sea Fleet has conducted periodic drone patrols over the Senkaku/Diaoyu Islands, which are also claimed by Japan and Taiwan. In September 2013 the Japanese Ministry of Defense scrambled fighter jets to intercept a drone flying over the area. Photographs of the aircraft subsequently published online show what appears to be a PLAN BZK-005.¹⁶ In April 2018 Japan's Self-Defense Forces identified a PLAN BZK-005 flying over the East China Sea.¹⁷
- The PLAN has also deployed drones with the South Sea Fleet, potentially to surveil disputed territories in the South China Sea. In 2016, a BZK-005 was temporarily deployed to Woody Island.¹⁸ In 2016 and 2017 BZK-005s were based at Lingshui Air Base on Hainan Island. Several Xianglongs were also deployed to Lingshui by either the PLAN or the PLAAF in 2018.¹⁹ That same year, the Navy's BZK-005 drones were re-located from Lingshui to Sanya Air Base, a small naval air station adjacent to the headquarters of the South Sea Fleet at Yulin Naval Base.
- Beginning in 2014, the PLAAF based several drones at Kashi Air Base in the western Xinjiang province. According to press reports at the time, the deployment may have been part of a government crackdown on China's Uighur minority population.²⁰ Subsequent satellite imagery indicates that Wing Loong 1s appeared at Kashi Air Base several times between 2014 and 2018, though it is not clear that these represent a single, sustained deployment. In the fall of 2018, satellite images show that the PLA replaced the Wing Loong 1s at Kashi Air Base with at least three Class III UAVs, which are most likely Wing Loong 2s.²¹
- In early 2017 a subsidiary of the China Aerospace Science and Technology Corporation (CASC) deployed a CH-4 to Mohe Gulian Air Base to assist firefighting efforts in Heilongjiang province.²²
- In mid-2017, amid growing tensions with India over the disputed Doklam Plateau, the PLAAF deployed a CH-4 and several Xianglongs to Shigatse Air Base; concurrently, a BZK-005 appeared at Gonggar Air Base.²³ Commercial satellite images of the two bases from late 2018 suggest that the Xianglong mission at Shigatse was ongoing, though it was unclear whether the CH-4 and BZK-005 were still present at either of the facilities.
- In early 2018 several Xianglongs were deployed to Yishuntun Air Base in northeast Jilin province. A media report suggested that the drones could potentially be used to surveil China's border with North Korea, which lies approximately 320 kilometers southeast of Yishuntun.²⁴ Satellite images show that four Xianglongs remained at the base as of late 2018.²⁵
- In October 2018 the PLAAF deployed two Wing Loon 1s to Dehong Mangshi Airport, a mixed civil-military airport situated on China's border with Myanmar in Yunnan Province.²⁶ Photos of the drones posted to social media suggest that they belong to the unit attached to the Western Theater Command.²⁷

INFRASTRUCTURE

Name	Country	Latitude	Longitude	Affiliation	Activity	Notes
Yishuntun Airbase	China	43°35'15"N	123°34'41"E	Air Force	Deployment	Xianglong base
Shigatse Air Base	China	29°20'58"N	89°18'45"E	Air Force	Deployment	Xianglong base
Dehong Mangshi Airport	China	24°23'54"N	98°31'29"E	Air Force	Deployment	Wing Loong deployment in late 2018

Lingshui Air Base	China	18°29'40"N	109°59'16"E	Navy	HQ	
Sanya Naval Air Base	China	18°17'12"N	109°27'51"E	Navy	HQ	
Daishan Air Base	China	30°17'11"N	122°08'37"E	Navy	HQ	
Malan Air Base	China	42°11'13"N	87°10'41"E	Air Force	HQ	
Shilongcun Airport	China	29°22'42"N	104°37'31"E		Test site	TB-001 flight tests in 2018 and 2019 ²⁸
Anshun Huangguoshu Airport	China	26°15'38"N	105°52'23"E	Guizhou Aircraft Industry Corporation	Test site	Xianglong, Divine Eagle, Wing Loong ID test site
Zhongwei Shapotou Airport	China	37°34'22"N	105°09'16"E		Test site	CH-4,5 live fire test site
Guyuan Liupanshan Airport	China	36°04'34"N	106°13'05"E		Test site	Wing Loong 1,2 live fire test site
Pucheng Neifu Airport	China	34°50'1"N	109°32'38"E		Test site	AT-200, JY-300 test site
Chengdu Air Base	China	30°42'19"N	103°57'1"E	Chengdu Aircraft Industry Group	Test site	
Unnamed Baotou Airfield	China	40°52'28"N	109°35'08"E		Test site	FH-98 test site
Jiayuguan Airport	China	39°51'25"N	98°20'29"E		Test site	CH-4,5 test site
Shahezhen Air Base	China	40°8'57"N	116°19'17"E		Training	
Heitan Air Base	China	37°2'22"N	079°51'48"E	Air Force	Deployment	Wing Loong 2 base in 2019 ²⁹
Kashi Air Base	China	39°32'29"N	076°01'09"E	Air Force	Deployment	Wing Loong 1 (status unclear)

OTHER

Name	Country	Latitude	Longitude	Affiliation	Activity	Notes
Ningbo Air Base	China	29°55'22"N	121°34'25"E	Navy	Deployment	
Pingquan Air Base	China	40°54'3"N	118°40'52"E	CASC	Test site	CH-5 first flight tests in 2017 ^{30,31}
Yinchuan Air Base	China	38°28'56"N	106°0'30"E	Air Force	Test site	BZK-005C live-fire tests in 2018
Hongyuan Airport	China	32°31'45"N	102°21'25"E		Test site	CH-5 high-altitude tests in 2018 ³²
Liangping Airport	China	30°40'46"N	107°47'10"E		Test site	TB-001 first flight tests in 2017 ³³
Lhasa Gonggar Airport	China	29°17'52"N	090°54'43"E	Air Force	Deployment	BZK-005 ³⁴
Baotou 2 Airport	China	40°36'55"N	108°59'49"E		Test site	Tian Ying UAV tests in 2018 ³⁵
Shenyang Beiling Air Base	China	41°52'15"N	123°26'19"E		Test site	Divine Eagle tests in 2015 and 2016 ³⁶
Aksu Airport	China	41°15'45"N	80°17'30"E			CH-5 base in 2018-early 2019 ³⁷
Xintai Air Base	China	36°00'06"N	117°37'33"E			BZK-007 base in 2014 ³⁸
Jiyuan Air Base	China	35°07'18"N	112°36'31"E			BZK-005 base in 2014 ³⁹
Alxa Left Banner Bayanhot Airport	China	38°44'53"N	105°35'18"E		Test site	Wing Loong 2 test site ⁴⁰

DEVELOPMENT

- The Wing Loong ID (翼龙ID) is a Class III fixed-wing system developed by Aviation Industry Corporation of China (AVIC). A scale model of the Wing Loong ID's design, which is based on the Wing Loong 1, was unveiled at the 2016 Zhuhai Airshow. A prototype aircraft made its maiden flight at Anshun Huangguoshu Airport on 23 December 2018.⁴¹ The ID is intended for the export market and is expected to make its first deliveries in the coming years.⁴²
- The Divine Eagle (神雕) is a Class III fixed-wing system developed by Shenyang Aircraft Corporation's 601 Institute. Photos of the Divine Eagle first emerged on Chinese websites in 2015.⁴³ With a 45-meter wingspan, the Divine Eagle is among the largest drones in the world. It has conducted test flights at Shenyang Beiling Air Base and Anshun Airport. A November 2018 media report suggested that the Divine Eagle may have already entered into service with the PLAAF.⁴⁴ However, this has not been independently confirmed.
- The Cloud Shadow (云影) is a Class III fixed-wing drone developed by AVIC. It was unveiled at China's Zhuhai Airshow 2016.⁴⁵ The Cloud Shadow features a WP-11C turbojet engine, sleek fuselage design, and bulbous nose. It is designed to carry out high-altitude surveillance and strike missions. At the time of unveiling, AVIC announced that it would also be available for export to international customers.
- The AV500W is a Class II rotary-wing UAV developed by AVIC. It was unveiled at the 2016 Zhuhai Airshow. It is notable for being China's first strike-capable unmanned rotary-wing aircraft.⁴⁶ In November 2018, Chinese media reported that the AV500W had carried out a successful strike test, destroying a target with an FT-8D air-to-surface missile at a distance of 4.5 kilometers.⁴⁷ In June 2019, AVIC announced that the AV500 had carried out a successful nighttime drill.⁴⁸
- The TB-001 is a Class III fixed-wing drone developed by Tengoen Technology. It was unveiled at the 14th China-ASEAN Expo in 2017 in Nanning.⁴⁹ Also known as the "Twin Tailed Scorpion" (双尾蝎), the TB-001 features a twin-engine, twin-boom design. It conducted its first flight tests at Liangping Airport in Chongqing province in 2017. SF Express, the Chinese package delivery firm, has conducted field tests of a TB-001 modified for cargo operations in Yunnan province.⁵⁰ Tengoen has also unveiled a smaller version of the TB-001—the TA-001—as well as two rotary-wing aircraft, the HA-001 and HB-001.
- The Caihong-7 (彩虹-7, or CH-7) is a Class III jet-powered flying-wing system developed by the 11th Research Institute of the China Aerospace Science and Technology Corporation (CASC). It was unveiled in 2018 at the Zhuhai Airshow.⁵¹ It is scheduled to begin flight tests in 2019 and production by 2022. According to media reports, the CH-7 could be sold for export.⁵²
- The Tian Ying (天鹰) is a Class III fixed-wing drone developed by the 302nd Institute of the China Aerospace Science Industry Corporation (CASIC). Like the CH-7, the Tian Ying has a tailless flying-wing design, though it is only half the size of the CH-7, with an estimated 10-meter wingspan. CASIC published blurred photos of an aircraft thought to be the Tian Ying in early 2018, reporting that it had conducted its first flight tests in late 2017.⁵³ It was officially revealed at the 2018 Zhuhai Airshow.⁵⁴ In January 2019, CASIC published a video of the Tian Ying conducting flight tests at Baotou 2 Airport in Inner Mongolia province.⁵⁵
- The JY-300 is a Class III fixed-wing system developed by the Institute 38 at the China Electronic Technology Group Corporation. It was unveiled in 2018 at the Zhuhai Airshow.⁵⁶ The JY-300 is designed to serve as an early warning aircraft, with miniature phased-array radar strips lining its fuselage. In 2018, it conducted flight tests at Pucheng Neifu Airport in Shaanxi province.
- The Fei Long-1 (飞龙-1) is a Class III fixed-wing UAV developed by Zhong Tian Guide Control Technology Company (ZT Guide). It was unveiled at the 2018 Zhuhai Airshow. In January 2019, ZT Guide announced that it had conducted its maiden flight in a test at Pucheng Neifu Airport in Shaanxi province.⁵⁷
- The Yaoying-2 (鸢鹰-II) is a Class III fixed-wing UAV developed by GAIC, a subsidiary of AVIC. Also known as the "Air Sniper," the Yaoying-2 is a strike-capable system with a 16 hour endurance and 200 kilometer operational radius. It is the successor to the Yaoying-1, which was unveiled in 2011. The Yaoying-2 conducted its maiden flight at Anshun Airport in July 2018.⁵⁸ According to media reports, AVIC is hoping to market the aircraft to foreign customers.
- The Qi Mingxing (启明星) is a Class III fixed-wing solar-powered UAV developed by AVIC. A scale model of the aircraft was publicly displayed in July 2018. A demonstrator aircraft conducted its first flight in October 2018.⁵⁹
- The Feihong-98 (飞鸿-98) is a Class III fixed-wing system based on the Antonov An-2, a manned Soviet-era biplane that China has produced under the name Shifei Y5B since the 1950s. With a reported maximum payload of up to 1.5 tons, the Feihong-98 is among the largest UAVs in the world.

It conducted its first flight test at the Baotou test site in October 2018.⁶⁰ According to a media report, in June 2019 the National University of Defense Technology and the China Aerospace Science and Technology Group conducted a drill in which a Feihong-98 autonomously airdropped a 500-kilogram resupply package at a distance of 500 kilometers.^{61,62} Unlike earlier flight tests, this exercise took place at Zhangye Danxia Airport, a new airfield in Zhangye, Gansu Province.

- The SD-40 Sea Cavalry (海骑兵) is a Class I fixed-wing vertical take-off and landing UAV developed by Han's Eagle Aviation Technology Company. The SD-40 reportedly conducted its maiden flight in July 2017.⁶³ In 2018 Han's Eagle conducted several flights in northeast China to demonstrate the SD-40 as a tool for aiding firefighters.⁶⁴ In 2019 the PLAN conducted a training exercise with the SD-40 on board a *Luyang II*-class destroyer.⁶⁵

EXPORTS

Country	Model	Make	Class	Status	Notes
Algeria	CH-3	CASC	II	Active	
Algeria	CH-4	CASC	III	Active	
Argentina	Matrice 210	DJI	I	Active	
Argentina	Phantom 4	DJI	I	Active	
Australia	Phantom 4	DJI	I	Active	
Bolivia	Typhoon H	Yuneec	I	Active	
Chile	Inspire	DJI	I	Active	
Chile	Mavic Pro	DJI	I	Active	
Chile	Phantom 3 SE	DJI	I	Active	
Colombia	Inspire	DJI	I	Active	
Denmark		DJI	I	Active	
Dominican Republic	Matrice 210	DJI	I	Active	
Dominican Republic	Mavic	DJI	I	Active	
DPRK	ASN-104	Xi'an ASN Technology Group	I	Active	
DPRK	Sky-09P	Taiyuan	I	Active	
DPRK	UV-10CAM	Microfly	I	Active	
Egypt	Wing Loong 1	AVIC	III	Active	
Finland	Mavic	DJI	I	Active	
France	Inspire	DJI	I	Active	
Germany	Phantom 4	DJI	I	Active	
Iraq	CH-4	CASC	III	Active	
Israel	Matrice	DJI	I	Active	
Israel	Mavic	DJI	I	Active	
Israel	Phantom	DJI	I	Active	
Jordan	CH-4	CASC	III	Active	

Kazakhstan	Wing Loong 1	AVIC	III	Active
Lithuania	Inspire	DJI	I	Active
Lithuania	Phantom 4	DJI	I	Active
Myanmar	CH-3	CASC	II	Active
New Zealand	Mavic Pro	DJI	I	Active
Nigeria	CH-3	CASC	II	Active
Pakistan	Wing Loong 1	AVIC	III	Active
Portugal	Mavic	DJI	I	Active
Russia	Phantom	DJI	I	Active
Saudia Arabia	CH-4	CASC	III	Active
Sri Lanka	Phantom 4	DJI	I	Active
Sudan	CH-3	CASC	II	Active
Sudan	DB-2	DB	I	Inactive
Turkmenistan	CH-3	CASC	II	Active
UAE	Wing Loong 1	AVIC	III	Active
UAE	Wing Loong 2	AVIC	III	Active
Ukraine	Inspire	DJI	I	Active
Ukraine	Phantom	DJI	I	Active
Uruguay	Phantom	DJI	I	Active

NOTES

1. Richard D. Fisher Jr., “AAD 2018: China’s Blowfish I VTOL UAV enters service with PLAN,” IHS Jane’s Defence Weekly, September 21, 2018, <https://www.janes.com/article/83264/aad-2018-china-s-blowfish-i-vtol-uav-enters-service-with-plan>.
2. Ran Dagoni, “Harpy UAV compromise with US: No upgrades for China,” *Globes*, 25 May 2005, <https://en.globes.co.il/en/article-917406/>.
3. “中国步兵装备彩虹802无人机 可捕获几十公里内目标,” Sina News Agency, 11 April 2017, <http://mil.news.sina.com.cn/jssd/2017-04-11/doc-ifyeceza2085561.shtml>.
4. Greg Waldron, “Pictures: Schiebel Camcopter S-100 operated from Chinese frigate,” *Flight International*, 18 May 2012, <https://www.flightglobal.com/news/articles/pictures-schiebel-camcopter-s-100-operated-from-chinese-frigate-372045/>.
5. Zhao Lei, “‘Soar Dragon’ drone to strengthen PLA aerial capabilities,” *China Daily*, 6 December 2016, http://www.chinadaily.com.cn/china/2016-12/06/content_27591837.htm.
6. Andreas Rupprecht, *Modern Chinese Warplanes: Chinese Air Force - Aircraft and Units*, (Houston: Harpia Publishing, 2018), 214.
7. Elsa Kania, *The PLA’s Unmanned Aerial Systems: New Capabilities for the ‘New Era’ of Chinese Military Power*, China Aerospace Studies Institute, (China Aerospace Studies Institute, 2018), 19.
8. Lawrence “Sid” Trevethan, “*Brigadization*” of the PLA Air Force, (China Aerospace Studies Institute, 2018), 25.
9. Andreas Rupprecht, *Modern Chinese Warplanes: Chinese Air Force - Aircraft and Units*, (Houston: Harpia Publishing, 2018), 214.
10. Elsa Kania, *The PLA’s Unmanned Aerial Systems: New Capabilities for the ‘New Era’ of Chinese Military Power*, China Aerospace Studies Institute, (China Aerospace Studies Institute, 2018), 19.
11. Rupprecht_A (@RupprechtDeino), “GJ-1/WD-1K Wing Loong I assigned to the WTC UAV Brigade,” Twitter, 14 February 2019, <https://twitter.com/RupprechtDeino/status/1096079682125160449>.
12. Author conversation with Andreas Rupprecht.
13. Lawrence “Sid” Trevethan, “*Brigadization*” of the PLA Air Force, (China Aerospace Studies Institute, 2018), 38.
14. Elsa Kania and Kenneth Allen, “The Human and Organizational Dimensions of the PLA’s Unmanned Aerial Vehicle Systems,” *China Brief*, 11 May 2016, <https://jamestown.org/program/the-human-and-organizational-dimensions-of-the-plas-unmanned-aerial-vehicle-systems/>.

15. Elsa Kania, *The PLA's Unmanned Aerial Systems: New Capabilities for the 'New Era' of Chinese Military Power*, China Aerospace Studies Institute, (China Aerospace Studies Institute, 2018), 25-26.
16. Dan Gettinger, "An Act of War": Drones Are Testing China-Japan Relations," Center for the Study of the Drone, 8 November 2013, <http://dronecenter.bard.edu/act-war-drones-testing-china-japan-relations/>.
17. Japan Ministry of Defense, "推定中国機の東シナ海における飛行について," news release, 30 April 2018, http://www.mod.go.jp/js/Press/press2018/press_pdf/p20180418_01.pdf.
18. Ankit Panda, "South China Sea: China's Surveillance Drones Make it to Woody Island," *The Diplomat*, 1 June 2016, <https://thediplomat.com/2016/06/south-china-sea-chinas-surveillance-drones-make-it-to-woody-island/>.
19. Dafeng cao (@dafengcao), "Hainan Lingshui AB, 2 Soar Dragons UAV are being deployed alongside KJ-500 AEW&C, Y-8Q ASW airplanes," Twitter, 15 March 2018, <https://twitter.com/dafengcao/status/974457399581933569>.
20. Didi Kirsten Tatlow, "China said to Deploy Drones After Unrest in Xinjiang," *New York Times*, 19 August 2014, https://sinosphere.blogs.nytimes.com/2014/08/19/china-said-to-deploy-drones-after-unrest-in-xinjiang/?_php=true&_type=blogs&_r=0.
21. See page 290.
22. Henri Kenhmann, "CH-4: Comment un drone MALE est converti en lutte contre l'incendie," *East Pendulum*, 11 May 2017, <http://www.eastpendulum.com/ch-4-drone-male-converti-lutte-contre-lincendie>.
23. Chris Biggers, "Shigatse During the Doka La Standoff," *bellingcat*, 23 August 2017, <https://www.bellingcat.com/news/rest-of-world/2017/08/23/shigatse-doka-la-standoff/>.
24. "Soar Dragon UAVs Deploy to Yishuntun Airbase," *Offiziere*, 23 March 2018, <https://offiziere.ch/?p=33037>.
25. See page 292.
26. See page 289.
27. (@Rupprecht_A), "GJ-1/WD-1K Wing Loong I assigned to the WTC UAV Brigade," Twitter, 14 February 2019.
28. Kelvin Wong, "Tengden readies production-readu TB001 armed reconnaissance UAV," *Jane's International Defense Review*, 28 March 2019, <https://www.janes.com/article/87523/tengden-readies-production-ready-tb001-armed-reconnaissance-uav>.
29. "China-Politics-Rights-Religion-Xinjiang," Getty Images, 30 May 2019, <https://www.gettyimages.com/detail/news-photo/this-photo-taken-on-may-30-2019-shows-personnel-around-a-news-photo/1148120743>.
30. "Chinese serial CH-5 drone completes trial flight," *Defence Blog*, 15 July 2017, <https://defence-blog.com/news/chinese-serial-ch-5-drone-completes-trial-flight.html>.
31. Henri Kenhmann, "Le drone militaire CH-5 prend son envol," *East Pendulum (blog)*, 16 July 2017, <http://www.eastpendulum.com/le-drone-militaire-ch-5-prend-son-envol>.
32. "“彩虹” 无人机提升高原战力 刷新起降海拔高度记录," *China.com*, 6 June 2018, https://military.china.com/important/11132797/20180606/32485890_all.html.
33. Dan Gettinger (@gettdan), "Location of the Tengono TB001 test site is Liangping Airport in Chongqing province," Twitter, 12 October 2017, <https://twitter.com/gettdan/status/918585727541239809>.
34. 卫纳夜格@Rajl (@rajfortyseven), "#China in occupied #Tibet: #PLAAF #HALE #UAV #BZK005 with #GCS at #Gonggar #Lhasa. 8 km ceiling & >40 hours endurance provides more stand-off distance & continuous vision. China wants a closer & deeper look inside #India," Twitter, 22 February 2018, <https://twitter.com/rajfortyseven/status/966731251796160512>.
35. Henri Kenhmann, "Extrait d'une vidéo de CASIC Institut 302, qui montre pour la première fois le décollage et l'atterrissage du drone à aile volant "Tian Ying" (天鹰)," Twitter, 1 January 2019, <https://twitter.com/HenriKenhmann/status/1080140472868167681>.
36. See page 292.
37. See page 288.
38. See page 292.
39. See TKTK.
40. 小央视频, "翼龙无人机突然失联,外军开启雷达搜寻,飞机凭此技术自主返航 | 小央视频," YouTube, 29 March 2019, <https://www.youtube.com/watch?v=ZxsthrLACak>.
41. Kelvin Wong, "China's AVIC aims to roll out Wing Loong I-D in 2018," *Jane's International Defence Review*, 29 January 2018, <https://www.janes.com/article/77414/china-s-avic-aims-to-roll-out-wing-loong-i-d-in-2018>.
42. Greg Waldron, "AVIC's Wing Loong ID UAV takes flight," *FlightGlobal*, 26 December 2018, <https://www.flight-global.com/news/articles/avics-wing-loong-id-uav-takes-flight-454655/>.
43. "New Chinese twin-fuselage UAV revealed," *Defence Blog*, 3 July 2015, <http://defence-blog.com/news/new-chinese-twin-fuselage-uav-revealed.html>.
44. Sean O'Connor, "Divine Eagle UAV spotted at China's Malan Airbase," *Jane's Defence Weekly*, 14 November 2018, <https://www.janes.com/article/84585/divine-eagle-uav-spotted-at-china-s-malan-airbase>.
45. Wendell Minnick, "Zhuhai 2016: China reveals Cloud Shadow UAV," *Shephard Media*, 31 October 2016, <https://www.shephardmedia.com/news/uv-online/zhuhai-2016-china-reveals-cloud-shadow-uav-export/>.
46. "Airshow China: CAIC unveils armed variant of its AV500 UAV," *Air Recognition*, 9 November 2018, <http://www.airrecognition.com/index.php/archive-world-worldwide-news-air-force-aviation-aerospace-air-military-defence-industry/defense-security-exhibitions-news/air-show-2016/airshow-china-2016/3063-airshow-china-caic-unveils-armed-variant-of-its-av500-uav.html>.
47. "AVIC AV500W UAV completes FT-8D missile live-fire test," *Air Recognition*, 5 November 2018, <http://www.airrecognition.com/index.php/archive-world-worldwide-news-air-force-aviation-aerospace-air-military-defence-industry/global-defense-security-news/global-news-2018/november/4602-avic-av500w-uav-completes-ft-8d-missile-live-fire-test.html>.

48. “Chinese Top Unmanned Chopper Completes Night Drills, Military Service Eyed,” Global Times, 20 June 2019, <http://www.defense-unmanned.com/article/3524/chinese-top-unmanned-helicopter-completes-night-drills.html>.
49. Chen Chuanren, “New Chinese Company Shows Family of UAVs,” Aviation International Online, 6 October 2017, <https://www.ainonline.com/aviation-news/defense/2017-10-06/new-chinese-company-shows-family-uavs>.
50. Jeffrey Lin and P.W. Singer, “China’s new drone company is building a UAV with a 20-ton payload,” Popular Science, 23 January 2018, <https://www.popsoci.com/chinas-new-drone-company-has-big-plans>.
51. “China unveils stealth combat drone in development,” Associated Press, 7 November 2018, <https://www.cbc.ca/news/technology/china-combat-drone-1.4841792>.
52. Chen Chuanren, “China Shows Off UAV Capabilities at Zhuhai,” Aviation International Online, 9 November 2018, <https://www.ainonline.com/aviation-news/defense/2018-11-09/china-shows-uav-capabilities-zhuhai>.
53. Henri Kenhmann, “CASIC fait voler son nouveau drone furtif à aile volante,” East Pendulum, 12 February 2018, <http://www.eastpendulum.com/casic-fait-voler-son-nouveau-drone-furtif-a-aile-volante>.
54. Joseph Trevithick and Tyler Rogoway, “China’s Biggest Airshow Offers More Evidence Of Beijing’s Stealth Drone Focus,” The Drive, 2 November 2018, <http://www.thedrive.com/the-war-zone/24645/chinas-biggest-air-show-offers-more-evidence-of-beijings-stealth-drone-focus>.
55. East Pendulum (@HenriKenhmann), “Extrait d’une vidéo de CASIC Institut 302, qui montre pour la première fois le décollage et l’atterrissage du drone à aile volant “Tian Ying” (天鹰),” Twitter, 1 January 2019, <https://twitter.com/HenriKenhmann/status/1080140472868167681>.
56. Henri Kenhmann, “JY-300 : CETC fait voler son drone AEW aux radars conformes,” East Pendulum, 30 October 2018, <http://www.eastpendulum.com/jy-300-cetc-fait-voler-son-drone-ae-w-aux-radars-conformes>.
57. Kelvin Wong, “China’s FL-1 MALE UAV performs maiden flight,” Jane’s International Defence Review, 22 January 2019, <https://www.janes.com/article/85869/china-s-fl-1-male-uav-performs-maiden-flight>.
58. Alice Shen, “Chinese firm eyes overseas market as strike drone Yaoying-2 makes maiden flight,” South China Morning Post, 5 July 2018, <https://www.scmp.com/news/china/diplomacy-defence/article/2153963/chinese-firm-eyes-overseas-market-strike-drone-yaoying>.
59. Kelvin Wong, “China’s AVIC trials Venus solar-electric UAV,” Jane’s International Defence Review, 29 October 2018, <https://www.janes.com/article/84114/china-s-avic-trials-venus-solar-electric-uav>.
60. Cao Zinan, “China’s self-developed commercial drone Feihong-98 completes first test flight,” China Daily, 17 October 2018, <http://www.chinadaily.com.cn/a/201810/17/WS5bc6e5dea310eff303282ed8.html>.
61. “我军半百双翼机如今变身新款无人机，有望继续服役，延续传奇历史,” youUAV.com, 23 June 2019, <http://m.youuav.com/news/detail/201906/32701.html>.
62. Henri Kenhmann, “L’armée chinoise teste l’approvisionnement par un drone cargo,” East Pendulum, 24 June 2019, <http://www.eastpendulum.com/larmee-chinoise-teste-lapprovisionnement-par-un-drone-cargo>.
63. “Sea Cavalry SD-40 Maritime UAV,” Naval-Technology, accessed 18 April 2019, <https://www.naval-technology.com/projects/sea-cavalry-sd-40/>.
64. “汉飞鹰航空大兴安岭森林防火演示,” 81IT.com, 14 June 2018, <http://www.81it.com/2018/0614/8909.html>.
65. Richard D. Fisher Jr., “Chinese navy deploys new VTOL UAV,” Jane’s Defence Weekly, 5 March 2019, <https://www.janes.com/article/87009/chinese-navy-deploys-new-vtol-uav>.

INDIA

INVENTORY¹

Model	Make	Origin	Class	Intro	Qty	Operator	Notes
Spylite	Bluebird Aero	Israel	I	2019*	600	Army	
Harop	IAI	Israel	I	Late 1990s		Air Force	Loitering munition
Searcher Mk I	IAI	Israel	II	Late 1990s		Army, Navy, Air Force	

Searcher Mk II	IAI	Israel	II	Early 2000s	Navy, Air Force
Heron 1	IAI	Israel	III	2002	Navy, Air Force

ACTIVE ACQUISITIONS

- India is exploring the possibility of acquiring a number of GA-ASI MQ-9 Reapers from the United States. According to media reports in 2018, the acquisition is a strategic priority for Indian Defense Minister Nirmala Sitharaman. Indian officials have reportedly pressed U.S. diplomats to approve the sale of armed Reapers, in particular, which are subject to tighter U.S. export restrictions compared to unarmed drones.² The U.S. has also reportedly offered the Indian Navy the GA-ASI Guardian, a maritime variant of the Reaper.³ U.S.-India negotiations for the sale of Reapers or Reaper variants—armed or unarmed—remain unresolved as of this writing.
- In July 2018 the Ministry of Defense announced plans to acquire 1,800 Class I UAVs and create 600 Army squads for the operation of those systems.⁴ The Army awarded BlueBird a contract for an unknown number of BlueBird Spylite systems in September 2018.⁵ The Army decided on the Spylite after it performed favorably in high-altitude tests, a key requirement of the competition. BlueBird has partnered with Hyderabad-based Cyient Ltd. to manufacture and deliver the aircraft.⁶ More Army contracts for Class I drones are expected to follow, although it's not clear whether they will be for the Spylite or another system.

INACTIVE

Model	Make	Origin	Class	Period	Qty	Operator	Notes
Nishant ⁷	DRDO	India	II	2011-2015	4	Army	

PERSONNEL

AIR FORCE^{8,9}

Name	HQ	Type	Equipment	Activated
3001 Squadron, 34th Wing, Western Air Command	Bhatinda Air Force Station	D	Heron	2000
3002 Squadron, 41st Wing, South Western Air Command	Jaisalmer Air Force Station	D	Searcher	
3003 Squadron, 23rd Wing, Western Air Command	Jammu Air Force Station	D	Heron, Searcher	
3004 Squadron, 12th Forward Base Support Unit, South Western Air Command ¹⁰	Naliya Air Force Station	D	Heron	2004
3005 Squadron, 8th Forward Base Support Unit, Western Air Command	Awantipur Air Force Station	D	Heron	

AIR FORCE

Name	HQ	Type	Equipment	Activated
Indian Naval Air Squadron 342, Southern Naval Command ¹¹	INS Garuda	D	Heron, Searcher Mk II	2006
In August 2002, the Indian Navy established the Intensive Flying and Trials Unit at INS Garuda in 2002 to train pilots, sensor operators, and ground crews on the Heron and Searcher. The IFTU was formally activated as the 342nd Air Squadron in January 2006, becoming the Navy's first dedicated UAV formation.				
Indian Naval Air Squadron 343, Western Naval Command ¹²	INS Porbandar	D	Heron, Searcher Mk II	2011
Indian Naval Air Squadron 344, Eastern Naval Command ¹³	INS Parundu	D	Heron, Searcher Mk II	2012

OPERATIONS

- India has frequently deployed drones for border surveillance, particularly along its borders with China and Pakistan. In December 2017 an Indian Heron crashed on the Chinese side of the border near the Doklam Plateau, where India and China have competing territorial claims.¹⁴ The incident, which took place months after a standoff between Indian and Chinese personnel on the plateau, led China to protest the “air intrusion.” Meanwhile, Indian Herons have been deployed to at least four bases in northwest India—Tezpur Air Force Station in 2015, Bagdogra Air Force Station in 2017 (and possibly to this day), and Chabua Air Force Station in 2018, and Kumbhirgram Air Force Station in 2019.¹⁵ For years, Indian Herons have also been based at Leh, a city in the Himalayan Mountains near Aksai Chin, another border area that is disputed between China and India. Meanwhile, Indian Searcher Mk IIs have been deployed to Jaisalmer and Nal air bases along the border with Pakistan. In 2015 the Indian Navy dispatched a Heron and Searcher Mk II to Port Blair to monitor maritime traffic around the Andaman and Nicobar Islands.¹⁶
- India has also deployed drones for operations in Jammu and Kashmir province. Two Indian Air Force UAV squadrons are believed to be based in Jammu and Awantipora air force bases. In late 2016, following a period of particularly intense unrest, the Indian Air Force said that it was putting each of its bases in the region under drone surveillance.¹⁷ In November 2018 India's army chief said that it would not hesitate to use armed drones in the region, provided there was no significant public or international resistance to the idea.¹⁸
- In the early 2010s, Indian Air Force personnel and Herons participated in National Technological Research Organization operations against Maoist groups in central India.¹⁹

INFRASTRUCTURE

Name	Country	Latitude	Longitude	Affiliation	Activity	Notes
Indian Naval Station Garuda	India	9.941°N	76.275°E	Navy	HQ	
Porbandar Airport	India	21°38'55"N	069°39'26"E	Navy	HQ	

Indian Naval Station Paundu	India	09°19'26"N	78°58'22"E	Navy	HQ	
Awantipur Air Force Station	India	33°52'35"N	074°58'32"E	Air Force	HQ	
Leh Air Force Station	India	34°08'09"N	077°32'47"E	Air Force	HQ	
Jaisalmer Air Force Station	India	26°52'49"N	70°51'18"E	Air Force	HQ	
Chitradurga Aeronautical Test Range	India	14°23'17"N	076°34'16"E	DRDO	HQ	Rustom-2 test site
Jammu Air Force Station	India	32°41'21"N	074°50'15"E	Air Force	HQ	
Bhatinda Air Force Station	India	30°16'12"N	74°45'20"E	Air Force	Test site	
Chabua Air Force Station	India	27°27'44"N	095°07'05"E	Air Force	Deployment	Heron base in 2018
Kumbhirgram Air Force Station	India	24°54'47"N	092°58'43"E	Air Force	Deployment	Heron base in 2019

OTHER

Name	Country	Latitude	Longitude	Affiliation	Activity	Notes
Nal Air Force Station	India	28°04'14"N	73°12'25"E		Deployment	Searcher base 2017-2018 (status unclear)
Bagdogra Air Force Station	India	26°40'52"N	088°19'43"E		Deployment	Heron base beginning in 2017 (status unclear)
Tezpur Air Force Station	India	26°42'44"N	092°47'14"E		Deployment	Heron base in 2015

DEVELOPMENT

- The Rustom-2 is a Class III fixed-wing surveillance and reconnaissance drone under development by the Defense Research and Development Organization (DRDO). The Rustom-2, which features a twin-engine design, will be India's first domestically produced operational medium-altitude long-endurance system. The project was unveiled at the 2010 Aero India Show.²⁰ The Rustom-2 made its first flight in 2016 at the Chitradurga range, the principal test facility for the program.²¹ DRDO intends to produce 10 Rustom-2 aircraft to be delivered to the Indian armed forces by 2020.²²

NOTES

1. "SIPRI Arms Transfers Database," Stockholm Peace Research Institute, accessed 16 April 2019, <https://www.sipri.org/databases/armstransfers>.
2. Shishir Gupta, "Predator drones on top of Nirmala Sitharaman's agenda in US visit," *Hindustan Times*, 17 November 2018, <https://www.hindustantimes.com/india-news/predator-drones-on-top-of-nirmala-sitharaman-s-agenda-in-us-visit/story-YmBH9W7q74SLxhqf15kZbN.html>.
3. Mike Stone, "Exclusive: U.S. offers India armed version of the Guardian drone - sources," *Reuters*, 18 July 2018, <https://in.reuters.com/article/britain-airshow-india-drones/exclusive-u-s-offers-india-armed-version-of-guardian-drone-sources-idINKBN1K8207>.
4. Manu Pubby, "Defence Ministry all set to equip all infantry units with UAV squad," *Economic Times*, 14 July 2018, <https://economictimes.indiatimes.com/news/defence/defence-ministry-all-set-to-equip-all-infantry-units-with-uav-squad/articleshow/51387474.cms>.
5. Arie Egozi, "Indian Army Picks Spylite UAV," *FlightGlobal*, 5 September 2018, <https://www.flightglobal.com/news/articles/indian-army-picks-spylite-uav-451680/>.
6. "Looks like a Jet, but it's a Drone," *Times of India*, 11 February 2019, <https://timesofindia.indiatimes.com/city/hyderabad/looks-like-a-jet-but-its-a-drone/articleshow/67946424.cms>.
7. Manu Pubby, "DRDO's two-decade-old Nishant UAV programme crashes; Indian Army cancels further orders," *Economic Times*, 14 July 2018, <https://economictimes.indiatimes.com/news/defence/drdo-two-decade-old-nishant-uav-programme-crashes-indian-army-cancels-further-orders/articleshow/49809095.cms>.
8. "UAV Squadrons," Bharat Rakshak, accessed 21 November 2018, <http://www.bharat-rakshak.com/IAF/units/others/288-uav-squadrons.html>.
9. "Commodore Commandants," Indian Air Force, accessed 9 March 2019, <http://indianairforce.nic.in/content/commodore-commandants>.
10. Ministry of Defence, "IAF Showcases Impressive Parade, Air Show on Air Force Day," press release, 8 October 2010, <http://pib.nic.in/newsite/erecontent.aspx?relid=66244>.
11. "INS 342 - The Flying Sentinels," Indian Navy, accessed 20 November 2018, <https://www.indiannavy.nic.in/content/uav>.
12. "INS 343 - The Frontier Formidables," Indian Navy, accessed 20 November 2018, <https://www.indiannavy.nic.in/content/uav-0>.
13. "Indian navy commissions third UAV squadron," UPI, 12 April 2012, <https://www.upi.com/Indian-navy-commissions-third-UAV-squadron/54231334235856/>.
14. Rajat Pandit and Saibal Dasgupta, "Indian Army's UAV crashes in Tibet, China protests 'air intrusion,'" *Times of India*, 8 December 2017, <https://timesofindia.indiatimes.com/india/indian-armys-uav-crashes-in-tibet-china-expresses-strong-dissatisfaction-over-air-intrusion-into-its-territory/articleshow/61969559.cms>.
15. See pages 296-298.
16. Chris Biggers, "India Increased Air Assets at Port Blair Prior to 2016," *Offiziere.ch* (blog), 6 May 2016, <https://offiziere.ch/?p=27046>.
17. Jugal R. Purohit, "IAF's Western Air Command places all bases under drone surveillance," *India Today*, 10 September 2016, <https://www.indiatoday.in/india/story/western-air-command-indian-air-force-drones-surveillance-340357-2016-09-10>.
18. Raghu Karnad, "We can use strike drones in J&K if people will accept collateral damage: Army Chief," *The Wire*, 28 November 2018, <https://thewire.in/security/we-can-use-strike-drones-in-jk-if-people-will-accept-collateral-damage-army-chief>.
19. Jugal Purohit, "Drone pulled out mid-air while Sukma ops were on, CRPF complains to MHA," *India Today*, 2 December 2014, <https://www.indiatoday.in/india/story/crpf-sukma-operation-maoists-surveillance-uav-ministry-of-home-affairs-229527-2014-12-02>.
20. Neelam Mathews, "India's Own MALE UAV To Fly Soon," *Aviation International Online*, 5 November 2015, <https://www.ainonline.com/aviation-news/defense/2015-11-05/indias-own-male-uav-fly-soon>.
21. "First Flight For Rustom II - India's MALE Drone," *Defense Update*, 18 November 2016, https://defense-update.com/20161118_rustom2.html.
22. "Rustom-2 drone to be delivered to armed forces by 2020: DRDO Chief," *Indian Express*, 26 May 2018, <https://indianexpress.com/article/india/rustom-2-drone-to-be-delivered-to-armed-forces-by-2020-drdo-chief-s-christopher-5191487/>.

INDONESIA

INVENTORY	Model	Make	Origin	Class	Intro	Qty	Operator	Notes
	Aerostar ¹	Aeronautics	Israel	II	2013	4	Air Force	
	ScanEagle ²	Insitu	USA	I	2018	6	Navy	
	ScanEagle 2 ³	Insitu	USA	I	2022	6		
	PUNA Wulung ⁴	BPPT/PTDI	Indonesia	II	2018	3	Air Force	
	V-200 ⁵	UMS Skeldar	Sweden	II	2017	1	Navy	Trial platform
	F-330 ⁶	UMS Skeldar	Sweden	I	2016	3	Army	“Rajawali-330”

ACTIVE ACQUISITIONS

- The Indonesian Air Force is seeking to acquire a strike-capable Class III medium-altitude long-endurance drone. In February 2018 the Ministry of Defense announced that Indonesia would acquire four AVIC Wing Loong 1s from China.⁷ However, the contract was cancelled and the acquisition process re-started in November 2018 following domestic criticism that it did not involve Indonesian companies.⁸ Turkish Aerospace Industries has partnered with PT Dirgantara Indonesia to offer the Anka for the program.⁹

INACTIVE

Model	Make	Origin	Class	Intro	Qty	Operator	Notes
Fox AT-1 ¹⁰	CAC Systems	France	I	2004	4		

PERSONNEL

AIR FORCE

Name		HQ	Type	Equipment	Activated
51st Air Squadron, 7th Air Wing ¹¹	<i>Skadron Udara 51, Wing Udara 7</i>	Supadio International Airport	D	Aerostar, Wulung	2015

NAVY

Name		HQ	Type	Equipment	Activated
700th Air Squadron, 1st Air Wing ¹²	<i>Skadron Udara 700</i>	Juanda Surabaya	D	ScanEagle	2018

OPERATIONS

- In late 2016, the Indonesian Air Force announced that it planned to deploy drones to Indonesia's border with the Democratic Republic of East Timor to combat smuggling, though the length and scope of this operation is not clear.¹¹
- In early 2017, the Air Force deployed drones to Tarakan City Air Force Base to monitor the border with Malaysia.¹²

INFRASTRUCTURE

Name	Country	Latitude	Longitude	Affiliation	Activity	Notes
Supadio International Airport	Indonesia	00°09'02"S	109°24'14"E	51st Sqn	HQ	

NOTES

1. "SIPRI Arms Transfers Database," Stockholm Peace Research Institute, accessed 16 April 2019, <https://www.sipri.org/databases/armstransfers>.
2. Ridzwan Rahmat, "Indonesian Navy to receive four ScanEagle UAVs in 2018," *Jane's Navy International*, 23 February 2018, <http://www.janes.com/article/78118/indonesian-navy-to-receive-four-scaneagle-uavs-in-2018>.
3. "Malaysia, Indonesia to Receive Six ScanEagle 2 UAS Each From Washington," *DefenseWorld.Net*, 1 May 2019, https://www.defenseworld.net/news/24703/Malaysia__Indonesia_To_Receive_Six_ScanEagle_2_UAS_Each_from_Washington.
4. Rangga Baswara Sawiyya, "Mengamati PUNA Wulung di PTDI, Sang Elang Pengawas dari Langit," *Angkasa Review*, 24 July 2018, <http://www.angkasareview.com/2018/07/24/mengamati-puna-wulung-di-ptdi-sang-elang-pengawas-dari-langit/>.
5. UMS Skeldar, "UMS Skeldar announces first customer with delivery of the SKELDAR V-200 to the Republic of Indonesia," news release, 16 February 2017, <https://umsskeldar.aero/ums-skeldar-announces-first-customer-delivery-skeldar-v-200-republic-indonesia/>.
6. Maki Catama, "Indonesian Army acquires three Rajawali UAVs," *AMDR*, February 2016, <http://www.aseanmil-def.com/2016/02/indonesian-army-acquires-three-rajawali.html>.
7. Ridzwan Rahmat, "Indonesia acquires four Wing Loong I UAVs from China," *Jane's Defence Weekly*, 25 February 2018, <http://www.janes.com/article/78147/indonesia-acquires-four-wing-loong-i-uavs-from-china>.
8. Ridzwan Rahmat, "Indo Defence 2018: Indonesia restarts acquisitions of MALE UAVs, passive surveillance system," *Jane's Defence Weekly*, 11 November 2018, <https://www.janes.com/article/84508/indo-defence-2018-indonesia-restarts-acquisitions-of-male-uavs-passive-surveillance-system>.
9. Tony Osborne, "Turkish Aerospace Industries Offering Anka UAV to Indonesia," *Aviation Week*, 15 August 2018, <http://aviationweek.com/awindefence/turkish-aerospace-offering-anka-uav-indonesia>.
10. "Fox AT-1: Flight Drone Intai Pertama Di Indonesia," *IndoMiliter*, 7 November 2018, <https://www.indomiliter.com/fox-at-1-flight-drone-intai-pertama-di-indonesia/>.
11. "Peresmian Skadron UAV TNI AU," *JakartaGreater*, 14 July 2015, <https://jakartagreater.com/peresmian-skadron-uav-tni-au/>.
12. Ridzwan Rahmat, "Indonesian Navy to establish new unmanned aviation squadron," *Jane's Navy International*, 12 July 2018, <http://www.janes.com/article/81719/indonesian-navy-to-establish-new-unmanned-aviation-squadron>.
13. "Drone TNI AU akan Berpatroli di Atambua," *Republika.co.id*, 3 October 2016, <https://www.republika.co.id/berita/nasional/daerah/16/10/04/oeivg3284-drone-tni-au-akan-berpatroli-di-atambua>.
14. Dadu Kamil, "Skadron Udara 51 Selesaikan Tugas di Luar Home-Base," *Militer.or.id*, 7 August 2017, <https://www.militer.or.id/3539/skudron-udara-51-selesaikan-tugas-di-luar-home-base/>.

JAPAN

INVENTORY

Model	Make	Origin	Class	Intro	Qty	Operator	Notes
ScanEagle ¹	Insitu	USA	I	2013	4	Army	
SkyRanger ^{2,3}	Aeryon	USA	I	2018		Army	
JUXS-S1 ⁴	Hitachi	Japan	I	2011		Army	
FFOS/ FFRS ⁵	Fuji Heavy Industries	Japan	II	2004		Army	FFOS updated to FFRS in 2006
RQ-4 Global Hawk ⁶	Northrop Grumman	USA	III	2020	3	Air Force	

ACTIVE ACQUISITIONS

- In its 2018 Mid-Term Defense Plan, Japan's Ministry of Defense outlined new efforts to acquire ship-board unmanned aircraft, potentially for eventual deployment on board a new class of multipurpose destroyers, within the next five years.⁷

INACTIVE

Model	Make	Origin	Class	Period	Qty	Operator	Notes
RMAX	Yamaha	Japan	I	2004-2006		Army	Probably inactive (status unclear)



(Left) The Central Army's FFRS at the Itami Garrison in 2017 (Top) The JUXS-S1 at the Itami Garrison in 2016.
Images credit: Hunini/Wikimedia

PERSONNEL

ARMY

Name		HQ	Type	Equipment	Activated
Central Unmanned Aerial Vehicle Unit, Central Army Military Intelligence, Central Army ^{8,9}	中部方面無人偵察機隊, 中部方面情報隊, 中部方面隊	Imazu Garrison	D	FFOS/FFRS	2008
Western Unmanned Aerial Vehicle Unit, Western Army Military Intelligence, Western Army ^{10, 11}	西部方面無人偵察機隊, 西部方面情報隊, 西部方面隊	Iizuka Garrison	D	FFOS/FFRS, ScanEagle	
Northern Unmanned Aerial Vehicle Unit, Northern Army Military Intelligence, Northern Army ^{12,13}	北部方面無人偵察機隊, 北部方面情報隊, 北部方面隊	Shizunai Garrison	D	FFOS/FFRS	
101st Target Drone Unit, 4th Anti-Aircraft Artillery Group, 1st Anti-Aircraft Artillery Brigade, Northern Army ¹⁴	第101無人標的機隊, 第4高射特科群, 第1高射特科団, 北部方面隊	Shizunai Garrison	D		
The 101st Target Drone Unit provides target drones for anti-aircraft artillery practice. It was known as the 101st UAV Unit (第101無人偵察機隊) until June 2019, when it was redesignated the 101st Target Drone Unit (第101無人標的機隊). ¹⁵					

OPERATIONS

Country	Base	Equipment	Period	Operation
Iraq		RMAX	2006	
The Self Defense Forces deployed the RMAX with the Japanese Iraq Reconstruction and Support Group, a humanitarian mission to Samarra, Iraq. ¹⁶ The drone was used to provide base perimeter security.				

DEVELOPMENT

- In the mid-1990s, the Japan Air Self Defense Forces began working on a high-speed, air-launched, multi-role drone known as the TACOM (an acronym based on the Japanese designation, 無人機研究システム), awarding Fuji Heavy Industries (Subaru) a contract in 1995 to develop a prototype system. The TACOM was designed to accompany manned fighter aircraft into combat, similar to the “loyal wingman” concept that is currently the subject of research projects in several countries. The JASDF began flight testing of initial prototypes in the early 2000s. Work on a new variant began in 2004 and continued into the early 2010s. In 2016, the Ministry of Defense announced that it was developing a

family of “loyal wingman” drones known as the Combat Support Unmanned Aircraft (戦闘支援無人機). These drones would fly ahead of fighters, serving as reconnaissance, attack, and decoy platforms for their manned counterparts. As of the 2016 plan, the MoD expects to be able to field these drones in the 2030s.



(Left) A TACOM demonstrator vehicle at Gifu Air Base in 2008. Credit: Hunini/Wikimedia. (Right) A TACOM demonstrator vehicle at Gifu Air Base in 2015. Credit: Hunini/Wikimedia

NOTES

1. “JGSDF to receive ScanEagle UAS from Insitu Pacific,” Army Technology, 14 May 2013, <https://www.army-technology.com/news/newsjgsdf-to-receive-scaneagle-uas-from-insitu-pacific/>.
2. “写真で振り返る2018年新装備,” 北大路機関 (blog), 31 December 2018, <https://blog.goo.ne.jp/harunakurama/e2dbb9c57fd4671d6b87e81efc90e37a>.
3. Ministry of Defense, “10師団だより,” presentation, July 2018, https://www.mod.go.jp/gsdf/mae/10d/top/tayori/h30/2018_07.pdf.
4. S. Ikonoza, F. Otsu, T. Furukawa, and N. Sato, “Small unmanned aerial vehicle system for advanced information gathering,” (2013), 209-213.
5. “陸自の無人偵察機 全長3・8 mの機体が3時間超もノーリスクで敵情視察いざという時は自爆も,” *Sankei Shimbun*, 29 June 2016, <https://www.sankei.com/premium/news/160629/prm1606290003-n1.html>.
6. Lara Seligman, “US Approves \$1.2B Global Hawk Sale to Japan,” Defense News, 23 November 2015, <https://www.defensenews.com/pentagon/2015/11/23/us-approves-1-2b-global-hawk-sale-to-japan/>.
7. Mike Yeo, “Japan seeks drones, subs F-35 jets as part of \$243 billion defense procurement plan,” Defense News, 19 December 2018, <https://www.defensenews.com/global/asia-pacific/2018/12/19/japan-seeks-drones-subs-f-35-jets-as-part-of-243-billion-defense-spending-plan/>.
8. “陸自の無人偵察機 全長3・8 mの機体が3時間超もノーリスクで敵情視察いざという時は自爆も,” *Sankei Shimbun*, 29 June 2016, <https://www.sankei.com/premium/news/160629/prm1606290003-n1.html>.
9. “中部方面区内各駐屯地主要所在部隊,” Japan Ground Self Defense Force, accessed June 2019, <https://www.mod.go.jp/gsdf/mae/MAsyokai/syozaitai.html>.
10. “情報隊総合訓練 【西部方面無人偵察機隊】,” 飯塚駐屯地広報誌, January 2018, <https://www.mod.go.jp/gsdf/iizuka/IIZUKAHP/tikuhou1.pdf>.
11. “飯塚駐屯地,” Japan Ground Self Defense Force, accessed June 2019, <https://www.mod.go.jp/gsdf/station/wa/iizuka.html>.
12. “静内駐屯地,” Japan Ground Self Defense Force, accessed June 2019, <https://www.mod.go.jp/gsdf/station/na/shizunai.html>.
13. “静内駐屯地創立記念に行ってきました。,” Minkara (blog), 16 July 2017, <https://minkara.carview.co.jp/user-id/240974/blog/40104355/>.
14. Ministry of Defence, “方面隊、新体制で始動 - 防衛省・自衛隊,” June 2019, <https://www.mod.go.jp/gsdf/nae/katudou/akasiya/2019/753.pdf>.
15. Ibid
16. 神田 英宣, “UAV の開発・運用動向と日本の安全保障,” *Bulletin of the National Institute for Defense Studies*, (2013), 25-48.
17. Hirofumi Doi, “TACOM - Air-Launched Multi-Role UAV,” paper presented at the 24th International Congress of the Aeronautica Sciences, 2004.
18. Ministry of Defense, “無人機の試験技術について - 防衛省・自衛隊,” presentation, 2012, <https://www.mod>.

go.jp/atla/research/dts2012/R3-5p.pdf.

19. Bradley Perrett, “Unmanned Wingmen for Japan’s Pilot Force Planned for 2030s,” *Aviation Week & Space Technology*, 23 September 2016, https://aviationweek.com/defense/unmanned-wingmen-japan-s-piloted-force-planned-2030s?NL=AW-05&Issue=AW-05_20161004_AW-05_221&sfvc4enews=42&cl=article_1&utm_rid=CPEN1000002485151&utm_campaign=7231&utm_medium=email&elq2=f201e8666dfb4defbc38dadc-dale9a06.

MALAYSIA

INVENTORY

Model	Make	Origin	Class	Intro	Qty	Operator	Notes
ScanEagle ¹	Insitu	USA	I	2013*	5 (1)	Army	Leased
ScanEagle 2 ²	Insitu	USA	I	2019	12	Navy	
Fulmar ³	Thales	Spain	I	2017	6	Coast Guard	
Aludra Mk.1 ⁴	CTRM	Malaysia	II	2008		Air Force	Leased
Aludra Mk.2 ⁵	CTRM	Malaysia	II	Early 2010s		Air Force	Leased
Camcopter S-100	Schiebel	Austria	II	2016	2	General Staff	Leased

ACTIVE ACQUISITIONS

- Under the the Royal Malaysian Air Force’s Capability 2055 modernization program, the Air Force is exploring the possibility of acquiring medium-altitude long-endurance drones for maritime surveillance.⁶ The RMAF is believed to be evaluating three aircraft—the TAI Anka, GA-ASI Sea Guardian, and AVIC Wing Loong 1—for the program.^{7,8} In a March 2019 interview, the head of the RMAF said that procuring a MALE UAV was a top priority.⁹

PERSONNEL

NAVY

Name	HQ	Type	Equipment	Activated
UAS Unit ¹⁰	TLDM Base Kota Kinabalu	D	ScanEagle	2019

In April 2019, the Navy announced that it will stand up a UAS Unit at TLDM Base Kota Kinabalu in 2019 to operate the ScanEagle.¹¹ The unit is expected to achieve full operational capability in 2020.

GENERAL STAFF

Name	HQ	Type	Equipment	Activated
UAS Team, Defense Staff Intelligence Division ¹²	<i>Tim UAS, Bahagian Staf Perisikan Pertahanan</i>	D	Camcopter S-100	

COAST GUARD

- The Malaysian Maritime Enforcement Agency—Malaysia's coast guard—acquired the Fulmar X for the New Generation Patrol Craft (NGPC) program. The first NGPC was launched in March 2017.¹³ The MMEA intends to field a total of six NGPC vessels, each equipped with a small number of drones.

DEVELOPMENT

- The Aludra Camar is a Class I fixed-wing drone developed by DRB-HICOM Defense Technologies (Deftech) with Universiti Teknologi Malaysia. It is expected to have a 4-meter-long wingspan and maximum take-off weight of 40 kilograms. A scale model was unveiled at the DSA 2018 defense expo.¹⁴

NOTES

1. Beth Stevenson, "DSA12: Insitu signs Malaysian ScanEagle deal," *Shephard Media*, 19 April 2012, <https://www.shephardmedia.com/news/uv-online/dsa12-insitu-signs-malaysian-scanegale-deal/>.
2. Dzirhan Mahadzir, "Malaysia lays groundwork for ScanEagle 2 arrival," *Shephard Media*, 13 November 2018, <https://www.shephardmedia.com/news/uv-online/malaysia-lays-groundwork-scanegale-2-arrival/>.
3. "Thales Fulmar UAS deliveries underway to Malaysian Coast Guard," *Air Forces Monthly*, 6 April 2017, <https://airforcesmonthly.keypublishing.com/2017/04/06/thales-fulmar-uas-deliveries-underway-to-malaysian-coast-guard/>.
4. Guy Martin, "Asian Region UAV Capability on the Rise," *Defence Review Asia*, 20 December 2012, <https://www.defencereviewasia.com/articles/195/Asian-region-UAV-capability-on-the-rise>.
5. Ibid
6. Martin Carvalho, "Mat Sabu: RMAF looking to boost maritime surveillance assets to monitor shipping routes," *The Star Online*, 9 August 2018, <https://www.thestar.com.my/news/nation/2018/08/09/mat-sabu-rmaf-looking-to-boost-maritime-surveillance-assets-to-monitor-shipping-routes/>.
7. Jon Grevatt, "DSA 2018: Korean Air and Deftech look to co-produce unmanned systems," *Jane's Defence Industry*, 17 April 2018, <https://www.janes.com/article/79333/dsa-2018-korean-air-and-deftech-look-to-co-produce-unmanned-systems>.
8. Gabriel Dominguez, "DSA 2018: TAI offers Anka MALE UAV to Southeast Asian countries," *Jane's Defence Weekly*, 17 April 2018, <https://www.janes.com/article/79345/dsa-2018-tai-offers-anka-male-uav-to-southeast-asian-countries>.
9. Chen Chuanren, "Malaysia: Maritime Surveillance, UAV, Radars, LCA Are Priority," *Aviation International Online*, 13 March 2019, <https://www.ainonline.com/aviation-news/defense/2019-03-13/malaysia-maritime-surveillance-uav-radars-lca-are-priority>.
10. Royal Malaysian Navy, "Unmanned Aerial Systems (UAS) TLDM, Program Terbaru TLDM Dalam Usaha Peningkat Keselamatan Maritim," news release, 21 November 2018, <http://www.navy.mil.my/index.php/en/information/news/main/item/4873-unmanned-aerial-systems-uas-tldm-program-terbaru-tldm-dalam-usaha-peningkat-keselamatan-maritim>.
11. Zam Yusa, "First drone unit by Oct," *Daily Express*, 28 April 2019, <http://www.dailyexpress.com.my/news/134531/first-drone-unit-by-oct/>.
12. "Pra Eksesais Pahlawan Peringkat Rejimen Perhubungan Strategik," Malaysian Armed Forces Headquarters, last modified 22 July 2019, <http://apps.mafhq.mil.my/index.php/my/berita/komlek-atm/850-pra-eksesais-pahlawan-peringkat-rejimen-perhubungan-strategik>.

13. Hariz Mohd, "MMEA gets its fastest, most sophisticated vessel in KM Bagan Datuk," *New Straits Times*, 15 March 2017, <https://www.nst.com.my/news/2017/03/220977/mmea-gets-its-fastest-most-sophisticated-vessel-km-bagan-datuk>.
14. Gabriel Dominguez, "DSA 2018: Malaysia's Deftech showcases Aludra Camar surveillance UAV," *Jane's Defence Weekly*, 18 April 2018, <https://www.janes.com/article/79389/dsa-2018-malaysia-s-deftech-showcases-aludra-camar-surveillance-uav>.

MYANMAR

INVENTORY

- Myanmar has reportedly acquired several CASC CH-3As from China, although there is not much evidence of this acquisition or that these aircraft remain active. Photos published online in 2015 showed several CH-3As parked outside of hangar at Meiktila Air Force Base in central Myanmar.¹ Media reports in 2016 suggested that Myanmar may have deployed the CH-3A to counterinsurgency operations in its northeastern provinces.² These reports were based in part on a widely-circulated cell-phone photograph purportedly taken in Myanmar showing a CH-3A parked on a runway.³

Model	Make	Origin	Class	Intro	Qty	Operator	Notes
CH-3A	CASC	China	II	2014*	4+		(status unclear)

*Estimate

INFRASTRUCTURE

OTHER

Name	Country	Latitude	Longitude	Affiliation	Activity	Notes
Meiktila Air Force Base	Myanmar	20°56'46"N	95°55'11"E	Air Force		Site of 2015 photos of CH-3A (status unclear)

NOTES

- Tarpitz, "Myanmar acquired CH 3A UCAVs from China," Pakistan Defence Forum, 13 November 2015, <https://defence.pk/pdf/threads/myanmar-acquired-ch-3a-ucavs-from-china.408227/>.
- Ankit Panda, "Is Myanmar Using Armed Chinese Drones for Counterinsurgency?," *The Diplomat*, 9 June 2016, <https://thediplomat.com/2016/06/is-myanmar-using-armed-chinese-drones-for-counterinsurgency/>.
- "China's armed CH-3 drone spotted in Myanmar," Defence Blog, 31 May 2016, <https://defence-blog.com/news/chinas-armed-ch-3-drone-spotted-in-myanmar.html>.

NEW ZEALAND

INVENTORY

Model	Make	Origin	Class	Intro	Qty	Operator	Notes
Mavic Pro ¹	DJI	China	I	2017	26	Army	
Phantom ²	DJI	China	I	2017		Army	
SkyRanger ³	Aeryon	Canada	I			Army	Probable trial system
Instant-Eye ⁴	Physical Sciences	USA	I			Army	Probable trial system
Night-Hawk IV ⁵	ARA Robotics	Canada	I			Army	Probable trial system
BlackHornet ⁶	FLIR	USA	I			Special Forces	In service with the NZ Special Air Service

ACTIVE ACQUISITIONS

- The Joint Remotely Piloted Aircraft Systems (Joint RPAS) project is a plan to acquire Class I UAVs for the Army and Navy. The New Zealand Defence Forces intend to introduce these systems by 2021.^{7,8}
- In the *Defence Capability Plan 2019*, the New Zealand Ministry of Defence laid out a plan to acquire long-range unmanned aircraft systems by the 2030s.⁹ These aircraft will be used to provide sustained surveillance capabilities for both ground and maritime forces. Though the MoD did not specify the exact type of UAV it intends to acquire, it will likely be some type of Class III UAV based on the description of desired capabilities.

INACTIVE

Model	Make	Origin	Class	Period	Qty	Operator	Notes
Kahu ¹⁰	Skycam	New Zealand	I	2006-2011		Army	

PERSONNEL

- The School of Aviation at Massey University in Palmerston, New Zealand offers a three-day training program, the RPAS Operators Course, to familiarize New Zealand Defense Forces personnel with drone

operations. As of early 2018, over 100 Army personnel had taken the course, earning the RPAS “wings” certification.¹¹

NOTES

1. Kurt Bayer, “NZDF has no plans to ground drones banned by US military allies over cyber-safety fears,” *NZ Herald*, 2 March 2018, https://www.nzherald.co.nz/nz/news/article.cfm?c_id=1&objectid=12005158.
2. Ibid
3. New Zealand Defence Force, Defense Technology Agency, *Integration of NZDF Remotely Piloted Aircraft Systems (RPAS) into New Zealand Civil Airspace*, (DTA Report 430), By James M. Pointon, 2018, <https://www.dta.mil.nz/assets/publication/a2a9062112/Report430.pdf>.
4. Ibid
5. Ibid
6. Ibid
7. Ibid
8. Brian Oliver, “Military Drones: Does New Zealand Need Them?,” *Journal of the Royal New Zealand Air Force*, Volume 4 (2018): 29-40, http://www.airforce.mil.nz/downloads/pdf/apdc/rnzaf_journal_2018_web.pdf.
9. Stacey Kirk, “NZ military \$20b shopping list: Planes, boats, soldiers, satellites and drones,” *Stuff.co.nz*, 11 June 2019, <https://www.stuff.co.nz/national/politics/113363745/nz-military-20b-shopping-list-planes-boats-soldiers-satellites-and-drones>.
10. “No plans to buy drones - NZDF,” *RNZ*, 12 December 2014, <https://www.radionz.co.nz/news/national/261591/no-plans-to-buy-drones-nzdf>.
11. “Taking to the Skies: Army RPAS Project Update,” New Zealand Defence Forces, accessed 3 December 2018, <http://army.mil.nz/downloads/pdf/army-news/armynews-489-remote-piloted-aircraft-systems.pdf>.

NORTH KOREA

INVENTORY

- North Korea has a fleet of between several hundred and one thousand domestically-produced variants of imported Class I unmanned aircraft, according to some estimates.¹ In a 2014 analysis by 38 North, a U.S. research center, this fleet is likely comprised of seven different models: variants of the U.S. MQM-107D Streaker, the Russian Pchela-1T and DR-3, Chinese Sky-09Ps, the Panghyon I and II, and an unidentified drone.² It’s difficult to know how many of these systems—some of which date to the Cold War—remain operational. The following table is based on images of North Korean drones that the DPRK has displayed at military parades or that have crashed in South Korea.

Model	Make	Origin	Class	Intro	Qty	Operator	Notes
Sky-09P ³	Taiyuan	China	I				
ASN-104	Xi’an ASN Technology Group	China	I				“Panghyon-1” “Panghyon-2”
UV-10CAM	Microfly	China	I				

OPERATIONS

- Between 2013 and 2017, North Korean drones conducted numerous surveillance flights inside South Korean airspace. In early 2014 South Korean authorities recovered the remains of what appeared to be North Korean variants of the Chinese Sky-09P and UV-10CAM UAVs in Samcheok, South Korea.⁴ In 2015 and 2016, South Korea detected several more North Korean drone incursions.⁵ A crashed UV-10CAM was discovered on a mountainside near Inje in 2017.⁶ Several of the drones that crashed in South Korea over the years were found to have captured images of a number of sensitive sites, including the South Korean presidential residence, several military installations, and the U.S.-operated Terminal High Altitude Area Defense missile system. South Korea announced in 2017 that it had developed a radar system designed specifically to detect intruding drones.⁷

NOTES

- “N.K. estimated to have some 1,000 drones: report,” *Yonhap News Agency*, 29 March 2017, <https://en.yna.co.kr/view/AEN20170329002100315>.
- Joseph S. Bermudez Jr., “North Korea Drones On,” 38 North (blog), 1 July 2014, https://www.38north.org/2014/07/jbermudez070114/#_ftn25.
- Martyn Williams, “North Korea’s drones: Made in China?,” North Korea Tech (blog), 20 April 2014, <https://www.northkoreatech.org/2014/04/20/north-koreas-drones-made-in-china/>.
- Chico Harlan, “Reputed North Korean drones worry officials in the South,” *Washington Post*, 11 April 2014, https://www.washingtonpost.com/news/worldviews/wp/2014/04/11/reputed-north-korean-drones-worry-officials-in-the-south/?utm_term=.ed4a4e07464c.
- Franz-Stefan Gady, “North Korea Flew a Spy Drone Across the DMZ,” *The Diplomat*, 4 September 2015, <https://thediplomat.com/2015/09/north-korea-flew-a-spy-drone-across-the-dmz/>.
- Matt Stiles, “As the world focuses on its nuclear ambitions, North Korea deploys another weapon: Drones,” *Los Angeles Times*, 28 June 2017, <https://www.latimes.com/world/asia/la-fg-north-korea-drone-2017-story.html>.
- Elizabeth Shim, “South Korea to deploy new radar to detect North Korea drones,” *UPI*, 14 July 2017, https://www.upi.com/Top_News/World-News/2017/07/14/South-Korea-to-deploy-new-radar-to-detect-North-Korea-drones/1571500045578/

PAKISTAN

INVENTORY

Model	Make	Origin	Class	Intro	Qty	Operator	Notes
ScanEagle ¹	Insitu	USA	I	2016		Navy	
Falco ²	Leonardo	Italy	II	2009		Air Force	
LUNA ³	EMT	Germany	I	2013	8	Army, Navy	
Burraq ⁴	NESCOM, CASC	Pakistan, China	II	2013		Air Force	Based on the CASC CH-3
Shahpar ⁵	GIDS	Pakistan	II	2013		Air Force	

Uqab ⁶	GIDS	Pakistan		2013		Army, Navy	
Wing Loong 1 ⁷	AVIC	China	III	2016	1-2	Air Force	Test platform

ACTIVE ACQUISITIONS

- According to an October 2018 media report, Pakistan and China have agreed to jointly produce an undisclosed number of Chinese AVIC Wing Loong 2 aircraft at Pakistan Aeronautical Complex Kamra.⁸ The Pakistani government has not officially confirmed the deal.

PERSONNEL

AIR FORCE

Name	HQ	Type	Equipment	Activated
1 UAV Flight ⁹		D	Falco, Burraq, Shahpur	2008

NAVY

Name	HQ	Type	Equipment	Activated
UAV Squadron ⁹	PNS Mehran	D	Uqab, ScanEagle	2011

OPERATIONS

- The Pakistan Air Force has reportedly deployed drones for counterterrorism operations in northwest Pakistan. In September 2015, the PAF claimed to have launched its first drone strike, killing three militants in the Shawal Valley. It is unclear whether these operations have continued since that time.¹⁰

INFRASTRUCTURE

Name	Country	Latitude	Longitude	Affiliation	Activity	Notes
M.M. Alam Air Base	Pakistan	32°33'47"N	71°34'15"E	Air Force	Test site	Wing Loong test site
Mushaf Air Base	Pakistan	32°02'55"N	72°39'55"E	Air Force	Deployment	Falco base

Murid Air Base	Pakistan	32°54'36"N	72°46'26"E	Air Force	Deployment	Shahpar and/or Burraq base

DEVELOPMENT

- A Pakistan Air Force modernization program known as Project Azm includes an effort to develop a medium-altitude long-endurance unmanned aircraft.¹¹ A January 2018 promotional video for PAC featured one possible design for the system. The status of this project is not clear as of this writing.¹²

NOTES

1. Tariq Moin Siddiqui, "Pakistan Navy Inducts ATR aircraft and Boeing ScanEagle UAV," *Geo.Tv*, 31 August 2016, <https://www.geo.tv/latest/113064-Pakistan-Navy-inducts-ATR-aircraft-and-Scaneagle-UAV-in-fleet>.
2. Greg Waldron, "Pakistan to begin co-production of Falco UAV," *Flight International*, 26 August 2009, <https://www.flightglobal.com/news/articles/pakistan-to-begin-co-production-of-falco-uav-331492/>.
3. Mike Rees, "Pakistan Navy Buys LUNA UAS from EMT for Maritime Shore Surveillance," *Unmanned Systems Technology*, 2 July 2012, <https://www.unmannedsystemstechnology.com/2012/07/pakistan-navy-buys-luna-uas-from-emt-for-maritime-shore-surveillance/>.
4. Tim Craig and Haq Nawaz Khan, "Pakistan unveils its own military drones as protests continue against U.S. attacks," *Washington Post*, 25 November 2013, https://www.washingtonpost.com/world/asia_pacific/pakistan-unveils-its-own-military-drones-as-protests-continue-against-us-attacks/2013/11/25/fae691cc-5607-11e3-bdbf-097ab2a3dc2b_story.html?utm_term=.be559df60b7e.
5. Ibid
6. "Pakistan Showed Off A Bunch of New Drones," 21st Century Arms Race (blog), 26 March 2019, <https://21stcenturyasianarmsrace.com/2019/03/26/pakistan-showed-off-a-bunch-of-new-drones/>.
7. Dan Gettinger, "Drone Bases Updates: Mianwali," Center for the Study of the Drone, 5 January 2018, <https://dronecenter.bard.edu/drone-bases-updates/>.
8. Gabriel Dominguez and Rahul Bedi, "China, Pakistan to jointly produce Wing Loong II UAVs, says report," *IHS Jane's Defence Weekly*, 9 October 2018, <https://www.janes.com/article/83660/china-pakistan-to-jointly-produce-wing-loong-ii-uavs-says-report>.
9. Alan Warnes, "The sky is the limit," *Digital Battlespace*, January 2018, https://mags.shephardmedia.com/Digital_Battlespace/2018/DB0118webmagwim/pubData/source/DB-01-18-webmag.pdf.
10. Greg Waldron, "Pakistan navy inducts first UAV squadron," *Flight International*, 25 July 2011, <https://www.flightglobal.com/news/articles/pakistan-navy-inducts-first-uav-squadron-359842/>.
11. Bilal Khan, "Possible MALE UAV Concepts at Pakistan's Aviation Design Institute," *Quwa*, 9 January 2018, <https://quwa.org/2018/01/09/possible-male-uav-concepts-at-pakistans-aviation-design-institute/>.
12. Bilal Khan, "Update: Pakistan Unmanned Aerial Vehicle (UAV) Program," *Quwa*, 3 August 2018, <https://quwa.org/2018/08/03/update-pakistan-unmanned-aerial-vehicle-uav-program-2/>.

PHILIPPINES

INVENTORY

Model	Make	Origin	Class	Intro	Qty	Operator	Notes
ScanEagle ^{1,2}	Insitu	USA	I	2018	14 (2+)	Air Force	
RQ-11B Raven ³	AeroVironment	USA	I	2017	3 (1)	Marines	
Hermes 450* ⁴	Elbit	Israel	II	2018		Air Force	

**Reported, but unconfirmed.*

ACTIVE ACQUISITIONS

- The Philippines is reportedly in the process of acquiring Skylark 1 and 3, Hermes 450, and Hermes 900 UAVs from Israel's Elbit Systems for the Philippine Army. According to a June 2019 media report, the deal is worth approximately \$180 million and is nearing completion.⁵ This acquisition program appears to be separate from the Philippines' reported acquisition of Hermes 450s for the Air Force's 300th Wing, though the connection between the two programs is not clear.

INACTIVE

Model	Make	Origin	Class	Period	Qty	Operator	Notes
Blue Horizon	EMIT Aviation	Israel	II	2001-Unknown	2		(status unclear)



U.S. Ambassador to the Philippines Sung Kim turns over a ScanEagle system to the Philippine Air Force in March 2018. Credit: U.S. Embassy in Philippines

PERSONNEL

AIR FORCE

Name	HQ	Type	Equipment	Activated
300th Air Intelligence and Security Wing ⁶	Antonio Bautista Air Base	D	ScanEagle, Hermes 450	2018

NOTES

1. Mike Yeo, "Philippines receives ScanEagle drones for maritime security," *Defense News*, 14 March 2018, <https://www.defensenews.com/unmanned/2018/03/14/philippines-receives-scaneagle-2-drones/>.
2. Mike Yeo, "These US partners in the Asia-Pacific are to receive ScanEagle drones," *Defense News*, 5 June 2019, <https://www.defensenews.com/unmanned/2019/06/05/these-us-partners-in-the-asia-pacific-are-to-receive-scaneagle-drones/>.
3. "U.S. Military Delivers Counterterrorism Equipment to the Philippines Army and Marine Corps," U.S. Embassy in the Philippines, accessed 16 October 2018, <https://ph.usembassy.gov/us-military-delivers-counterterrorism-equipment-philippine-army-marine-corps/>.
4. Ami Rojkes Dombé, "Report: Elbit Sold Hermes 450 UAVs to the Philippines," *Israel Defense*, 24 August 2018, <http://www.israeldefense.co.il/en/node/35400>.
5. Yuval Azulai, "Elbit nears \$180m Philippines drone deal," *Globes*, 13 June 2019, <https://en.globes.co.il/en/article-elbit-set-to-sign-philippines-drone-deal-1001289414>.
6. Frances Mangosing, "New PH Air Force intel unit to boost surveillance in West Philippine Sea," *Inquirer.net*, 13 March 2018, <http://globalnation.inquirer.net/164947/intelligence-unit-surveillance-west-philippine-sea-reconnaissance-south-china-sea>.

SINGAPORE

INVENTORY

Model	Make	Origin	Class	Intro	Qty	Operator	Notes
Hermes 450 ¹	Elbit Systems	Israel	II	2007		Air Force	Fully operational in 2015
Heron 1 ²	Israel Aerospace Industries	Israel	III	2012		Air Force	
ScanEagle ³	Insitu	USA	I	2012	12	Navy	
Skyblade III ⁴	Singapore Technologies	Singapore	I	2009		Army	

ACTIVE ACQUISITIONS

- In the Next-Generation SAF 2030 and Beyond plan presented to the Singapore Parliament in March 2019, the Ministry of Defence indicated that the Army could adopt a mix of fixed-wing, multirotor, and hybrid VTOL systems.⁵

- The Singapore Air Force is evaluating a replacement for its Hermes 450s and Heron 1s, which are due to be retired in the coming years. The project is known as the Next-Gen Unmanned Aerial Vehicle.⁶

INACTIVE

Model	Make	Origin	Class	Period	Qty	Operator	Notes
Scout	Israel Aerospace Industries	Israel	II	1984-1994		Air Force	
Searcher	Israel Aerospace Industries	Israel	II	1994-2017		Air Force	

PERSONNEL

AIR FORCE

- Activated in 2007, the Republic of Singapore Air Force UAV Command manages the service's drone operations.⁷ The Command is comprised of the UAV Group, Image Exploitation Group, 1st Air Engineering and Logistics Group, and the Operations Development Group.⁸ The UAV Group, which is responsible for piloting the Air Force's drones, is comprised of the UAV Command's three operational squadrons: the 116th, 119th, and 128th. The Imagery Exploitation Group is comprised of the 129th Squadron and 138th Squadron. The 1st Air Engineering and Logistics Group is comprised of the 801st Squadron and 811th Squadron. The Operations Development Group serves as the Command's headquarters and is responsible for ensuring that the Command meets the Air Force's intelligence requirements.

Name	HQ	Type	Equipment	Activated
116th Squadron, UAV Group, UAV Command	Camp Murai, Tengah Air Base	D	Hermes 450	2007
119th Squadron, UAV Group, UAV Command	Camp Murai, Tengah Air Base	D	Heron 1	1998
128th Squadron, UAV Group, UAV Command ⁹	Camp Murai, Tengah Air Base	D	Heron 1	1988

Between 1978 and 1988, the 128 Squadron, which was then known as the Field Photo Unit, was attached to the Singapore Army. It transferred from the Army to the Air Force and was redesignated the 128th Sqn in 1988, at which point it took command responsibility for Singapore's fleet of newly acquired Scouts. The Squadron began flying the Searcher in 1994, which replaced the Scout in 1998. In 2012, the 128 began flying the Heron 1, which achieved full operational capability in 2017.

TRAINING

- The RSAF stood up the UAV Training School (UTS) in July 1998.^{10,11} UTS is subordinated to the Air Force Training Command's Flying Training Institute. Cadets are trained on both simulators and live aircraft.

- Singapore regularly deploys drones overseas to participate in multinational training exercises. In 2015 an RSAF Heron 1 with the 119th Squadron participated in Exercise Forging Sabre in Arizona. In 2017 three RSAF Heron 1s participated in Exercise Cope Tiger alongside forces from Thailand and the United States.¹² On multiple occasions, the Heron 1s have participated in Australia's Exercise Wallaby, an annual bilateral exercise held at the Shoalwater Bay Training Area.¹³

OPERATIONS	Country	Base	Equipment	Period	Operation
	Afghanistan	Tarin Kowt	Searcher	2010	Blue Ridge
Between August and November 2010, Singapore deployed the UAV Task Group (UTG), a group of 52 personnel, mostly from the 128th Squadron, equipped with IAI Searchers, to Tarin Kowt in Uruzgan province. ¹⁴ The UTG provided ISR for Operation Blue Ridge, Singapore's contribution to the International Security Assistance Force.					

INFRASTRUCTURE	Name	Country	Latitude	Longitude	Affiliation	Activity	Notes
	Camp Murai, Tengah Air Base	Singapore	01°23'14"N	103°42'31"E	UAV Command	HQ, Training	

NOTES

1. "Fact Sheet: Hermes 450 Unmanned Aerial Vehicle (UAV)," MINDEF Singapore, 30 March 2015, <https://www.mindef.gov.sg/web/portal/mindef/news-and-events/latest-releases/article-detail/2015/march/2015mar30-News-Releases-01655>.
2. Benita Ito, "Watching From The Skies," Pioneer, 1 September 2017, https://www.mindef.gov.sg/web/portal/pioneer/article/cover-article-detail/technology/2018-q1/sep17_cs.
3. "Insitu to deliver ScanEagle UAS for Singapore Navy," Naval Technology, 10 July 2012, <https://www.naval-technology.com/news/newsinsitu-to-deliver-scaneagle-uas-for-singapore-navy/>.
4. Greg Waldron, "Singapore to deploy Skyblade III UAV," FlightGlobal, 01 December 2010, <https://www.flight-global.com/news/articles/singapore-to-deploy-skyblade-iii-uav-350317/>.
5. Ng Eng Hen, "Transforming the SAF to Meet a More Troubled Environment" (speech, Singapore, 1 March 2019, MINDEF), https://www.mindef.gov.sg/web/portal/mindef/news-and-events/latest-releases/article-detail/2019/march/01mar19_speech.
6. Ibid
7. Ministry of Defense Singapore, "Inauguration of the Unmanned Aerial Vehicle (UAV) Command," News release, 25 May 2007.
8. "Unmanned Aerial Vehicle Command," The Air Force, accessed on 18 October 2018, <https://www.mindef.gov.sg/web/portal/rsaf/rsaf-forces/commands/detail/unmanned-aerial-vehicle-command>.
9. "Reorganisation of UAV Command," The Air Force News, 18 August 2015, https://issuu.com/aficnme/docs/air_force_news_134_lr.
10. The Republic of Singapore Air Force, "UAV Training School - Redefine Perfection," Facebook, 2015, <https://www.facebook.com/media/set/?set=a.543638989077963.1073742045.236424069799458&type=1>.
11. "Air Force Training Command," The Republic of Singapore Air Force, accessed 20 March 2019, <https://www.mindef.gov.sg/web/portal/rsaf/rsaf-forces/commands/detail/air-force-training-command>.
12. Ministry of Defense Singapore, "Singapore, Thailand and US Conclude Trilateral Air Exercise," news release, 31 March 2017.
13. Ministry of Defense Singapore, "Fact Sheet: Exercise Wallaby 2018," news release, 10 November 2018, https://www.mindef.gov.sg/web/portal/mindef/news-and-events/latest-releases/article-detail/2018/november/10nov18_fs.
14. Nelson Lim Tiong How and Seah Pi Yee, "The UTG Command experience," Pointer Journal, 22 March 2013, https://www.mindef.gov.sg/oms/content/imindef/publications/pointer/supplements/AirForceSupplement/_jcr_content/imindefPars/0006/file.res/Binder%20Pointer%20supplyment.pdf.

SOUTH KOREA

INVENTORY

Model	Make	Origin	Class	Intro	Qty	Operator	Notes
XeFI	NESTEC	ROK	I	2018*		Army	
RQ-101 Falcon ¹	KAI	ROK	II	2002	30 (5)*	Army	“Song-golmae” or “Night Intruder” “송골매”
RemoEye-002B ²	UconSystem	ROK	I	2013	480 (120)	Army	
RemoEye-006 ³	UconSystem	ROK	I	2009		Army, Marines	
RQ-102 ⁴	KAI	ROK	II	2020*		Army	“KUS-FT”
Searcher ⁵	IAI	Israel	II			Army	
Camcopter S-100 ⁶	Schiebel	Austria	II	2011*			
RQ-4 Global Hawk ⁷	Northrop Grumman	USA	III	2019	4	Air Force	Initial delivery delayed from 2018

*Estimate

ACTIVE ACQUISITIONS

- In a September 2018 speech, the commander of the Korean Marine Corps said that the service was looking into acquiring a tilt-rotor VTOL system.⁸

PERSONNEL

ARMY

- The RoK Army activated the Air Patrol Companies (공중정찰중대는) in the early 2000s to operate the RQ-101 Falcon and the Searcher for corps-level intelligence, surveillance, and reconnaissance. In 2018 the RoK Army embarked on a review of the future of its corps-level drone reconnaissance programs, stating that Class II systems that have been acquired to date may eventually be used for training purposes.⁹ That same year, the RoK activated the DroneBot Warrior Unit, an experimental unit that will develop new operational concepts that could be the basis for a wider re-thinking of the Army’s drone programs and units.

Name		HQ	Type	Equipment	Activated
“DroneBot Warrior” Unit	드론봇 전투단	Yongin, Gyeonggi Province	D	XeFI and other Class I UAVs	2018
The DroneBot Warrior Unit was announced in 2017 and activated in 2018. ¹⁰ It is tasked with experimenting with new capabilities such as drone swarms and manned-unmanned teaming. As of late 2018, the unit consisted of 85 personnel; it is expected to eventually grow to a battalion with some staffing by civilian experts. ¹¹					
Air Patrol Company, 142nd Intelligence Battalion, 2nd Corps ¹²	2군단 142정보대대 공중정찰중대	G 419	D	RQ-101, RQ-102	2001
Air Patrol Company, 143rd Intelligence Battalion, 3rd Corps ¹³	3군단 143정보대대 공중정찰중대는	G 404	D	RQ-101, RQ-102	2003
Air Patrol Company, 145th Intelligence Battalion, 5th Corps ¹⁴	5군단 145정보대대 공중정찰중대는	G 202	D	Searcher	
Air Patrol Company, 148th Intelligence Battalion, 8th Corps ¹⁵	8군단 148정보대대 공중정찰중대에	Gangwon Province	D	RQ-101, RQ-102	2004
Air Patrol Company, 140th Intelligence Battalion, Capital Corps ¹⁶	제3야전군 수도군단 140정보대대 공중정찰중대는	G 202	D	RQ-101, RQ-102	2005



(Left) The 3rd Corps' Air Patrol Company celebrates 600 missions in 2012. Credit: RoK MND / Wikimedia. (Right) An RQ-101 prepares for launch. Credit: RoK MND / Wikimedia

AIR FORCE

Name		HQ	Type	Equipment	Activated
Air Intelligence Unit, Air Force Operations Command ¹⁷	공군작전사령부 공군항공정보단	Osan Air Base	D	RQ-4 Global Hawk	2017

The Air Intelligence Unit was created in December 2017 to serve as South Korea's dedicated medium and high-altitude intelligence squadron. The squadron will be responsible for operating RQ-4 Global Hawks and any future Class III systems acquired by the Air Force.

TRAINING

- The RoK Army has established at least nine Drone Training Centers around the country. The first Drone Training Center (드론교육원) was established at the Army Intelligence School (육군정보학교) in May 2017 to provide instruction on the operation and maintenance of unmanned aircraft.¹⁸ The Army established a second Drone Training Center in Chungnam Province in 2018.¹⁹ In July 2019 the Army announced that it had established seven more regional Drone Training Schools with the Maritime Defense Command, Special Forces Command, 2nd Corps, 5th Corps, 31st Division, 36th Division, and the Infantry School.^{20,21} The Army said that it intends to open another nine centers in 2020. The training program appears to focus on using Class I UAVs, particularly multi-rotor drones. The Army intends to be able to train 1,000 drone operators per year by 2021. Together with the DroneBot Warrior Unit, the Drone Training Centers initiative is designed to prepare the RoK Army for future combat scenarios in which small drones are a ubiquitous presence on the battlefield.

OPERATIONS

Country	Base	Equipment	Period	Operation
Afghanistan		RemoEye-006	2010-2014	

The Korean Army deployed to Afghanistan between 2010 and 2014 to provide a protective detail for Korea's Provincial Reconstruction Team, a civilian humanitarian mission.^{22,23} The Army's "Ashena Unit" was equipped with the Remoeye-006 for force protection.

DOMESTIC OPERATIONS

- According to a 2016 analysis by Captain Sukjoon Yoon, the RoK military views unmanned systems as an important capability for identifying and monitoring North Korean military activities such as the deployment of long-range artillery and the development of nuclear facilities.²⁴
- The Ministry of National Defense announced in July 2019 that it would begin deploying the Camcopter S-100 and the RQ-101 Falcon for maritime patrols after the ROK military failed to detect a North Korean boat.²⁵

INFRASTRUCTURE

Name	Country	Latitude	Longitude	Affiliation	Activity	Notes
G 419, Hongcheon, Gangwon Province	ROK	37°42'12" N	127°54'18" E	142 Bn	HQ	

G 404, Yanggu, Gangwon Province	ROK	38°05'15" N	127°59'13" E	143 Bn	HQ	
G 222, Yangju, Gyeonggi Province	ROK	37°49'49" N	126°59'24" E	140 Bn, 148 Bn	HQ	
Goehung Flight Performance Test Site	ROK	34°36'83" N	127°12'24" E	KAI	Test site	Expansion to be completed by 2020

OTHER

Name	Country	Latitude	Longitude	Affiliation	Activity	Notes
G 536, Chungcheong Province	ROK	36°16'10" N	127°06'50" E		Test site	Served as test site for KUS-FS in 2017

DEVELOPMENT

- The KUS-FS is a Class III MALE UAV designed and built by Korean Aerospace Industries. The project has its origins in the early 2000s, when the Korean Agency for Defense Development launched a study of MALE UAV concepts.²⁶ Following this study, the Defense Acquisition Program Administration selected KAI to lead a project to develop a drone with specifications equivalent to the U.S. MQ-1 Predator in 2008. The KUS-FS completed its first flight in 2012. After a hiatus, flight tests resumed in 2017.²⁷
- The TR-60 is a Class II tilt-rotor VTOL UAV developed by the Korea Aerospace Research Institute. In 2011, KARI unveiled the TR-60 in a demonstration flight at the Goehung Flight Performance Test Site.²⁸ In mid-2017, the TR-60 completed a successful test flight on a Korea Coast Guard vessel.²⁹
- The KUS-VT is a Class II tilt-rotor VTOL UAV developed by Korean Aerospace Industries. A model of the KUS-VT was displayed at the 2017 Seoul Aerospace and Defense Exhibition.³⁰
- The Night Intruder-600VT (NI-600VT) is a Class III rotary-wing UAV developed by Korean Aerospace Industries. Work on the NI-600VT began in 2017. It was unveiled in April 2018 and, as of June 2019, is currently undergoing flight tests.^{31,32} The airframe is based on that of a manned helicopter. It is approximately 9-meters-long and has a reported MTOW of 600 kilograms.

EXPORTS

Country	Model	Make	Class	Status	Notes
Bolivia	RemoEye-006	UconSystems	I	Active	

NOTES

1. Jung Sung-ki, "S. Korea to Transfer UAV, Missile Technologies to UAE," *The Korea Times*, 7 January 2010, http://www.koreatimes.co.kr/www/news/nation/2010/01/205_58626.html.
2. "ADEX 2017: Uconsystem's RemoEye-002B delivered to Korean Army," Air Recognition, 18 October 2017, <http://www.airrecognition.com/index.php/archive-world-worldwide-news-air-force-aviation-aerospace-air-military-defence-industry/defense-security-exhibitions-news/air-show-2017/adex-2017-news-coverage-report/3809-adex-2017-uconsystem-s-remoeye-002b-delivered-to-ukrainian-army.html>.
3. "History," UCONSYSTEM Co., LTD, accessed June 2019, <http://www.uconsystem.com/eng/company/history.asp>.
4. "South Korea to Field New Tactical Drones from Korean Air" Defense Update, 11 January 2016, https://defense-update.com/20160111_kus-x.html.
5. "SIPRI Arms Transfers Database," Stockholm Peace Research Institute, accessed 16 April 2019, <https://www.sipri.org/databases/armstransfers>.
6. "Korea plans to buy 2 unmanned surveillance aircraft," Korea Times, 20 April 2011, http://www.koreatimes.co.kr/www/news/nation/2011/04/117_85539.html.
7. "U.S. to Defer Global Hawk Drone Delivery to S. Korea," *Yonhap News Agency*, 13 April 2018, <http://www.defense-aerospace.com/articles-view/release/3/192421/u.s.-to-defer-global-hawk-drone-delivery-to-south-korea.html>.
8. "해병대, 항공기 탑재능력 대형수송함 · 수직이착륙 UAV 도입 검토," *Yonhap News Agency*, 12 September 2018, <http://www.yonhapnews.co.kr/bulletin/2018/09/12/0200000000AKR20180912076700014.HTML?-from=search>.
9. [단독] 4000억 무인기 개발사업, DMZ 비행금지에 길 잃다," *JoongAng Daily*, 15 October 2018, <https://news.joins.com/article/23045071>.
10. "S. Korea's military creates drone combat unit," *Yonhap News Agency*, 28 September 2018, <http://english.yonhapnews.co.kr/news/2018/09/28/0200000000AEN20180928003900315.html>.
11. "드론봇전투단, 무인기 10대 운용중...연내 18대 추가 도입," *Financial News*, 11 October 2018, <http://www.fnnews.com/news/201810110605152938?pg=mny>.
12. 김철환, "육군2군단 공중정찰중대, 무인항공기 1000회 비행 달성" *Chosun.com*, 16 May 2018, http://bemil.chosun.com/nbrd/bbs/view.html?b_bbs_id=10002&pn=1&num=8923&fbclid=IwAR0yc1OPzgLuqlVEyPcmbXCHpIMli_yQxvEUDpG6YAMnbJXK0gJ5BoBjeR0.
13. "3군단 UAV중대 전군 최초 '무사고 비행 700회' 금자탑," *Yonhap News*, 27 February 2015, <http://www.yonhapnews.co.kr/bulletin/2015/02/27/0200000000AKR20150227161700062.HTML>.
14. Ministry of National Defense, "UAV<무인항공기>, 떴다 무사고 500회," news release, 19 June 2013, http://www.mnd.go.kr/cop/kookbang/kookbangIlboView.do?siteId=&pageIndex=625&findType=&findWord=&categoryCode=dema0004&boardSeq=952&startDate=&endDate=&id=mnd_020102000000.
15. 세워안병현, "한국형 UAV '송골매' 1000회 비행 기록 세워," *Well-being News*, 13 November 2015, <http://www.wbkn.tv/news/articleView.html?idxno=17001>.
16. "이것이 한국형 무인기 송골매," *Chosun*, 8 April 2014, <http://m.chosun.com/svc/article.html?sname=photo&-contid=2014040801576>.
17. "Air Force launches new wing to monitor N. Korea's nuke, missile activity," *Yonhap News Agency*, 30 November 2017, <http://english.yonhapnews.co.kr/search1/2603000000.html?cid=AEN20171201003400315>.
18. 국방TV, "[국방뉴스] 17.05.22 육군정보학교, 드론 전문 교육원 개원," YouTube, 22 May 2017, <https://www.youtube.com/watch?v=4PHNvvsyk9c>.
19. "육군, 계룡대 드론교육센터 신설...2020년까지 14곳 확대," *Newsis*, 23 May 2018, http://www.newsis.com/view/?id=NISX20180523_0000316314.
20. 박진우 "육군 '내년부터 '드론전사' 연간 1000여명 양성.' " *데일리한국*, 1 July 2019, <http://daily.hankooki.com/lpage/politics/201907/dh20190701115220137530.htm>.
21. "Army Opens 7 Drone Training Centers, Plans to Set Up 9 More," *Korea BizWire*, 1 July 2019, <http://koreabizwire.com/army-opens-7-drone-training-centers-plans-to-set-up-9-more/139813>.
22. "History," UCONSYSTEM Co., LTD, accessed June 2019, <http://www.uconsystem.com/eng/company/history.asp>.
23. Kang Seung-woo, "Military unit in Afghanistan to return home," *The Korea Times*, 24 June 2014, http://www.koreatimes.co.kr/www/news/nation/2016/08/116_159687.html.
24. Sukjoon Yoon, "Proliferated Drones: A Perspective on South Korea," Center for a New American Security, May 2016, <http://drones.cnas.org/reports/a-perspective-on-south-korea/#1460584789652-3eb6e4b3-1480>.
25. "Military to take sweeping sea border security measures," *Yonhap*, 7 July 2019, <http://www.koreaherald.com/view.php?ud=20190707000124>.
26. Peter La Franchi, "Seoul plans indigenous UCAV," *Flight International*, 2 December 2003, <https://www.flight-global.com/news/articles/seoul-plans-indigenous-ucav-174556/>.
27. Gareth Jennings, "South Korean KUS-FS MALE UAV continues flight trials as development draws to a conclusion," *Jane's International Defence Review*, 21 March 2018, <https://www.janes.com/article/78734/south-korean-kus-fs-male-uav-continues-flight-trials-as-development-draws-to-a-conclusion>.
28. Jung Sung-ki, "Unmanned tilt-rotor vertical take-off aircraft unveiled," *The Korea Times*, 30 November 2011, http://www.koreatimes.co.kr/www/news/biz/2011/11/123_99879.html.
29. Arun Mathew, "South Korean TR-60 tiltrotor UAV completes flight trials," *DefPost*, 12 July 2017, <https://defpost.com>.

com/south-korean-tr-60-tiltrotor-uav-completes-flight-trials/.

30. Chris Pocock, "U.S. Sends New Deterrence Message to North Korea Via Seoul Airshow," *Aviation International Online*, 19 October 2017, <https://www.ainonline.com/aviation-news/defense/2017-10-19/us-sends-new-deterrence-message-north-korea-seoul-airshow>.
31. "수직이착륙 무인기 · 개인 항공기 개발 박차," *Kmib.co.kr*, 27 June 2019, <http://news.kmib.co.kr/article/view.asp?arcid=0924085791&code=11151400&sid1=i>.
32. "[미래 국방] 수직이착륙 · 즉각타격형 ... 세계 하늘 휘저을 '꿈의 무인기' 떴다," *Joins*, 13 April 2018, <https://news.joins.com/article/22532162>.

SRI LANKA

INVENTORY

Model	Make	Origin	Class	Intro	Qty	Operator	Notes
Searcher Mk II ¹	IAI	Israel	II	Early 2000s	2-4	Air Force	
Phantom 4	DJI	China	I	2016	2	Army	Acquired for training
Blue Horizon II ²	EMIT	Israel	II	2006	2-4	Air Force	

ACTIVE ACQUISITIONS

- The Ministry of Defence Action Plan 2018, a procurement roadmap, outlines one project to acquire "strategic" UAVs for an estimated 9.3 billion Rupee (USD 51 million) and another project to acquire "tactical" UAVs for an estimated 3.1 billion Rupee (USD 17 million).³

INACTIVE

Model	Make	Origin	Class	Period	Qty	Operator	Notes
Super Scout	IAI	Israel	II	Mid-1990s - Early 2000s		Air Force	

PERSONNEL

AIR FORCE

- In 2008, the 11th Squadron, which the Air Force activated in 1996 to serve as Sri Lanka's primary squadron for drone operations, was split into the 111th and 112th Squadrons.⁴

Name	HQ	Type	Equipment	Activated
No. 111 Unmanned Aerial Vehicle Squadron	SLAF Base Vavuniya	D	Searcher Mk II	2008
No. 112 Unmanned Aerial Vehicle Squadron	SLAF Station Weerawila	D	Blue Horizon II	2008

ARMY

Name	HQ	Type	Equipment	Activated
15th Unmanned Aerial Vehicle Regiment, Army Artillery ^{5,6}	Army Camp Balalla	D	Phantom 4	2016

OPERATIONS

- The Sri Lanka Air Force deployed drones extensively over the course of the 26-year civil war against the Liberation Tigers of Tamil Eelam. Air Force Searcher Mk II, Blue Horizon II, and Scout drones were used to conduct surveillance and reconnaissance, target acquisition, and battlefield damage assessment.⁷ The primary unit responsible for operations was the 11th Squadron based at Vavuniya. Several drones were lost to LTTE anti-aircraft fire.

INFRASTRUCTURE

Name	Country	Latitude	Longitude	Affiliation	Activity	Notes
SLAF Base Vavuniya	Sri Lanka	08°44'31"N	80°29'53"E	111th Sqn	HQ	
SLAF Station Weerawila	Sri Lanka	06°15'18"N	81°14'07"E	112th Sqn	HQ	

NOTES

- “SIPRI Arms Transfers Database,” Stockholm Peace Research Institute, accessed 16 April 2019, <https://www.sipri.org/databases/armstransfers>.
- Ibid
- Ministry of Defence and State Ministry of Defence, *Action Plan-2018*, (2018), http://www.defence.lk/sinhala/news/pdf/ACTION_PLAN_20180420.pdf.
- Sri Lanka Air Force, “UAV Squadron Celebrates its 2nd Anniversary,” news release, 4 June 2010, <http://www.airforce.lk/news.php?news=340>.
- “15th Medium Regiment,” Gunner, accessed 27 November 2018, <http://www.gunner.lk/15history.php>.
- Sri Lankan Army, *Annual Performance Report 2016*, <https://www.parliament.lk/uploads/documents/paperspresented/performance-report-srilanka-army-2016.pdf>.
- United Nations, *Report of the Secretary-General's Panel of Experts on Accountability in Sri Lanka*, (2011), <https://www.law.umich.edu/facultyhome/drwcabook/Documents/Documents/Report%20of%20the%20Panel%20of%20Experts%20on%20Accountability%20in%20Sri%20Lanka.pdf>

TAIWAN

INVENTORY

Model	Make	Origin	Class	Intro	Qty	Operator	Notes
Chung Shyang 2	NCSIST	Taiwan	II	2011	32 (8)	Navy	“銳鳶” Initially in service with the Army; est. 27 remain ¹
Cardinal 2	NCSIST	Taiwan	I	2016	30 (5)	Marines ²	“紅雀”

ACTIVE ACQUISITIONS

- The Ministry of National Defense (MND) unveiled a plan in September 2018 to establish an Air Force Reconnaissance Squadron equipped with long-range strike-capable drones.³ According to the MND, the drones would be used to improve combat efficiency and precision-strike capabilities in Taiwan’s littoral regions. The MND is reportedly considering the NCIST Tengyun to fill this requirement, although a decision has yet to be made as of this writing.⁴
- The Army is reportedly considering acquiring a Class I rotary-wing drone. According to an April 2019 media report, the Army has a requirement for 112 systems, or 224 aircraft.⁵ The UAV must have an endurance of at least 60 minutes and operational range of 20 kilometers.



The Chung Shyang 2 UAV in 2013. Credit: 玄史生/ Wikimedia

PERSONNEL

NAVY

Name		HQ	Type	Equipment	Activated
Maritime Tactical Reconnaissance Squadron	海上戰術偵蒐大隊	Pingtung Air Base	D	Chung Shyang II	2017

The Navy activated the Maritime Tactical Reconnaissance Squadron in September 2017 and declared it operational in January 2019.^{6,7} It is the successor to the Army's Tactical Reconnaissance Brigade (陸軍航特部戰術偵蒐大隊), which stood up in 2013 and remained active until the Chung Shyang 2s were transferred to the Navy.

INFRASTRUCTURE

Name	Country	Latitude	Longitude	Affiliation	Activity	Notes
Pingtung Air Force Base	Taiwan	22°40'20"N	120°27'42"E	Navy	HQ	
Taimali Airport	Taiwan	22°35'12"N	121°00'02"E	Army	HQ, Test site	Chung Shyang 2 site

OTHER

Name	Country	Latitude	Longitude	Affiliation	Activity	Notes
Zhi-Hang Air Force Base	Taiwan	22°47'10"N	121°10'08"E		Test site	Teng Yun test site

DEVELOPMENT

- The Teng Yun (騰雲) is a Class III fixed-wing system developed by the National Chung-shan Institute of Science and Technology (NCSIST or CIST). The Teng Yun project was launched in 2009 and the prototype aircraft was unveiled at the 2015 Taipei International Aerospace and Defense Industry Exhibition.⁸ The Teng Yun conducted flight tests in Taitung County in southeast Taiwan in April 2018.⁹
- The Jian Xiang (劍翔) is a Class I anti-radiation loitering munition developed by NCSIST. It was unveiled at the 2017 Taipei Aerospace and Defense Technology Exhibition.¹⁰ It bears a physical resemblance to the IAI Harpy/Harop. According to a June 2019 media report, the Taiwanese Air Force Air Defense and Missile Command intends to spend approximately \$2.64 billion on developing and acquiring a fleet of anti-radiation vehicles.¹¹

NOTES

1. “軍方報告曝光：銳鳶無人機今年1月墜海 7年摔掉7架 列印,” *Liberty Times*, 19 April 2019, <https://news.ltn.com.tw/news/politics/breakingnews/2763908>.
2. 陳欣倫, “UAV納入陸戰隊情監偵運用之研究,” 海軍學術雙月刊, April 2017, <https://navy.mnd.gov.tw/Files/Paper/2-UAV%E7%B4%8D%E5%85%A5%E9%99%B8%E6%88%B0%E9%9A%8A%E6%83%85.pdf>.
3. Lo Tien-pin and Jake Chung, “Combat drone plans submitted,” *Taipei Times*, 2 September 2018, <http://www.taipeitimes.com/News/taiwan/archives/2018/09/02/2003699654>.
4. 朱明, “配合國防自主 空軍暫緩MQ-9無人機等待國產騰雲機,” *Up Media*, 15 October 2018, https://www.upmedia.mg/news_info.php?SerialNo=49955.
5. 洪哲政, “秘密訪商 陸軍希望建構旋翼型戰場無人機曝光,” *UDN*, 23 April 2019, <https://udn.com/news/story/10930/3771787>.
6. “陸軍銳鳶無人機隊 9.1移撥海軍,” *Liberty Times*, 28 August 2017, <http://news.ltn.com.tw/news/politics/paper/1130483>.
7. 者洪哲政, “銳鳶無人機戰備實況 首公開,” *聯合晚報*, 24 January 2019, <https://money.udn.com/money/story/5648/3612012>.

8. “中科院戰略型無人機 首度公開亮相,” *Liberty Times*, 10 August 2015, <http://news.ltn.com.tw/news/politics/breakingnews/1408072>.
9. Matthew Strong, “Taiwan tests largest domestic drone above Taitung,” *Taiwan News*, 13 April 2018, <https://www.taiwannews.com.tw/en/news/3404886>.
10. Wendell Minnick, “NCSIST displays new loitering munition,” *Shephard Media*, 17 August 2017, <https://www.shephardmedia.com/news/uv-online/ncsist-display-new-loitering-munition/>.
11. George Liao, “Taiwan military to spend NT\$80 billion on anti-radiation drone fleet,” *Taiwan News*, 19 June 2019, <https://www.taiwannews.com.tw/en/news/3727728>.

THAILAND

INVENTORY

Model	Make	Origin	Class	Intro	Qty	Operator	Notes
Searcher Mk 2 ¹	IAI	Israel	II	2001	4	Army	
Hermes 450 ²	Elbit Systems	Israel	II	2018	4	Army	
Aerostar ³	Aeronautics	Israel	II	2011	22	Air Force	Purchased in 2011 and 2013
Dominator ⁴	Aeronautics	Israel	III		1+	Army	
Narai 3.0 ⁵	NRDO	Thailand	I	2019	80	Navy	
RQ-11 Raven ⁶	AeroVironment	USA	I	2010	36 (12)	Army	
Tiger Shark 2 ⁷	DTI	Thailand	I	2015		Air Force	Trial platform
U-1 Sky Scout ⁸	RV Connex	Thailand	I	2017		Air Force	

PERSONNEL

ARMY

Name		HQ	Type	Equipment	Activated
21st Aviation Battalion, Army Aviation Center	กองพันบินที่ 21, ศูนย์การบินทหารบก	Army Aviation Center, Lopburi	P	Searcher Mk 2, Hermes 450	2017

The 21st Aviation Battalion operates a mix of manned and unmanned aircraft for intelligence, reconnaissance, and surveillance.⁹

AIR FORCE

Name		HQ	Type	Equipment	Activated
404th Squadron, 3rd Air Division, 4th Air Wing ¹⁰	404 กองบิน, กองบิน 4	Takhli Air Force Base	D	AeroStar, TigerShark II, Sky Scout	2011

OPERATIONS

- In July 2018 the Royal Thai Air Force announced that it was sending fighter aircraft and drones to search for illegal fishing boats.¹¹ The illegal fishing operation was conducted in coordination with the Department of Fisheries and based in Rayong Province.

INFRASTRUCTURE

Name	Country	Latitude	Longitude	Affiliation	Activity	Notes
Army Aviation Center, Lopburi	Thailand	14°56'59"N	100°38'40"E	21st Aviation Brigade	HQ	
Takhli Air Force Base	Thailand	15°16'05"N	100°17'32"E	404th Sqn	HQ	

DEVELOPMENT

- The D-Eyes Mk I is a fixed-wing Class I UAV developed by the Defense Technology Institute (DTI). Initially developed for the Royal Thai Air Force, the D-Eyes may also eventually go into service with the army, navy, and marines. In early April 2019, the Ministry of Defense conducted an evaluation of the system at Photaram Airport.

NOTES

1. "SIPRI Arms Transfers Database," Stockholm Peace Research Institute, accessed 16 April 2019, <https://www.sipri.org/databases/armstransfers>.
2. Chen Chuanren and Chris Pocock, "Thailand Introduces Elbit's Hermes 450 UAS," *Aviation International Online*, 25 June 2018, <https://www.ainonline.com/aviation-news/defense/2018-06-25/thailand-introduces-elbits-hermes-450-uas>.

3. “กองทัพอากาศไทยจัดหา UAV แบบ Aerostar ล็อตที่สอง (UPDATED),” Thai Armed Forces (blog), 5 January 2011, <http://www.thaiarmedforce.com/taf-military-news/55-rtaf-news/231-aerostar-to-rtaf.html>.
4. Kobi Yeshayahu, “Aeronautics wins \$27m Thailand UAV Deal,” *Globes*, 30 July 2018, https://en.globes.co.il/en/article.aspx?did=1001248103#utm_source=iglobes&utm_medium=referral&utm_campaign=iglobes.
5. Sompong Nondhasa, “Thai navy fields new small UAV,” *Shephard News*, 2 July 2019, <https://www.shephardmedia.com/news/uv-online/thai-navy-fields-new-small-uav/>.
6. “RTA Conducts Trainign Usage of Raven,” *Militer Review* (blog), 16 March 2012, <https://pena-abad.blogspot.com/2012/03/rta-conducts-training-usage-of-raven-rq.html>.
7. “Thai DTI shows its UAV Research Results,” *Asian Military Review*, 9 November 2017, <https://asianmilitaryreview.com/2017/11/thai-dti-shows-its-uav-research-results/>.
8. “DS2017: ทอ. เตรียมนำ U-1 เข้าประจำการ/RTAF Deploying its U-1 UAV,” Thai Armed Forces (blog), 19 November 2017, <http://thaiarmedforce.com/taf-military-news/rtaf-news/881-rtaf-deploying-its-u-1-uav>.
9. “Royal Thai Army: UAV - 21st Aviation Battalion,” Thai Defense-News (blog), 9 May 2018, <https://thaidefense-news.blogspot.com/2018/05/royal-thai-army-uav-21st-aviation.html>.
10. “PRIMETIME กับ เทพชัย” : UAV ฮีโร่ ค้นซาก ฮ.ทัพอากาศตก เขาชะเมา,” *Nation* 22, 28 June 2016, <http://www.nationtv.tv/main/program/378507188/>.
11. Ministry of Foreign Affairs of Thailand, “ข่าวสารนิเทศ : ไทยใช้อากาศยานไร้คนขับเพื่อติดตาม ควบคุมและเฝ้าระวังการทำประมงผิดกฎหมาย,” news release, 19 June 2019, <https://bit.ly/2Ka54Bs>.
12. “Thai MoD Inspects the Progress of Mini UAV D-Eyes Mk1,” *Asian Defence News* (blog), 4 May 2019, <https://asian-defence-news.blogspot.com/2019/05/thai-mod-inspects-progress-of-mini-uav.html>.

VIETNAM

INVENTORY

Model	Make	Origin	Class	Intro	Qty	Operator	Notes
Orbiter 2 ^{1,2}	Aeronautics	Israel	I	2014	15-24 (5-8)	Army	
Shikra ³	Viettel	Vietnam	I	2018		Navy	
ScanEagle ⁴	Insitu	USA	I	2022*	6	Coast Guard	

ACTIVE ACQUISITIONS

- In June 2018, the French journal Intelligence Online reported that two firms, Israel Aerospace Industries and Aeronautics, were competing for a Vietnamese tender for Class III unmanned aircraft.⁵ According to a report in December 2018, Vietnam approved the acquisition of three IAI Herons in a deal worth approximately \$160 million.⁶ This deal has yet to be confirmed by either Israel or Vietnam.
- The Vietnamese Border Defense Force (Bộ đội Biên phòng Việt Nam or BPSP) may have acquired a Class I drone that closely resembles the U.S. AeroVironment Raven. The UAV was displayed at a January 2019 event attended by BPSP command. A March 2019 report in a Vietnamese media outlet speculated that the drone may have been produced domestically.⁷

NOTES

1. Arie Egozi, “Vietnam ups interest in unmanned Orbiter 3,” *FlightGlobal*, 3 March 2015, <https://www.flightglobal.com/news/articles/vietnam-ups-interest-in-unmanned-orbiter-3-409675/>.
2. Khang Minh, “Truyền thông Trung Quốc đề cao UAV Việt Nam,” *Soha*, 8 August 2018, <http://soha.vn/truyen->

thong-trung-quoc-ca-ngoi-uav-viet-nam-ten-lua-phong-khong-hq-9-cung-phai-de-chung-20180808153318019.htm.

3. Beth Stevenson, "UAVs fly in from Vietnam," *Jane's 360*, 9 November 2018, <https://www.janes.com/article/84471/uavs-fly-in-from-vietnam-id18d3>.
4. "Contracts for May 31, 2019," U.S. Department of Defense, accessed 3 June 2019, <https://dod.defense.gov/News/Contracts/Contract-View/Article/1863144/>.
5. "Drone race underway in Vietnam," *Intelligence Online*, 27 June 2018, <https://www.intelligenceonline.com/corporate-intelligence/2018/06/27/drone-race-underway-in-vietnam,108314927-art>.
6. Prashanth Parameswaran, "A New Vietnam-Israel Drone Deal?," *The Diplomat*, 11 December 2018, <https://thediplomat.com/2018/12/a-new-vietnam-israel-drone-deal/>.
7. Ánh Dương, "Biên phòng Việt Nam được trang bị SUAV RQ-11 Raven của Mỹ?," *Soha*, 20 March 2019, <http://soha.vn/bien-phong-viet-nam-duoc-trang-bi-suav-rq-11-raven-cua-my-20190320144940164.htm>.

EURASIA

ARMENIA	.....	58
AZERBAIJAN	.....	59
BELARUS	.....	61
GEORGIA	.....	62
KAZAKHSTAN	.....	63
RUSSIA	.....	64
TURKMENISTAN	.....	76
UKRAINE	.....	76
UZBEKISTAN	.....	80

ARMENIA

INVENTORY	Model	Make	Origin	Class	Intro	Qty	Operator	Notes
	Baze ¹	Military Aviation Institute	Armenia	I	2012			
	Ptero-5E ²	AFM Servers	Russia	I	2015			“X-55”
	Krunk ³		Armenia	I	2011		Air Force	



The Baze UAV in a 2016 military parade in Yerevan. Credit: Keptor/Wikimedia

OPERATIONS

- Armenia has deployed drones in the ongoing Nagorno-Karabakh territorial conflict between the Artsakh Defense Army—Armenian-backed separatists—and Azerbaijan. Azerbaijan has repeatedly claimed to have shot down Armenian drones, although it has not always been clear whether these were drones operated by Armenian forces or by the separatists.⁴ In January 2015 the Azerbaijani Ministry of Defense announced that it had downed an Armenian UAV. In April 2018 Azerbaijan announced that it had downed a DJI Mavic belonging to Armenian forces.⁵ In June 2018 Azerbaijan announced that it had downed what appeared to be an X-55 (Ptero-5E).⁶

NOTES

- “Армянский БЛА «Baze»,” Livejournal, 10 August 2015, <https://vpk-armenii.livejournal.com/70022.html>.
- “Azerbaijan Army seized Armenia’s UAV - Photos,” *Karabakh Today*, 7 April 2016, <http://en.karabakh.today/news/security/4834-azerbaijani-army-seized-armenias-uav>.
- “Armenia Claims Its Military Produces Drones,” *RFE/RL*, 21 June 2011, <https://www.rferl.org/a/24241481.html>.
- Ф.Исазаде, “Азербайджанские ВВС сбили армянский БЛА,” *Interfax.az*, 29 January 2015, <https://interfax.az/view/630578>.
- Azerbaijan Ministry of Defense, “Ermənistan silahlı qüvvələrinə məxsus kvadrokopter məhv edilib,” news release, 17 April 2018, <https://mod.gov.az/az/news/ermenistan-silahli-quvvelerine-mexsus-kvadrokopter-me-hv-edilib-22319.html>.
- “ВС Азербайджана сбили БПЛА АО Арцаха, осуществляющий приграничное наблюдение,” ArmenPress, 19 June 2018, <https://armenpress.am/rus/news/938020.html>.

AZERBAIJAN

INVENTORY

- Azerbaijan displayed six UAVs— the Orbiter-3, Orbiter-1K, Aerostar, Hermes 450, Hermes 900, and Heron TP—at the in the 100th anniversary of the Armed Forces of Azerbaijan military parade on 26 June 2018.

Model	Make	Origin	Class	Intro	Qty	Operator	Notes
Aerostar* ¹	Aeronautics	Israel	II	2008		Army	
Sky Striker ²	Elbit Systems	Israel	I	2018	100	Coast Guard	Loitering munition
Orbiter-1K* ³	Aeronautics	Israel	I	2011		Army	“Zərbə-K” Loitering munition
Orbiter-3* ⁴	Aeronautics	Israel	I	2016		Army	
Harop ⁵	IAI	Israel	I	2011	50	Army	
Heron TP ⁶	IAI	Israel	III	2015	2	Air Force	
Hermes 450 ⁷	Elbit Systems	Israel	II	2011	10	Air Force	
Hermes 900 ⁸	Elbit Systems	Israel	III	2018	2	Coast Guard	

* Licensed for production by Azad Systems.

PERSONNEL

- The Azerbaijan Ministry of Defense opened a new facility for training Air Force UAV operators in June 2017.⁹ The facility is operated by the Air Force Training Command and is equipped with simulators. The official announcement of the new facility did not mention where specifically it is located, but the base appears to be Baku Lokbatan Airport, an airfield west of the capital that was refurbished in 2016 and 2017 to accommodate UAV operations.¹⁰
- In December 2018 the Azerbaijan Ministry of Defense opened a new facility to train UAV specialists in the Azerbaijan Army.¹¹ It consists of a single building with classrooms and an aircraft hangar. It is equipped with flight simulators and multiple UAVs, including the Aerostar, Orbiter 1, and Orbiter 3. The official announcement of the new facility did not disclose its location, but official photographs released by the MoD match satellite images of Salyany Air Base.¹²

OPERATIONS

- Azerbaijan has deployed drones to support security operations in Nagorno-Karabakh. In 2016 Azerbaijan reportedly used an Israeli-made Harop loitering munition to target a bus carrying a group of Arme-

nian volunteer fighters, according to Armenia's Defense Ministry.¹³ In 2018 Israeli law enforcement officials indicted Aeronautics for allegedly targeting Armenian separatists with a loitering munition at the request of Azeri military officials during a live product demonstration.¹⁴

- In June 2018 the press secretary for the Artsakh Defense Army (Armenian-backed separatists) claimed that the Artsakh forces had downed 22 UAVs belonging to Azerbaijan since 2011 and had lost 3 UAVs over the same period.¹⁵ The Azeri Ministry of Defense has claimed to have downed 25 Armenian drones, most of which were consumer drones made by DJI.¹⁶

INFRASTRUCTURE

Name	Country	Latitude	Longitude	Affiliation	Activity	Notes
Baku Lokbatan Airport	Azerbaijan	40°20'53"N	049°40'29"E	Air Force	HQ, Training	
Sangachal Air Base	Azerbaijan	40°07'47" N	49°27'18" E	Air Force	Deployment	Heron 1 site
Salyany Air Base	Azerbaijan	39°38'45"N	48°59'45"E	Army	Training	

NOTES

1. Tal Inbar, "Production in Azerbaijan Begins in a Factory Set Up by the Israeli Company- 'Aeronautics,'" *Israel Defense*, 20 June 2011, <http://www.israeldefense.co.il/en/content/production-azerbaijan-begins-factory-set-israeli-company-%E2%80%9Caeronautics%E2%80%9D>.
2. "DSX yeni kamikadze PUA-nı təqdim etdi – Sky Striker," *Azeri Defence*, 10 January 2019, <http://az.azeridefence.com/dsx-yeni-kamikadze-pua-ni-teqdim-etdi-sky-striker/>.
3. Arie Egozi, "Azerbaijan starts producing Zarba armed UAV," *FlightGlobal*, 10 January 2017, <https://www.flightglobal.com/news/articles/azerbaijan-starts-producing-zarba-armed-uav-433014/>.
4. Arie Egozi, "Azerbaijan Could Produce Unmanned Orbiter 3," *FlightGlobal*, 22 September 2014, <https://www.flightglobal.com/news/articles/azerbaijan-could-produce-unmanned-orbiter-3-403987/>.
5. "SIPRI Arms Transfers Database," Stockholm Peace Research Institute, accessed 16 April 2019, <https://www.sipri.org/databases/armstransfers>.
6. "Azerbaijan demonstrates Israeli-made Heron drones for first time ever," *PanArmenian.Net*, 26 June 2018, https://panarmenian.net/eng/news/257180/Azerbaijan_demonstrates_Israelimade_Heron_drones_for_first_time_ever.
7. "Israel sells drones, missiles to Azerbaijan," *RFE/RL*, 27 February 2012, https://www.rferl.org/a/azerbaijan_israel_iran_missiles_drones/24496978.html.
8. "Azerbaijan demonstrate for the first time it's Hermes 900 capability," *Defence Blog*, 18 August 2017, <https://defence-blog.com/news/azerbaijan-demonstrate-for-the-first-time-its-hermes-900-capability.html>.
9. Azerbaijan Ministry of Defense, "Müdafiə Nazirliyinin rəhbərliyi HHQ Təlim Mərkəzində olub," news release, 7 June 2017, <https://mod.gov.az/az/news/mudafie-nazirliyinin-rehberliyi-hhq-telim-merkezinde-olub-18829.html>.
10. See page 286.
11. "Azerbaijani defense minister attends opening of UAV Specialists Training Center," *Azvision.az*, 28 December 2018, <https://en.azvision.az/news/98557/-azerbaijani-defense-minister-attends-opening-of-uav-specialists-training-center-.html>.
12. See page 286.
13. Thomas Gibbons-Neff, "Israeli-made suicide drone spotted in Nagorno-Karabakh conflict," *The Washington Post*, 5 April 2016, https://www.washingtonpost.com/news/checkpoint/wp/2016/04/05/israeli-made-kamikadze-drone-spotted-in-nagorno-karabakh-conflict/?noredirect=on&utm_term=.31ac03657849.
14. Jacob Magid, "Israeli dronemaker said to have bombed Armenians for Azerbaijan faces charges," *Times of Israel*, 29 August 2018, <https://www.timesofisrael.com/israeli-dronemaker-said-to-have-bombed-armenians-for-azerbaijan-faces-charges/>.
15. "Асратян: За последние 7 лет Армия обороны НКР уничтожила 22 беспилотника вооруженных сил Азербайджана," *ArmInfo*, 22 June 2018, http://arminfo.info/full_news.php?id=32772.
16. "Ötən il cəbhədə Ermənistan Ordusuna aid 5 PUA məhv edilib – FOTO," *Azeri Defence*, 1 January 2018, <http://az.azeridefence.com/oten-il-cebhede-ermenistan-ordusunun-5-pua-mehv-edilib-foto/>.

BELARUS

INVENTORY

Model	Make	Origin	Class	Intro	Qty	Operator	Notes
Burevestnik-MB ¹	NPT MBK*	Belarus	II	2018			
Busel-MB ²	NPT MBK*	Belarus	II	2018			
Berkut-2 ³	JSC Agat Control Systems	Belarus	I	2015	30 (10)		“Беркут-2”
BP-12 Mosquito	558 Aviation Repair Plant	Belarus	I				“BP-12 Москит”

PERSONNEL

- The 927th Unmanned Aircraft Systems Training and Applications Center (927-м центре подготовки и применения беспилотных авиационных комплексов Вооруженных Сил Республики Беларусь) was established in 2010 at Bereza Air Base.⁴ It serves as both a training academy and a test site for Belarussian UAV manufacturers.
- The Belarusian State Aviation Academy (Белорусскую государственную академию авиации), formerly the Minsk Aviation Technical School of Civil Aviation (Минского авиационного технического училища гражданской авиации), established the Department of Unmanned Systems and Combat Control (кафедра беспилотных авиационных комплексов и боевого управления) in 2011.⁵ It provides two, four-year courses of instruction for aspiring active duty officers and several courses for reserve officers. Graduates are awarded the rank of lieutenant and go on to serve in the Armed Forces as either UAV operators, sensor operators, or maintenance technicians.

INFRASTRUCTURE

Name	Country	Latitude	Longitude	Affiliation	Activity	Notes
Bereza Air Base	Belarus	52°33'32"N	24°53'2"E	927th Center	Training, Test site	

DEVELOPMENT

- The Belar YS-Ex is a domestically-produced variant of the Yabhon Flash-20, a Class III UAV developed by the UAE's Adcom Systems. Produced by Belarus' Indela Systems, it was unveiled at the MILEX 2017 defense trade show.⁶ It is not believed to be in active service.
- The Yastreb (Ястреб) is a Class III UAV developed by the Research and Manufacturing Center of Multipurpose Unmanned Aerial Systems (NPT MBK), a division of the Belarussian Academy of Sciences. It was unveiled at the Army-2018 defense trade show.⁷ According to the manufacturer, it has a maximum take-off weight of 700 kilograms and can be equipped with multiple loitering munitions for aerial strikes, each of which are fitted with a 10 kilogram shaped-charge warhead.⁷

NOTES

1. Gabriel Bazzolo, "Armed drones in service with Belarus army," Defence Blog, 13 July 2018, <https://defence-blog.com/aviation/armed-drones-service-belarus-army.html>.
2. Ibid
3. James Drew, "MAKS: Belarus carving slice of military UAV market," *FlightGlobal*, 27 August 2015, <https://www.flightglobal.com/news/articles/maks-belarus-carving-slice-of-military-uav-market-416117/>.
4. Igor Zhuk, "Upgraded Aerial Scout," Military-Industrial Complex Belarus, January 2018, http://80.94.229.210/upload/statii_files/files/%D0%92%D0%BE%D0%B7%D0%B4%D1%83%D1%88%D0%BD%D1%8B%D0%B9-%D1%80%D0%B0%D0%B7%D0%B2%D0%B5%D0%B4%D1%87%D0%B8%D0%BA.pdf.
5. "Кафедра беспилотных авиационных комплексов и боевого управления," Белорусскую государственную академию авиации, accessed 18 May 2019, <http://bsaa.by/students/chair/kafedra-bespilotnykh-aviatsionnykh-kompleksov-i-boevogo-upravleniya-bak-i-bu/>.
6. "Belar YS-Ex unmanned aerial vehicle debuts at MILEX 2017," *Defence Blog*, 21 May 2017, <https://defence-blog.com/news/belar-ys-ex-unmanned-aerial-vehicle-debuts-at-milex-2017.html>.
7. Nikolai Novichkov, "Belarus showcases Yastreb UAV," *Jane's International Defence Review*, 24 September 2018, <https://www.janes.com/article/83308/belarus-showcases-yastreb-uav>.
8. "Army-2018: Belarus Offered Russian Military a Multirole UAV," *Mil.Today*, 23 August 2018, <http://mil.to-day/2018/Industry15/>.

GEORGIA

INVENTORY

Model	Make	Origin	Class	Intro	Qty	Operator	Notes
Skylark ¹	Elbit	Israel	I				

ACTIVE ACQUISITIONS

- In its *Major Systems Acquisition Strategy 2019-2025*, the Georgian Ministry of Defence declared that "equipping combat units with modern units to develop reconnaissance and surveillance capabilities represents an MoD priority."²

INACTIVE

Model	Make	Origin	Class	Period	Qty	Operator	Notes
Hermes 450 ³	Elbit	Israel	II	2007-Unknown		Air Force	(status unclear)
Aerostar	Aeronautics	Israel	II	2005-Unknown			(status unclear)

OPERATIONS

- In April 2008, several months before the start of the 2008 Georgian War, a Russian fighter jet shot down a Georgian Air Force Hermes 450 drone over the disputed Abkhazia territory.⁴ While Russia denied involvement, a United Nations investigation confirmed that Russia was indeed responsible, citing a video

of the incident taken from the drone's cameras. The incident—one of the few air-to-air engagements to date involving drones and fighter aircraft—contributed to a rise in tensions between the two countries.

NOTES

1. Georgian Ministry of Defense, "GDRP-T First Rotation Culmination Field Exercise" news release, 11 July 2018, <https://mod.gov.ge/en/news/read/6694/gdrp-t-first-rotation-culmination-field-exercise>.
2. Republic of Georgia, Ministry of Defence, *Major Systems Acquisition Strategy 2019-2025*, (Tbilisi: 2018), https://mod.gov.ge/uploads/2018/pdf/Major_Systems_Acquisition_Strategy-IREAID.pdf.
3. "SIPRI Arms Transfers Database," Stockholm Peace Research Institute, accessed 16 April 2019, <https://www.sipri.org/databases/armstransfers>.
4. United Nations, *Report of UNOMIG on the Incident of 20 April Involving the Downing of a Georgian Unmanned Aerial Vehicle over the Zone of Conflict*, <https://www.securitycouncilreport.org/wp-content/uploads/Georgia%20UNOMIG%20Report%20on%20Drone.pdf>.

KAZAKHSTAN

INVENTORY

Model	Make	Origin	Class	Intro	Qty	Operator	Notes
Skylark I-LEX ¹	Elbit	Israel	I	2015		Army	
Orlan-10 ²	Special Technology Center	Russia	I	2015		Army	
Wing Loong 1 ³	AVIC	China	III	2017	2	Air Force	

ACTIVE ACQUISITIONS

- In May 2018, Turkish Aerospace Industries reportedly signed an agreement with Kazakhstan Aviation Industry for joint production of the TAI Anka, a Class III MALE UAV.⁴

INFRASTRUCTURE

Name	Country	Latitude	Longitude	Affiliation	Activity	Notes
Taraz Airport	Kazakhstan	42°51'13"N	071°18'13"E	Air Force	HQ, Training	Wing Loong 1 site ⁵

NOTES

1. Astana Qazaqstan, "Military Parade 2017 of the Army of the Republic of Qazaqstan," YouTube, 7 May 2017, <https://www.youtube.com/watch?v=9ntWunxYwSw>.

2. Ibid
3. “Kazakhstan unveils new «Pterodactyl» unmanned combat aerial vehicle at KADEX 2016,” *Defence Blog*, 22 August 2016, <https://defence-blog.com/news/kazakhstan-unveil-new-chengdu-pterodactyl-unmanned-combat-aerial-vehicle-at-kadex-2016.html>.
4. Göksel Yildirim, “Turkish, Kazakh aviation firms seal deal,” Anadolu Agency, 24 May 2018, <https://www.aa.com.tr/en/science-technology/turkish-kazakh-aviation-firms-seal-deal/1155612>.
5. Government of the Republic of Kazakhstan, “Minister of Defence defines development directions of largest military training grounds,” news release, 2 September 2016, <http://www.government.kz/en/novosti/1003658-minister-of-defense-defines-development-directions-of-largest-military-training-grounds.html>.

RUSSIA

INVENTORY

Model	Make	Origin	Class	Intro	Qty	Operator	Notes
Phantom ¹	DJI	China	I	2019	10	Army	
Bird Eye 400 ^{2*}	IAI	Israel	I	2013		Army	“Zastava”, “Застава”
Granat-1 ³	Kalashnikov	Russia	I	2010		Army	“Гранат-1”
Granat-4 ⁴	Kalashnikov	Russia	I	2013		Army	“Гранат-4”
Eleron-3 ⁵	Eniks	Russia	I	2013		Army	“Элерон-3”
Takhion ⁶	Izh-mash-UAV	Russia	I	2014		Army	“Тахион”
Orlan-10 ⁷	Special Technology Center	Russia	I	2013	>1,000	Army, Airborne, Navy	“Орлан-10”
Searcher Mk II ^{8*}	IAI	Israel	II	2013	30+	Air Force, Army, Navy	“Forpost”, “форпост”

* Licensed for production in Russia.

INACTIVE

Model	Make	Origin	Class	Period	Qty	Operator	Notes
Tu-243	Tupolev	Russia	III	1970s-2000s		Air Force	(status unclear)

Tu-300	Tupolev	Russia	III	1970s-2000s		Air Force	(status unclear)
CamCopter S-100 ⁹	Schiebel	Austria	II	2011-Unknown	2	Navy, Coast Guard	“Горизонт Эйр”

PERSONNEL

- According to figures released by the Ministry of Defense in January 2019, the Russian military had activated 40 UAV units (подразделения БПЛА) and acquired over 2,100 UAVs since 2012.¹⁰ However, the MoD has not disclosed a complete list of these units. The following partial list is based largely on Russian Ministry of Defense statements, which were cross-checked with the online database known as *Milkavkaz*. It represents the extent of publicly disclosed information on Russian drone units, but it contains significant gaps, particularly in the Aerospace Forces and Airborne.¹¹

ARMY

- Most of the UAV units in the Russian Ground Forces appear to be company-sized formations (Рота БПЛА) equipped with various Class I tactical systems. They are generally attached as organic support elements to Motor Rifle Brigades, the Ground Forces' primary combined arms formation. Within a typical Motor Rifle Brigade, the UAV Company may be called upon to provide aerial surveillance or reconnaissance for any of the combat elements of the brigade. According to Dr. Lester Grau and Chuck Bartles at the U.S. Army's Foreign Military Studies Office, each UAV Company is organized into platoons that each operate different UAVs.^{12,13} For example, a “mini-platoon” is equipped with the hand-launched Granat-1 while a “short-range” platoon is equipped with the heavier catapult-launched Orlan-10 or Granat-3SV.
- Other Russian Ground Forces formations also appear to contain UAV elements of varying sizes. Several formations, such as the 16th Special Purpose Brigade in the Eastern Military District, incorporate UAV units that are probably smaller than a full UAV Company. Another group, the 201st Military Base in Tajikistan, has activated an Unmanned Aviation Battalion (Батальон беспилотной авиации) that includes a unit equipped with the Searcher Mk II.¹⁴

Name	HQ	Type	Equipment	Activated
UAV Unit, 16th Separate Special Purpose Brigade (Unit 54607), Western Military District ¹⁵	Подразделения БПЛА, 16-я отдельная бригада специального назначения (в/ч 54607), ЗВО	Tambov, Tambov Oblast	D	Eleron, Granat-4, Orlan-10
UAV Company, 4th Guards Tank Division (Unit 19612), 1st Guards Tank Army, Western Military District ¹⁶	Рота БПЛА, 4-я гвардейская танковая дивизия, 1-я гвардейская танковая армия, ЗВО	Naro-Fominsk, Moscow Oblast	D	
UAV Company, 25th Separate Guards Motorized Rifle Brigade, 6th Army, Western Military District	Рота БПЛА, 25-я отдельная гвардейская мотострелковая бригада, 6-я армия, ЗВО	Pskov Oblast	D	

UAV Company, 15th Separate Guards Motorized Rifle Brigade (Unit 90600), 2nd Guards Combined Army, Central Military District ¹⁷	Рота БПЛА, 15-я отдельная гвардейская мотострелковая бригада (в/ч 90600), 2-ю гвардейскую общевойсковую армию, Центральный военный округ	Samara, Samara Oblast	D	Tachyon-3, Eleron-3, Orlan-10	2014
UAV Company, 55th Separate Motorized Rifle Mountain Brigade (Unit 55115), 41st Army, Central Military District ¹⁸	Рота БПЛА, 55-я отдельная мотострелковая бригада (в/ч 05812), 41-я общевойсковая армия, Центральный военный округ	Kyzyl, Tuva Republic	D	Orlan-10, Eleron-3	2018
UAV Company, 21st Separate Guards Motorized Rifle Brigade (Unit 12128), 2nd Guards Combined Army, Central Military District ¹⁹	Рота БПЛА, 21-я отдельная гвардейская мотострелковая Омско-Новобугская Краснознамённая (в/ч 12128), 2-я гвардейская общевойсковая армия, Центральный военный округ	Totskoye, Orenburg Oblast	D	Zastava, Granat, Leer	2014
UAV Unit, 385th Guards Artillery (Unit 32755), 2nd Guards Combined Army, Central Military District ²⁰	Подразделения БПЛА, 385-я гвардейская артиллерийская Одесская Краснознамённая, ордена Богдана Хмельницкого бригада (в/ч 32755), 2-я гвардейская общевойсковая армия, Центральный военный округ	Totskoye, Orenburg Oblast	D		2018
UAV Battalion, 201st Russian Military Base, Central Military District ²¹	Батальон беспилотной авиации, 201-я российская военная база, Центральный военный округ	Gissar Air Base and Qurghontepa International Airport, Tajikistan	D	Orlan-10, Eleron, Granat, Takhion, Searcher Mk II	2019
UAV Unit, 120th Artillery Brigade (Unit 59361), 31st Army, Central Military District ²²	120-я артиллерийская бригада (в/ч 59361), 41-я общевойсковая армия, Центральный военный округ	Yurga, Kemerovo Oblast	D	Orlan-10	2019

UAV Company, 19th Separate Motorized Rifle Brigade (Unit 20634), 58th Army, Southern Military District ²³	Рота БПЛА, 19-я отдельная мотострелковая Воронежско-Шумлинская Краснознамённая (в/ч 20634), 58-й армии, Южный военный округ	Vladikavkaz, North Ossetia	D	Orlan-10	2014
UAV Company, 20th Separate Guards Motorized Rifle Brigade (Unit 22220), 8th Guards Combined Arms Army, Southern Military District ²⁴	Рота БПЛА, 20-я отдельная гвардейская мотострелковая бригада (в/ч 22220), 8-я гвардейская общевойсковая армия, Южный военный округ	Volgograd, Volgograd Oblast	D		
UAV Company, 4th Guards Military Base (Unit 66431), Southern Military District ²⁵	Рота БПЛА, 4 гвардейская военная база (в/ч 66431), Южный военный округ	Tskhinvali, South Ossetia	D	Granat, Orlan-10	2014
UAV Company, 7th Military Base (Unit 09332), Southern Military District ²⁶	Рота БПЛА, 7 российская военная база (в/ч 09332), Южный военный округ	Gudauta, Abkhazia	D	Orlan-10, Zastava, Granat	2010
UAV Company, 102nd Military Base (Unit 04436), Southern Military District ²⁷	Рота БПЛА, 102-я российская военная база, Южный военный округ	Gyumri, Armenia	D	Granat, Orlan-10, Tachyon	2014
UAV Company, 136th Separate Guards Motorized Rifle Brigade (Unit 63354), 58th Army, Southern Military District ^{28,29}	Рота БПЛА, 136-я отдельная гвардейская мотострелковая, 58-я общевойсковая армия, Южный военный округ	Buynaksk, Republic of Dagestan	D		2015
UAV Unit, 291st Artillery Brigade (Unit 64670), 58th Combined Arms Army, Southern Military District ³⁰	подразделения БПЛА, 291-я артиллерийская бригада (в/ч 64670), 58-я общевойсковая армия, Южный военный округ	Troitskaya, Ingushetia	D		2018

UAV Company, 49th Machine-Gun and Artillery Regiment (Unit 71436), 18th Machine Gun Artillery Division (Unit 05812), 68th Army Corps, Eastern Military District ^{31,32}	Рота БПЛА, 49-й пулемётно-артиллерийский, (в/ч 71436), 18-я пулемётно-артиллерийская дивизия (в/ч 05812), Восточный военный округ	Iturup Island, Sakhalin Oblast	D	Orlan-10

NAVY

- The Russian Navy has activated one UAV regiment (полк БПЛА) with the Northern Fleet and one UAV squadron (эскадрилья БПЛА) with the Black Sea Fleet. It also appears to be in the process of standing up UAV units with the Baltic Fleet and Pacific Fleet.^{33,34} In March 2018 the Baltic Fleet conducted an exercise in which a Searcher Mk II corrected naval artillery fire.³⁵
- Russian reports on the Pacific Fleet's UAV activities are somewhat contradictory. In 2014 media outlets reported that the Pacific Fleet had activated a UAV regiment equipped with the Searcher Mk II.³⁶ More recent reports, such as a December 2017 MoD article and a January 2019 media report in Izvestia, claim that the Northern Fleet is the only fleet with a UAV regiment.^{37,38} Yet, satellite images of Petropavlovsk-Kamchatsky Airport, the Pacific Fleet Air Wing's main air base, appear to show that ground control stations for the Searcher Mk II were placed at the base some time in late 2017 or early 2018.³⁹ And in June 2019, reports in Russia media outlets said that Searcher UAVs with Pacific Fleet Naval Aviation (*Военно-воздушные силы Тихоокеанского флота*) had been deployed to monitor forest fires on the Kamchatka Peninsula.⁴⁰ It is very likely that the Pacific Fleet is equipped with Searchers, although it is not clear whether these aircraft constitute a unique UAV unit. In December 2018 the Navy announced that Steregushchiy-class corvettes with the Pacific Fleet would receive several Orlan-10s.⁴¹

Name		HQ	Type	Equipment	Activated
UAV Regiment, 45th Air Force and Air Defense Army, Northern Fleet	полк БПЛА, 45-я армия ВВС и ПВО, Северный флот ВМФ России	Severomorsk-2 Air Base	D	Orlan-10, Searcher Mk II	2016
UAV Squadron, 318th Mixed Aviation Regiment, Black Sea Fleet ⁴²	эскадрилья БПЛА, 318-го смешанного авиационного полка, Черноморский флот	Sebastopol	D	Searcher Mk II	2019

TRAINING

- The 924th State Center for Unmanned Aviation of the Russian Federation Ministry of Defense (*924 Государственного центр беспилотной авиации Министерства обороны Российской Федерации*) was activated in 2014 as an inter-service theoretical and technical training academy for drone pilots, sensor operators, and technicians.⁴³ It is currently located southeast of Moscow in Kolomna. Practical training on the Searcher likely takes place at the nearby Stupino Air Base. Established in 1983 to provide instruction on ground-based cruise missiles, the Center merged with the 215th UAV Base in 2011, and was re-named the 924th Multiservice Center for Unmanned Aerial Vehicles in 2013. In December 2014 it was renamed again, as the 924th State Center for Unmanned Aviation of the Russian Federation Ministry of Defense.

- The Russian Air Force also conducts officer training at the 4th Faculty of Unmanned Aviation at the Chelyabinsk Higher Military Aviation School of Navigators (*4 ФАКУЛЬТЕТ беспилотной авиации, Челябинское высшее военное авиационное училище штурманов*), part of the Zhukovsky-Gagarin Air Force Academy. In October 2018, 4th Faculty graduated its first class of operators, who completed a five-year course of study that included stints at the 924 Center.⁴⁴ Officers who graduate from the 4th Faculty lead unmanned aircraft units in the Air Force, Navy, and Army.
- Unmanned aircraft have featured prominently in Russian Army training operations and military exercises, particularly in the Southern Military District, where some of the Army's oldest drone units are located. In November 2018, the Russian Ministry of Defense reported that a single company at a military base in Armenia (likely the 102nd Military Base) had accumulated more than 5,000 flight hours in training operations at the Kamkhud and Alagyaz ranges that year, a 20 percent increase over 2017.⁴⁵ In 2016, Russian drones were deployed in the INDRA-2016 military exercise with India.⁴⁶ At the annual Army International Games (ARMI) in 2017, teams from Russia, Kazakhstan, and Iran competed in a range of mock drone operations such as nighttime aerial reconnaissance and artillery fire correction.⁴⁷ A team from Belarus joined ARMI in 2018.

OPERATIONS

Country	Base	Equipment	Period	Operation
Georgia		Pchela-1T	2008	Mole Cricket 19
Russia briefly deployed the Pchela-1T in the 2008 Russo-Georgian War. ⁴⁸ In <i>The Russian Military and the Georgia War: Lessons and Implications</i> , Ariel Cohen and Robert E. Hamilton write that Russian military commanders during the war declared the system virtually inoperable due to its noisiness, degraded image quality, and low flight ceiling. ⁴⁹				
Ukraine	Taganrog Air Base	Searcher Mk II, Orlan-10, Eleron-3, (Other)	2014-	Accountability
Drones have featured prominently in Russian operations in eastern Ukraine in support of Ukrainian separatists. Though Russia has not officially acknowledged its participation in the conflict, at least nine different types of Russian-made UAVs have been identified operating in the region since the start of hostilities. ⁵⁰ The Ukrainian government has reported that Russian military UAV specialists deployed to the area in 2018 to evaluate the effectiveness of these systems in combat. ⁵¹ The conflict has provided a testing ground for Russia to explore new operational concepts involving drones such as the Leer-3 electronic warfare system, which consists of three Orlan-10s and a KamAZ-5350 truck that serves as a command and control hub. ⁵² At least two Russian Searcher Mk IIs and a dozen Orlan-10s have been downed in eastern Ukraine since 2014. According to a March 2019 presentation by a Ukrainian military official, Ukrainian forces catalogued 641 cases in which Russian and Russian-backed forces in eastern Ukraine used UAVs in 2017 and 250 cases in 2018. ⁵³				
Syria	Khmeimim Air Base	Searcher Mk II, Orlan-10, Eleron-3, (Other)	2015-	Grapes of Wrath
Russia deployed drones to the Syrian Civil War in 2015. Initially deployed around Khmeimim Air Base, a Russian military headquarters in Latakia province, Russian Searcher Mk IIs have been spotted at Aleppo International Airport in 2016, Deir ez-Zor Airport in 2017, and T-4 Air Base in 2019. ^{54,55,56} Russia has used the Leer-3 electronic warfare system to interfere with enemy communications, including their ability to send messages to mobile phones. ^{57,58} According to the MoD, Russian UAVs had conducted 23,000 sorties, totaling more than 140,000 flight hours since the beginning of the Syrian conflict as of July 2018. ⁵⁹				

INFRASTRUCTURE

Name	Country	Latitude	Longitude	Affiliation	Activity	Notes
Severomorsk-2 Air Base, Murmansk Oblast	Russia	69°0'54"N	033°17'30"E	Navy	HQ	
Chkalovsk Air Base, Kaliningrad Oblast	Russia	54°46'0"N	020°23'48"E	Navy	HQ	
Taganrog Air Base, Rostov Oblast	Russia	47°13'N	38°55'E		Deployment	
Kolomna, Moscow Oblast	Russia	55°01'59"N	038°50'42"E	924th Center	Training	
Salka Airport (Nizhny Tagil), Sverdlovsk Oblast	Russia	57°59'18"N	060°14'6"E		Test site	Forpost test site
Stupino Airfield, Moscow Oblast	Russia	54°53'18"N	038°9'6"E		Training	
Petropavlovsk-Kamchatsky Airport, Kamchatka	Russia	53°10'3"N	158°27'12"E	Navy	HQ	
Khmeimim Air Base	Syria	35°24'42"N	35°56'42"E	Air Force	Deployment	

OTHER

Name	Country	Latitude	Longitude	Affiliation	Activity	Notes
Staroselye Airport	Russia	58°6'6"N	038°55'30"E		Test site	Corsair test site
Borisoglebsky Airport	Russia	55°51'49"N	049°07'44"E	Kazan State Aviation Plant	Test site	Altair test site

Protasovo Airfield	Russia	54°29'45"N	039°55'57"E		Test site	Orion test site in mid-2017
Deir ez-Zor Airport	Syria	35°17'07"N	040°10'33"E		Deployment	Searcher Mk II deployment in 2017
Qurghon-teppa International Airport	Tajikistan	37°51'44"N	068°51'46"E	201st Military Base	Deployment	Possible Searcher Mk II deployment

DEVELOPMENT

- The Orion (*Орион*) is a Class III fixed-wing UAV developed by the Kronshtadt Group, a subsidiary of Joint-Stock Financial Corporation Sistema, under a contract awarded by the Ministry of Defense in 2011. The Orion was first publicly displayed at the 2017 MAKS arms fair. In August 2018 the director of Russia's arms export bureau said that an unnamed country in the Middle East had already placed an order for the Orion-E, an export variant of the system.⁶⁰ In September 2018 Kronshtadt showcased a strike-capable variant of the Orion.⁶¹ According to a September 2018 media report, Kronshtadt is exploring the possibility of developing a high-altitude long-endurance variant of the Orion called the Orion-2.⁶²
- The Altair (*Альтаир*) is a twin-engine Class III fixed-wing UAV. The Simonov Design Bureau (SDB) began work on the Altair in 2011 with the goal of developing a high-altitude drone for arctic surveillance missions. The Altair's first flight tests took place in 2016. In October 2018 the Ministry of Defense pulled the project from SDB, noting the company's lack of progress in overcoming technical challenges in key areas such as sensors and microprocessors.⁶³ In December 2018 Deputy Defense Minister Alexei Krivoruchko said in an interview that work on the Altair would continue at the Ural Civil Aviation Plant.⁶⁴
- The Okhotnik (*Охотник*) is a Class III fixed-wing UAV developed by Sukhoi. The Okhotnik is reportedly designed to serve as a combat drone capable of reaching a top speed of 1,000 kilometers per hour. Photos of the drone, showing the aircraft taxiing on a runway, were first published online in January 2019.⁶⁵ The Okhotnik conducted its maiden flight in August 2019, lasting around 20 minutes.⁶⁶ A satellite image from early 2019 showed that a demonstrator aircraft has been based at Akhtubinsk Air Base, potentially for flight tests.⁶⁷ Sukhoi has reportedly manufactured several demonstrator aircraft as of this writing.
- The Forpost-M (*Форпост-М*) is a variant of Searcher Mk II developed by the Ural Civil Aviation Plant (UZGA). The project was announced at the Army-2015 arms fair.⁶⁸ Built from Russian components, it is expected to have improved communications compared to the Searcher, a new radar system, and strike capability.⁶⁹ In July 2018 the Ministry of Defense reported that the Forpost-M was undergoing tests and could enter service in 2019.⁷⁰
- The Corsair (*Корсар*) is a Class II fixed-wing UAV developed by OKB Luch. It was unveiled at the 9 May 2018 Victory Day parade in Moscow.⁷¹ The project reportedly began in 2009, with the aircraft's first flight taking place in 2015. The Corsair is a twin-boom aircraft with a push-propeller design. According to a March 2019 media report, Corsair production has been delayed due to a legal dispute between OKB Luch and Itlan Engineering Center, a company contracted to provide engines for the Corsair.⁷² Nevertheless, Russian officials have signalled their intention to purchase the Corsair.
- The Katran (*Катран*) is a Class II rotary-wing UAV developed by Russian Helicopter Group. It was unveiled at the 2018 Victory Day parade in Moscow.⁷³ The Katran is notable for its coaxial rotor layout. It is expected to replace the Schiebel Camcopter S-100, which the Navy acquired in limited numbers in 2011 for trials. The Katran reportedly began flight trials in 2018.⁷⁴
- The Carnivora (*Карниво́ра*) is a Class I fixed-wing UAV developed by NPP Mikran. A mockup was displayed at the 2017 "Robotization of the Armed Forces" conference and an upgraded version was announced in a video released in December 2018.⁷⁵ It is designed for both strike and counter-UAV missions and is advertised as capable of operating in denied environments.



The Katran (left) and Corsair (right) UAVs at the 2018 Victory Day Parade in Moscow. Credit: Kremlin.ru/Wikimedia

EXPORTS

Country	Model	Make	Class	Status	Notes
Armenia	Ptero-5E	AFM Servers	I	Active	
Kazakhstan	Orlan-10	Special Technology Center	I	Active	

NOTES

1. Russian Ministry of Defense, “В воинские соединения ЮВО на Северном Кавказе поступили первые мини-квадрокоптеры,” news release, 11 June 2019, https://function.mil.ru/news_page/country/more.htm?id=12236086@egNews.
2. Ministry of Defense of Russia, “Семь новых комплексов БЛА «Застава», «Гранат» и «Леер» поступили в ЦВО,” news release, 16 January 2014, https://vpk.name/news/103561_sem_novyih_kompleksov_bla_zastava_granat_i_leer_postupili_v_cvo.html.
3. “Russia Military Power: Building a Military to Support Great Power Aspirations,” Defense Intelligence Agency, 2017, <http://www.dia.mil/Portals/27/Documents/News/Military%20Power%20Publications/Russia%20Military%20Power%20Report%202017.pdf>.
4. Ibid
5. “Минобороны закупило 34 российских беспилотника на сумму в 100 млн руб,” *RIA*, 4 December 2013, <https://ria.ru/20131204/981761250.html>.
6. “Russia Military Power: Building a Military to Support Great Power Aspirations,” Defense Intelligence Agency, 2017, <http://www.dia.mil/Portals/27/Documents/News/Military%20Power%20Publications/Russia%20Military%20Power%20Report%202017.pdf>.
7. “UAV Use in the Russian Armed Forces,” Operational Environment Watch, June 2018, <https://community.apan.org/wg/tradoc-g2/fmso/p/oe-watch-issues>.
8. Вадим Савицкий, “Демонстрация новых российских БЛА,” *Military Review*, 2 July 2013, <https://topwar.ru/30286-demonstraciya-novyh-rossijskih-bla.html>.
9. Ibid
10. Rob Lee (@RALee85), “For UAVs, Russia has increased the number of UAV units from 3 to 40, the # of UAVs from 91 to 2,136, # of UAV flights completed annually from 600 to 18k from 2012 to 2018,” Twitter, 11 January 2019, <https://twitter.com/RALee85/status/1083903473312243718>.
11. “Во всех соединениях ВДВ к концу года появятся подразделения беспилотников,” *RIA News*, 29 May 2018, https://vpk.name/news/216539_vo_vseh_soedineniyah_vdv_k_koncu_goda_poyavyatsya_podrazdeleniya_bespi-lotnikov.html.
12. Lester W. Grau and Chuck Bartles, “Integration of unmanned aerial systems within Russian artillery,” *Fires Bulletin*, July 2016, <https://community.apan.org/wg/tradoc-g2/fmso/m/finso-monographs/195395>.
13. Lester W. Grau and Chuck Bartles, “The Russian Reconnaissance Fire Complex Comes of Age,” Changing Character of War Center, May 2018, <https://static1.squarespace.com/static/55faab67e4b0914105347194/t/5b0eaf961ae6cf4f8066b5c/1527689124139/The+Russian+Reconnaissance+Fire+Complex+Comes+of+Age.pdf>.
14. “Российскую базу в Таджикистане усилят батальоном БПЛА,” *Eurasia Daily*, 15 January 2019, <https://eadaily.com/ru/news/2019/01/15/rossiyskuyu-bazu-v-tadzhikistane-usilyat-batalonom-bpla>.
15. Ministry of Defense, “Подразделение беспилотной авиации ЗВО сдает итоговую проверку за летний период обучения в Тамбовской области,” news release, 23 October 2018, https://function.mil.ru/news_page/country/

- more.htm?id=12200968@egNews.
16. Ministry of Defense, "Общий налет БЛА гвардейской танковой армии ЗВО в летнем периоде обучения составил более 2,5 тыс. Часов," news release, 10 November 2018, https://function.mil.ru/news_page/country/more.htm?id=12203452@egNews.
 17. Ministry of Defense, "В миротворческом соединении ЦВО сформирована рота беспилотных летательных аппаратов," news release, 17 December 2014, https://function.mil.ru/news_page/country/more.htm?id=12003988@egNews.
 18. Петр Архипов, "Рота БПЛА заступает на боевое дежурство в горную бригаду ЦВО," ПолитРоссия, January 2018, <https://politros.com/110450-rot-a-bpla-zastupaet-na-boevoe-dezhurstvo-v-gornuyu-brigadu-cvo>.
 19. Ministry of Defense, "Войска Центрального военного округа оснащаются новейшими беспилотными летательными аппаратами," news release, 15 January 2014, https://function.mil.ru/news_page/country/more.htm?id=11889195@egNews/.
 20. Ministry of Defense, "У артиллеристов 2-й общевойсковой армии ЦВО в Оренбургской области появится подразделение БПЛА," news release, 17 December 2018, https://function.mil.ru/news_page/country/more.htm?id=12003988@egNews.
 21. "Российскую базу в Таджикистане усилят батальоном БПЛА," *Eurasia Daily*, 15 January 2019, <https://eadaily.com/ru/news/2019/01/15/rossiyskuyu-bazu-v-tadzhikistane-usilyat-batalonom-bpla>.
 22. Ministry of Defense, "Отдельные подразделения беспилотной авиации впервые появились в артиллерийских соединениях ЦВО," news release, 6 March 2019, https://function.mil.ru/news_page/country/more.htm?id=12220356@egNews.
 23. "О похождениях роты БПЛА 19-й мотострелковой бригады в Украине," InformNapalm, 8 May 2015, <https://informnapalm.org/8819-o-pohozhdeniyah-rot-y-bpla-19-j-motostrelkovoy-brygady-v-ukrayne/>.
 24. "В ЮВО сформированы роты беспилотных летательных аппаратов," Ministry of Defense, 28 January 2014, https://function.mil.ru/news_page/world/more.htm?id=11896364@egNews.
 25. "4 гвардейская военная база (в/ч 66431)," Voinsayachast, 26 January 2015, <https://voinskayachast.net/suhoputnie-voyska/motostrelkovie/vch66431>.
 26. *В ожидании бури: Южный Кавказ*, edited by K.B. Макиенко, (Moscow: Center for Analysis of Strategy and Technology, 2018), 112.
 27. *В ожидании бури: Южный Кавказ*, edited by K.B. Макиенко, (Moscow: Center for Analysis of Strategy and Technology, 2018), 108.
 28. *В ожидании бури: Южный Кавказ*, edited by K.B. Макиенко, (Moscow: Center for Analysis of Strategy and Technology, 2018), 114-115.
 29. Ministry of Defense, "Подразделение БЛА мотострелковой бригады в Дагестане приступило к ночным полетам," news release, 13 July 2016, https://function.mil.ru/news_page/person/more.htm?id=12089736@egNews.
 30. Ministry of Defense, "В артиллерийском соединении ЮВО в Ингушетии сформировано подразделение БЛА," news release, 14 December 2018, https://function.mil.ru/news_page/country/more.htm?id=12208080@egNews.
 31. "В подразделения БПЛА на Сахалине поступили 5 комплексов «Орлан-10»," *Military Review*, 9 March 2016, <https://topwar.ru/92035-v-podrazdeleniya-bpla-na-sahaline-postupili-5-kompleksov-orlan-10.html>.
 32. Алексей Рамм and Богдан Степовой, "Курильские аэродромы: беспилотники защитят Дальний Восток," *Izvestiya*, 8 April 2019, <https://iz.ru/850441/aleksei-ramm-bogdan-stepovoi/kurilskie-aerodromy-besplotniki-zashchitiat-dalnii-vostok>.
 33. Алексей Рамм and Богдан Степовой, "Безлюдный флот: Россия стала второй по числу военных беспилотников," *Izvestia*, 24 April 2018, <https://iz.ru/732935/aleksei-ramm-bogdan-stepovoi/bezlyudnyi-flot>.
 34. "Russian UAV Regiment Stationed in the Arctic," *Operational Environment Watch*, February 2018, <https://community.apan.org/wg/tradoc-g2/fmo/p/oe-watch-issues>.
 35. Ministry of Defense, "Расчеты подразделения БЛА Балтийского флота учатся корректировать огонь корабельной артиллерии," news release, 21 March 2018, <https://tvzvezda.ru/news/forces/content/e3f7c79851e-c195dd0a94b5265e2297999291fea7c27a4df6bf4e3dcdcf322405>.
 36. "На Тихоокеанском флоте укомплектован отряд беспилотников," МАНГАЗЕЯ, 17 January 2014, <https://www.mngz.ru/russia-world-sensation/281112-na-tihookeanskom-flote-ukomplektovan-otryad-besplotnikov.html>.
 37. Анна КОРОЛЬКОВА, "У первого полка БПЛА – морская прописка," *Red Star*, 28 December 2017, <http://archive.redstar.ru/index.php/newspaper/item/35528-u-pervogo-polka-bpla-morskaya-propiska>.
 38. Алексей Рамм and Александр Круглов, "Дроны-поводыри: беспилотники впервые указали путь эскадре," *Izvestiya*, 5 January 2019, <https://iz.ru/768417/aleksei-ramm-aleksandr-kruglov/drony-povodyri-besplotniki-vpervye-ukazali-put-eskadre>.
 39. See page 305.
 40. "Беспилотные летательные аппараты морской авиации ТОФ задействованы для мониторинга пожарной обстановки на Камчатке," *Рамблер*, 4 June 2019, <https://news.rambler.ru/troops/42278927-besplotnye-letatelnye-apparaty-morskoj-aviatsii-tof-zadeystvovany-dlya-monitoringa-pozharnoy-obstanovki-na-kamchatke/>.
 41. Алексей Рамм and Богдан Степовой, "С «Орланом» на корме: корветы-невидимки получают ударные дроны," *Izvestiya*, 18 December 2018, <https://iz.ru/817741/aleksei-ramm-bogdan-stepovoi/s-orlanom-na-korme-korvety-nevidimki-poluchat-udarnye-drony>.
 42. "Присмотрят свысока: Крым укрепят эскадрилей БПЛА «Форпост»," *Izvestiya*, 14 August 2019, <https://iz.ru/909392/aleksei-kozachenko-roman-kretcul-aleksei-ramm/prismotriat-svysoka-krym-ukrepiat-eskadrilei-bpla-forpost>.

43. "История 924 Государственного центр беспилотной авиации Министерства обороны Российской Федерации," Ministry of Defense, accessed 17 November 2018, <http://stat.mil.ru/924gcba/history.htm>.
44. Ministry of Defense, "ПЕРВЫЙ ВЫПУСК ОФИЦЕРОВ - ОПЕРАТОРОВ БЛА В ВС РФ СОСТОЯЛСЯ В ЧЕЛЯБИНСКОМ ФИЛИАЛЕ ВУНЦ ВВС «ВВА»,» news release, 29 October 2018, <http://vva.mil.ru/more/Novosti/item/144800/>.
45. Ministry of Defense, "В Армении в 2018-м учебном году беспилотники ЮОВО налетали 5 тыс. Часов," 17 November 2018, https://function.mil.ru/news_page/country/more.htm?id=12204393@egNews.
46. "Мотострелки применили беспилотники «Орлан-10» в рамках учений «Индра-2016», RIA Novosti, 27 September 2016, <https://ria.ru/20160927/1477918690.html>.
47. Ministry of Defense, "В Казахстане завершился конкурс АрМИ-2017 среди расчетов беспилотников," news release, 8 August 2017, https://function.mil.ru/news_page/country/more.htm?id=12136942@egNews.
48. Isabelle Facon, "A Perspective on Russia," Center for a New American Security, May 2016, <http://drones.cnas.org/wp-content/uploads/2016/05/A-Perspective-on-Russia-Proliferated-Drones.pdf>.
49. Ariel Cohen and Robert E. Hamilton, *The Russian Military and the Georgia War: Lessons and Implications* (Strategic Studies Institute: 2008), 61.
50. "The ninth Russian drone type identified in Donbas," *InformNapalm*, 9 June 2018, <https://informnapalm.org/en/the-ninth-russian-drone-type-identified-in-donbas/>.
51. "На Донбасс прибыла группа 'спецов' из России и новые БПЛА: в разведке сообщили детали," *Segodnya*, 21 December 2018, <https://www.segodnya.ua/regions/donetsk/na-donbass-pribyla-gruppa-specov-iz-rf-i-novye-bpla-v-razvedke-soobshchili-detali-1200116.html>.
52. Michael Sheldon, "#MinskMonitor: The Russian Drone Wagons of the Donbas," Digital Forensic Research Lab, 11 November 2018, <https://medium.com/dfrlab/minskmonitor-the-russian-drone-wagons-of-the-donbas-7481a998e8ca>.
53. Borys Kremenetsky, "EW Lessons Learned: Russian Hybrid Warfare in Ukraine," presentation, Royal United Services Institute, London, 20 March 2019, https://rusi.org/sites/default/files/russian_military_jamming_in_the_air_environment_-_maj_gen_borys_kremenetskyi.pdf.
54. Aldin (@aldin_ww), "What could be a Russia UAV 'Forpost' at Aleppo airport 07-19-2016 Syria," Twitter, 18 August 2016, https://twitter.com/aldin_ww/status/766393119629869056.
55. See page 310.
56. Observer IL (@Obs_IL), "Quick look at T-4 Airbase (#Tiyas) #Syria - Sat Imagery dated 05.05.2019 (Pleiades). #RuAF 2x Su-25 'Frogfoot', #SyAAF Su-24, #RuAF 1x 'Forpost' UAV h/t @obretix (Licensed copy of #IAI Searcher)," Twitter, 7 May 2019, https://twitter.com/Obs_IL/status/1125676744680321024.
57. "Russia's UAV Virtual Cellular Communication Tower," *Operational Environment Watch*, March 2017, <https://community.apan.org/wg/tradoc-g2/fmso/p/oe-watch-issues>.
58. "Testing Russian Weapons in Syria," *Operational Environment Watch*, March 2017, <https://community.apan.org/wg/tradoc-g2/fmso/p/oe-watch-issues>.
59. Russian Ministry of Defense, "Российские беспилотники во время операции в Сирии провели в воздухе более 140 тысяч часов," news release, 6 July 2018, https://function.mil.ru/news_page/country/more.htm?id=12184627@egNews.
60. "Russian company release photos of new Orion UAV," Defence Blog, 26 March 2018, <https://defence-blog.com/news/russian-company-release-photos-new-orion-uav.html>.
61. Jeremy Binnie, "Russia announces Orion UAV sale to Middle East country," *IHS Jane's Defence Weekly*, 21 August 2018, <https://www.janes.com/article/82491/russia-announces-orion-uav-sale-to-middle-east-country>.
62. Nikolai Novichkov, "Kronshtadt weaponises Orion-E UAV, outlines HALE UAV development," *Jane's International Defence Review*, 26 September 2018, <https://www.janes.com/article/83350/kronshtadt-weaponises-orion-e-uav-outlines-hale-uav-development>.
63. "В Казани закрыта программа производства тяжелого беспилотника," *Federal Press*, 9 October 2018, <http://fedpress.ru/news/16/economy/2139659>.
64. "Разработка беспилотника 'Альтиус' продолжится с новым подрядчиком," *TASS*, 19 December 2018, <https://tass.ru/armiya-i-opk/5931392>.
65. David Axe, "Russia's Next Deadly Weapon: A Stealth, Jet-Powered Robot Warplane," *The National Interest*, 28 January 2019, <https://nationalinterest.org/blog/buzz/russias-next-deadly-weapon-stealth-jet-powered-robot-warplane-42662>.
66. David Donald, "Russia Releases S-70 Okhotnik Flight Video," *Aviation International Online*, 8 August 2019, <https://www.ainonline.com/russias70flightvideo>.
67. Joseph Trevithick, "Russia's 'Hunter' Flying Wing Unmanned Combat Air Vehicle Is A Big Beast," *The Drive*, 21 May 2019, <https://www.thedrive.com/the-war-zone/28147/russias-hunter-flying-wing-unmanned-combat-air-vehicle-is-a-big-beast>.
68. Arie Egozi, "Russia developing unmanned Forpost-M," *FlightGlobal*, 21 March 2017, <https://www.flightglobal.com/news/articles/russia-developing-unmanned-forpost-m-435419/>.
69. "Russia's new combat drone ready for maiden flight," *Pravda*, 28 September 2018, http://www.pravdareport.com/news/russia/economics/28-09-2018/141689-hunter_drone-0/.
70. Алексей Гундарев, "ВКС получают первый российский ударный беспилотник," *Zvezda*, 24 July 2018, <https://tvzvezda.ru/news/opk/content/201807240223-mjti.htm>.
71. Vladimir Karnozov, "Russia Unveils New Missile-armed UCAVs," *Aviation International Online*, 14 May 2018, <https://www.ainonline.com/aviation-news/defense/2018-05-14/russia-unveils-new-missile-armed-ucavs>.
72. "Победные российские «Корсары» снова лишились двигателей," *Lenta.ru*, 28 March 2019, <https://lenta.ru/>

news/2019/03/28/korsar/.

73. “Минобороны России рассекретило планы разработки ударных беспилотников,” MKRU, 5 May 2018, <https://www.mk.ru/politics/2018/05/05/minoborony-rossii-rassekretilo-plany-razrabotki-udarnykh-bespilotnikov.html>.
74. Nikolai Novichkov, “Russia’s new Katran UAV to enter trials in mid-2018,” *Jane’s International Defence Review*, 1 June 2018, <https://www.janes.com/article/80560/russia-s-new-katran-uav-to-enter-trials-in-mid-2018>.
75. Kelsey D. Atherton, “Russia’s Carnivora is designed for a drone-eat-drone world,” *C4ISRNET*, 13 December 2018, <https://www.c4isrnet.com/unmanned/2018/12/14/russias-carnivora-is-designed-for-a-drone-eat-drone-world/>.

TURKMENISTAN

INVENTORY

Model	Make	Origin	Class	Intro	Qty	Operator	Notes
Orbiter-3 ¹	Aeronautics	Israel	I	2017			
CH-3 ²	CAIC	China	II	2016	2		
Falco ³	Selex ES	Italy	II	2010	3		

NOTES

1. “Türkmenistan hərbi paradda yeni silahlarını nümayiş etdirdi – FOTO – VIDEO,” *Azeri Defence*, 31 October 2017, <http://az.azeridefence.com/turkmenistan-herbi-paradda-yeni-silahlarini-numayis-etdirdi-foto-video/>.
2. “SIPRI Arms Transfers Database,” Stockholm Peace Research Institute, accessed 16 April 2019, <https://www.sipri.org/databases/armstransfers>.
3. Ibid

UKRAINE

INVENTORY

- Several reports have indicated that the number of unmanned aircraft in the Ukrainian military is rising sharply. In its official annual review of military procurement, the Ukrainian Air Force reported purchasing 75 systems (each of which likely include multiple aircraft) in 2018, roughly double the 35 systems the Air Force purchased in 2017.¹ In January 2018, Ukrainian journalist Yuri Butusov, editor of the online website Censor.net, reported that the Armed Forces General Staff had set a goal of purchasing a minimum of 500 unmanned aircraft systems over the next few years, although this figure has not been officially confirmed.²
- The Donbass War has prompted a boom in the development of domestic drones.³ In addition to several imported systems, at least three Ukrainian systems—the Athlon Air A1-M Fury, Spaitech Sparrow, and DeViro Leleka-1000—were in active use as of this writing. Several other Ukrainian UAVs such as the Observer-S, Raybird-1, and ASU-1 Valkyrie have been cleared for use in the military, though they do not appear to have been purchased in large numbers. The State Scientific Testing Center in Chernihiv (*Державному науково-випробувальному центрі Збройних Сил України*) is responsible for testing and approving new systems.
- In addition to state-level acquisition efforts, Ukraine’s volunteer battalions have developed and acquired an array of hobbyist and military-grade drones. At least some of these acquisitions were subsidized by private fundraising drives. The demand for modern drones led to the creation of companies like Matrix UAV, which was formed to deliver drones to the volunteer battalions in the wake of the Russian incursion. Matrix UAV has developed experimental fixed-wing and multirotor surveillance and reconnaissance drones, including a quadrotor UAV armed with a grenade launcher.⁴

Model	Make	Origin	Class	Intro	Qty	Operator	Notes
RQ-11B Raven ⁵	AeroVi- ronment	USA	I	2016	72 (24)	Air Force	
Warmate ⁶	WB Elec- tronics	Poland	I	2017			“Cokil” “Sokil” Licensed for domes- tic pro- duction by Ukraine’s CheZaRa
FlyEye ⁷	WB Electronics	Poland	I	2018	16 (4)	Army	
A1-S/M Fury ⁸	Athlone Air	Ukraine	I	2015	>40	Army	“фурія”
Sparrow ⁹	Spaitech	Ukraine	I	2015		Army	Trial Sys- tem
Leleka- 100 ¹⁰	DeViro	Ukraine	I			Army	“Лелека”
Observer- S ¹¹	Def C	Ukraine	I	2018			Trial System
Spectator- M ¹²	JSC Me- ridian	Ukraine	I	2016		Army	Upgraded version delivered in 2019
ACS-3 Raybird ¹³	AVK Skateon	Ukraine	I	2019		Air Force	
ASU-1 Valkyrie ¹⁴	Aviation Systems of Ukraine	Ukraine	I	2017		Paramili- tary	
Phantom ¹⁵	DJI	China	I			Paramili- tary	
Inspire ¹⁶	DJI	China	I			Paramili- tary	
Bayraktar TB2 ¹⁷	Baykar- Makina	Turkey	III	2019			

INACTIVE

Model	Make	Origin	Class	Period	Qty	Operator	Notes
Tu-143	Tupolev	Russia	III	1970s-2010s		Air Force	(status unclear)



(Left) Ukrainian servicemen with the A1-S Fury during an exercise in Yavoriv, Ukraine in September 2018. Credit: U.S. Army (Right) Ukrainian Humvees with Leleka-100 UAVs during rehearsal for the 2018 Independence Day military parade in Kyiv. Credit: VoidWander/Wikimedia

PERSONNEL

AIR FORCE

Name	HQ	Type	Equipment	Activated
383rd Unmanned Aerial Vehicle Regiment (Unit A3808)	383-й окремий полк дистанційно-керованих літальних апаратів (в/ч А3808) Khmelnyskyi	D	Bayraktar-TB2	1987

The 383rd was equipped with Soviet-era Tu-141 and Tu-143s, which were last deployed in 2014 and 2015 to eastern Ukraine.¹⁸ Two members of the 383rd were killed in February 2015 in fighting around Donetsk Airport.¹⁹ The 383rd will reportedly begin operating the Bayraktar-TB2, which Ukraine acquired in late March 2019.²⁰

PARAMILITARY

Name	HQ	Type	Equipment	Activated
Aerorozvidka	Аеророзвідка	D	Multiple small UAVs	2014

The Aerorozvidka is a volunteer battalion that formed after the Russian incursion into eastern Ukraine. It is tasked with providing aerial intelligence to Ukrainian forces.²¹ In 2016 Minister of Defense Stepan Poltorak recognized the Aerorozvidka unit for its service in the ongoing conflict.²²

OPERATIONS

- The Ukrainian military and pro-government paramilitary forces have fielded a mix of Class I consumer drones, indigenous military systems, and foreign-made systems for reconnaissance, artillery spotting, and battle damage assessment in the conflict in eastern Ukraine.²³ Ukrainian drones have been extensively targeted by counter-UAV systems. In 2016 Ukraine found that Russian electronic warfare systems were able to easily jam and intercept its U.S.-supplied RQ-11 Ravens.²⁴

INFRASTRUCTURE

Name	Country	Latitude	Longitude	Affiliation	Activity	Notes
Chernihiv Air Base	Ukraine	51°33'0"N	031°19'0"E		Test site	

DEVELOPMENT

- The Horlytsya (*Горлиця*) is a Class II UAV developed by Antonov State Company. It was unveiled in 2017, when Antonov revealed it had conducted its first flight.²⁵ It is the first strike-capable drone produced in Ukraine. According to the manufacturer, the Horlytsya has an endurance of 8 hours.
- Antonov is believed to be developing a strike-capable high-altitude long-endurance UAV with the help of an unnamed foreign country. The company displayed a model of the drone at the Arms and Security expo in Kyiv in October 2018.²⁶ The aircraft will reportedly have a 25-meter wingspan and 13-meter length. Ukraine announced in June 2019 that the Antonov and the United Arab Emirates were exploring the possibility of cooperating on the development of UAVs.²⁷

NOTES

1. "[ОБТ] закупівля озброєння для ЗС України," Ukrainian Military Pages (blog), <https://www.ukrmilitary.com/p/purchase-of-military-equipment-of-armed.html>.
2. "Генштаб засекретив поставки дронів і ПТРК," *Korrespondent*, 24 January 2018, <https://ua.korrespondent.net/ukraine/3932422-henshtab-zasekretyv-postavky-droniv-i-ptrk>.
3. John Wendle, "The Fighting Drones of Ukraine," *Air & Space Magazine*, February 2018, <https://www.airspace-mag.com/flight-today/ukraines-drones-180967708/>.
4. Patrick Tucker, "Ukraine Startup Building Drones with Grenade Launchers," *Defense One*, 20 August 2018, <https://www.defenseone.com/technology/2018/08/ukraine-startup-building-drones-grenade-launchers/150692/>.
5. Leigh Giangreco, "Ukraine receives Raven UAVs," *FlightGlobal*, 28 July 2016, <https://www.flightglobal.com/news/articles/ukraine-receives-raven-uavs-427971/>.
6. Juliusz Sabak, "AS 2017: Warmate UAV with Ukrainian Warheads," *Defence24.com*, 18 October 2017, <https://www.defence24.com/as-2017-warmate-uav-with-ukrainian-warheads-photos>.
7. "ВСУ беруть на вооруження польський беспілотник Fly Eye," *Korrespondent*, 15 December 2017, <https://korrespondent.net/ukraine/3918510-vsut-na-vooruzhenye-polskyi-bespylotnyk-fly-eye>.
8. "БПАК А1-С / А1-СМ «Фурія»," Ukrainian Military pages (blog), 17 August 2016, <https://www.ukrmilitary.com/2016/08/furya.html>.
9. "ДЕШЕВИЙ ТА ЯКІСНИЙ «ГОРОБЧИК»: В ОДЕСІ ВИПРОБУВАЛИ ТАКТИЧНИЙ БЕЗПІЛОТНИК SPARROW LE 1," *5.UA*, 12 February 2017, <https://www.5.ua/regiony/deshevyi-ta-yakisnyi-horobchik-u-odesi-vyprobuvay-taktychniy-bezpilotnyk-sparrow-le-161095.html>.
10. "Шоумен Притула подарував військовим 93-ї бригади сучасний безпілотник," *Новинарня*, 13 December 2018, <https://novynarnia.com/2018/12/13/shoumen-pritula-podaruvav-viyskovim-93-yi-brigadi-suchasniy-bezpilotnik/>.
11. "До експлуатації у ЗСУ допущений безпілотний авіаційний комплекс Observer-S (ВІДЕО)," Ukrainian Military Pages (blog), 24 May 2018, <https://www.ukrmilitary.com/2018/05/def-c-observer-s.html>.
12. Ukroboronprom, "БЕЗПІЛОТНИК СПЕКТАТОР-М1 ПРИЙНЯТО НА ОЗБРОЄННЯ ЗБРОЙНИХ СИЛ УКРАЇНИ," news release, 14 June 2019, <https://ukroboronprom.com.ua/uk/media/bezpilotnyk-spectator-m1-priynyato-na-ozbroyennya-zbrojnyh-syl-ukrayiny.html>.
13. "РЕКОРДНИЙ ПОЛІТ УКРАЇНСЬКОГО БЕЗПІЛОТНИКА КОМПАНІЇ «СКАЕТОН»," *SpaceCom.UA*, 7 January 2019, <http://space.com.ua/2019/07/01/rekordnij-polit-ukrayinskogo-bezpilotnika-kompaniyi-skaeton/>.
14. "Безпілотний авіаційний комплекс ASU-1 «Валькірія»," Ukrainian Military Pages (blog), 28 May 2018, <https://www.ukrmilitary.com/2018/05/asu-1-valkyrja.html>.

15. “Зусиллям волонтерів на озброєння полку «Азов» надійшов новий квадрокоптер DJI Inspire 1,” Ukrainian Military Pages (blog), 7 December 2016, <https://www.ukrmilitary.com/2016/12/dji-inspire-1.html>.
16. Ibid
17. Illia Ponomarenko, “Turkish Bayraktar strike drones pass tests in Ukraine (Video),” *Kyiv Post*, 20 March 2019, <https://www.kyivpost.com/ukraine-politics/turkish-bayraktar-strike-drones-pass-tests-in-ukraine-video.html>.
18. Михаил Жирохов, “Украинский арсенал: дроны,” *Фраза*, 3 May 2017, <https://frazz.ua/analyt-ics/259195-ukrainskij-arsenal-dronu>.
19. “383-й окремий полкдистанційно-керованих літальних апаратів,” Книги та Стіни Памяті, accessed 12 April 2019, <http://memorybook.org.ua/units/383reg.htm>.
20. “ЛИШИЛОСЯ ТІЛЬКИ ОПАНУВАТИ: ЗСУ НАРЕШТІ ОТРИМАЛИ УДАРНІ БЕЗПІЛОТНИКИ БАЙРАКТАР,” *5.UA*, 20 March 2019, <https://www.5.ua/suspilstvo/lyshylosia-tilky-opanuvaty-zsu-naresh-ti-otrymaly-udarni-bezpilotnyky-bayraktar-188794.html>.
21. Patrick Tucker, “In Ukraine, Tomorrow’s Drone War Is Alive Today,” *Defense One*, 9 March 2015, https://www.defenseone.com/technology/2015/03/ukraine-tomorrows-drone-war-alive-today/107085/?oref=search_Ukraine%20Future%20drone%20war.
22. Ministry of Defense of Ukraine, “Stepan Poltorak: Aerial reconnaissance unit will receive required funding,” news release, 7 December 2016, <http://www.mil.gov.ua/en/news/2016/12/07/stepan-poltorak-aerial-reconnais-sance-unit-will-receive-the-required-funding/>.
23. James Harvey, “Rebel Drones: UAV Overmatch in the Ukrainian Conflict,” Foreign Military Studies Office, January 2015, <https://community.apan.org/wg/tradoc-g2/fmso/m/fmso-monographs/195099>.
24. Phil Stewart, “Exclusive: U.S.-supplied drones disappoint Ukraine at the front lines,” *Reuters*, 21 December 2016, https://www.reuters.com/article/us-usa-ukraine-drones-exclusive-idUSKBN14A26D?utm_campaign.
25. “Antonov’s Hotlytsya tactical UAV prototype is airborne,” *Air Recognition*, 10 November 2017, <https://www.airrecognition.com/index.php/archive-world-worldwide-news-air-force-aviation-aerospace-air-military-defence-industry/global-defense-security-news/global-news-2017/november/3861-antonov-s-hotlytsya-tactical-uav-proto-type-is-airborne.html>.
26. Defense Express Channel, “Проект стратегічного БПАК від ДП «Антонов». “Зброя та Безпека-2018,” YouTube, 17 October 2018, <https://www.youtube.com/watch?v=8qeOtqSy4RU>.
27. “В ОАЭ рассматривают возможность СП с Украиной по производству БПЛА,” *ЦТС*, 28 June 2019, https://cfts.org.ua/news/2019/06/20/v_oae_rassmatrivayut_vozmozhnost_sp_s_ukrainoy_po_proizvodstvu_bpla_53864.

UZBEKISTAN

INVENTORY

Model	Make	Origin	Class	Intro	Qty	Operator	Notes
RQ-11B Raven ¹	AeroVi-ronment	USA	I	2018	12 (4)	Special forces	

ACTIVE ACQUISITIONS

- Uzbekistan reportedly purchased an undisclosed number of AVIC Wing Loong I from China.^{2,3} The status of this agreement is not clear as of this writing.

NOTES

1. “Uzbekistan Receives RQ-11 UAV,” Forecast International, 12 September 2018, http://www.defense-aerospace.com/articles-view/release/3/195972/uzbekistan-receives-rq_11-small-drone.html.
2. “China Claims Six Potential Customers for Wing Loong,” *sUAS News*, 26 June 2013, <https://www.suasnews.com/2013/06/china-claims-six-potential-customers-for-wing-loong/>.
3. East Pendulum (@HenriKenhmann), “L’Ouzbékistan signe un contrat d’acquisition du drone Wing Loong avec AVIC,” Twitter, 29 May 2018, <https://twitter.com/HenriKenhmann/status/1001631625472491520>.

EUROPE

Austria	.....	84
Belgium	.....	84
Bulgaria	.....	87
Croatia	.....	88
Cyprus	.....	89
Czech Republic	.....	90
Denmark	.....	92
Estonia	.....	94
Finland	.....	95
France	.....	96
Germany	.....	105
Greece	.....	112
Hungary	.....	114
Ireland	.....	115
Italy	.....	116
Latvia	.....	122
Lithuania	.....	122
Luxembourg	.....	123
Netherlands	.....	124
North Macedonia	.....	126
Norway	.....	127
Poland	.....	129
Portugal	.....	132
Romania	.....	133

Serbia	.....	135
Slovakia	.....	136
Slovenia	.....	137
Spain	.....	138
Sweden	.....	145
Switzerland	.....	148
United Kingdom	.....	149

AUSTRIA

INVENTORY

Model	Make	Origin	Class	Intro	Qty	Operator	Notes
Tracker ¹	Survey Copter	France	I	2016	18 (6)	Army	

EXPORTS

Country	Model	Make	Class	Status	Notes
Australia	CamCopter S-100	Schiebel	II	Active	
China	CamCopter S-100	Schiebel	II	Active	
France	CamCopter S-100	Schiebel	II	Active	
Italy	CamCopter S-100	Schiebel	II	Active	
Jordan	CamCopter S-100	Schiebel	II	Active	
Malaysia	CamCopter S-100	Schiebel	II	Active	
ROK	CamCopter S-100	Schiebel	II	Active	
Russia	CamCopter S-100	Schiebel	II	Inactive	
UAE	CamCopter S-100	Schiebel	II	Active	

NOTES

1. Johannes Weichhart, "Drohnen sind startklar für Asyleinsatz," *kurier.at*, 15 February 2016, <https://kurier.at/chronik/oesterreich/drohnen-sind-startklar-fuer-asyleinsatz/181.007.562>.

BELGIUM

INVENTORY

Model	Make	Origin	Class	Intro	Qty	Operator	Notes
RQ-5 Hunter-B ¹	IAI	Israel	III	2001	18	Air Force	Active fleet of 11 aircraft due to losses
RQ-11 Raven ^{2,3}	AeroVironment	USA	I	2017	27 (8)	Army	

ACTIVE ACQUISITIONS

- In its “Strategic Vision 2030” planning document, which was released in 2016, the Belgian Ministry of Defense announced that it would invest 490 million euros to acquire medium-altitude long-endurance drones to replace the RQ-5 Hunter B.⁴ In 2018 the MoD began negotiations with the U.S. to purchase the GA-ASI MQ-9B SkyGuardian, a variant of the MQ-9 Reaper, to fill this requirement.⁵ The U.S. State Department approved the sale of four MQ-9B SkyGuardians to Belgium in March 2019.⁶
- According to “Strategic Vision 2030,” the MoD intends to invest 18 million euros in tactical drones and 9 million euros in mini drones between 2021 and 2024.⁷
- In June 2018 the Belgian Navy launched the Maritime Tactical UAS Project (MTUAS) to explore different ship-board reconnaissance platforms.⁸ Under this program, it has conducted a series of flight tests with the domestically produced Schiebel Camcopter S-100, a rotary-wing drone.

INACTIVE

Model	Make	Origin	Class	Period	Qty	Operator	Notes
Épervier	MBLE	Belgium	I	1977-1999		Army	

PERSONNEL**AIR FORCE**

Name	HQ	Type	Equipment	Activated
80th UAV Squadron ⁹	80ème Escadrille UAV Florennes Air Base	D	RQ-5 Hunter	2004

The 80th Sqn is comprised of three groups totaling 120 soldiers. It was previously subordinated to the Belgian Land Component (army) as the 80th Surveillance and Observation Battery and equipped with the Épervier. The Army retired the Épervier and deactivated the 80th in 1999.¹⁰ Five years later, the unit was reactivated as the 80th UAV Squadron and transferred from the Land Component to the Air Component. Upon reactivation it was equipped with the RQ-5 Hunter. In 2011 the 80th moved its headquarters from Elsenborn-Butgenbach Air Base to Florennes Air Base. The 80th regularly conducts readiness training exercises during the winter months at Beja Air Base in Portugal.

ARMY

Name	HQ	Type	Equipment	Activated
Cavalry Reconnaissance Battalion (ISTAR Battalion), Motorized Brigade Headquarters ¹¹	<i>Bataillon de Chasseurs à Cheval (Bataillon ISTAR), Le Quartier Général de la Brigade Motorisée</i>	ND	RQ-11 Raven	2017

The Army stood up the ISTAR Battalion in 2011. It was equipped with the RQ-11 Raven in 2017.

OPERATIONS

Country	Base	Equipment	Period	Operation
Democratic Republic of Congo ¹²	Kinshasa	RQ-5 Hunter	2006	EUFOR RD Congo
In 2006, Belgium deployed the 80th UAV Sqn with the European Forces (EUFOR) Congo peacekeeping force. One Belgian RQ-5 Hunter was shot down during the mission, injuring six civilians on the ground.				
Bosnia-Herzegovina ¹³	Tuzla	RQ-5 Hunter	2005	Althea
Afghanistan ¹⁴	Camp Marmal	RQ-11 Raven	2018-	Resolute Support
A detachment from the Cavalry Reconnaissance Battalion (ISTAR Battalion), equipped with the RQ-11 Raven, deployed in April 2018 to Camp Marmal, Afghanistan to participate in Operation Resolute Support. The detachment is responsible for training Afghan security forces.				

DOMESTIC OPERATIONS

- For several months each year, the 80th relocates to Koksijde Air Base to conduct environmental monitoring patrols in the North Sea.¹⁵ This operation began in 2007 and is conducted in conjunction with the Maritime Information Bureau (*Carrefour d'Information Maritime*).
- The 80th deployed to Brasschaat Air Base for Vigilant Guardian, a 2016 counter-terrorism operation launched in the wake of the 2015 Paris terrorist attacks.¹⁶
- In 2017 the Ministry of Defense agreed to permit the 80th Sqn to deploy to Brasschaat Air Base to conduct border security and customs enforcement operations.¹⁷

INFRASTRUCTURE

Name	Country	Latitude	Longitude	Affiliation	Activity	Notes
Florennes Air Base	Belgium	50°14'36"N	004°38'45"E	80th Sqn	HQ	

NOTES

1. "B-Hunter UAV," La Défense, accessed 11 September 2018, <https://www.mil.be/nl/materiaal/b-hunter-uav>.

2. Guillaume Belan, “Des drones Raven pour le Benelux,” *Air&Cosmos*, 14 December 2016, <http://www.air-cosmos.com/des-drones-raven-pour-le-benelux-87537>.
3. “24 mini-drones soutiendront l’armée belge dans ses opérations en 2018,” *RTBF*, 31 August 2017, https://www.rtb.be/info/belgique/detail_24-mini-drones-soutiendront-l-armee-belge-dans-ses-operations-en-2018?id=9696762.
4. “La Vision Stratégique Pour La Défense,” La Défense, news release, 29 June 2016, <https://www.mil.be/sites/mil.be/files/pdf/strategic-vision-belgian-defense-fr.pdf>.
5. Dominic Perry, “Belgium lines up Predator acquisition,” *FlightGlobal*, 29 October 2018, <https://www.flightglobal.com/news/articles/belgium-lines-up-predator-acquisition-453022/>.
6. Brian Garrett-Glaser, “Belgium to Purchase Four MQ-9B SkyGuardian Drones for \$600 million,” *Rotar&Wing International*, 26 March 2019, <https://www.rotorandwing.com/2019/03/26/belgium-purchase-four-mq-9b-sky-guardian-drones-600-million/>.
7. “La Vision Stratégique Pour La Défense,” La Défense, news release, 29 June 2016, <https://www.mil.be/sites/mil.be/files/pdf/strategic-vision-belgian-defense-fr.pdf>.
8. Schiebel, “Schiebel Completes Successful S-100 Trials for the Belgian Navy,” news release, 3 July 2018, <http://www.janes.com/article/81480/schiebel-completes-successful-s-100-trials-for-the-belgian-navy>.
9. “80 Unmanned Aerial Vehicle Squadron,” La Défense, accessed 11 September 2018, <https://www.mil.be/fr/unites/80-unmanned-aerial-vehicle-squadron>.
10. “Historique de la 80ème Escadrille UAV (80 UAV Sqn),” Florennes Air Base, accessed 11 September 2018, <https://www.florennesairbase.be/histoire/historique-du-80-uav-sqn/>.
11. Stijn Verboven, “Les Chasseurs a Cheval Retournent aux Origines,” La Défense, accessed 11 September 2018, <https://www.mil.be/fr/article/les-chasseurs-cheval-retournent-aux-origines>.
12. “Belgian resumes Congo UAV operations after B-Hunter is shot down,” *Flight International*, 14 August 2006, <https://www.flightglobal.com/news/articles/belgium-resumes-congo-uav-operations-after-b-hunter-is-shot-208465/>.
13. “Historique de la 80ème Escadrille UAV (80 UAV Sqn),” Florennes Air Base, accessed 11 September 2018, <https://www.florennesairbase.be/histoire/historique-du-80-uav-sqn/>.
14. “De Raven: 007 in het luchtruim,” La Defense, accessed 15 July 2019, https://www.mil.be/nl/artikel/de-raven-007-het-luchtruim?mobile_domain_switch=0.
15. “Silent Watch: Les UAV Veillent,” La Défense, accessed 11 September 2018, <https://www.mil.be/fr/article/silent-watch-les-uav-veillent>.
16. Ibid
17. “Les UAV de La Défense Soutiennent La Douane,” La Défense, accessed 11 September 2018, <https://www.mil.be/fr/article/les-uav-de-la-defense-soutiennent-la-douane>.

BULGARIA

INVENTORY

Model	Make	Origin	Class	Intro	Qty	Operator	Notes
RQ-11B Raven ¹	AeroVironment	USA	I	2015			
Phoenix 30 ²	UAV Solutions	USA	I	2014	4		

ACTIVE ACQUISITIONS

- In October 2017 Bulgaria reportedly awarded Textron Systems a \$9.4 million contract for Aerosonde tactical drones, control systems, and a training package.³ According to a Textron executive, the delivery of these systems was expected within one calendar year, but as of this writing, it has not been confirmed by any official sources that these systems have been delivered or are in active service.

PERSONNEL

ARMY

Name	HQ	Type	Equipment	Activated
ISTAR Battalion (Unit 54880), 61st Stryama Mechanized Brigade, Land Forces Command ⁴	<i>батальон ISTAR (в.ф. 54880), 61 Стрямска механизирана бригада</i> Kazanlak Garrison	ND	RQ-11B Raven	

NOTES

1. "Bulgarian Military Arms with New Unmanned Vehicles." *Novinite.com*, March 30, 2015, <https://www.novinite.com/articles/167570/Bulgarian+Military+Arms+with+New+Unmanned+Vehicles>.
2. Beth Stevenson, "Four VTOL UAVs delivered to Bulgarian armed forces," *FlightGlobal*, 3 December 2014, <https://www.flightglobal.com/news/articles/four-vtol-uavs-delivered-to-bulgarian-armed-forces-406703/>.
3. Yasmin Tadjeh, "Textron Secures First Foreign Military Sale for Aerosonde Drone," *National Defense Magazine*, 12 December 2017, <http://www.nationaldefensemagazine.org/articles/2017/12/12/textron-secures-first-foreign-military-sale--for-aerosonde-drone>.
4. ЦОНЧО ДРАГАНСКИ, "'Оса' защити военна колона," Вестник Българска армия, 26 January 2018, <http://www.armymedia.bg/archives/110601>.

CROATIA

INVENTORY

Model	Make	Origin	Class	Intro	Qty	Operator	Notes
Skylark ¹	Elbit	Israel	I	2007	4	Army	
Orbiter 3B ²	Aeronautics	Israel	I	2018	6 (1)	Army	Shared with Ministry of Agriculture

PERSONNEL

ARMY

Name	HQ	Type	Equipment	Activated
Intelligence Operations Center ³	<i>Središnjica za obavještajno djelovanje</i> Pula Airfield	ND	Skylark	2015

Prior to 2015, the Croatian Armed Forces' Aerial Intelligence Company, Military Intelligence Battalion (*Satnije za obavještajnu potporu iz zraka, Vojnoobavještajne bojne*, or SOPiZ VOb) was responsible for drone operations.³ Following the implementation of the Croatian Armed Forces Long-Term Development Plan 2015-2024, the Ministry of Defense is believed to have shifted responsibility for UAVs to the newly created Intelligence Operations Center, a sub-staff unit of the Croatian Armed Forces General Staff. In September 2018 the MoD announced that it intends to turn the Pula Airport on the Istrian peninsula into a Center for Unmanned Aircraft Systems.^{4,5} The MoD intends to base 150 personnel from various support units at the airfield's military wing, which had been inactive since 2012.

OPERATIONS

- In August 2018, the Ministry of Defense deployed an Army Skylark team for firefighting operations in Zadar, Šibenik-Knin, and Split-Dalmatia counties.⁶ The drones were tasked with early fire detection and targeting for manned firefighting aircraft. It was Croatia's first use of military drones for firefighting.

INFRASTRUCTURE

Name	Country	Latitude	Longitude	Affiliation	Activity	Notes
Pula Airfield ⁷	Croatia	44°53'37"N	013°55'20"E		HQ, Training	

NOTES

1. Eduard Šoštarić, "MORH u Izraelu kupuje špijunske letjelice," *nacional*, 21 November 2006, <http://arhiva.nacional.hr/clanak/29245/morh-u-izraelu-kupuje-spjunske-letjelice>.
2. Bogdan Blotnej, "Špijunski dronovi čuvat će hrvatske ribe, more, brodove...", *24 Sata*, 15 May 2018, <https://www.24sata.hr/tech/spijunski-dronovi-cuvat-ce-hrvatske-ribe-more-brodove-573628>
3. "Vojnoobavještajni postroj," Ministarstvo obrane Republike Hrvatske, accessed 10 October 2018, <https://www.morh.hr/hr/karijera-u-morh-u/232-morh/aktualne-teme/20-obljernica-vro-oluja/postroji/11835-vojnoobav-je%C5%A1tajni-postroj.html>.
4. "Krstičević na sjednici Vlade: Vraćamo našu vojsku u Pulu," *24 sata*, 13 September 2018, <https://www.24sata.hr/news/krsticevic-na-sjednici-vlade-vracamo-nasu-vojsku-u-pulu-590221>.
5. "Dio nekadašnje zrakoplovne baze pripast će Ližnjanu, ostatak postaje baza za Bepilote Letjelice," *Glas Istre*, 13 September 2018, <https://www.glasistre.hr/pula/dio-zracne-luke-pripast-ce-liznjanu-ostatak-postaje-baza-za-bepilote-letjelice-569887>.
6. M.J. Piše, "Zavirite u samo srce obrane od požara: Hrvatska ove godine u borbi protiv vatrene stihije ima novo, moćno oružje," *Dnevnik.hr*, 27 August 2018, <https://dnevnik.hr/vijesti/hrvatska/ove-godine-prvi-put-koristena-bepilotna-letjelica-u-akciji-gasenja-pozara-vec-od-prosloga-tjedna-je-uvedena-u-sustav---525282.html>.
7. Igor Bozinovski, "Croatia to establish Centre for Unmanned Aerial Systems," *IHS Jane's Defence Weekly*, 17 September 2018, <https://www.janes.com/article/83021/croatia-to-establish-centre-for-unmanned-aerial-systems>

CYPRUS

INVENTORY

INACTIVE

Model	Make	Origin	Class	Period	Qty	Operator	Notes
Searcher	IAI	Israel	II	2002- Un-known	2		(status unclear)

NOTES

1. "SIPRI Arms Transfers Database," Stockholm Peace Research Institute, accessed 16 April 2019, <https://www.sipri.org/databases/armstransfers>.

CZECH REPUBLIC

INVENTORY

Model	Make	Origin	Class	Intro	Qty	Operator	Notes
ScanEagle ¹	Insitu	USA	I	2015	10	Army	
RQ-11B Raven ²	AeroVi-ronment	USA	I	2009	6	Army	
RQ-12 Wasp AE ³	AeroVi-ronment	USA	I	2015		Army	

ACTIVE ACQUISITIONS

- In November 2017 the Czech MoD announced that it would invest approximately \$46.5 million to acquire new surveillance and combat drones.⁴ In October 2018 the MoD held an industry day to discuss potential options.⁵ It intends to select a system by 2020, with deliveries anticipated between 2022 and 2024. The desired system will have a MTOW of 600 kilograms, and will be capable of ISR, EW, and strike missions.⁶

INACTIVE

Model	Make	Origin	Class	Period	Qty	Operator	Notes
Sojka III ⁷	Air Force Research Institute	Czech Republic	I	1998-2012		Army	

Tu-143 ⁸	Tupolev	Russia	1984-1995	Air Force	“VR-3 Rejs”

PERSONNEL

ARMY

Name	HQ	Type	Equipment	Activated
Unmanned Reconnaissance Company, 102nd Reconnaissance Battalion, 53rd Regiment of Reconnaissance and Electronic Warfare, Combat Support Forces, Land Forces Command ⁹	<i>Rota bezpilotních průzkumných prostředků, 102. průzkumného praporu, 53. pluk průzkumu a elektronického boje</i> Prostějov	D	RQ-11B Raven, ScanEagle	2003

Originally known as the 116th UAV Sqn, it was redesignated the Unmanned Reconnaissance Company in 2000 and subordinated to the 102nd Btn after the latter stood up in 2003.¹⁰ It is comprised of one group equipped with the ScanEagle and four squads equipped with the RQ-11B Raven.¹¹

OPERATIONS

Country	Base	Equipment	Period	Operation
Afghanistan	Bagram Air Base	RQ-11 Raven, ScanEagle	2005-	

The 102nd Reconnaissance Battalion first deployed to Afghanistan in 2005, though it's not clear whether these troops were equipped with drones at the time.¹² Beginning in 2010, multiple Czech rotations to PRT Logar in northern Afghanistan included 102nd Btn troops equipped with the RQ-11 Raven. In 2015 the 102nd's ScanEagle group deployed with the ACR Guard Company to provide security assistance for Bagram Air Base. The ScanEagles were acquired with U.S. counterterrorism aid, specifically for base protection and surveillance missions in Afghanistan.¹³ As of December 2018, the Czech ScanEagles had accumulated nearly 3,000 flight hours in Afghanistan.¹⁴

NOTES

1. “Čeští vojáci mají v Afghánistánu nové drony,” *Novinky.com*, 3 June 2015, <https://www.novinky.cz/zahranici/svet/371242-cesti-vojaci-maji-v-afghanistanu-nove-drony.html>.
2. “Czech Army to purchase Raven Miniature UAVs,” *Defence IQ*, 15 October 2009, <https://www.defenceiq.com/air-forces-military-aircraft/articles/czech-army-to-purchase-raven-miniature-uavs>.
3. “Objeví se na českých hranicích kvůli uprchlíkům drony? Armáda to nevylučuje,” *Zpravy*, 15 March 2016, <https://www.blesk.cz/clanek/zpravy-udalosti/380284/objevi-se-na-ceskych-hranicich-kvuli-uprchlikum-drony-armada-to-nevylucuje.html>.
4. Jaroslav Adamowski, “Czech military to acquire combat, surveillance drones,” *Defense News*, 29 November 2017, <https://www.defensenews.com/global/europe/2017/11/29/czech-military-to-acquire-combat-surveillance-drones/>.
5. “Armáda pořídí bojové drony, má připravenou miliardu,” *E15.cz*, 11 October 2018, <https://www.e15.cz/domaci/armada-poridi-bojove-drony-ma-pripravenou-miliardu-1352257>.
6. Ibid
7. Henry S. Kenyon, “Sojka Spreads Its Wings,” *SIGNAL*, September 2005, <https://www.afcea.org/content/sojka->

- spreads-its-wings.
8. Tomas Berka, "Tupolev Tu-143 neboli VR-3 Rejs," *Valka.cz*, 20 March 2004, <https://www.valka.cz/10610-Tupolev-Tu-143-neboli-VR-3-Rejs>.
 9. "102. průzkumný prapor Prostějov," *Army.cz*, accessed 23 September 2018, <http://www.102pzpr.army.cz/o-nas>.
 10. "Poslední let UAV SOJKA III," 102. průzkumného praporu, accessed 14 April 2019, http://www.102pzpr.cz/posledni_let_uav_sojka_iii.html.
 11. "102. průzkumný prapor [2003-]," *Valka.cz*, accessed 23 September 2018, <http://www.armadinoviny.cz/102-pruzkumny-prapor-ma-jedenact-sve-existence-uspesne-za-sebou.html>.
 12. "Průzkumníci odletí do Afghánistánu za měsíc," *iDNES.cz*, 17 February 2005, https://www.idnes.cz/zpravy/nato/pruzkumnici-odleti-do-afghanistanu-za-mesic.A050216_092845_zpr_nato_inc.
 13. "Oči nad Bagrámem sledují české vojáky během patrol. Armáda chce však víc Zdroj," *iDNES.cz*, 11 August 2018, https://zpravy.idnes.cz/bagram-dron-balon-vzducholod-afghanistan-vojaci-mise-kamery-pqw-/zpr_nato.aspx?c=A180809_103141_zpr_nato_inc.
 14. "Drony české armády nalétaly v Afghánistánu tisíce letových hodin," *iDNES.cz*, 28 December 2018, https://www.idnes.cz/zpravy/domaci/vojaci-afghanistan-drony-bagram-armada.A181226_071715_domaci_brzy.

DENMARK

INVENTORY

Model	Make	Origin	Class	Intro	Qty	Operator	Notes
	DJI ¹	China	I	2016	25		Probable Phantom or Inspire
RQ-20A Puma ²	AeroVironment	USA	I	2012	90 (30)	Army	

ACTIVE ACQUISITIONS

- The Danish MoD procurement agency's (*Forsvarsministeriets Materiel- og Indkøbsstyrelse*) 2018-2023 acquisition strategy includes a requirement for an unspecified class of UAVs for the Army.³ It plans to acquire these systems between 2019 and 2023.

INACTIVE

Model	Make	Origin	Class	Period	Qty	Operator	Notes
RQ-11 Raven ⁴	AeroVironment	USA	I	2008-2012	12	Army	Acquired for use in Afghanistan
Sperwer ⁵	Sagem	France	II	1999-2006	12	Army	

PERSONNEL

ARMY

Name	HQ	Type	Equipment	Activated
UAS Company, 1st Military Intelligence Surveillance and Reconnaissance Battalion, Army Intelligence Regiment ^{6,7}	<i>UAS Kompagni, 1 Military Intelligence Surveillance og Rekognoscerings bataljonen, Efterretningsregimentet</i> Varde Kaserne Garrison	D	RQ-20 Puma	2014

INACTIVE

- The UAV Battery (*UAV Batteri*, or UAVBT) was a unit subordinated to the 3rd Management and Targeting Division, Royal Danish Artillery Regiment in the early 2000s.⁸ It was garrisoned at Varde Kaserne. The UAVBT was equipped with the Sagem Sperwer, known as *Tårnfalken*. The MoD ended the *Tårnfalken* program in 2005 due to mismanagement and technical difficulties and deactivated the UAV Battery.⁹

OPERATIONS

Country	Base	Equipment	Period	Operation
Afghanistan		RQ-11 Raven, RQ-20 Puma	2008-2015	
The Army deployed with the RQ-11 Raven to Helmand province in 2008. ¹⁰ It was replaced in the deployment by the RQ-20 Puma in 2012. ¹¹				
Horn of Africa		RQ-20 Puma	2013	Ocean Shield
An Army RQ-20 detachment deployed aboard the Esbern Snare in 2013 for anti-piracy operations in the Horn of Africa. ¹²				

INFRASTRUCTURE

Name	Country	Latitude	Longitude	Affiliation	Activity	Notes
Hans Christian Andersen Airport ¹³	Denmark	55°28'36"N	010°19'51"E		Test site	

EXPORTS

Country	Model	Make	Class	Status	Notes
Spain	Huginn X1	Sky-Watch	I	Active	

NOTES

1. Matias Ludvig Littauer, "Forsvaret køber stort ind af kinesiske droner – USA forbyder dem af sikkerhedshensyn," *Berlingske*, 27 January 2019, <https://www.berlingske.dk/samfund/forsvaret-koeber-stort-ind-af-kinesiske-droner-usa-forbyder-dem-af>.
2. Magnus Bjerg, "Danmark køber nye droner for millioner," *Ekstra Bladet*, 15 June 2012, <https://ekstrabladet.dk/nyheder/krigogkatastrofer/article4027682.ece>.
3. Andreas Krog, "Kampfly, SM2-missiler og droner: Her er Forsvarets indkøbsliste," *Altinget*, 4 March 2019, <https://www.alinget.dk/artikel/kampfly-sm2-missiler-og-droner-her-er-forsvarets-indkoebsliste>.
4. AeroVironment, "Danish Army Chooses AeroVironment's Raven Small Unmanned Aircraft System," news release, 11 September 2007, https://www.avinc.com/resources/press-releases/view/danish_army_chooses_aerovironments_raven_small_unmanned_aircraft_system.
5. Kristian Søby Kristensen, Flemming Pradhan-Blach and Gary Schaub, Jr., "Unmanned and Unarmed: On the Future use of Unmanned Aerial Systems in the Danish Armed Forces," Centre for Military Studies, University of Copenhagen, February 2014, https://cms.polsci.ku.dk/english/publications/uav1/Unmanned_and_Unarmed.pdf.
6. Carsten H. Petersen and Michael A. Villumsen, "Danske Artilleriregiment nedlægges og nye myndigheder opstår...", *Dansk-Artilleri-Tidsskrift*, 2 December 2013, <http://www.a-o-f.dk/PDF/DAT%202013-2.pdf>.
7. "Gruppeforer Til Unmanned Aerial System (UAS) Ved Efterretningsregimentet," Forsvaret, accessed 14 April 2019, <https://karriere.forsvaret.dk/job/opslag/?vacantPositionId=159824&mediaId=4684>.
8. Forsvarskommandoen, *Rapport vedr. undersøgelse af UAV 'Tårnfalken'*, 2 June 2005, http://www.fmn.dk/nyheder/Documents/Endelig_unders%C3%B8gelsesrapport_af_2_juni_2005.pdf.
9. Kristian Søby Kristensen, Flemming Pradhan-Blach and Gary Schaub, Jr., "Unmanned and Unarmed: On the Future use of Unmanned Aerial Systems in the Danish Armed Forces," Centre for Military Studies, University of Copenhagen, February 2014, https://cms.polsci.ku.dk/english/publications/uav1/Unmanned_and_Unarmed.pdf.
10. Haeren, "Afghanistan: Forsvarets nye ubemandede overvågningsfly Raven er en succes i Helmand-provinsen," news release, 30 May 2008, <https://web.archive.org/web/20081220053812/http://forsvaret.dk:80/HOK/Nyt%20og%20Presse/ISAF/Pages/oejneioerkenen.aspx>.
11. "Danske fly og helikoptere i Afghanistan," Forsvaret, accessed 14 April 2019, <https://www2.forsvaret.dk/opgaver/afghanistan2002-2015/Materiel/fly/Pages/default.aspx>.
12. Forsvaret, "Lille drone er god hjælp ud for Somalia," news release, 15 November 2013, https://www2.forsvaret.dk/nyheder/overige_nyheder/Pages/Pumaesbernsnare.aspx.
13. Forsvaret, "Forsvaret bliver del af dronecenter," news release, 14 September 2018, https://www2.forsvaret.dk/nyheder/overige_nyheder/Pages/Forsvaretbliverdelafdronecenter.aspx.

ESTONIA

INVENTORY

Model	Make	Origin	Class	Intro	Qty	Operator	Notes
RQ-11 Raven ¹	AeroVironment	USA	I	2010			
RQ-20B Puma ²	AeroVironment	USA	I	2019			

NOTES

1. U.S. Embassy Tallinn, "New U.S. Tool in Estonian NATO Arsenal," news release, 25 October 2010, <https://www.eesti.ca/new-us-tool-in-estonian-nato-arsenal/print30057>.
2. "Contracts for Sept. 14, 2018," U.S. Department of Defense, accessed 10 October 2018, <https://dod.defense.gov/News/Contracts/Contract-View/Article/1634449/>.

FINLAND

INVENTORY

Model	Make	Origin	Class	Intro	Qty	Operator	Notes
Mavic ¹	DJI	China	I	2019	150	Army	
Orbiter 2B ^{2,3}	Aeronautics	Israel	I	2016	250 (55)	Army	“Minilennokki-järjestelmä”
Ranger ⁴	RUAG Aerospace	Switzerland, Israel	II	2003	12	Army	“lentotiedustelu-järjestelmä”

PERSONNEL

ARMY

- The Finnish Army has an unknown number of UAS Squads (*minilennokkiryhmä*) equipped with the Israeli Aeronautics Orbiter-2.⁵ These squads are integrated into all eight of its brigade-level formations. Each UAS squad is comprised of nine personnel and is equipped with one or two systems (four or eight aircraft).
- According to media reports in December 2018, the Finnish Defense Forces contacted drone hobbyists to gauge their interest in joining a cadre of reservists that specialized in flying quadcopter drones.⁶ However, the Defense Forces said that it was only seeking information on drone operators and that there were no plans to create a “quadcopter corps” (*nelikopterijoukkoja*).

Name	HQ	Type	Equipment	Activated
Air Reconnaissance Company, Ostrobothnia Jaeger Battalion, Pori Brigade ⁷	<i>Lentotiedustelukompania, Pohjanmaan jääkäripataljoona, Porin prikaatin</i> Niinisalo	D	Orbiter 2B, Ranger	

The Air Reconnaissance Company is believed to provide instruction to officers, NCOs, and conscripts on piloting the Orbiter 2B and Ranger.

INFRASTRUCTURE

Name	Country	Latitude	Longitude	Affiliation	Activity	Notes
Niinisalo Test Range	Finland	61°51'46"N	22°27'38"E		HQ, Training, Test site	

NOTES

1. Jarmo Huhtanen, "Puolustusvoimat ostaa tiedustelulennokkeja Kiinasta," *Helsingin Sanomat*, 13 June 2019, <https://www.hs.fi/kotimaa/art-2000006140877.html>.
2. Arie Egozi. "Finland gets second batch of Orbiter UAVs." *FlightGlobal*, 24 September 2014, <https://www.flight-global.com/news/articles/finland-gets-second-batch-of-orbiter-uavs-404087/>.
3. "Minilennokkijärjestelmä (MUAS)," Maavoimat, accessed 21 September 2018, <https://maavoimat.fi/muas>.
4. Israel Aerospace Industries, "Ranger UAV System Ordered by Finland," news release, 29 September 1999, <http://www.iai.co.il/Shared/UserControls/Print/PopUp.aspx?lang=en&docid=24058>.
5. "Kuvat ja video: Uusi lennokka turvaa Suomi-taistelijaa – voiko "mentaalista miinakauhua" korvata?," *Länsiväylä*, 9 September 2016, <https://www.lansivayla.fi/artikkeli/431970-kuvat-ja-video-uusi-lennokki-turvaa-suomi-taistelijaa-voiko-mentaalista-miinakauhua>.
6. Jarmo Huhtanen, "Puolustusvoimat kartoittaa lennokkeja ja pienoiskoptereita ammatikseen lennättäviä reserviläisiä – Taitavat lennättäjät ovat iso apu taistelukentällä," *Helsingin Sanomat*, 11 December 2018, <https://www.hs.fi/kotimaa/art-2000005929023.html>.
7. "Porin prikaatin joukkoyksiköt Niinisalossa," Porin prikaati, <https://varusmies.fi/documents/1950813/0/Porin+prikaatin+alokastiedote/b35dacee-b3e8-4fd5-bf75-30996b91cc20/Porin+prikaatin+alokastiedote.pdf>.

FRANCE

INVENTORY

Model	Make	Origin	Class	Intro	Qty	Operator	Notes
Black Hornet 3 ¹	FLIR	USA	I	2019		Army	
3S ²	Drone Protect System	France	I	2019		Air Force	
Mavic	DJI	China	I	2018		Army	
NX70 ³	Novadem	France	I	2019	54	Army	
Spy'Ranger ⁴	Thales	France	I	2019	210 (70)	Army	"SMDR"
Tracker ⁵	EADS Cassidian	France	I	2006	255 (62)	Army	"DRAC"
Skylark-1LE ⁶	Elbit	Israel	I	2010	10	Special Forces	Skylark 1 delivered in 2008
IT180-3EL-1 ⁷	ECA Group/Infotron	France	I	2012	3	Army	"DRO-GEN"
Sperwer ⁸	Sagem	France	II	2004	24	Army	"SDTI"

Camcopter S-100 ⁹	Schiebel	Austria	II	2017	2	Navy
Patrol-ler ^{10,11}	Sagem	France	III	2019	11	Army
MQ-9 Reaper ¹²	GA-ASI	USA	III	2014	12 (4)	Air Force

ACTIVE ACQUISITIONS

- The SDAM (*Système de Drones Aérien de la Marine*) program seeks to develop a shipboard tactical unmanned rotorcraft for French Navy frigates. It was launched in 2016 or 2017 as the successor program to SERVAl (*Système Embarqué de Reconnaissance Vecteur Aérien Léger*), an initiative to integrate an unmanned rotorcraft into French Navy operations. In December 2017, the French military procurement agency awarded Airbus Helicopters and Naval Group a contract to lead the development of the SDAM platform based on the team's VSR700, which is currently under development.¹³ The program is aiming to field a demonstrator air vehicle by 2021 for flight tests and to introduce the SDAM into the fleet by 2027.¹⁴ SDAM has a total acquisition goal of 15 aircraft.
- The MoD has informed the Senate that it intends to purchase 20 new Class I tactical UAVs for the Special Forces by 2025 to replace the Skylark.¹⁵

INACTIVE

Model	Make	Origin	Class	Period	Qty	Operator	Notes
Heron 1 / Harfang ¹⁶	IAI,EADS	Israel, France	III	2008-2018	3	Air Force	
CL-89	Canadair	Canada	II	1981-Early 1990s		Army	
CL-289 ¹⁷	Canadair	Canada	II	1992-2010	12	Army	
Cre-cerelle ¹⁸	Sagem	France	I	1994-2004		Army	
RQ-5 Hunter	IAI	Israel	III	1995-2004		Air Force	



The French Army is in the process of replacing the Sperwer (left) with the Patroller. Credit: Wikimedia

PERSONNEL

ARMY

Name		HQ	Type	Equipment	Activated
61st Artillery Regiment, Intelligence Command ¹⁹	<i>61e régiment d'artillerie, Commandement du Renseignement</i>	Général d'Aboville Barracks, Chaumont	D	Sperwer, Tracker, Patroller, Black Hornet 3	1999
Formed in 1910, the 61st Artillery Regiment merged with the 7th Artillery Regiment in 1999 to become the Army's primary UAV unit. The 61st is subordinated to the Intelligence Command and comprised of four UAV batteries, an intelligence processing battery, a maintenance battery, a headquarters and logistics battery, and a reserve battery. The 61st took delivery of the first Patroller in mid-2019, and will transition fully from the flying the Sperwer to the Patroller by 2020.					
Targeting and Surveillance Battery, 40th Artillery Regiment, 2nd Armored Brigade, 3rd Division ²⁰	<i>batterie d'acquisition et de surveillance, 40e régiment d'artillerie, 2e brigade blindée, 3e division</i>	Maunoury Garrison, Marne	P	Tracker	2016
Targeting and Surveillance Battery, 3rd Marine Artillery Regiment, 6th Light Armored Brigade, 3rd Division ²¹	<i>batterie d'acquisition et de surveillance, 3e régiment d'artillerie de marine, 6e brigade légère blindée, 3e division</i>	Camp Canjuers, Var	P	Tracker	
Targeting and Surveillance Battery, 11th Marine Artillery Regiment, 9th Marine Brigade, 1st Division ²²	<i>batterie d'acquisition et de surveillance, 11e régiment d'artillerie de marine, 9e brigade d'infanterie de marine, 1re division</i>	Camp de la Lande d'Ouée	P	Tracker	
Brigade Intelligence Battery, 93rd Mountain Artillery Regiment, 27th Mountain Infantry Brigade, 1st Division ²³	<i>batterie de renseignement brigade, 93e régiment d'artillerie de montagne, 27e brigade d'infanterie de montagne, 1re division</i>	Reyniès Garrison, Varcès	P	Tracker	
Brigade Intelligence Battery, 68th Artillery Regiment of Africa, 7th Armored Brigade, 1st Division ²⁴	<i>batterie de renseignement brigade, 68e régiment d'artillerie d'Afrique, 7e brigade blindée, 1re division</i>	Camp La Valbonne, Ain	P	Tracker	
Targeting and Surveillance Battery, 35th Parachute Artillery Regiment, 11th Parachute Brigade, 3rd Division ²⁵	<i>batterie d'acquisition et de surveillance, 35e régiment d'artillerie parachutiste, 11e brigade parachutiste, 3e division</i>	Soult Garrison, Occitanie	P	Tracker, Mavic	

13th Engineer Regiment, 2nd Armored Brigade, 3rd Division ²⁶	<i>13e régiment du génie de Valdahon, 2e brigade blindée, 3e division</i>	Valdahon Garrison, Bourgogne-Franche-Comté	ND	IT180-3EL-1	

AIR FORCE

Name		HQ	Type	Equipment	Activated
1/33 Squadron “Belfort”, 33rd Surveillance, Reconnaissance, and Attack Wing ²⁷	<i>l’escadron de drones 1/33 “Belfort”, 33e Escadre de surveillance, de reconnaissance et d’attaque</i>	Air Base 709 Cognac-Chateaubernard	D	MQ-9 Reaper	2010

As of this writing, the 1/33 is comprised of three groups—SAL 33, VR291, and BR218—totaling 20 aircrews and five or six operational aircraft.²⁸ Each French MQ-9 Reaper is crewed by four airmen—a pilot, sensor operator, tactical coordinator, and imagery interpreter. By 2020, the 1/33 Sqn is expected to be equipped with a total of 12 aircraft. The 1/33 previously flew the Harfang and the RQ-5 Hunter. In 2019, the French Air Force announced that it would reactivate the 33rd Wing, a former fighter squadron, and subordinate the 1/33rd Sqn to the new air wing.²⁹ The 33rd Wing will be formally reintroduced on 5 September 2019 and will manage the planned expansion of the 1/33rd Sqn.

3/33 Drone Operational Transformation Squadron, 33rd Surveillance, Reconnaissance, and Attack Wing ³⁰	<i>3/33 “Moselle” Escadron de Transformation Opérationnelle Drone, 33e Escadre de surveillance, de reconnaissance et d’attaque</i>	Air Base 709 Cognac-Chateaubernard	D	MQ-9 Reaper	2019

The 3/33rd Sqn is new unit that will manage some of the training of French Reaper aircrews. It was activated in mid-2019 as part of a planned expansion of the 1/33rd Sqn and reorganization of the Air Force’s Reaper training program.

NAVY

Name		HQ	Type	Equipment	Activated
Flotilla 36F ³¹	<i>Flotille 36F</i>	Hyerès Naval Air Base	P	CamCopter S-100	2019

SPECIAL FORCES

Name		HQ	Type	Equipment	Activated

10th Parachute Commando (Air Force), Special Operations Command ³²	<i>Commando Parachutiste de l'Air no 10 (l'Armée de l'Air), Commandement des Opérations Spéciales</i>	Air Base 123 Orleans-Bricy	ND	Skylark-1LE	2009
13th Dragoon Parachute Regiment (Army), Special Operations Command ³³	13e Régiment de Dragons Parachutistes (l'Armée de Terre), Commandement des Opérations Spéciales	Sauvagnac Garrison, Nouvelle-Aquitaine	ND	Sky-lark-1LE	
1st Marine Parachute Regiment (Army), Special Operations Command ³⁴	1er régiment de parachutistes d'infanterie de marine (l'Armée de Terre), Commandement des Opérations Spéciales	Bayonne Garrison, Nouvelle-Aquitaine	ND	Sky-lark-1LE	

TRAINING

- The 61st Artillery Regiment is responsible for training personnel from the 61st in Sperwer and Tracker operations as well as personnel from other all other regiments that operate the Tracker.³⁵ The 13th Engineer Regiment is responsible for training engineers in the operation of the IT180-3EL-1. The 1st Marine Infantry Parachute Regiment and the 13th Parachute Dragoon Regiment are responsible for training special forces units to operate the Skylark.
- In 2017, the French Army established a specialized training program to prepare for the arrival of the Sagem Patroller the following year.³⁶ The program combines education in the technical operation of the Patroller and over 200 hours of theoretical training on regulations, procedures, and aircraft familiarity. Training and instruction takes place at the School of Army Light Aviation (ELAT) and the 61st Regiment's Delegated Training Center (CFD), in partnership with the DCI Group's International Helicopter Training Center. The program will train 18 operators per year for four years.
- In September 2014 the French Air Force stood up the Center of Excellence for Drones (*centre d'excellence drones*) at Air Base 701 Cognac-Chateaubernard to coordinate training for MQ-9 Reaper crews and to conduct research into drone operations and technology.³⁷ Until recently, however, French aircrew training was largely split between a course led by the U.S. Air Force in the U.S. and a second course led by U.S. contractors in Niger.³⁸ This was due to a lack of aircraft available for training missions. The introduction of additional Reapers in 2017 allowed the French Air Force to transfer a Reaper from Niamey to Cognac to begin conducting training missions in France. A second Reaper was transferred in 2018.³⁹ In May 2019 the French Air Force introduced a plan to train Reaper aircrews entirely in France.⁴⁰ It involves activating a new air wing, the 33rd Wing and a new drone unit, the 3/33rd ETOD Sqn, to train aircrews. Under the new plan, training will take place in two stages. In the first stage, which will be managed by the Center of Excellence for Drones, cadets will learn basic aeronautical concepts and receive practical flight instruction on a Cirrus sport aircraft. The second stage, which will be managed by the 3/33rd ETOD Sqn, will take place at Cognac and will involve theoretical and practical instruction specific to the Reaper. The Air Force intends to train between 80 and 100 Reaper aircrews by 2030.

OPERATIONS

Country	Base	Equipment	Period	Operation
Balkans		CL-289, Sperwer, Hunter, Crecelle	1995, 2001, 2007-2008	IFOR, KFOR

In 1995, the 7th Artillery Regiment (*7e régiment d'artillerie*)—which was merged with the 61st Regt in 1999—deployed with the CL-289 for several months to Bosnia to support the Implementation Force (IFOR).⁴¹ The 1/33 Squadron deployed in 2001 with RQ-5 Hunter to Kosovo, where it completed over 25 missions in support of the Kosovo Force (KFOR).⁴² The 61st Artillery Regiment deployed between 2007 and 2008 with the Sperwer to Kosovo.⁴³

Lebanon	Sperwer	2006-2007	UNIFIL

A detachment of the 61st Artillery Regiment deployed to Lebanon with the Sperwer in the wake of the 2006 Lebanon War.⁴⁴ The 61st Regt supported UNIFIL, the U.N. peacekeeping mission.

Chad	CL-289	2008-2009	EUFOR Chad

A detachment of the 61st Artillery Regiment deployed to Chad with the CL-289 between 2008 and 2009 to support the European Union Force Chad (EUFOR Chad).⁴⁵ It was the last operational deployment of the CL-289.

Afghanistan	Bagram Airfield	Sperwer, Harfang, DRAC	2008-2012	ISAF/Enduring Freedom

The August 2008 Uzbini Valley Ambush, in which 10 French soldiers died, prompted the French government to rapidly deploy drones to Afghanistan.⁴⁶ The 61st Artillery Regiment deployed with the Sperwer to Afghanistan in November 2008. By October 2011, the 61st had carried out 1,000 missions with the SDTI.⁴⁷ The 61st withdrew from Afghanistan in June 2012.⁴⁸ The 1/33 Squadron deployed with the Harfang to Afghanistan between 2009 and 2012. The Harfang carried out approximately 660 sorties, resulting in more than 5,000 flight hours.⁴⁹

Libya	Naval Air Station Sigonella	Harfang	2011	Harmattan

The 1/33 Squadron deployed with the Harfang to NAS Sigonella, Italy to support Unified Protector, the 2011 NATO-led intervention in Libya.⁵⁰

Central African Republic	N/A	Sperwer	2017-2018	MINUSCA

The 61st Artillery Regiment deployed with the Sperwer to support the U.N.'s Multidimensional Integrated Stabilization Mission in the Central African Republic.^{51,52}

Niger, Mali	Air Base 101, Niger	Harfang, MQ-9 Reaper, Mavic, Tracker	2014-	Barkhane

The 1/33 Squadron deployed with the Harfang to Niger in January 2013 to support counterterrorism operations in neighboring Mali.⁵³ France's first MQ-9 Reaper arrived in Niger in December 2013. As of April 2018, French Reapers had flown more than 20,000 flight hours in the Sahel.⁵⁴ In November 2018, a Reaper crashed short of the runway at Air Base 101.⁵⁵ The French Reapers in Niger will be armed with laser-guided bombs by the end of 2019 and with Hellfire missiles by 2020. Meanwhile, French ground forces in Mali have deployed with the Tracker since the start of the conflict.⁵⁶ And, beginning in early 2018, a special forces detachment of the 35th Parachute Artillery Regiment in Mali was equipped with the Mavic Pro. Writing in *Fantassins* magazine in early 2019, Captain Kenneth Mac Dowall described the unit's experiences with the consumer drone, finding that it was useful in certain circumstances such as creating battlefield damage reports, but that there were several drawbacks to deploying it in a combat environment.⁵⁷

DOMESTIC OPERATIONS

- France's domestic drone deployments focus on providing surveillance for high-profile events. In 2003, the 1/33 Squadron deployed the RQ-5 Hunter for security operations surrounding the G8 Summit in Evian.⁵⁸ In 2004, the Hunter participated in security operations during the 60th anniversary of the Normandy landings.⁵⁹ During the 2007 G8 Summit in Deauville, the Air Force deployed the newly-acquired Harfang.⁶⁰ An MQ-9 Reaper participated in the July 14 Bastille Day Parade in 2017—the Reaper's first operational mission in domestic airspace.⁶¹ In its annual report on activities in 2018, the Air Force said that it has offered to support local law enforcement with the Reaper during high-profile events, writing that such missions are a way to enhance unit training as well as domestic security.⁶²

INFRASTRUCTURE

Name	Country	Latitude	Longitude	Affiliation	Activity	Notes
Général d'Aboville Garrison	France	48°04'47"N	05°03'01"E	61st Regt	HQ, Training	
Air Base 709 Cognac-Châteaubernard	France	45°39'16"N	0°18'49"W	1/33 Sqn	HQ, Training	
Niamey International Airport	Niger	13°28'54"N	02°10'13"E	1/33 Sqn	Deployment	

OTHER

Name	Country	Latitude	Longitude	Affiliation	Activity	Notes
Air Base 125, Istres	France	43°31'28"N	4°56'30"E		Test site	Dassault nEUROn test site

DEVELOPMENT

- France is one of the four primary European nations participating in the EuroDrone program. See page XV for more information.
- The Neuron is a Class III UAV developed by a multinational consortium led by France's Dassault Aviation. Launched in 2003, the Neuron program sought to develop a stealthy combat drone capable of penetrating enemy air defenses. Initial flight tests began in 2012 in France and, subsequently, in Sweden in 2015.⁶³ In January 2019 France's *Direction Générale de l'Armement* announced that the Neuron had conducted its 150th test flight. Entities in Greece, Italy, Spain, Sweden, and Switzerland are involved in the program.⁶⁴

EXPORTS

Country	Model	Make	Class	Status	Notes
Austria	Tracker	EADS Cassidian	I	Active	

Canada	Sperwer	Sagem	II	Inactive
Colombia	AR-Drone	Parrot	I	Active
Denmark	Sperwer	Sagem	II	Inactive
Greece	Sperwer	Sagem	II	Active
Indonesia	Fox AT-1	CAC Systems	I	Inactive
Netherlands	Sperwer	Sagem	II	Inactive
Sweden	Sperwer	Sagem	II	Inactive

NOTES

1. Nathan Gain, "Des « Drones opérationnels de poche » pour les Terriens," Forces Operations Blog, 17 January 2019, <http://forcesoperations.com/des-drones-operationnels-de-poche-pour-les-terriens/>.
2. Drone Protect System, "DPS Équipe L'Armée de l'Air," news release, 20 February 2019, <http://www.droneprotectsystem.fr/details-dps+equipe+l+armee+de+l+air-201.html>.
3. Novadem, "French Ministry of the Armed Forces choose the Novadem NX70 micro reconnaissance UAV to equip soldiers in operation," news release, 17 June 2019, <https://www.suasnews.com/2019/06/french-ministry-of-the-armed-forces-choose-the-novadem-nx70-micro-reconnaissance-uav-to-equip-soldiers-in-operation/>.
4. Pierre Tran, "France Orders 105 Spy' Ranger Drones From Thales," Defense News, 5 January 2017, <https://www.defensenews.com/air/2017/01/05/france-orders-105-spy-ranger-drones-from-thales/>.
5. Airbus, "DRAC (Drone de Reconnaissance Au Contact) programme," news release, 10 January 2005, http://company.airbus.com/news-media/press-releases/Airbus-Group/Financial_Communication/2005/01/en_20050110_drac.html.
6. Vincent Groizeleau, "La DGA livre des mini-drones aux forces spéciales," *Mer et Marine*, 23 March 2010, <https://www.meretmarine.com/fr/content/la-dga-livre-des-mini-drones-aux-forces-speciales>.
7. Infotron, "IT180 mini UAV will secure the progression of ISAF French troop convoys in Afghanistan," news release, 18 June 2012, <http://rpdefense.over-blog.com/article-it180-mini-uav-will-secure-the-progression-of-isaf-french-troop-convoys-in-afghanistan-107095588.html>.
8. Ministry of Defense of France, "Livraison de 3 drones SDTI à l'armée de Terre," news release, 23 March 2010, <https://www.defense.gouv.fr/salle-de-presse/communiqués/communiqués-du-ministère-des-armées/livraison-de-3-drones-sdti-a-l-armee-de-terre>.
9. "Un deuxième drone Camcopter S-100 à bord du BPC Dixmude," Apps&Drones, 4 January 2019, <http://www.apps-drones.com/un-deuxieme-drone-camcopter-s-100-a-bord-du-bpc-dixmude-118899>.
10. Beth Stevenson, "Paris picks Patroller for UAV requirement," FlightGlobal, 22 January 2016, <https://www.flightglobal.com/news/articles/paris-picks-patroller-for-uav-requirement-421137/>.
11. Olivier Hertel, "Le drone Patroller arrive au sein de l'Armée de terre," Sciences et Avenir, 1 June 2019, https://www.sciencesetavenir.fr/high-tech/le-drone-patroller-arrive-au-sein-de-l-armee-de-terre_134121.
12. Chris Pocock, "French Chief Describes Reaper Plans," *Aviation International Online*, 22 November 2013, <https://www.ainonline.com/aviation-news/defense/2013-11-22/french-chief-describes-reaper-plans>.
13. Pierre Tran, "Naval Group, Airbus collaborate on helicopter drone project," Defense News, 11 January 2018, <https://www.defensenews.com/industry/2018/01/11/naval-group-airbus-collaborate-on-helicopter-drone-project/>.
14. Naval Group, "Le Futur Systeme de Drone Aerien," news release, 1 March 2019, <https://www.naval-group.com/fr/episode/le-futur-systeme-de-drone-aerien/>.
15. France, Senate, *Des Affaires Étrangères, De La Défense Et Des Forces Armées* (1), (N° 477), 16 May 2018, <https://www.senat.fr/leg/pjl17-477.html>.
16. Armée de l'Air, "Le drone Harfang fait ses adieux aux forces armées," news release, 11 January 2018, <https://www.defense.gouv.fr/air/actus-air/le-drone-harfang-fait-ses-adeux-aux-forces-armees>.
17. Ministry of Defense of France, "Le drone CL289 retiré du service après 17 ans d'exploitation," news release, 5 August 2010, <https://www.defense.gouv.fr/actualites/operations/le-drone-cl289-retire-du-service-apres-17-ans-d-exploitation>.
18. "Creckerelle (Kestrel)," Federation of American Scientists, last modified 21 September 1999, accessed 5 January 2019, <https://fas.org/man/dod-101/sys/ac/row/creckerelle.htm>.
19. "61e régiment d'artillerie," Armée de Terre, accessed 12 September 2018, <https://www.defense.gouv.fr/espanol/terre/l-armee-de-terre/le-niveau-divisionnaire/commandement-du-renseignement/61e-regiment-d-artillerie>.
20. "40e régiment d'artillerie," Armée de Terre, last modified 6 July 2016, accessed 5 January 2018, <https://www.defense.gouv.fr/espanol/terre/l-armee-de-terre/le-niveau-divisionnaire/3e-division/40e-regiment-d-artillerie>.
21. "3e régiment d'artillerie de marine," Armée de Terre, last modified 2 March 2017, accessed 5 January 2018, <https://www.defense.gouv.fr/espanol/terre/l-armee-de-terre/le-niveau-divisionnaire/3e-division/3e-regiment-d-artillerie-de-marine>.
22. "11e régiment d'artillerie de marine," Armée de Terre, last modified 5 July 2016, <https://www.defense.gouv.fr/>

- terre/l-armee-de-terre/le-niveau-divisionnaire/1re-division/11e-regiment-d-artillerie-de-marine.
23. “93e régiment d’artillerie de montagne,” Armée de Terre, last modified 5 July 2016, accessed 5 January 2018, https://www.defense.gouv.fr/english/node_64/l-armee-de-terre/le-niveau-divisionnaire/1re-division/93e-regiment-d-artillerie-de-montagne.
 24. “68e régiment d’artillerie d’Afrique,” Armée de Terre, last modified 5 July 2016, accessed 5 January 2018, <https://www.defense.gouv.fr/espanol/terre/l-armee-de-terre/le-niveau-divisionnaire/1re-division/68e-regiment-d-artillerie-d-afrique>.
 25. “35e régiment d’artillerie parachutiste,” Armée de Terre, last modified 2 May 2018, accessed 5 January 2018, <https://www.defense.gouv.fr/espanol/terre/l-armee-de-terre/le-niveau-divisionnaire/3e-division/11e-brigade-parachutiste/regiments/35e-regiment-d-artillerie-parachutiste>.
 26. Jean Marc Tanguy, “Première opex pour le DROGEN,” Air&Cosmos, 27 September 2016, <http://www.air-cosmos.com/premiere-opex-pour-le-drogen-83077>.
 27. “Escadron de drones 01.033 Belfort,” Armée de l’Air, accessed 12 September 2018, <http://www.defense.gouv.fr/air/activites/unites-aeriennes/escadron-de-drones/escadron-de-drones-01.033-belfort>.
 28. Emmanuel Huberdeau, “Le reaper vole pour la première fois en France,” *Air&Cosmos*, 6 July 2017, <http://www.air-cosmos.com/le-reaper-vole-pour-la-premiere-fois-en-france-97325>.
 29. Sophie Louet, “L’armée française recherche des pilotes de drones Reaper,” Reuters, 16 May 2019, <https://fr.reuters.com/article/idFRKCN1SM2B0-OFRT>.
 30. Philippe Chapleau, “Reaper: l’écurie française se renforce comme prévu et recrute des équipages,” Lignes de défense (blog), 17 May 2019, <http://lignesdedefense.blogs.ouest-france.fr/archive/2019/05/16/reaper-20235.html>.
 31. Arnaud, “Bientôt une section drone au sein de la Flottille 36F,” *Avions Legendaires*, 15 July 2019, <https://www.avionslegendaires.net/2019/07/actu/bientot-une-section-drone-au-sein-de-la-flottille-36f/>.
 32. Laurent Lagneau, “Pour gagner en autonomie, le Commando parachutiste de l’Air n°10 conçoit le CORVUS, son propre mini-drone,” *zone militaire*, 25 August 2018, <http://www.opex360.com/2018/08/25/gagner-autonomie-commando-parachutiste-de-lair-n10-concoit-corvus-propre-mini-drone/>.
 33. ÉTAT-MAJOR DE L’ARMÉE DE TERRE, *INSTRUCTION N° 128.5000/DEF/EMAT/OAT/BEMP relative à l’entraînement et au contrôle annuel de l’aptitude technique des spécialistes des aéronefs pilotés à distance de l’armée de terre*, 13 May 2015, http://circulaires.legifrance.gouv.fr/pdf/2015/09/cir_39998.pdf.
 34. Ibid
 35. Ibid
 36. Armée de Terre, “L’Ecole des drones est désormais une réalité,” news release, 19 January 2018, <https://www.defense.gouv.fr/terre/actu-terre/l-ecole-des-drones-est-desormais-une-realite>.
 37. Armée de l’Air, “Le centre d’excellence drones s’équipe d’un nouveau simulateur,” news release, 12 April 2016, <https://www.defense.gouv.fr/air/actus-air/le-centre-d-excellence-drones-s-equipe-d-un-nouveau-simulateur>.
 38. Frédéric Lert, “La formation des équipages du drone MQ-9 Reaper rapatriée à Cognacpremiumlibre,” *AeroBuzz*.fr, 10 January 2017, <https://www.aerobuzz.fr/defense/formation-equipages-drone-mq-9-reaper-rapatriee-a-cognac/>.
 39. Armée de l’Air, “Un deuxième Reaper sur le sol français,” news release, 8 January 2018, <https://www.defense.gouv.fr/air/actus-air/un-deuxieme-reaper-sur-le-sol-francais>.
 40. Frédéric Lert, “French Air Force introduces new UAV pilot training scheme,” *Jane’s Defence Weekly*, 23 May 2019, <https://www.janes.com/article/88729/french-air-force-introduces-new-uav-pilot-training-scheme>.
 41. Oceane Zubeldia, “L’armée française et l’utilisation des drones dans les missions de reconnaissance, de 1960 au conflit du Kosovo,” *Revue Historique Des Armées*, (2010), 62-71.
 42. Ibid
 43. Ministry of Defense of France, “21/02/08 - Kosovo: SDTI for KFOR,” <https://www.defense.gouv.fr/operations/terminees/operation-trident-1999-2014/actualites/21-02-08-kosovo-des-sdti-pour-la-kfor>.
 44. Michel Asencio, Philippe Gros, Jean-Jacques Patry, “Les drones tactiques a voilure tournante dans les engagements contemporains,” *Foundation pour la Recherche Strategique*, 2010, https://www.files.ethz.ch/isn/122387/2010_08.pdf.
 45. Ibid
 46. Dr. Jean-Baptiste Jeangène Vilmer, “Proliferated Drones: A Perspective on France,” *Center for a New American Security*, 2016, <http://drones.cnas.org/reports/a-perspective-on-france/>.
 47. “Le SDTI en Afghanistan: Un 1000 eme Vol ‘Explosif!’,” *Arti*, (July 2012), 22.
 48. Philippe Chapleau, “Trois drones Sperwer de plus pour le 61e régiment d’artillerie,” *Ouest France*, 16 January 2014, <http://lignesdedefense.blogs.ouest-france.fr/archive/2014/01/15/trois-drones-sperwer-de-plus-pour-le-61e-regiment-d-artiller-11030.html>.
 49. Ministère Des Armées, “Afghanistan : fin de mission pour le détachement Harfang,” news release, 24 February 2012, <https://www.defense.gouv.fr/english/actualites/operations/afghanistan-fin-de-mission-pour-le-detachement-harfang>.
 50. Zach Rosenberg, “France Deploys Harfang Over Libya,” *Flight International*, 25 August 2011, <https://www.flightglobal.com/news/articles/france-deploys-harfang-over-libya-361301/>.
 51. “Des drones tactiques français en Centrafrique,” *Le Figaro*, 24 May 2017, <http://www.lefigaro.fr/flash-actu/2017/05/24/97001-20170524FILWWW00389-des-drones-tactiques-francais-en-centrafrique.php>.
 52. Représentation permanente de la France, “MINUSCA - La France déploie une unité de drones tactiques de type Sperwer Mk,” news release, 19 July 2018, <https://onu.delegfrance.org/La-France-reste-presente-et-engagee-en-RCA>.
 53. Ministry of Defense of France, “Opération Serval : zoom sur le détachement Harfang,” news release, 8 February

- 2013, <https://www.defense.gouv.fr/english/layout/set/print/operations/terminees/operation-serval-2013-2014/actualite/operation-serval-zoom-sur-le-detachement-harfang>.
54. Loïc Lauze, “Sahel: Les Drones MQ-9 Reaper Ont Effectué Plus de 20,000 Heures de Vol,” *Defens’Aero*, 3 April 2018, <http://www.defens-aero.com/2018/04/drones-mq-9-reaper-effectue-20-000-heures-vol.html>.
55. defenceWeb, “French Reaper crashes in Niger,” defenceWeb, 20 November 2018, <https://www.defenceweb.co.za/aerospace/unmanned-aerial-vehicles/french-reaper-crashes-in-niger/>.
56. Ministry of Defense, “Barkhane: le drone de reconnaissance au contact en vol tactique au-dessus du plateau de Batal,” news release, 8 December 2017, <https://www.defense.gouv.fr/operations/actualites2/barkhane-le-drone-de-reconnaissance-au-contact-en-vol-tactique-au-dessus-du-plateau-de-batal>.
57. Kenneth Mac Dowall, “Utilisation des drones Mavic Pro par le GCP lors de l’opération Barkhane,” *Fantassins*, (Spring 2019), http://www.emd.terre.defense.gouv.fr/img/emd/fantassin/2019_n42_fantassins.pdf.
58. France, Sénat, *Rapport D’Information: Les drones dans les forces armées*, N.559, Paris: Sénat, 2017, accessed July 2019, <https://www.senat.fr/rap/r16-559/r16-5591.pdf>.
59. Ibid
60. Airbus, “Harfang, déployé depuis la base aérienne d’Evreux, a participé à la sécurité globale du G8,” News release, May 27, 2011, http://company.airbus.com/news-media/press-releases/Airbus-Group/Financial_Communication/2011/05/20110527_cassidian_harfang/fr_20110527_cassidian_harfang.html.
61. “French Air Force completes first flight of the MQ-9 Reaper unmanned aircraft,” Air Force Technology, 10 July 2017, <https://www.airforce-technology.com/news/newsfrench-air-force-completes-first-flight-of-mq-9-reaper-unmanned-aircraft-5866960>.
62. France, Ministry of Defense, *Retrospective 2018*, Paris: Commandement de la défense aérienne et des opérations aérienne, 2018.
63. “Program Milestones,” Dassault, accessed 18 June 2019, <https://www.dassault-aviation.com/en/defense/neuron/programme-milestones/>.
64. David Donald, “Neuron Passes 150-flight Milestone,” Aviation International Online, 7 January 2019, <https://www.ainonline.com/aviation-news/defense/2019-01-07/neuron-passes-150-flight-milestone>.

GERMANY

INVENTORY¹

Model	Make	Origin	Class	Intro	Qty	Operator	Notes
MIKADO	AirRobot	Germany	I	2009	145	Army, Marines	AirRobot AR 100-B
ALADIN	EMT	Germany	I	2003	290 (145)	Army, Marines	
Black Hornet ²	FLIR	USA	I	2018	20	Army	
KZO ³	Rheinmetall	Germany	II	2005	61	Army	Est. 44 aircraft remaining
LUNA	EMT	Germany	I	2000	90 (9)	Army	
LUNA NG ⁴	EMT	Germany	I	2020	15 (3)	Army	

Skeldar V-200 ⁵	Skeldar	Sweden, Switzerland	II	2019	2	Navy	
RQ-20 Puma AE ⁶	AeroVironment	USA	I	2019*	6 (3)	Marines	
Phantom ⁷	DJI	China	I	2016	30 (15)	Marines	
Heron 1	IAI	Israel	III	2010	6	Air Force	Leased
Heron TP ⁸	IAI	Israel	III	2019	5	Air Force	Leased

*Estimate

ACTIVE ACQUISITIONS

- Germany is considering acquiring the Northrop Grumman MQ-4C Triton high-altitude surveillance drone, known in the Bundeswehr as “Pegasus.”⁹ The Bundeswehr launched this effort in the wake of the Euro Hawk failure in 2013, a program to develop a variant of the Northrop Grumman Global Hawk capable of flying in European airspace. In April 2018 the U.S. State Department approved a possible sale of four Tritons for an estimated \$2.5 billion. As of this writing, the deal has not yet been approved by the German parliament.¹⁰

INACTIVE

Model	Make	Origin	Class	Period	Qty	Operator	Notes
CL-89	Canadair	Canada	II	1972-1994		Army	
CL-289 ¹¹	Canadair	Canada	II	1990-2009		Army	



(Left) The KZO at the ILA Berlin Air Show 2016. Credit: Julian Herzog / Wikimedia
(Right) The LUNA in Afghanistan in 2013. Credit: Bundeswehr / Flickr

PERSONNEL

ARMY

- The Technical Intelligence Company (*Technische Aufklärungskompanie*) is one of two primary UAV formations in the German Army. A typical Technical Intelligence Company contains one or more platoons equipped with UAVs and one or more with radar. The UAV platoons appear to be equipped with the LUNA, but are most likely also equipped with smaller drones such as the ALADIN and MIKADO. Most Technical Intelligence Companies are subordinated to a reconnaissance battalion. The reconnaissance battalions, as well as several separate reconnaissance companies, collectively form the Army Intelligence, Surveillance, and Reconnaissance Corps (*Heeresaufklärungstruppe*, or HAufklTr), which the Army stood up in 2008.¹² The *Heeresaufklärungstruppe* is comprised of six reconnaissance battalions, two airborne reconnaissance companies, one reconnaissance company attached to the 291st Jaeger Battalion, and a training center.
- The Reconnaissance Batteries (*Artillerieaufklärungsbatterie*) are the Army Artillery Corps' (*Artillerietruppe*) equivalent to the Technical Intelligence Companies in that they are equipped with both UAVs and radar. The Reconnaissance Batteries are primarily equipped with the KZO. Each Reconnaissance Battery is subordinated to an artillery battalion. The *Artillerieaufklärungsbatterie* are based on the Artillery Corps' Drone Batteries (*Drohnenbatterie*), which the Bundeswehr created in the mid-1980s to operate the CL-289.¹³ The *Drohnenbatterie* were active until the early 2000s when the Bundeswehr reorganized the Artillery Corps, dissolving the *Drohnenbatterie* or merging them with other units to create the current *Artillerieaufklärungsbatterie*.

Name		HQ	Type	Equipment	Activated
4th Technical Intelligence Company, 3rd Reconnaissance Training Battalion, 9th Armor Training Brigade ¹⁴	4. Technische Aufklärungskompanie, Aufklärungslehrbataillon 3, Panzerlehrbrigade 9	Lüneburg	P	LUNA	
4th Technical Intelligence Company, 6th Reconnaissance Battalion, 41st Armored Grenadier Brigade, 1st Armored Division ¹⁵	4. Technische Aufklärungskompanie, Aufklärungsbataillon 6, Panzergrenadierbrigade 41, 1. Panzerdivision	Eutin	P	LUNA	2008
4th Technical Intelligence Company, 7th Reconnaissance Battalion, 21st Armored Brigade, 1st Armored Division ¹⁶	4. Technische Aufklärungskompanie, Aufklärungsbataillon 7, Panzerbrigade 21, 1. Panzerdivision	Ahlen	P	LUNA	
4th Technical Intelligence Company, 13th Reconnaissance Battalion, 37th Armored Grenadier Brigade, 10th Armored Division ¹⁷	4. Technische Aufklärungskompanie, Aufklärungsbataillon 13, Panzergrenadierbrigade 37, 10. Panzerdivision	Gotha	P	LUNA	

4th Drone Company, 8th Reconnaissance Battalion, 12th Armored Brigade, 10th Armored Division ¹⁸	<i>4. Drohnenkompanie, Aufklärungsbataillon 8, Panzerbrigade 12, 10. Panzerdivision</i>	Freyung	D	KZO, LUNA	2007
4th UAV and Field Intelligence Company, 230th Mountain Reconnaissance Battalion, 23rd Mountain Brigade, 10th Armored Division ¹⁹	<i>UAV-Kompanie und Feldnachrichtenzug, Gebirgsaufklärungsbataillon 230, Gebirgsjägerbrigade 23, 10. Panzerdivision</i>	Füssen	D	LUNA	
Drone Platoon, 260th Airborne Reconnaissance Company, 1st Airborne Brigade, Rapid Forces Division ²⁰	<i>Drohnenzug, Luftlandaufklärungskarte 260, Luftlandebrigade 1, Division Schnelle Kräfte</i>	Lebach	D		
Technical Intelligence Platoon, 310th Airborne Reconnaissance Company, 1st Airborne Brigade, Rapid Forces Division ²¹	<i>technischer Aufklärungszug, Luftlandaufklärungskompanie 310, Luftlandebrigade 1, Division Schnelle Kräfte</i>	Seedorf	P		
2nd Reconnaissance Battery, 325th Artillery Battalion, 1st Armored Division ²²	<i>2. Aufklärungsbatterie; Artillerie-bataillon 325, 1. Panzerdivision</i>	Munster	P	KZO	
2nd Reconnaissance Battery, 131st Artillery Battalion, 10th Armored Division ²³	<i>2. Aufklärungsbatterie, Artilleriebataillon 131, 10. Panzerdivision</i>	Weiden	P	KZO	
2nd Ground and Air Reconnaissance Battery, 345th Artillery Demonstration Battalion, 10th Armored Division ²⁴	<i>2. Batterie als bodengebundene und luftgestützte Aufklärungsbatterie, Artillerielehrbataillon 345, 10. Panzerdivision</i>	Ahlen	P	KZO	
5th Reconnaissance Battery, 295th Artillery Battalion, German-French Brigade, 10th Armored Division ²⁵	<i>5. Aufklärungsbatterie, Artilleriebataillon 295, Deutsch-Französische Brigade, 10. Panzerdivision</i>	Stetten	P	KZO	

NAVY AND MARINES

Name	HQ	Type	Equipment	Activated
Technical Reconnaissance Platoon, Reconnaissance Company, Marines ²⁶	<i>Technischer Aufklärungszug, Aufklärungskompanie, Seebataillone</i> Eckernförde	P	ALADIN, MIKADO	
Marine Special Forces Command ²⁷	<i>Kommando Spezialkräfte der Marine</i>	ND	RQ-20 Puma AE II	

AIR FORCE

Name	HQ	Type	Equipment	Activated
51st Tactical Air Squadron	<i>Luftwaffengeschwader 51 "Immelmann"</i> Schleswig Air Base	P	Heron 1, Heron TP	

TRAINING

- Army drone operator training takes place at the Training Center Munster (*Ausbildungszentrum Munster*) and the Training Area Military Joint Tactical Support/Indirect Fire at Idar-Oberstein (*Ausbildungsbereich Streitkräftegemeinsame Taktische Feuerunterstützung/Indirektes Feuer*).²⁸ The Reconnaissance Forces Training Area (*Ausbildungsbereich Heeresaufklärungstruppe*), which is based at Munster and subordinated to the Army ISR Command, provides operator training for the MIKADO, ALADIN, and LUNA.²⁹ Specialized training in the operation of the KZO takes place at Idar-Oberstein, the artillery academy.
- Air Force operator training takes place at the 51 Tactical Air Squadron at Jagel Air Base and at Tel Nof Air Force Base in Israel. The Air Force training program lasts approximately 11 weeks and combines theoretical and practical instruction. At Jagel, operators are trained on the simulator. In January 2019, the first German Air Force Heron TP operators arrived in Israel.³⁰ Over the next two years, 70 German personnel are expected to complete the course.³¹

OPERATIONS

Country	Base	Equipment	Period	Operation
Balkans ³²		CL-289, LUNA, ALA-DIN	1997-1999, 2003 - Unknwon	SFOR, KFOR
Germany deployed with the CL-289 to the Balkans twice in the late 1990s; in 1997 and between 1998 and 1999. In 1998 and 1999, the CL-289 conducted 212 missions as part of the Kosovo Force, most of which were dedicated to tracking the movements of refugees of the Kosovo War. The Bundeswehr also deployed the LUNA and ALADIN to the Balkans in 2003.				
Afghanistan ³³	Camp Marmal	MIKADO, ALADIN, LUNA, KZO, Heron 1	2003-	Enduring Freedom, Resolute Support

German reconnaissance units deployed with the LUNA to Afghanistan beginning in 2003. The Army introduced the ALADIN in Afghanistan in 2005 and the KZO in 2009. The Air Force deployed three leased Heron 1 drones to Afghanistan in 2010. German drones initially supported operations around Kabul. Of the five German drones deployed to Afghanistan, the LUNA and Heron 1 accumulated the most flight hours. As of 2017, the leased Heron 1s had flown more than 30,000 flight hours in Afghanistan.³³ In December 2018, Germany extended the contract to lease the Heron 1 for operations in Afghanistan until May 2020.³⁴

Mali ^{35,26}	Gao	Heron 1, LUNA	2016-	MINUSMA

In 2016 Germany deployed three leased Heron 1s to Gao in support of the United Nations Multidimensional Integrated Stabilization Mission in Mali. Germany extended the contract for the leased Heron 1s in Mali in January 2017 and again in December 2018. The Heron 1s are expected to be deployed in Mali until July 2020.³⁷

Figure 9: German UAV Operational Flight Hours from 1990 to 2019

System	Period of Record	Flight Hours
ALADIN	2005 - June 2019	6,983
Black Hornet	2018 - June 2019	66
CL 289	1990 - 2009	468
Phantom (DJI)	2017 - June 2019	104
Heron 1	2010 - May 2019	50,086
KZO	2004 - May 2019	7,121
LARUS	2019 - June 2019	0
LUNA	2003 - May 2019	18,219
MIKADO	2011 - June 2019	4,379
<i>Total</i>		<i>87,426</i>

Source: Bundeswehr, Bundestag

INFRASTRUCTURE

Name	Country	Latitude	Longitude	Affiliation	Activity	Notes
Tel Nof Air Base	Israel	31°50'22"N	34°49'18"E	51 Sqn	Training	
Camp Marmal	Afghanistan	36°42'10"N	067°13'40"E	Army, 51 Sqn	Deployment	
Gao	Mali	16°14'54"N	000°00'20"E	51 Sqn	Deployment	

DEVELOPMENT

- Germany is one of the four primary European nations participating in the EuroDrone program. See page XV for more information.

EXPORTS

Country	Model	Make	Class	Status	Notes
Netherlands	ALADIN	EMT	I	Inactive	
Pakistan	LUNA	EMT	I	Active	
Saudia Arabia	LUNA X-2000	EMT	I	Active	

NOTES

1. Editorial staff of the Federal Office of Bundeswehr Equipment, Information Technology and In-Service Support, "Taktische UAS der Bundeswehr," Newsletter Verteidigung, May 2015, https://www.dwt-sgw.de/fileadmin/redaktion/SGW-Veranstaltungen/2015/5F4_Unmanned_Systems/NV-Special-8-2015.pdf.
2. Matthias Monroy, "Bundeswehr beschafft Nano-Drohnen," *Netzpolitik.org*, 29 September 2016, <https://netzpolitik.org/2016/bundeswehr-beschafft-nano-drohnen/>.
3. Bettina Sagittarius, "Unbemannte Drohne klärt auf," *Volksstimme.de*, 17 July 2017, <https://www.volksstimme.de/lokal/burg/bundeswehr-uebung-unbemannte-drohne-klart-auf>.
4. Björn Lenz, "Neue Aufklärungsdrohne: Nachfolger für LUNA und KZO," *Bundeswehr*, 7 December 2017, <https://bit.ly/2scSbeW>.
5. Nicholas Fiorenza, "Bundeswehr orders rotary-wing UAV for K130 corvette," *Jane's Defence Weekly*, 13 August 2018, <https://www.janes.com/article/82332/bundeswehr-orders-rotary-wing-uav-for-k130-corvette>.
6. AeroVironment, "German Navy to Field AeroVironment Puma Unmanned Aircraft," news release, 7 May 2018, <https://www.businesswire.com/news/home/20180507005290/en/German-Navy-Field-AeroVironment-Puma-Unmanned-Aircraft>.
7. Marcus Engert, "Die Bundeswehr nutzt unsichere Drohnen, und es ist ihr egal," *Buzzfeed Deutschland*, 9 August 2017, https://www.buzzfeed.com/de/marcusengert/die-bundeswehr-nutzt-drohnen-die-die-usa-als?utm_term=.lIO35DKq5N#.pr5dL9xPL6.
8. Assaf Uni, "Bundestag approves €1b Israeli UAV deal for German army," *Globes*, 13 June 2018, <https://en.globes.co.il/en/article-bundestag-approves-%E2%82%AC1b-israeli-uav-deal-for-german-army-1001241320>.
9. Sebastian Sprenger, "These three German drones are worth watching," *Defense News*, 22 March 2018, <https://www.defensenews.com/air/2018/03/22/these-three-german-drones-are-worth-watching/>.
10. Dave Majumdar, "Germany Is Buying 4 Northrop Grumman MQ-4C Triton UAVs," *The National Interest*, 8 April 2018, <https://nationalinterest.org/blog/the-buzz/germanys-buying-4-northrop-grumman-mq-4c-triton-uavs-25262>.
11. Uwe Brinkmann, "Nutzungsende für das Drohnensystem CL-289 in Aachen," *Deutsches Heer*, 3 May 2011, <https://bit.ly/2F8IbvF>.
12. Germany, Chief of Staff of the German Army, *The Reorientation of the German Army*, (Strausberg, July 2013), accessed 5 January 2019, http://www.benning.army.mil/MCoE/GLNO/content/pdf/Brochure_German%20Army%20Reorientation.pdf.
13. "Drohnenbatterie 1," *Garnisonsgeschichte der Stadt Delmenhorst*, accessed 5 January 2019, <http://www.garnison-schornik-delmenhorst.de/truppenteile/heer/artillerie-vbd-einh/drohnen-batterie-1.html>.
14. "Aufklärungsbataillon 3 - Gliederung," *Deutsches Heer*, accessed 5 January 2019, <https://bit.ly/2CSk8yA>.
15. "Aufklärungsbataillon 6 - Gliederung," *Deutsches Heer*, accessed 5 January 2019, <https://bit.ly/2Quy9GE>.
16. "Aufklärungsbataillon 7 - Gliederung," *Deutsches Heer*, accessed 5 January 2019, <https://bit.ly/2LUxNbi>.
17. "Aufklärungsbataillon 13 - Gliederung," *Deutsches Heer*, accessed 5 January 2019, <https://bit.ly/2s7o7kW>.
18. "Aufklärungsbataillon 8 - Gliederung," *Deutsches Heer*, accessed 5 January 2019, <https://bit.ly/2F9Ik1c>.
19. "Gebirgsaufklärungsbataillon 230," *Deutsches Heer*, accessed 5 January 2019, <https://bit.ly/2GZ8w10>.
20. "Luflandeaufklärungskompanie 260 - Gliederung," *Deutsches Heer*, accessed 5 January 2019, <https://bit.ly/2R8EbBQ>.
21. "Luflandeaufklärungskompanie 310 - Gliederung," *Deutsches Heer*, accessed 5 January 2019, <https://bit.ly/2Tu-ivwAU>.
22. "Artillerielehrbataillon 325 - Gliederung," *Deutsches Heer*, accessed 5 January 2019, <https://bit.ly/2GZaOx8>.
23. "Artilleriebataillon 131 - Gliederung," *Deutsches Heer*, accessed 5 January 2019, <https://bit.ly/2TtUGVF>.
24. "Artilleriebataillon 345 - Gliederung," *Deutsches Heer*, accessed 5 January 2019, <https://bit.ly/2Tq02kW>.
25. "Artilleriebataillon 295- Gliederung," *Deutsches Heer*, accessed 5 January 2019, <https://bit.ly/2CSIQzf>.
26. "Über die Aufklärungskompanie," *Marine*, accessed 5 January 2019, <https://bit.ly/2C0NKrZ>.
27. Thomas Wiegold, "DroneWatch: Marine-Spezialkräfte bekommen neue Aufklärungsdrohne (Nachtrag),"

- Augen Geradeaus, 9 May 2018, <https://augengeradeaus.net/2018/05/dronewatch-marine-spezialkraefte-bekommen-neue-aufklaerungsdrohne/>.
28. “Ausbildungsbereich Streitkräftegemeinsame Taktische Feuerunterstützung/Indirektes Feuer in Idar-Oberstein,” Deutsches Heer, accessed 5 January 2019, <https://bit.ly/2TuhpBe>.
 29. “Ausbildungsbereich Heeresaufklärungsgruppe in Munster,” Deutsches Heer, accessed 5 January 2019, <https://bit.ly/2BYBBnm>.
 30. Anna Ahronheim, “German Air Force Pilots Arrive in Israel to Train on Drones,” The Jerusalem Post, 4 February 2019, <https://www.jpost.com/Israel-News/First-German-Air-Force-pilots-arrive-in-Israel-to-train-on-advanced-drone-579638>.
 31. German Ministry of Defense, “German Air Force Crews Train on Heron TP Unmanned Aircraft in Israel,” news release, 20 March 2019, <http://www.defense-aerospace.com/articles-view/release/3/201167/german-af-crews-train-on-heron-tp-unmanned-aircraft-in-israel.html>.
 32. Detlef H. Keller, “Die Drohnen des Heeres im Einsatz, *Heer Strategie & Technik*, August 2011, https://www.emt-penzberg.de/fileadmin/web_data/presse/2011_08_SuT_08_11_S.17-25.pdf.
 33. Ulrike Franke, “The Unmanned Revolution: How Drones are revolutionising Warfare,” (PhD diss., Oxford, 2018), 211-229.
 34. Nicholas Fiorenza, “Germany Funds procurement projects as Bundeswehr grows further,” *Jane’s Defence Weekly*, 6 December 2018, <https://www.janes.com/article/85055/germany-funds-procurement-projects-as-bundeswehr-grows-further>.
 35. The Shephard News Team, “LUNA flies in MINUSMA mission,” *Shephard Media*, 5 July 2016, <https://www.shephardmedia.com/news/uv-online/first-flight-germanys-emt-luna/>.
 36. Alexander Steenbeck, “120 Soldaten aus Eutin bereiten sich auf Mali-Einsatz,” *Ostholsteiner Anzeiger*, 28 January 2016, <https://www.shz.de/lokales/ostholsteiner-anzeiger/120-soldaten-aus-eutin-bereiten-sich-auf-mali-einsatz-vor-id12578431.html>.
 37. Nicholas Fiorenza, “Germany Funds procurement projects as Bundeswehr grows further,” *Jane’s Defence Weekly*, 6 December 2018, <https://www.janes.com/article/85055/germany-funds-procurement-projects-as-bundeswehr-grows-further>.

GREECE

INVENTORY

Model	Make	Origin	Class	Intro	Qty	Operator	Notes
Sperwer ¹	Sagem	France	II	2005	16 (4)	Army	
Pegasus II Block I ²	Hellenic Aerospace Industry	Greece	II	2005	17	Air Force	

ACTIVE ACQUISITIONS

- Greece reportedly intends to spend approximately \$44 million on a three-year lease for seven Israel Aerospace Industries Heron 1 UAVs.³ In a briefing before a parliamentary committee in February 2018, Greek Alternate Minister of National Defence Dimitris Vitsas said that the acquisition would largely be used for security operations in the Mediterranean. As of this writing, the status of the project is unclear.
- In July 2018, the European Union awarded the Greek Ministry of Defense a \$1.3 million grant to acquire 25 surveillance drones for the Hellenic Army, which previously lacked an unmanned Class I ISR capability organic to smaller formations.⁴ Although the make and model of these aircraft has not been disclosed, it is likely to be a small fixed-wing aircraft equivalent to the RQ-11 Raven.

INACTIVE

Model	Make	Origin	Class	Period	Qty	Operator	Notes
Pegasus I	Hellenic Aerospace Industry	Greece	II	1986-Unknown		Army	

PERSONNELARMY

Name	HQ	Type	Equipment	Activated
Unmanned Aircraft Unit, 472nd Intelligence and Surveillance Battalion, 2nd Communications, Electronic Warfare, Intelligence and Surveillance Regiment, Supreme Military Command of the Interior and the Islands ⁵	<i>Λόχου Μη Επανδρωμένων Αεροχημάτων, 472 Τάγματος Επιτήρησης - Πληροφορικής (472 ΤΕΠΠ), 2ου Συγκροτήματος Επικοινωνιών, Ηλεκτρονικού Πολέμου, Πληροφορικής και Επιτήρησης (2ο ΣΕΗΠΠΕΠ)</i> Athens, Attica	D	Sperwer	
Unmanned Aircraft Unit, 471st Intelligence and Surveillance Battalion, 1st Communications, Electronic Warfare, Intelligence and Surveillance Group Regiment, 4th Army Corps ⁶	<i>Λόχου Μη Επανδρωμένων Αεροχημάτων, 471 Τάγματος Επιτήρησης - Πληροφορικής (471 ΤΕΠΠ), 1ου Συγκροτήματος Επικοινωνιών, Ηλεκτρονικού Πολέμου, Πληροφορικής και Επιτήρησης (1ο ΣΕΗΠΠΕΠ)</i> Thrace	D	Sperwer	

AIR FORCE

Name	HQ	Type	Equipment	Activated
Unmanned Aircraft Squadron, 110th Combat Wing ⁷	<i>Μοίρα Μη Επανδρωμένων Αεροσκαφών, 110 Πτέρυγα Μάχης</i> Larissa Air Base	D	Pegasus II Block I	2003

INFRASTRUCTURE

Name	Country	Latitude	Longitude	Affiliation	Activity	Notes
Larissa Air Base	Greece	39°38'56"N	22°27'55"E	UAV Sqn	HQ	

NOTES

1. Peter La Franchi, "Greece doubles Sagem Sperwer tactical UAV inventory," *Flight International*, 15 June 2006, <https://www.flightglobal.com/news/articles/greece-doubles-sagem-sperwer-tactical-uav-inventory-207245/>.
2. Giorgos Marakakis, "ΟΙ ΔΗΛΩΣΕΙΣ Κ. ΔΕΝΔΙΑ ΚΑΙ ΤΑ ΕΞΟΠΛΙΣΤΙΚΑ ΘΕΜΑΤΑ ΤΟΥ ΕΛΛΗΝΙΚΟΥ ΣΤΡΑΤΟΥ," Phoenix, 6 December 2014, <https://hellenicphoenix.wordpress.com/2014/12/06/23/>.
3. Igor Bozinovski, "Greece to lease Heron UAVs from Israel," *Jane's Defence Weekly*, 7 February 2018, <https://www.janes.com/article/77680/greece-to-lease-heron-uavs-from-israel>.
4. Theodore L. Valmas, "Greece receives EU funding for surveillance equipment," *IHS Jane's Defence Weekly*, 11 July 2018, <https://www.janes.com/article/81690/greece-receives-eu-funding-for-surveillance-equipment>.
5. "ΔΙΑΒΙΒΑΣΕΙΣ: Δείτε τα ελληνικά Drones σε άσκηση," *On Alert*, 31 May 2016, <http://www.onalert.gr/stories/aeroporia-stratou-deite-ta-ellinika-drones/50005>.
6. Leonidas Blaveris, "Με... drones στα σύνορα," *Proelasi*, 14 March 2016, <https://www.proelasi.org/%CE%BC%CE%B5-drones-%CF%83%CF%84%CE%B1-%CF%83%CF%8D%CE%BD%CE%BF%CF%81%CE%B1/>.
7. "Μοίρα Μη Επανδρωμένων Αεροσκαφών," Hellenic Air Force, accessed 25 March 2019, <https://www.haf.gr/structure/ata/110pm/mmeaf/>.

HUNGARY

INVENTORY

Model	Make	Origin	Class	Intro	Qty	Operator	Notes
Skylark-ILE ¹	Elbit	Israel	I	2009	9	Army	
RQ-11 Raven ²	AeroVironment	USA	I			Special Forces	

PERSONNEL

ARMY

Name	HQ	Type	Equipment	Activated
UAV Company, 24th Reconnaissance Battalion, Hungarian Defense Forces Combat Command ³	<i>Pilótanélküli Felderítő Repülő Század, MH 24. Bornemissza Ezred, MH Összhad-erőnemi Parancsnokság</i> Debrecen	D	Skylark	2007

SPECIAL FORCES

Name	HQ	Type	Equipment	Activated
2nd Special Purpose Brigade ⁴	<i>MH 2. vitéz Bertalan Árpád Különleges Rendeltetésű Dandár</i> Szolnok	ND	RQ-11 Raven	2007

OPERATIONS

Country	Base	Equipment	Period	Operation
Afghanistan ^{5,6}	Pol-e Khomri, Baghlan Province	Skylark	2010-2013	ISAF/Enduring Free-dom

The Hungarian Provincial Reconstruction Team 8 (HUN PRT-8), a composite unit that included detachments from various branches of the armed forces, was the first Hungarian rotation to deploy with the Skylark-1LE to Afghanistan. Successive rotations of Hungarian PRT forces also deployed with Skylarks, which were flown by the 24th Reconnaissance Battalion.

NOTES

1. Honvedelem, "Felderítés a levegőből," news release, 22 July 2009, <https://www.honvedelem.hu/cikk/15820>.
2. "Nemzetközi hadgyakorlatot tartottak Szolnokon," AIRportal.hu, 30 March 2018, <https://airportal.hu/nemzetkozi-hadgyakorlatot-tartottak-szolnokon/>.
3. "MH 24. Bornemissza Gergely Felderítő Ezred," Honvédelem.hu, accessed 11 September 2018, https://honvedelem.hu/szervezet/mh_24_bornemissza_gergely_felderito_ezred.
4. "Felkészítésen az operátorok," Honvedelem.hu, accessed July 2019, https://honvedelem.hu/cikk/115115_felkeszitesen_az_operatorok.
5. Trautmann Balázs, "Hangtalan Pacsirta," Magyar Honvéd, 18 April 2014, https://honvedelem.hu/cikk/43534_hangtalan_pacsirta.
6. Honvedelem, "The 100th Flight in Afghan Airspace," news release, 29 November 2011, <https://honvedelem.hu/cikk/29116>.

IRELAND

INVENTORY

Model	Make	Origin	Class	Intro	Qty	Operator	Notes
Orbiter 2B ¹	Aeronautics	Israel	I	2007		Army	Upgraded from Orbiter 1 in 2016 ²

NOTES

1. Don Lavery, “Defence Forces to use Israeli robot spy planes,” *Independent.ie*, 1 August 2007, <https://www.independent.ie/irish-news/defence-forces-to-use-israeli-robot-spy-planes-26308432.html>.
2. Niall Sargent, “Criticism over plan to spend €2m on Israeli-made drones,” *The Irish Times*, 28 November 2016, <https://www.irishtimes.com/news/ireland/irish-news/criticism-over-plan-to-spend-2m-on-israeli-made-drones-1.2884185>.

ITALY

INVENTORY

Model	Make	Origin	Class	Intro	Qty	Operator	Notes
RQ-11A/B Raven	AeroVironment	USA	I	2007	36 (12)	Army	
RQ-11C Raven DDL	AeroVironment	USA	I	2016	42 (14)	Army	
RQ-7 Shadow	AAI	USA	II	2014	16 (4)	Army	
MQ-1 Predator	GA-ASI	USA	III	2004	6	Air Force	“Preda-tor A”
MQ-9 Reaper ¹	GA-ASI	USA	III	2010	6	Air Force	“Preda-tor B”
Strix-C ²	Alpi Aviation	Italy	I	2009		Air Force	In ser-vice with the 16th Force Protec-tion Wing
Strix-D	Alpi Aviation	Italy	I		6 (3)	Navy	
RQ-24A Sixton ³	Selex-ES	Italy	I	2008	2	Army	
Bramor	C-Astral	Slovenia	I	2014		Army	
CamCopter S-100 ⁴	Schiebel	Austria	II	2012	2	Navy	Trial plat-form

ACTIVE ACQUISITIONS

- The P.1HH “Hammerhead” and P.2HH, the planned successor to P.1HH, are medium-altitude long-endurance systems based on the manned Piaggio P-180 business aircraft. The P.1HH and P.2HH are built by Piaggio Aerospace, an Italian firm that was owned by the UAE’s Mubadala fund until December 2018. The P.1HH was unveiled in 2013.⁵ The Italian Air Force has funded some of the development of the Hammerhead. Flight tests have been carried out at Trapani Air Base in Sicily.⁶ One prototype aircraft crashed off the Sicilian coast in 2016. In March 2018, the Italian MoD submitted a request to Parliament to purchase ten P.1HH and P.2HH systems (20 total aircraft) for 755 million euros.⁷ This proposal fell apart later in the year when a new government took power in Rome, throwing the Piaggio’s future into doubt. As of April 2019, the Italian government appeared ready to purchase four P.1HH aircraft for the Air Force with future purchases possible.⁸

INACTIVE

Model	Make	Origin	Class	Period	Qty	Operator	Notes
FQM-151 Pointer	AeroVironment	USA	I	2004-2007		Army	

PERSONNELARMY

Name	HQ	Type	Equipment	Activated
41st “Cordenons” Regiment, RISTA-EW Brigade ⁹	41° Reggimento “Cordenons”, Brigata RISA-EW Sora, Frosinone	P	RQ-11 Raven, Bramor, RQ-7 Shadow	2001

AIR FORCE

Name	HQ	Type	Equipment	Activated
28th Squadron, 32nd Air Wing ¹⁰	28° Gruppo Volo APR, 32° Stormo Amendola Air Base	D	MQ-1 Predator, MQ-9 Reaper	2002
61st Squadron, 32nd Air Wing ^{11,12}	61° Gruppo Volo APR, 32° Stormo Amendola Air Base, Sigonella Air Base	D	MQ-1 Predator	2017

NAVY AND MARINES

Name		HQ	Type	Equipment	Activated
4th Helicopter Squadron	<i>4° Gruppo elicotteri</i>	Grottaglie	ND	CamCopter S-100	
1st San Marco Regiment, San Marco Marine Brigade ¹³	<i>1° Reggimento "San Marco", Brigata marina "San Marco"</i>	Amendola Air Base, Sigonella Air Base	ND	Strix-C	2017

TRAINING

- The Center of Excellence for Remotely Piloted Aircraft (*Centro di Eccellenza per Aeromobili a Pilotaggio Remoto*, or CdE APR) at Amendola Air Base is responsible for providing UAV operator training for all branches of the military, as well as to civilian public safety officers, and for developing operational concepts for unmanned aircraft employment.^{14,15} Activated in October 2009, the CdE APR is managed by the Air Force's 3rd Department for Aerospace Planning. A typical training program at CdE APR includes a course dedicated to the doctrine and use of unmanned systems and a second course, based on STANAG 4670, the NATO guidance for UAV operator training, that trains students in aircraft and sensor operations. RQ-7 and MQ-1/9 operators receive standard pilot training and certification at the 70th Air Wing. The CdE APR also works on developing counter-UAS operational concepts and training. As of February 2019, more than 470 personnel have attended the CdE APR.
- Until 2018, specialized additional training for Italy's MQ-1 and MQ-9 pilots and sensor operators took place largely at Holloman Air Force Base in the United States. In 2018 the Italian Air Force inaugurated a new training simulator for the Predator and Reaper drones at Amendola, making it possible for some MQ-1/9 training to be conducted in Italy.¹⁶ The introduction of these new systems was part of the European Defense Agency's initiative to enhance European drone training capabilities.

OPERATIONS

Country	Base	Equipment	Period	Operation
Iraq ¹⁷	Tallil Air Base	MQ-1 Predator, FQM-151 Pointer	2005-2006	Ancient Babylon
Italian Air Force MQ-1 Predator drones deployed to Iraq in January 2005. The Predator was tasked with carrying out ISR missions in the Dhi Qar Governorate. The Predators monitored the withdrawal of Italian forces from Iraq in 2005 and 2006. Italian forces in Iraq were also equipped with the FQM-151 Pointer, the predecessor to the RQ-11 Raven, for short-range re-connaissance.				
Afghanistan	Camp Arena, Herat	MQ-1 Predator, MQ-9 Reaper, RQ-7 Shadow, Strix-C, Bramor	2007-	Enduring Freedom (US), Resolute Support (US)
Between 2007 and 2014, Italian MQ-1 Predators accumulated more than 13,000 flight hours in Afghanistan. ¹⁸ In 2014, Italian MQ-9 Reapers replaced the Predators. In 2016, the Italian Army's 1st Aviation Regiment and 41st "Cordenons" Regiment deployed with the RQ-7 Shadow to Afghanistan. As of early 2019, the Italian Shadows had accumulated 2,000 flight hours in Afghanistan. ¹⁹ Separately, Italy has deployed the Bramor and the Strix-C to enhance perimeter security at Camp Arena and Herat Air Base. ^{20,21}				
Libya ²²	Trapani Air Base	MQ-9 Reaper	2011	Odyssey Dawn/Uni-fied Protector

In August 2011, shortly after they achieved initial operational capability, several Italian MQ-9 Reapers were deployed to support the NATO-led intervention in Libya. The aircraft were based at Trapani in Sicily and were controlled from Amendola Air Base via satellite by Air Force personnel with the 28th Squadron.²³

Kosovo ²⁴	MQ-9 Reaper, RQ-11 Raven	2012,2014-2015	Joint Enterprise, Ko-sovo Force

In 2012, an MQ-9 Reaper with the 28th Squadron supported the NATO Operation Joint Enter-prise in Kosovo. In October 2014, elements of the 41st “Cordones” Regiment equipped with the RQ-11 Raven were deployed for six months to Kosovo with the 5th Alpine Regiment.

Mediterranean	Sigonella	MQ-1 Predator	2013-	Mare Nostrum, Mare Sicuro

The Italian Air Force’s Predators have been a fixture of Italy’s security operations in the Mediterranean. When Italy launched Operation Safe Sea (Mare Sicuro) in 2015, at least one Air Force Predator A or Predator B supported the operation.²⁵ In 2017 the Italian Air Force activated the 61st Squadron which, together with personnel from the 28th Squadron and 41st Air Wing, primarily provides ISR support for Safe Sea.²⁶

Djibouti ²⁷	Chabelley Air Base	MQ-1 Predator	2014-2015	Atalanta

In August 2014, the 28th Sqn deployed for an eight-month tour in Djibouti under Operation Atalanta, the E.U.’s counter-piracy mission off the Horn of Africa. Over the course of the deployment, the Italian drones completed 28 missions, totalling more than 300 flight hours.

Iraq ²⁸	Ali Al Salem, Kuwait	MQ-1 Predator	2014-	Inherent Resolve (US)

Beginning in 2014, Italy contributed two MQ-9 Reapers with the 32nd Air Wing to Operation Inherent Resolve, the U.S.-led counter-ISIS campaign in Syria and Iraq. The Reapers are based at Ali Al Salem, alongside U.S. and U.K. MQ-9 Reapers. The Italian Reapers identified targets for Coalition jets and provided ISR support to Kurdish forces.

DOMESTIC OPERATIONS

- In March 2019, the Army deployed with the RQ-11 Raven in Operation Land of Fires (Terra dei Fuochi) to combat illegal dumping.²⁹ The operation focused on the Naples region and involved both military and civilian law enforcement personnel.

INFRASTRUCTURE

Name	Country	Latitude	Longitude	Affiliation	Activity	Notes
Amendola Air Base, Foggia	Italy	41°32'29"N	015°43'05"E	32nd Wing	HQ, Training	
Ali Al Salem Air Base	Kuwait	29°20'48"N	47°31'14"E	32nd Wing	Deployment	

Sigonella Air Base, Sicily	Italy	37°24'06"N	014°55'20"E	32nd Wing	Deployment
Herat Airport	Afghanistan	34°12'36"N	62°13'42"E	32nd Wing	Deployment

OTHER

Name	Country	Latitude	Longitude	Affiliation	Activity	Notes
Vicenzo-Fliro Airport Trapani-Birgi	Italy	37°54'43"N	012°29'36"E		Test site	P.1HH tests

DEVELOPMENT

- Italy is one of the four primary European nations participating in the EuroDrone program. See page XV for more information.
- The P.2 HammerHead (P.2HH) is a Class III UAV developed by Piaggio Aerospace.³⁰ It is the successor to the P.1 HammerHead, which the Italian Air Force intends to buy. Piaggio announced that it was working on the P.2HH in 2018. Although the company has revealed the exact specifications, the P.2HH is reportedly significantly larger than its predecessor.
- The Falco Xplorer is a Class III UAV developed by Leonardo. It was unveiled at the 2019 Paris Air Show.^{31,32} The Xplorer reportedly has a maximum take off weight of 13,000 kilograms, a payload capacity of 350 kilograms, and an endurance of 24 hours. It is the largest UAV developed by Leonardo. The Xplorer was scheduled to begin flight tests in June 2019, with deliveries to future customers beginning in 2020.

NOTES

1. Luca Peruzzi, "Italy flies first Predator B sortie over Libya," *Flight International*, 15 August 2011, <https://www.flightglobal.com/news/articles/italy-flies-first-predator-b-sortie-over-libya-360732/>.
2. David Cenciotti, "Italian Mini-UAV Deployed to Afghanistan for Herat Airbase Surveillance," *The Aviationist*, 24 July 2013, <https://theaviationist.com/2013/07/24/strix-c-afghanistan/>.
3. David Cenciotti, "The Italian Navy is Testing a Tiny Camcopter drone from its Amphibious Warfare Ship," *The Aviationist*, 31 May 2014, <https://theaviationist.com/2014/05/31/s-100-san-giusto-trials/>.
4. Staff of Analisi Difesa. "Mini droni Selex ES per l'Esercito Italiano." *Analisi Difesa*, 18 July 2014, <https://www.analisedifesa.it/2014/07/mini-droni-selex-es-per-l'esercito-italiano/>.
5. Murdo Morrison, "Piaggio developing successor to P.1HH UAV." *FlightGlobal*, 6 June 2018, <https://www.flight-global.com/news/articles/piaggio-developing-successor-to-p1hh-uav-449254/>.
6. Tom Kington, "Piaggio Aero UAV Deliveries Set Back by Prototype Crash." *Defense News*, 14 July 2016, <https://www.defensenews.com/digital-show-dailies/farnborough/2016/07/14/piaggio-aero-uav-deliveries-set-back-by-prototype-crash/>.
7. Tom Kington, "Italy plans to spend \$951M on 20 surveillance drones." *Defense News*, 27 March 2018, <https://www.defensenews.com/unmanned/2018/03/27/italy-plans-to-spend-951m-on-20-surveillance-drones/>.
8. Tom Kington, "Italy to buy drones to keep company alive, but the Air Force doesn't want them," *Defense News*, 26 April 2019, <https://www.defensenews.com/unmanned/2019/04/26/italy-to-buy-drones-to-keep-company-alive-but-the-air-force-doesnt-want-them/>.
9. Marco Petrelli, "Droni militari: Shadow 200, occhi volanti dell'Esercito Italiano," *GQ Italia*, 20 July 2018, https://www.gqitalia.it/gadget/hi-tech/2018/07/20/droni-shadow-200-occhi-volanti-dellesercito-italiano/?refresh_ce=.
10. Pino Bruno and Roberto Buonanno, "Predator, i droni italiani. Viaggio nella base di Amendola, dove osano le 'Streghe'," *Repubblica*, 11 February 2015, https://www.repubblica.it/tecnologia/2015/02/11/news/predator_italiani_viaggio_nella_base_di_amendola_dove_osano_le_streghe-107040393/.
11. David Cenciotti, "The Italian Air Force Predator A+ of the 32° Stormo (Wing) appear with new markings," *The*

- Aviationist, 11 July 2017, <https://theaviationist.com/2017/07/11/the-italian-air-force-predator-a-drones-appear-with-brand-new-markings-at-new-squadron-activation-ceremony/>.
12. Ministero Della Difesa, "A Sigonella La Ricostituzione Del 61° Gruppo Volo," news release, 10 July 2017, <http://www.aeronautica.difesa.it/comunicazione/notizie/Pagine/asigonellariscotruzione.aspx>.
 13. "La Brigata Marina San Marco," *Forze Armate*, January 2017, http://www.avia-it.com/act/reparti/Reparti_2017/Seg_art_giu_17/La_Brigata_Marina_San_Marco.pdf.
 14. Giuseppe Fauci, "Una Giornata con Il Centro di Eccellenza APR," *Sicurezza del Volo*, March 2017, http://www.aeronautica.difesa.it/comunicazione/editoria/rivsicurezza/archivio_riviste/Documents/2017/Rivista320-2017.pdf.
 15. Padaline Salvatore, "TERMINATO IL 18° CORSO PER OPERATORI DI MICRO E MINI APR," 25 October 2017, <http://www.aeronautica.difesa.it/comunicazione/notizie/Pagine/TERMINATOIL18CORSOPEROPERATORIDIMICROEMINIAPR.aspx>.
 16. "Italian Air Force inducts new Predator Mission Training," *Air Force Technology*, 28 February 2018, <https://www.airforce-technology.com/news/italian-air-force-inducts-new-predator-mission-trainer/>.
 17. "Iraq," Ministero della Difesa, accessed 5 September 2018, [http://www.aeronautica.difesa.it/missione/attivitaoperative/operazioni_conclude/opr_internazionali_conclude/Pagine/Iraq\(2003\).aspx](http://www.aeronautica.difesa.it/missione/attivitaoperative/operazioni_conclude/opr_internazionali_conclude/Pagine/Iraq(2003).aspx).
 18. "13 mila ore di volo per i Predator italiani a Herat," *Analisi Difesa*, 17 May 2014, <https://www.analisedifesa.it/2014/05/13-mila-ore-di-volo-per-i-predator-italiani-in-afghanistan/>.
 19. Ministero della Difesa, "Missione in Afghanistan: 2000 ore di volo per l'UAV Shadow 200," news release, 14 January 2019, https://www.difesa.it/OperazioniMilitari/op_intern_corso/AfghanistanRS/notizie_teatro/Pagine/Missione_in_Afghanistan_2000_ore_di_volo_per_UAV_Shadow_200.aspx.
 20. ISAF Rc-W, "Primo volo a Herat per il mini drone Bramor," *Analisi Difesa*, July 9, 2014, <https://www.analisedifesa.it/2014/06/primo-volo-a-herat-per-il-mini-drone-bramor/>.
 21. David Cenciotti, "Italian mini-UAV deployed to Afghanistan for Herat airbase surveillance," *The Aviationist*, 24 July 2013, <https://theaviationist.com/2013/07/24/strix-c-afghanistan/>.
 22. "Libia," Ministero della Difesa, accessed 5 September 2018, http://www.aeronautica.difesa.it/missione/attivitaoperative/operazioni_conclude/opr_internazionali_conclude/Pagine/Libia.aspx.
 23. Luca Peruzzi, "Italian air force chief details Libyan operations," *Flight International*, 17 June 2011, <https://www.flightglobal.com/news/articles/italian-air-force-chief-details-libyan-operations-358044>.
 24. Ministero della Difesa, "UAV italiano partecipa alle operazioni di ricerca di un giovane disperso a Mitrovica," news release, 15 April 2015, https://www.difesa.it/OperazioniMilitari/op_intern_corso/KFOR/notizie_teatro/Pagine/UAVitaliano_partecipa_operazioni_ricerca_giovanedisperso.aspx.
 25. "Terrorismo: navi, aerei e uomini dell'operazione Mare Sicuro. Ma non sarà un blocco navale," *Repubblica*, 20 March 2015, https://www.repubblica.it/politica/2015/03/20/news/terrorismo_operazione_mare_sicuro-110061642/.
 26. Vincenzo Di Martino, "Sorveglianza dei cieli i Predator a Sigonella," *Live Sicilia Catania*, 16 July 2017, https://catania.livesicilia.it/2017/07/16/sorveglianza-dei-cieli-i-predator-a-sigonella_425470/.
 27. EU NAVFOR, "Italian Unmanned Aerial Vehicle Detachment Completes its Deployment with the EU Naval Force," news release, 9 February 2015, <http://eunavfor.eu/italian-unmanned-aerial-vehicle-detachment-completes-its-deployment-with-eu-naval-force/>.
 28. Gianluca di Feo, "Così i droni italiani spiano i cavi del Califfo," *L'Espresso*, 10 December 2015, <http://espresso.repubblica.it/plus/articoli/2015/12/10/news/esclusivo-espresso-cosi-droni-italiani-spiano-il-califfo-1.242989>.
 29. Ministero della Difesa, "Esercito Italiano: volano droni nella Terra dei fuochi," news release, 20 March 2019, https://www.difesa.it/Primo_Piano/Pagine/esercito_italiano_droni_terra_fuochi.aspx.
 30. Murdo Morrison, "Piaggio Developing Successor to the P.1HH UAV," *Flight Global*, 6 June 2018, <https://www.flightglobal.com/news/articles/piaggio-developing-successor-to-p1hh-uav-449254/>.
 31. Theresa Hitchens, "Leonardo's New UAV targets Pay-as-You-Go ISR Market," *Breaking Defense*, 17 June 2019, <https://breakingdefense.com/2019/06/leonardos-new-uav-targets-pay-as-you-go-isr-market/>.
 32. Leonardo, "Leonardo unveils its largest-ever drone, the Falco Xplorer, opening up new civil and military markets for the Company in the unmanned domain," news release, 17 June 2019, <https://www.leonardocompany.com/press-release-detail/-/detail/leonardo-unveils-its-largest-ever-drone-the-falco-xplorer-opening-up-new-civil-and-military-markets-for-the-company-in-the-unmanned-domain>.

LATVIA

INVENTORY

Model	Make	Origin	Class	Intro	Qty	Operator	Notes
RQ-20A Puma ¹	AeroVi-ronment	USA	I	2019	9 (3)	Army	
Penguin-C	UAV Fac-tory	Latvia	I	2019*		Army	

NOTES

1. Latvian Public Broadcasting staff. "Latvia to receive three unmanned aircraft systems with US support." LSM.LV, 16 April 2018, <https://eng.lsm.lv/article/society/defense/latvia-to-receive-three-unmanned-aircraft-systems-with-us-support.a275105/>.
2. UAV Factory, "UAV Factory supplies unmanned aerial vehicles to the National Armed Forces of Latvia," news release, 5 March 2019, <https://www.suasnews.com/2019/03/uav-factory-supplies-unmanned-aerial-vehicles-to-the-national-armed-forces-of-latvia/>.

LITHUANIA

INVENTORY

Model	Make	Origin	Class	Intro	Qty	Operator	Notes
Phantom 4 ¹	DJI	China	I	2017		Army	
Inspire ²	DJI	China	I			Army	
RQ-11 Raven ³	AeroVi-ronment	USA	I				
ScanEagle ⁴	Insitu	USA	I	2013	5	Special forces	

PERSONNEL

Name	HQ	Type	Equipment	Activated
Remotely Piloted Vehicle Group ^{5,6}	<i>Nuotoliniu būdu valdomų orlaivių grandies</i>	D	ScanEagle	

The Lithuanian Armed Forces appears to have activated a unit known as the Remotely Piloted Vehicle Group, or NBVOG, to operate the ScanEagle. Not much is known about this unit except that it may be subordinated to the Air Force and tasked with providing ISR support to ground and special forces. In September 2018, the NBVOG conducted a training exercise at Pajuosčio Air Base.

NOTES

1. Vaidoto mechanizuotasis pėstininkų batalionas, “AČIŲ tariame UAB “TPI Vilnius” vadovui Vygintas Aniukštis už dovanotą bepilotį orlaivį DJI Phantom 4 Pro Vaidoto batalionui,” Facebook, 16 March 2017, <https://www.facebook.com/VaidotoBN/photos/a.1120522731375546.1073741828.1119506161477203/1302184666542684/?type=3&theater>.
2. Ibid
3. “Raven DDL Gimbals, RSTA Kits, Initial Spares, Contractor Logistics Support, and New Equipment Training,” FedBizOpps.Gov, accessed July 2019, <https://www.fbo.gov/index?s=opportunity&mode=form&tab=core&id=f494fa037d236bdacd8b908f65677378>.
4. “Foreign Military Sales (FMS) Lithuania FMS Case No. LH-P-LAF for the Procurement of Spares, Sustainment Parts and Technical Data to Support ScanEagle Unmanned Aircraft Systems (UAS’s),” FedBizOpps.Gov, accessed July 2019, https://www.fbo.gov/index.php?s=opportunity&mode=form&id=3947a78b136d731882af065d675c2afb&tab=core&_cview=0.
5. “Bepiločių orlaivių valdytojų pratybos: galima skristi ilgai ir toli,” *Krašto Apsauga*, 24 September 2018.
6. “Kariuomenės bepiločių orlaivių valdytojai ‘Dangaus akys’: galime skristi ilgai ir toli,” *ekspertai.eu*, 29 September 2018, <http://www.ekspertai.eu/kariuomenes-bepilociu-orlaiviu-valdytojai-dangaus-akys-galime-skristi-ilgai-ir-toli>.

LUXEMBOURG

INVENTORY

Model	Make	Origin	Class	Intro	Qty	Operator	Notes
RQ-11 ¹	AeroVi- ronment	USA	I	2017	12 (4)	Army	

NOTES

1. “UAV: Raven,” Letzebuurger Armei, accessed 13 September 2018, <http://www.armee.lu/materiel/uav>.

NETHERLANDS

INVENTORY

Model	Make	Origin	Class	Intro	Qty	Operator	Notes
PD-100 Black Hornet ¹	FLIR	USA	I	2019	43	Army, Marines	
RQ-21 Integrator ²	Insitu	USA	I	2018	9 (3)	Army	
ScanEagle ³	Insitu	USA	I	2012	6 (2)	Army	
RQ-11 Raven ⁴	AeroVi- ronment	USA	I	2008	72 (24)	Army, Marines, Special Forces	
MQ-9 Reaper ⁵	GA-ASI	USA	III	2020	4	Air Force	

ACTIVE ACQUISITIONS

- In October 2018 the Ministry of Defense issued a request for information for fixed-wing vertical take-off and landing drones for the Royal Navy.⁶ Specific technical requirements were not provided.

INACTIVE

Model	Make	Origin	Class	Period	Qty	Operator	Notes
Sperwer ⁷	SAGEM	France	II	1999-2011		Army	
ALADIN ⁸	EMT	Germany	I	2006-2009	10	Army	Acquired for use in Afghani- stan
Aerostar ⁹	Aeronau- tics	Israel	II	2009-2010		Contrac- tor- operated	Leased for use in Af- ghanistan

PERSONNEL

ARMY

Name		HQ	Type	Equipment	Activated
107th Aerial Systems Battery, Joint ISTAR Command	<i>107 Aerial Systems Batterij, JISTARC</i>	't Harde	D	Integrator, ScanEagle	2012

The Army activated the 101st RPV Battery, 103rd ISTAR Battalion to operate the Sperwer in 1998. In 2011 the Army launched the Joint Intelligence, Surveillance, Target Acquisition and Reconnaissance Command (JISTARC). The Army redesignated the 101st RPV Bty as the 107th Aerial Systems Bty and subordinated it to JISTARC in 2012. The 107th has four operational platoons.

AIR FORCE

Name		HQ	Type	Equipment	Activated
306th Squadron		Leeuwarden Air Base	D	MQ-9 Reaper	2018

Originally founded in 1953 as a fighter training squadron, the 306th was inactive from 2010 to September 2018, when the Air Force reactivated the unit to operate the MQ-9 Reaper.

OPERATIONS

Country	Base	Equipment	Period	Operation
Afghanistan	Camp Holland, Tarin Kowt	Sperwer, Aladin, Raven, Aerostar	2006-2010	ISAF/Enduring Freedom
The 101st RPV Bty deployed twice to Afghanistan with a fleet of Sperwers that flew 285 missions, accumulating 713 flight hours. ⁹ The Sperwers were replaced by contractor-owned, contractor-operated Aeronautics Aerostars in 2009, which were active until the Dutch withdrawal from Afghanistan the following year. ¹⁰				
Indian Ocean	HNMS Rotterdam	ScanEagle	2012-2013	Ocean Shield
In 2012 specialists with the Joint ISTAR Command deployed on board the amphibious assault ship HNMS Rotterdam for Ocean Shield, a NATO counter-piracy operation in the Indian Ocean. It was the first deployment for the Dutch ScanEagle. ^{11,12}				
Mali	Camp Castor, Gao	ScanEagle, Raven	2014-2016	MINUSMA
Between 2014 and 2016, elements of the 107th Aerial Systems Bty deployed with the U.N. Multidimensional Integrated Stabilization Mission in Mali (MINUSMA) to provide intelligence support. ¹³ Dutch ScanEagles flew more than 1,000 flight hours before the German Bundeswehr took over the intelligence mission in 2016. ¹⁴				

INFRASTRUCTURE

Name	Country	Latitude	Longitude	Affiliation	Activity	Notes
Leeuwarden Air Base	Nether-lands	53°13'43"N	05°45'38"E	306th Sqn	HQ	

NOTES

1. "Aanschaf Black Hornets," *Materieelgezien*, 3 March 2018, https://magazines.defensie.nl/materieelgezien/2018/03/03_mgkort01.
2. "Integrator komt eraan," *Materieelgezien*, March 2017, <https://magazines.defensie.nl/materieelgezien/2017/03/mg201703integrator-jv>.
3. Pieter Bastiaans, "ScanEagle acquired as interim replacement for Netherlands Army Sperwer," *Dutch Defence Press*, 7 May 2012, <https://www.dutchdefencepress.com/scaneagle-acquired-as-interim-replacement-for-royal-netherlands-army-sperwer/>.
4. Beth Stevenson, "Netherlands to upgrade Ravens and buy two new UAV models," *FlightGlobal*, 31 October 2016, <https://www.flightglobal.com/news/articles/netherlands-to-upgrade-ravens-and-buy-two-new-uav-mo-430938/>.
5. Valerie Insinna, "Netherlands signs deal for unarmed MQ-9 Reaper drones," *Defense News*, 17 July 2018, <https://www.defensenews.com/digital-show-dailies/farnborough/2018/07/17/netherlands-signs-deal-for-unarmed-mq-9-reaper-drones/>.
6. Beth Stevenson, "UAVs for the Dutch Navy; Belgium Likely to Acquire SkyGuardian," *Aviation International Online*, 1 November 2018, <https://www.ainonline.com/aviation-news/defense/2018-11-01/uavs-dutch-navy-belgium-likely-acquire-skyguardian>.
7. Gerard Van Oosbree, "Sperwer withdrawn from Royal Netherlands Army service," *Dutch Defence Press*, 27 August 2011, <https://www.dutchdefencepress.com/sperwer-withdrawn-from-royal-netherlands-army-service/>.
8. Ministerie van Defensie, "Onbemande spionagevliegtuigjes voor Uruzgan, news release," 21 April 2006, <https://www.defensie.nl/actueel/nieuws/2006/04/21/onbemande-spionagevliegtuigjes-voor-uruzgan>.
9. Gerard Van Oosbree, "Sperwer withdrawn from Royal Netherlands Army service," *Dutch Defence Press*, 27 August 2011, <https://www.dutchdefencepress.com/sperwer-withdrawn-from-royal-netherlands-army-service/>.
10. Anno Gravemaker, "Israel's Aeronautics to Supply Dutch UAV Service," *Flight International*, 18 January 2009, <https://www.flightglobal.com/news/articles/israels-aeronautics-tosupply-dutch-uav-service-321148/>.
11. Pieter Bastiaans, "ScanEagle conducts its first operational mission in Dutch service," *Dutch Defence Press*, 12 October 2012, <https://www.dutchdefencepress.com/scaneagle-conducts-its-first-operational-mission-in-dutch-service/>.
12. Ministerie van Defensie, ScanEagle operationeel voor piraterijbestrijding, news release, 9 August 2012, <https://www.defensie.nl/actueel/nieuws/2012/08/09/scaneagle-operationeel-voor-piraterijbestrijding-video>.
13. Andre Twigt, "Missie Mali moet het zonder JISTARC doen," *Defensiekrant*, 2016, <https://magazines.defensie.nl/defensiekrant/2016/11/mali>.
14. Dick Van Ingen, "1.000 vliegreun in 1.000 woorden," *Missie in Mali Weblog*, 21 December 2015, <https://www.defensie.nl/onderwerpen/missie-in-mali/weblog/2015/1.000-vliegreun-in-1.000-woorden>.

NORTH MACEDONIA

INVENTORY

Model	Make	Origin	Class	Intro	Qty	Operator	Notes
RQ-11 ¹	AeroVi-ronment	USA	I	2017	12 (4)	Army	

NOTES

1. “Беспилотните летала од Вашингтон пристигнаа во Македонија,” *Channel 5*, 13 December 2013, <https://kanal5.com.mk/articles/191655/bspilotnite-letala-od-vashington-pristignaa-vo-makedonija>.

NORWAY

INVENTORY

Model	Make	Origin	Class	Intro	Qty	Operator	Notes
RQ-11 Raven ¹	AeroVironment	USA	I	2011	45 (15)	Army	
RQ-20B Puma AE II DDL M1 ²	AeroVironment	USA	I	2019		Army	
RQ-12A Wasp Block IV DDL M1 ³	AeroVironment	USA	I	2019		Army	
PD-100 Black Hornet ⁴	FLIR	USA	I	2015		Army	

PERSONNEL

ARMY⁵

Name	HQ	Type	Equipment	Activated
MUAS Troop, Cavalry Squadron, 2nd Battalion	<i>MUAS-tropp, Kavalerieskadron, 2. bataljon</i>	D	Raven, Puma	
MUAS Troop, 2nd Cavalry Squadron, Telemark Battalion	<i>MUAS-tropp, Kavalerieskadron 2, Telemark bataljon</i>	D	Raven, Puma	
MUAS Troop, 1st Cavalry Squadron, Armored Battalion	<i>MUAS-tropp, Kavalerieskadron 1, Panserbataljonen</i>	D	Raven, Puma	

AIR FORCE

Name	HQ	Type	Equipment	Activated
718 Squadron “Drone Service” ⁶	718 skvadron “dronetjenesten”	Sola Air Base	D	

The Drone Service was founded in 1973 to operate target drones. The squadron recruits conscripts with a background in model aircraft.

TRAINING

- The Air Force’s Tactical Flight School (*Luftforsvarets flytaktiske skole*, or LFTS) at Rygge Air Station is responsible for training all operators. The six-week LFTS course consists of two weeks of theoretical instruction and four weeks of practical training.

OPERATIONS

Country	Base	Equipment	Period	Operation
Afghanistan ⁷		Raven	2011-2014	Enduring Freedom/ ISAF
Provincial Reconstruction Team (PRT) 17 deployed to Afghanistan with RQ-11B Ravens in May 2011. This was Norway’s first drone deployment. Successive Norwegian PRTs also de-ployed with the RQ-11B Raven.				

INFRASTRUCTURE

Name	Country	Latitude	Longitude	Affiliation	Activity	Notes
Andøya Test Center	Norway	69°17'41"N	16°01'46"E		Test site	Initiated UAV test operations in 2014

NOTES

1. Gayle Putrich, “Norway to get AeroVironment Ravens in 2011,” *Flight International*, 9 December 2010, <https://www.flightglobal.com/news/articles/norway-to-get-aerovironment-ravens-in-2011-350751/>.
2. Ole Dag Kvamme, “Forsvaret kjøper droner til 152 millioner,” *UAS Norway*, 25 February 2019, <https://www.uasnorway.no/forsvaret-kjooper-droner-til-152-millioner/>.
3. Ibid
4. Erlend Dalløkken, “Nå skal også norske soldater utrustes med knøttsmå droner,” *Teknisk Ukeblad Media*, 15 July 2015, <https://www.tu.no/artikler/na-skal-ogsa-norske-soldater-utrustes-med-knottsma-droner/196998>.
5. Kristian Simonsen, “Droner mellon teknologer og ledere,” Masters thesis, Forsvarets høgskole, 2014, <https://brage.bibsys.no/xmlui/bitstream/handle/11250/282131/Simonsen%20Kristian%20-%20masteroppgave%202014.pdf?sequence=1>.
6. “Dronflyger/målflyoperatør,” Forsvaret, accessed 4 October 2018, <https://forsvaret.no/karriere/forstegangstjeneste/muligheter/luftforsvaret/droneflyger-malflyoperatør>.
7. Kristian Simonsen, “Droner mellon teknologer og ledere,” Masters thesis, Forsvarets høgskole, 2014, <https://brage.bibsys.no/xmlui/bitstream/handle/11250/282131/Simonsen%20Kristian%20-%20masteroppgave%202014.pdf?sequence=1>.

POLAND

INVENTORY	Model	Make	Origin	Class	Intro	Qty	Operator	Notes
	Black Hornet 3 ^{1,2}	FLIR	USA	I	2019	40*	Special Forces	
	Warmate ^{3,4}	WB Electronics	Poland	I	2017	1000 (100)	Army, Paramilitary**	Loitering munition
	FlyEye ⁵	WB Electronics	Poland	I	2013	60 (15)*	Army, Special Forces, Paramilitary	
	Orlik PGZ-19R ⁶	WZL-2	Poland	I	2021	40 (8)		
	Orbiter ⁷	Aeronautics	Israel	I	2007	45 (15)	Army	
	ScanEagle ⁸	Insitu	USA	I	2011	10 (1)	Special Forces	
	RQ-21A Blackjack ⁹	Insitu	USA	I	2019	5 (1)	Special Forces	
	MicroFalcon	Innocon	Israel	I	2017	9 (3)		For use by the UAV Training Center

*Estimate

ACTIVE ACQUISITIONS ^{10,11}

The Polish Armed Forces Development Program 2013-2022 laid out a plan to acquire a range of Class I, II, and III UAVs, though some of these programs have faced delays.

- With the Orlik program, the MoD sought to acquire a Class I tactical UAV. In December 2018, the MoD awarded a \$209 million contract for 40 PGZ-19R UAVs for the Orlik program.¹²
- With the Wizjer program, the MoD is seeking a Class I system for short-range reconnaissance for use at the battalion level. The Wizjer system will match the capabilities of a Class I UAV like the WB Electronics FlyEye. The procurement goal is for around 15 systems, which will likely amount to some 60 air vehicles.
- With the Wazka program, the MoD is seeking a Class I rotary-wing vertical take-off and landing drone capable of day and nighttime operations. The procurement goal is six systems, each comprising of two aircraft. After cancelling the program in 2017, the MoD re-started this procurement program in December 2018.¹³

- With the Gryf program, the MoD is seeking to acquire 12 or more Class II medium-range, strike-capable drones. In 2015, the Polish Armament Group and the Israeli defense firm Elbit Systems proposed a domestically-produced variant of the Elbit Hermes 450 for the program.
- With the Zefir program, the MoD is seeking to acquire four Class III UAVs. The two options currently under evaluation are reportedly the U.S. General Atomics Aeronautical Systems MQ-9 Reaper and the Israeli Elbit Hermes 900.

PERSONNEL**AIR FORCE**

Name	HQ	Type	Equipment	Activated
12th Unmanned Aerial Vehicle Base, 1st Tactical Aviation Wing ^{14,15}	<i>12. Baza Bezzałogowych Statków Powietrznych, 1. Skrzydło Lotnictwa Taktycznego</i> Miroslawiec Air Base	D	Orbiter	2016

In 2006 the Army activated the Air Reconnaissance Squadron, 1st Tactical Aviation Brigade to operate surveillance and reconnaissance drones. Following the deactivation of this unit in 2015, responsibility for UAV operations was transferred to the 12th UAV Base. Though the Air Force initially activated the 12th with the idea that it would eventually operate a Class III aircraft, it is currently equipped with only Class I aircraft.

SPECIAL FORCES

Name	HQ	Type	Equipment	Activated
Imagery Analysis Section, Information Support Group, Military Unit NIL ¹⁶	<i>Rozpoznania obrazowego, Grupy Wsparcia Informacyjnego, Jednostki Wojskowej Nil</i> Krakow	D	FlyEye, ScanEagle, Blackjack	2011

The Imagery Analysis Section is one of three sections in the Informational Support Group. It is primarily responsible for UAV operations. Military Unit NIL began operating drones in 2011 when it took delivery of the ScanEagle. NIL is a Polish Army special forces unit tasked with providing intelligence, logistics, and command support to special operations.

TRAINING

- The Unmanned Aerial Vehicles Training Center (*Ośrodek Szkolenia Obsługi Systemów Bezzałogowych Statków Powietrznych*, or OSOSBSP) is a training facility for pilots, sensor operators, and mechanics located at the Polish Air Academy in Dęblin.¹⁷ It is equipped with 3 Innocon Micro-Falcon systems and several simulators.¹⁸

OPERATIONS

Country	Base	Equipment	Period	Operation
Afghanistan ^{19, 20}	Ghazni Province	ScanEagle, Orbiter	2011-	ISAF/Enduring Freedom

Polish forces deployed drones operationally for the first time in Afghanistan. Polish forces were equipped with both the Orbiter and the ScanEagle. During one six-month rotation in 2011, Polish special forces conducted nearly 700 missions, accumulating over 2,700 flight hours.

INFRASTRUCTURE

Name	Country	Latitude	Longitude	Affiliation	Activity	Notes
Mirosławiec Air Base	Poland	53°20'38"N	16°5'14"E	12th UAV Base	HQ, Test site	

EXPORTS

Country	Model	Make	Class	Status	Notes
Ukraine	FlyEye	WB Electronics	I	Active	
Ukraine	Warmate	WB Electronics	I	Active	

NOTES

- Łukasz Pacholski, "Komandosi z Lublińca dostaną nano bezzałogowce," *radar.rp.pl*, 27 May 2019, <https://radar.rp.pl/wojsko-polskie/13302-system-pd-100-black-hornet-3-prs-dla-jw-komandosow-z-lublinca>.
- Marek Dąbrowski, "Nano bezzałogowce dla wojska. Black Hornet w Lublińcu," *Defence24.com*, 15 June 2019, <https://www.defence24.pl/nano-bezzałogowce-dla-wojska-black-hornet-w-lublinca>.
- Ministerstwo Obrony Narodowej, "WARMATE dla polskiej armii," news release, 20 November 2017, <http://www.mon.gov.pl/aktualnosci/artykul/najnowsze/podpisanie-umowy-na-dostawy-zestawow-warmate-dla-wojska-polskiego-s2017-11-20/>.
- Remigiusz Wilk, "Poland purchases 1,000 Warmate loitering munitions," *IHS Jane's Defence Weekly*, 21 November 2017, <https://www.janes.com/article/75864/poland-purchases-1-000-warmate-loitering-munitions>.
- Rafał Lesiecki, "New Generation of FlyEye Systems for the Polish Territorial Defence Component," *Defence 24*, 18 December 2018, <https://www.defence24.com/new-generation-of-flyeye-systems-for-the-polish-territorial-defence-component-agreement-signed>.
- "Poland orders 40 Orlik tactical short-range unmanned aerial vehicles," *Defence Blog*, 3 December 2018, <https://defence-blog.com/news/poland-orders-40-orlik-tactical-short-range-unmanned-aerial-vehicles.html>.
- Tomasz Kwasek, "Bezzałogowe systemy powietrzne dla Wojsk Lądowych i Wojsk Specjalnych w latach 2001–2017," *Lotnictwo*, March 2018, <http://www.magnum-x.pl/sklep/lotnictwo/id-2018/lotnictwo-3-2018>.
- Stephen Trimble, "Insitu receives contract to deliver ScanEagles to Poland," *Flight International*, 24 September 2010, <https://www.flightglobal.com/news/articles/insitu-receives-contract-to-deliver-scaneagles-to-poland-347806/>.
- "Dodatkowy Blackjack dla polskich specjalsów," *Defence24*, 23 September 2018, <https://www.defence24.pl/dodatkowy-blackjack-dla-polskich-specjalsow>.
- Jarosław Adamowski, "Poland Plans to Spend \$21B on Drones, Helos, Air Defense, Subs," *Defense News*, 20 July 2016, <https://www.defensenews.com/home/2016/07/20/poland-plans-to-spend-21b-on-drones-helos-air-defense-subs/>.
- Rafał Lipka, "Unmanned Aerial Vehicles in the Polish Armed Forces – current status of the Technical Modernisation Programme," *The Casimir Pulaski Foundation*, 17 January 2017, <https://pulaski.pl/en/unmanned-aerial-vehicles-in-the-polish-armed-forces-current-status-of-the-technical-modernisation-programme/>.
- Juliusz Sabak, "MON: dostawy czterech klas systemów bezzałogowych do 2022 r.," *Defence24*, 6 February 2018, <https://www.defence24.pl/mon-dostawy-systemow-bezzałogowych-zefir-gryf-i-orlik-do-2022-roku>.
- "Micro-UAVs for the Polish Military. Wazka Programme: Another Attempt," *Defence24*, 7 December 2018, <https://www.defence24.com/micro-uavs-for-the-polish-military-wazka-programme-another-attempt>.
- "Historia Garnizonu," 12. Baza Bezzałogowych Statków Powietrznych, accessed 3 October 2018, <http://12bb.wp.mil.pl/pl/5.html>.
- "Dywizjon Rozpoznania Powietrznego," *Jednostki Wojskowe*, accessed 3 October 2018, https://www.jednostki-wojskowe.pl/index.php?option=com_content&view=article&id=522&Itemid=27.

16. “Suflerzy komandosów,” Jednostki Wojskowej Nil, accessed 3 October 2018, http://jw4724.wp.mil.pl/pl/1_22.html.
17. “Ośrodek Szkolenia Obsługi Systemów Bezzałogowych Statków Powietrznych: O ośrodku,” Wyższa Szkoła Oficerska Sił Powietrznych, accessed 11 September 2018, <http://www.wsosp.pl/index.php/pl/struktura-csidpl/os-rodek-szkolenia-obslugi-systemow-bezzałogowych-statkow-powietrznych>.
18. Wyższa Szkoła Oficerska Sił Powietrznych, “Nowe Systemy BSP,” news release, 13 June 2017, <http://www.wsosp.deblin.pl/index.php/pl/aktualnosci-uczelnia/1587-nowe-systemy-bsp>.
19. Magdalena Kowalska-Sendek and Ewa Korsak, “Żołnierze z Mirosławca świętują,” *polska-zbrojna.pl*, 1 September 2018, <http://polska-zbrojna.pl/home/articleshow/26254?t=Zolnierze-z-Mirosławca-swietuja>.
20. Szczepan Głuszcak, “Podsumowanie IX zmiany PKW Afganistan,” PKW Afganistan, 21 October 2011, http://isaf.wp.mil.pl/pl/1_1642.html.

PORTUGAL

INVENTORY

Model	Make	Origin	Class	Intro	Qty	Operator	Notes
AR4 Light Ray ¹	Tekever	Portugal	I	2011			
Mavic ²	DJI	China	I			Special Forces	
RQ-11 Raven ^{3,4}	AeroVironment	USA	I	2019	36 (12)	Army	

OPERATIONS

Country	Base	Equipment	Period	Operation
Kosovo ⁵		AR4 Light Ray	2014	KFOR

NOTES

1. Beth Stevenson, “Portuguese Army Uses Indigenous UAVs in Kosovo,” *FlightGlobal*, 19 September 2014, <https://www.flightglobal.com/news/articles/portuguese-army-uses-indigenous-uavs-in-kosovo-403901/>.
2. Abraxas Spa (@AbraxasSpa), “Portuguese SOF with DJI Mavic (Mavic 2 Pro?) during the visit by Joint Chief of Staff,” Twitter, 23 March 2019, <https://twitter.com/AbraxasSpa/status/1109464190228590592>.
3. Victor Barreira, “Portugal to establish UAV-based ISTAR capability,” *Jane’s International Defence Review*, 10 April 2018, <https://www.janes.com/article/79169/portugal-to-establish-uav-based-istar-capability>.
4. AeroVironment, “NATO Support and Procurement Agency (NSPA) Awards AeroVironment \$5.9 Million Contract to Procure Raven Unmanned Aircraft Systems for the Portuguese Army,” news release, 13 September 2018, <https://markets.businessinsider.com/news/stocks/nato-support-and-procurement-agency-nsa-awards-aerovironment-5-9-million-contract-to-procure-raven-unmanned-aircraft-systems-for-the-portuguese-army-1027532408>.
5. Beth Stevenson, “Portuguese Army Uses Indigenous UAVs in Kosovo,” *FlightGlobal*, 19 September 2014, <https://www.flightglobal.com/news/articles/portuguese-army-uses-indigenous-uavs-in-kosovo-403901/>.

ROMANIA

INVENTORY

Model	Make	Origin	Class	Intro	Qty	Operator	Notes
Phoenix 30 ¹	UAV Solutions	USA	I	2016	4	Army	
RQ-7 Shadow ²	AAI	USA	II	2000	11	Air Force	Fewer aircraft remaining (status unclear)
RQ-11 Raven ^{3,4,5}	AeroVironment	USA	I	2014		Army	
ScanEagle ⁶	Insitu	USA	I	2013	10 (2)	Army	Initially leased for use in Afghanistan (status unclear)
SACT Boreal 5 ⁷	Military Equipment and Technologies Research Agency	Romania	I			Army	

ACTIVE ACQUISITIONS

- In 2016, the Romanian Ministry of National Defense (MApN) launched a 55 million euro competition for Class I UAVs for the Romanian Land Forces.⁸ In January 2017, the MApN selected the Aeronautics Orbiter 4. However, the contract was reportedly cancelled the following month after Israel Aerospace Industries, a competitor for the contract, appealed the decision.⁹ As of this writing, it is not clear how the MApN proceeded with this acquisition program.

INACTIVE

Model	Make	Origin	Class	Period	Qty	Operator	Notes
Tu-143 ¹⁰	Tupolev	Russia	III	1987-2002	12	Air Force	“VR-3”

PERSONNEL

AIR FORCE

Name		HQ	Type	Equipment	Activated
142nd Reconnaissance Squadron ¹¹	<i>Escadrila 142 Cerce-tare</i>	Timișoara Traian Vuia International Airport	D	RQ-7 Shadow	1998

ARMY

Name		HQ	Type	Equipment	Activated
IMINT Component, Military Intelligence Brigade ¹²	<i>Componenta IMINT, Brigada de Informații Militare</i>		D	RQ-7 Shadow, ScanEagle, RQ-11 Raven	2010

OPERATIONS

Country	Base	Equipment	Period	Operation
Iraq ^{13,14}		RQ-7 Shadow	2003-2009	Iraqi Freedom (US)
Provincial Reconstruction Team (PRT) 17 deployed to Afghanistan with RQ-11B Ravens in May 2011. This was Norway's first drone deployment. Successive Norwegian PRTs also de-ployed with the RQ-11B Raven.				
Afghanistan		RQ-7 Shadow, ScanEagle	2010-2011, 2013-	Enduring Freedom (US), Freedom's Sentinel (US)
According to media reports, Romania initially deployed the Shadow to Afghanistan in 2010 for a year-long mission. ¹⁵ The Shadow was replaced by around 10 ScanEagles in 2013. ¹⁶ The ScanEagles were reportedly owned by the U.S. and operated by Romanian forces. As of December 2017, Romanian forces in Afghanistan had conducted 600 ScanEagle missions. ¹⁷				

INFRASTRUCTURE

Name	Country	Latitude	Longitude	Affiliation	Activity	Notes
Timișoara Traian Vuia International Airport	Romania	45°48'36"N	21°20'17"E	142nd Sqn	HQ	

NOTES

- Beth Stevenson, "Romanian Army receives four Phoenix 30 UAVs," *FlightGlobal*, 11 January 2016, <https://www.flightglobal.com/news/articles/romanian-army-receives-four-phoenix-30-uavs-420698/>.
- "Romania gets Shadow 600," *Flight International*, 22 April 1998, <https://www.flightglobal.com/news/articles/romania-gets-shadow-600-36226/>.
- "Divizia 4 Infanterie „Gemina”, Ziua Porților Deschise,” Facebook, 23 April 2019, https://www.facebook.com/Divizia4/photos/ms.c.eJxFUsmNRTEI62gEZu~_~;sVHgw7ta3nAC1uTKYIMoiP4wAKoBxQ~_o0g-dQxDliHsClyzDiIorMZbiOaRwj0zxUfQHokyR~;HmP6ASLNILtYGINeINGSrJUQWiKbkiYv1uwwk-g2EXI~_JVb3z7XkUy0lmD9k9Uuc43B7qk3LnJ81AX9PqYnpNuRdLnKR4brlnKBvJNeXoCfM2panuUx-1EjMeQwgly70K5gPbqXicRbUlsbKW3xH4erPGOs8J5TCz5PVT2popran1tRK3E5gdxXI~_~_RewAH-1PaYgwxijRuLIs18HtbECsNwAcMA36m1imyPdjqQDK47Lg0CK1lJjARXPQfgD6j2SPwDZFioTw~-.bps.a.2148197998567605/2148198891900849/?type=3&theater.
- Nicholas Vidro, "Raven UAV takes flight over Romania," U.S. Army, 23 March 2017, https://www.army.mil/article/184781/raven_uav_takes_flight_over_romania.
- "Drone Raven in dotarea batalioanelor romanesti de infanterie," Radu Dobritoiu, 30 May 2014, <https://radudobritoiu.ro/drone-raven-in-dotarea-batalioanelor-romanesti-de-infanterie/>.
- "VIDEO | Parada militară de la Arcul de Triumf," *Digi24*, 1 December 2016, <https://www.digi24.ro/stiri/actualitate-evenimente/live-text-ceremoniile-de-la-arcul-de-triumf-defileaza-3-000-de-militari-avioane-f-16-vor-survola-capitala-623413>.
- "UAV-uri in Armata Romana," Romania Military (blog), 3 September 2011, <https://www.rumaniamilitary.ro/uav-uri-in-armata-romana>.
- Victor Cozmei, "Noi achizitii in Aparare: Drone tactice de 55 de milioane de euro si 3 milioane de euro pentru sisteme de observare si recunoastere a tintelor pentru nave fluviale," *HotNews.ro*, 18 August 2016, <https://www.hotnews.ro/stiri-esential-21233736-noi-achizitii-aparare-drone-tactice-55-milioane-euro-3-milioane-euro-pentru-sisteme-observare-recunoastere-tintelor-pentru-nave-fluviale.htm>.
- Arie Egozi, "Romania halts Orbiter 4 procurement after appeal," *FlightGlobal*, 1 February 2017, <https://www.flightglobal.com/news/articles/romania-halts-orbiter-4-procurement-after-appeal-433712/>.
- Adrian Roman, "Romanian Reconnaissance Aircraft 1950-2010," ACIG.org, 29 June 2011, <https://archive.fo/ERmHu>.
- Ibid
- "12 ani in teatrul de operatii din Afganistan: forte speciale si structuri de sprijin," RoArmy.ro, 19 July 2014, <http://www.roarmy.ro/12-ani-in-teatrul-de-operatii-din-afghanistan-for-te-speciale-si-structuri-de-sprijin/>.
- Radu Dobrițoiu, "Forțele speciale ale Armatei în misiuni internaționale," Radio Romania Actualități, 21 June 2013, http://www.romania-actualitati.ro/fortele_speciale_ale_armatei_in_misiuni_internationale-51591.
- Mark Miranda, "Romanian forces end mission in Iraq," U.S. Army, 10 June 2009, https://www.army.mil/article/22383/romanian_forces_end_mission_in_iraq.
- "MAPN trimite avioane fără pilot în Afganistan," Putera, 25 May 2010, http://www.puterea.ro/eveniment/mapn_trimite_avioane_fara_pilot_in_afghanistan-2490.html.
- Radu Dobrițoiu, "Drone americane, operate de soldații români din Afganistan," Radio Romania Actualități, 21 June 2013, http://www.romania-actualitati.ro/drone_americane_operate_de_soldatii_romani_din_afghanistan-51595.
- "Ziua Nationala a Romaniei. 3.500 de militari romani si straini au defilat la Parada 1 decembrie 2017," PRO-TV Chisinau, <http://protv.md/international/ziua-nationala-a-romaniei-3-500-de-militari-romani-si-straini---2087741.html>.

SERBIA

INVENTORY

Model	Make	Origin	Class	Intro	Qty	Operator	Notes
Orbiter ¹	Aeronautics	Israel	I	2008	30 (10)	Army	

ACTIVE ACQUISITIONS

- In September 2018, Deputy Defense Minister Nenad Miloradovic confirmed that Serbia intends to purchase combat drones from China.² Under the terms of the agreement, the aircraft would be assembled in Serbia. The cost of the acquisition is reportedly around \$30 million.³ Serbia would be the first European nation to purchase a Class III system made in China. In September 2019, Serbia announced that it would take delivery of nine Wing Loong 1s within six months. An follow-on order for additional aircraft is possible.

DEVELOPMENT

- The Vrabac (*BPABAI*) is a fixed-wing Class I system unveiled in 2008. It is developed by the Serbian Military Technical Institute Belgrade. It conducted its maiden flight in 2011 and it was displayed at UMEX-2018, an arms fair in the United Arab Emirates.
- The Mini Aleks is a Class I UAV developed by Engine Development and Production company (EDePro). EDePro unveiled the Mini Aleks at the IDEX defense trade show in Abu Dhabi in February 2019. According to media reports, it is set to make its maiden flight in mid-2019.

NOTES

1. Arie Egozi, "Serbians to go to Israel for unmanned air vehicle training," *Flight International*, 16 October 2008, <https://www.flightglobal.com/news/articles/serbians-go-to-israel-for-orbiter-unmanned-air-vehic-317509/>.
2. Igor Bozinovski, "Serbia confirms procurement of Chinese UAVs," *IHS Jane's Defence Weekly*, 21 September 2018, <https://www.janes.com/article/83256/serbia-confirms-procurement-of-chinese-uavs>.
3. "Jedinstvena Nišlijka: Jedina pri Vojsci Srbije koja upravlja dronom," *Naissus.Info*, 5 May 2018, <https://naissus.info/jedinstvena-nislijka-jedina-pri-vojsci-srbije-koja-upravlja-dronom/>.
4. "ТЕКУЋИ ПРОЈЕКТИ: ВРАБАЦ," ВОЈНОТЕХНИЧКИ ИНСТИТУТ, accessed 22 September 2018, <http://www.vti.mod.gov.rs/index.php?view=actuality&type=projects&category=1>.
5. "Serbia unveils new Pegaz multifunctional unmanned aircraft complex with anti-tank missiles," Defence Blog, 23 October 2016, <https://defence-blog.com/news/serbia-unveils-new-pegaz-multifunctional-unmanned-aircraft-complex-with-anti-tank-missiles.html>.
6. Jeremy Binnie, "IDEX 2019: Serbian Mini Aleks UAV to make first public flight in July," *IHS Jane's Defence Weekly*, 21 February 2019, <https://www.janes.com/article/86670/idx-2019-serbian-mini-aleks-uav-to-make-first-public-flight-in-july>.

SLOVAKIA

INVENTORY

Model	Make	Origin	Class	Intro	Qty	Operator	Notes
Skylark I-LE ¹	Elbit	Israel	I	2009		Army	
Micro Falcon ²	Innocon	Israel	I	2018			Purchased for the BPsVI recon-naissance vehicles

PERSONNEL

SPECIAL FORCES

Name	HQ	Type	Equipment	Activated
5th Special Operations Regiment ³	5. pluku špeciál-neho určenia Žilina	ND	Skylark	

NOTES

1. Lukáš Milan, "Armáda kúpila bezpilotné lietadlá. Snažila sa to taji," *Pravda*, July 11, 2009, <https://spravy.pravda.sk/domace/clanok/162527-armada-kupila-bezpilotne-lietadla-snazila-sa-to-tajit/>.
2. "Slovakia received first batch of upgraded infantry fighting vehicles," Defence Blog, June 19, 2018, <https://defence-blog.com/army/slovakia-received-first-batch-upgraded-infantry-fighting-vehicles.html>.
3. Roman Kment, "Skylark I-LE," *Obrana*, April 2010, <https://www.mod.gov.sk/data/files/1797.pdf>.

SLOVENIA

INVENTORY

Model	Make	Origin	Class	Intro	Qty	Operator	Notes
Bramor ¹	C-Astral	Slovenia	I	2016	6 (2)	Army	"BLS Belin"

PERSONNEL

ARMY

- The Slovenian Army announced plans in 2015 to equip the Intelligence Reconnaissance Companies (*Obveščevalno-izvidniška četa*) of both the 1st Brigade and 72nd Brigade with two Bramor systems apiece. According to a November 2018 article in SV Revija, the 1st and the 72nd's drones are expected to reach initial operational capability by mid-2019.²

Name	HQ	Type	Equipment	Activated
UAS Unit, Intelligence Reconnaissance Company, 1st Rodovsky Battalion, 1st Brigade ^{3,4}	Oddelek brezpilotnih letalnikov, Obveščevalno-izvidniška četa, Rodovski bataljon 1. BR, 1. brigada Cerkljah pri Krki	D	Bramor	2016
UAS Unit, Intelligence Reconnaissance Company, 72nd Rodovski Battalion, 72nd Brigade ⁵	Murska Sobota Barracks Obveščevalno-izvidniška četa, Rodovski bataljon, 72. brigada	D	Bramor	

EXPORTS

Country	Model	Make	Class	Status	Notes
Italy	Bramor	C-ASTRAL	I	Active	
Bangladesh	Bramor	C-ASTRAL	I	Active	

NOTES

1. Ministrstvo Za Obrambo, "Ministrstvo za obrambo podpisalo pogodbo za dobavo brezpilotnih letal Slovenski vojski," news release, 20 October 2015, http://www.mo.gov.si/si/medijsko_sredisce/novica/7548/.
2. Ciril Belšak, "Z Brezpilotniki Ob Bok Tujim Vojskam," *SV Revija*, 11 November 2018, http://www.mo.gov.si/fileadmin/mo.gov.si/pageuploads/revija_sv/2018/sv_18_11.pdf.
3. "Slovenska vojska s prvim brezpilotnim letalom," *DELO*, 13 July 2016, <http://www.times.si/slovenija/slovenska-vojska-s-prvim-brezpilotnim-letalom--2e02f04e662bef6749cd71aa128fb716ce12853f.html>.
4. Marko Pišlar, "V SV ŠTIRJE OPERATERJIBREZPILOTNIKOV, DOKONCA LETA ŠE DESET," *Revija SV*, August 2016, http://www.mo.gov.si/fileadmin/mo.gov.si/pageuploads/revija_sv/2016/SV_16_8.pdf.
5. "Rodovski bataljon," Slovenska vojska, accessed 11 September 2018, <http://www.slovenskavojska.si/struktura/1-brigada/rodovski-bataljon/>.

SPAIN

INVENTORY

Model	Make	Origin	Class	Intro	Qty	Operator	Notes
Black Hornet ¹	FLIR	USA	I	2016		Special Forces	
Huginn X1 ²	Sky-Watch	Denmark	I	2016		Navy/Marines, Army	Trial platform
Alcotan ³	Unmanned Solutions	Spain	I	2016	4 (2)	Navy	Rapaz trial platform
RQ-11B/DDL Raven ⁴	AeroVironment	USA	I	2008	150 (50)	Army	
RQ-12 Wasp ⁵	AeroVironment	USA	I	2015*		Air Force, Special Forces	"NR-03"
Fulmar X ^{6,7}	Thales España	Spain	I	2017	12 (4)	Navy/Marines, Army	

Alpha 800 ⁸	Alpha Unmanned Systems	Spain	I	2018	2	Army	
Orbiter 3 ⁹	Aeronautics	Israel	I	2019	6 (2)	Army	
ScanEagle ¹⁰	Insitu	USA	I	2015	8	Navy	
Condor ¹¹	Drone Tools	Spain	I	2018	2	Air Force	
Sistema integrado de vigilancia aérea (SIVA) ¹²	National Institute of Aerospace Technology	Spain	I	2006	4	Air Force	Training platform at the UAS School
Atlantic ¹³	SCR	Spain	I	2018	2	Army	Rapaz trial platform
Tucan ¹⁴	SCR	Spain	I	2018	5	Army, Air Force	Rapaz trial platform
Searcher MKII/ MKIII ¹⁵	IAI	Israel	II	2007	16	Army	“PASI”
MQ-9 Reaper ¹⁶	GA-ASI	USA	III	2019	4	Air Force	

**Estimate*

ACTIVE ACQUISITIONS

- Spain is evaluating several Class I drones to augment and eventually replace its fleet of U.S.-made RQ-11 Ravens.¹⁷ The Army, Navy, and Marines have acquired a Fulmar X, Toucan, and Atlantic for operational evaluation. By fielding several platforms with operational units for test and evaluation, the MoD is seeking to shorten the acquisition process.¹⁸
- The MoD is seeking a replacement for the Searcher, which is expected to be retired by the mid-2020s.¹⁹ The Project Rapaz roadmap names the Airbus DS Atlante and the Indra Pelicano as two possible options to succeed the Searcher.

INACTIVE

Model	Make	Origin	Class	Period	Qty	Operator	Notes
V-200 ²⁰	UMS Skeladr	Sweden	II	2013- Unknown	2	Navy	Trial platform

PERSONNEL

ARMY

Name		HQ	Type	Equipment	Activated
Air Systems Reconnaissance Group, 1st Intelligence Regiment, NATO Rapid Deployable Spanish Corps	<i>Grupo de Obtención por Sistemas Aéreos, Regimiento de Inteligencia n° 1</i>	Base Conde de Gazola	D	Searcher MKIII, Black Hornet	2015

The Air Systems Reconnaissance Group is one of four groups that comprise the 1st Intelligence Regiment.²¹ It was stood up in 2015 to assume responsibility for operating the Searcher from the 1st Regt's Group II and the 63rd Regt's RPAS Bty.^{22,23} The Air Systems Reconnaissance Group is believed to include personnel from both the 1st and the 63rd Regt.²⁴

RPAS Battery, Acquisition and Location Group (II/63), 63rd Rocket Artillery Regiment, Field Artillery Command	<i>La Batería de RPAS, Grupo de Adquisición y Localización II/63 (GAIL), Regimiento de Artillería Lanzacohetes de Campaña n° 63</i>	Base Conde de Gazola	D	Atlantic, Toucan	2007

The RPAS Battery was activated in 2007 to conduct Searcher operations in Afghanistan with the 1st Intelligence Regiment.²⁵ In 2017, the Army tasked the RPAS Battery with carrying out tests of the Atlantic and Toucan in support of the Army's General Directorate of Armament and Material (Dirección General de Armamento y Material).²⁶

2nd Light Infantry Brigade "King Alfonso XIII" of the Legion	<i>La Brigada de Infantería Ligera "Rey Alfonso XIII" II de La Legión</i>	Base Alvarez de Sotomayor	ND	Black Hornet, Orbiter 3	

In 2018, the Army tasked the 2nd Brigade with experimenting with new technologies such as unmanned air and ground vehicles and equipped it with the Black Hornet.^{27,28}

4th Paratrooper "Almogavares" Brigade ²⁹	<i>Brigada "Almogavares" VI de Paracaidistas</i>	Base Principe	ND	RQ-11 Raven	

NAVY

Name		HQ	Type	Equipment	Activated
11th Aircraft Squadron ^{30,31}	<i>11° Escuadrilla Aérea</i>	Torregorda, Cadiz	D	ScanEagle	2014

The 11th Sqn is comprised of 31 personnel: 1 commanding officer, 4 officers, 20 non-commissioned officers, and 6 sailors.

AIR FORCE

Name		HQ	Type	Equipment	Activated
233rd Squadron, 23rd Wing ³²	233 <i>Escuadron, Ala 23</i>	Talavera la Real Air Base	D	MQ-9 Reaper	2018
The Spanish Air Force activated the 233rd Sqn to operate the MQ-9 Reaper. Talavera la Real Air Base is expected to serve as the main operating base for Spain's MQ-9 Reaper fleet. Lanzarote Aerodrome in the Canary Islands is expected to serve as the Deployed Operating Base while personnel at Torrejón Air Base will analyze the imagery.					
Aerial Deployment Support Squadron ³³	<i>Escuadrón de Apoyo al Despliegue Aereo</i>		ND	RQ-11 Raven, RQ-12 Wasp, Condor	

SPECIAL FORCES

Name		HQ	Type	Equipment	Activated
Parachute Sapper Squadron, Air Force ^{34,35}	<i>Escuadrón de Zapadores Paracaidistas, Ejercito de Aire</i>	Alcantarilla Air Base	ND	Black Hornet, RQ-12 Wasp AE	
Special Forces Command ³⁶	<i>Mando de Operaciones Especiales</i>	Alicante	ND	Black Hornet	
Fuerza de Guerra Naval Especial, Navy ³⁷	Fuerza de Guerra Naval Especial, Armada Española	La Algameca Naval Station	ND	Black Hornet	

TRAINING

- The Spanish Air Force's UAS School (*Escuela de UAS de las FAS*) was established in 2012 to provide professional training to all Spanish operators of Class I and II UAVs.³⁸ In its first two years of operation, the UAS School graduated 242 students certified as Operator of UAS (Operador de Sistemas Aéreos no Tripulados).³⁹ The school is equipped with simulators and training aircraft, including the SIVA and Tucan UAVs.⁴⁰
- Spain's MQ-9 Reaper pilots and sensor operators are trained in Spain and in the United States.⁴¹

OPERATIONS	Country	Base	Equipment	Period	Operation
	Afghanistan	Herat Airport; Qala-i-Nau	Searcher; RQ-11B Raven; ScanEagle (COCO)	2008-2014	

Between 2008 and 2014, Spanish troops equipped with the Searcher and Raven were deployed to north-west Afghanistan to provide assistance to Regional Command West, International Security Assistance Force. The Searcher was initially deployed to Herat Airport and then to Qala-i-Nau. The Spanish military flew more than 1,000 Searcher missions, accumulating over 6,000 flight hours.⁴² Three teams from the 1st Intelligence Regiment and two teams from the 63rd Rocket Artillery Regiment were responsible for Searcher operations. In 2012 NATO also assigned contractor-operated ScanEagles to Spanish troops at Qala-i-Nau.

Iraq	Gran Capitán Base, Bismayah, Iraq	ScanEagle	2017-2018	Inherent Resolve (US)

In 2017 and 2018, elements of the Navy's 11th Sqn deployed to Gran Capitán Base, Bismayah, Iraq for Operation Inherent Resolve.^{43, 44} The 11th Sqn detachment equipped with the ScanEagle integrated with the Special Operations Tactical Group (SOTG VII), one of the Spanish special forces teams deployed to assist with training Iraqi forces.

Indian Ocean	<i>ESPS Galicia</i>	ScanEagle	2015-2017	Atalanta

Between 2015 and 2017, the 11th Sqn deployed with Spain's amphibious assault ship Galicia for Operation Atalanta, a EU-led counter-piracy operation.⁴⁵ This was the first deployment for the 11th Squadron's ScanEagle. During its 18-month deployment, the ScanEagle flew more than 700 flight hours.⁴⁶



(Left) The 11th Sqn in Iraq in November 2018. (Right) The Navy's Alcotán UAV, a trial system under the *Rapaz* program. Photos credit: Armada Espanola / Flickr

DOMESTIC OPERATIONS

- The Army deployed with Searchers in 2017 to help combat wildlives in northwest Spain, accumulating 147 flight hours. In 2018, the Army again deployed with Searchers for a three-month period in 2018 to detect wildfires and surveil at-risk areas.⁴⁷

INFRASTRUCTURE

Name	Country	Latitude	Longitude	Affiliation	Activity	Notes
Base Conde de Gazola	Spain	42°37'07"N	05°41'50"W	Army	HQ	

Rozas Air-port	Spain	43°06'53"N	07°27'41"W	Army	Training, Test site	
Talavera la Real Air Base	Spain	38°53'29"N	06°49'17"W	Air Force	HQ	
Matacán Air Base	Spain	40°57'07"N	05°30'07"W	Air Force	Training	Home to the School of UAS

OTHER

Name	Country	Latitude	Longitude	Affiliation	Activity	Notes
Pajares de los Oteros	Spain	42°20'01"N	05°27'02"W	Army	Training, Test site	

DEVELOPMENT

- Spain is a participant in the EuroMale development project. It joined the project in mid-2016. In November 2018, the Air Force confirmed that it is seeking to acquire 15 of the planned Class III aircraft.⁴⁸ The Air Force considers its MQ-9 Reapers to be an interim capability to provide the Air Force with operational experience with a Class III system until the EuroMale is available. For more on the EuroMale project, see page XV.
- Atlante II project; see page 165.

EXPORTS

Country	Model	Make	Class	Status	Notes
Malaysia	Fulmar	Thales	I	Active	

NOTES

- “El Ejército del Aire ya opera el micro UAV Blackhornet,” *Infodefensa.com*, 7 March 2018, <http://www.infodefensa.com/es/2018/03/07/noticia-ejercito-opera-micro-blackhornet.html>.
- Esteban Villarejo, “Infantería de Marina prueba su primer dron: el danes Hugginn X-1,” *ABC*, 26 January 2016, <https://abcblogs.abc.es/tierra-mar-aire/industria-de-defensa/huggin-infanteria-marina-dron.html>.
- “La DGAM pone a prueba el RPAS Alcotán de Usol,” *Infodefensa.com*, 9 September 2016, <https://www.infodefensa.com/es/2016/09/09/noticia-prueba-alcotan.html>.
- B. Carrasco, “El Ejército última la distribución de los nuevos Raven digitales,” *Infodefensa.com*, 10 April 2017, <https://www.infodefensa.com/es/2017/04/10/noticia-ejercito-ultima-distribucion-nuevos-raven-digitales.html>.
- Los RPAS ‘Wasp AE’ del Ejército del Aire superan las 100 horas de vuelo,” *Infodefensa.com*, 8 February 2016, <http://infodron.es/id/2016/02/08/noticia-ejercito-superan-horas-vuelo.html/>.
- David Ing, “Spain orders Fulmar mini UAV,” *IHS Jane’s Defence Weekly*, 24 October 2017, <http://www.janes.com/article/75162/spain-orders-fulmar-mini-uav>.
- “España formaliza la adquisición del Fulmar para Ejército de Tierra,” *Infodefensa.com*, 18 June 2018, <http://www.infodefensa.com/es/2018/06/18/noticia-espana-formaliza-adquisicion-fulmar-ejercito-tierra.html>.
- The Shephard News Team, “Spanish Army acquires two Alpha 800 UAS,” *Shephard Media*, 21 December 2018, <https://www.shephardmedia.com/news/uv-online/spain-acquires-two-alpha-800-uas/>.
- David Ing, “Spain procures Aeronautics Orbiter UAVs,” *IHS Jane’s Defence Weekly*, 10 October 2018, <https://www.janes.com/article/75162/spain-orders-fulmar-mini-uav>.

- www.janes.com/article/83701/spain-procures-aeronautics-orbiter-uavs.
10. "La Armada desinara en 2015 un UAV ScanEagle a las operaciones de lucha contra la piratería en el Océano Índico," *Defensa.com*, 10 September 2014, <https://www.defensa.com/espana/armada-destinara-2015-uav-scanegle-operaciones-lucha-contra>.
 11. B. Carrasco and Tania M. Tomas, "La DGAM adquiere dos RPAS Condor de Dronetools para la UME y el Ejército del Aire," *Infodefensa.com*, 12 October 2017, <http://www.infodefensa.com/es/2017/10/12/noticia-drone-tools-suministrara-condor-unidad-militar-emergencias.html>.
 12. "Sistema integrado de vigilancia aérea (SIVA)," Ejército de Tierra, accessed 2 October 2018, http://www.ejercito.mde.es/materiales/vehiculo_aereo_no_tripulado/SIVA.html.
 13. "El Ejército español adquiere los sistemas RPAS Atlantic y Tucan de SCR," *Infodefensa.com*, 19 December 2017, <http://www.infodefensa.com/es/2017/12/19/noticia-ejercito-espanol-adquiere-sistemas-atlantic-tucan.html>.
 14. Ibid
 15. J Arias Borque, "El Ejército de Tierra creará una unidad de aviones no tripulados," *Libertad*, 24 April 2012, <https://www.libertaddigital.com/nacional/2012-04-24/el-ejercito-de-tierra-creara-una-unidad-de-aviones-no-tripulados-1276456692/>.
 16. Esteban Villarejo, "Spain To Buy Four MQ-9 Reapers for \$168.2 million," *Defense News*, 22 November 2015, <https://www.defensenews.com/air/2015/11/22/spain-to-buy-four-mq-9-reapers-for-168-2-million/>.
 17. B. Carrasco, "Maj. Gen. Meijide (Spanish Army): 'It's necessary to replace the PASI and acquire Class I RPAS,'" *Infodefensa.com*, 5 June 2018, <https://www.infodefensa.com/es/2018/06/05/noticia-meijide-spanish-necessary-replace-acquire-class.html>.
 18. B. Carrasco, "Almte. Gonzalez (Digam): 'Las prioridades son el avión entrenador, el buque subacuático y los interrogadores IFF'," *Infodefensa.com*, 4 March 2019, <https://www.infodefensa.com/es/2019/03/04/noticia-almte-gonzalez-digam-avion-entrenador-buque-subacuatico-interrogadores-ahora-prioridades.html>.
 19. B. Carrasco, "Maj. Gen. Meijide (Spanish Army): 'It's necessary to replace the PASI and acquire Class I RPAS,'" *Infodefensa.com*, 5 June 2018, <https://www.infodefensa.com/es/2018/06/05/noticia-meijide-spanish-necessary-replace-acquire-class.html>.
 20. "La Armada obtiene su primer UAV embarcado a SAAB AB por 2,5 millones," *Infodron.es*, 5 July 2013, <http://www.infodron.es/id/2013/07/05/noticia-la-armada-obtiene-su-primer-uav-embarcado-a-saab-ab-por-25-millones.html>.
 21. "Grupo de Obtención Por Sistemas Aéreos," Ejército de Tierra, accessed 27 March 2019, <http://www.ejercito.mde.es/unidades/Valencia/rintel/Organizacion/grosa.html>.
 22. "El Grupo de Obtención por Sistemas Aéreos alza el vuelo," *infodron.es*, 26 October 2015, <http://www.infodefensa.com/es/2015/10/26/noticia-grupo-obtencion-sistemas-aereos-vuelo.html>.
 23. Javier Pastor, "Vigilantes silenciosos: Así son los drones que utiliza el ejército español," *Xataka*, 10 December 2015, <https://www.xataka.com/drones/vigilantes-silenciosos-asi-son-los-drones-que-utiliza-el-ejercito-espanol>.
 24. "El Grosa será capacitado como centro de referencia militar," *infodron.es*, 27 March 2018, <http://infodron.es/id/2018/03/27/noticia-grosa-capacitado-centro-referencia-militar.html>.
 25. "Regimiento de Artillería Lanzacohetes de Campaña nº 63," Ejército de Tierra, accessed 27 March 2019, <http://www.ejercito.mde.es/unidades/Leon/rca63/Organizacion/index.html>.
 26. "La base del Ferral adiestrará con sus nuevos drones a los artilleros españoles en El Teleno," *Diario de León*, 25 December 2018, https://www.diariodeleon.es/noticias/leon/base-ferral-adiestrara-sus-nuevos-drones-artilleros-espanoles-teleno_1302177.html.
 27. Ejército de Tierra, "The Chief of Staff of the Army chairs a monographic meeting on the upcoming 'Fuerza 35'," news release, 23 January 2019, http://www.ejercito.mde.es/gl/news/2019/01/7102_jeme_reunion_35.html?_loCALE=gl.
 28. Esteban Villarejo, "La Legión estrena un nuevo dron, de tecnología israelí, en la misión en Irak," *ABC Blogs*, 5 June 2019, <https://abcblogs.abc.es/tierra-mar-aire/espana/la-legion-estrena-un-nuevo-dron-de-tecnologia-israeli-en-la-mision-en-irak.html>.
 29. Ejército de Tierra, "La Brigada Paracaidista imparte las Jornadas de Actualización del sistema Mini-UAV 'Raven'," news release, 7 October 2013, <http://www.ejercito.mde.es/noticias/2013/10/2681.html>.
 30. "Scan Eagle - 11ª Escuadrilla Aérea," Armada Española, accessed 27 March 2019, <http://www.armada.mde.es/ArmadaPortal/page/Portal/ArmadaEspañola/buquesaeronaves/prefLang-es/03flotilla-aeronaves-aeronaves-no-tripuladas--0111-escuadrilla-aeronaves-scan-eagle>.
 31. Europa Press Staff, "El dron 'Scan Eagle' de la Armada realiza su primer vuelo en Irak," *Europa Press*, 12 November 2017, <http://www.lavanguardia.com/vida/2017/11/12/433569795360/el-dron-scan-eagle-de-la-armada-realiza-su-primer-vuelo-en-irak.html>.
 32. "El Ejército del Aire se plantea armar los nuevos drones de reconocimiento," *El Confidencial*, 2 January 2019, <https://www.elconfidencialdigital.com/articulo/defensa/ejercito-aire-plantea-armar-nuevos-drones-reconocimiento/20181228135623119937.html>.
 33. Julio Maiz Sanz, "El nuevo dron Condor del Ejército del Aire," *Defensa*, 14 June 2018, <https://www.defensa.com/espana/nuevo-dron-condor-ejercito-aire>.
 34. "El EZAPAC Incorpora Al Micro-UAV PD-100 Black Hornet A Sus Unidades," *Hispanaviacion*, 6 March 2018, <http://www.hispanaviacion.es/ezapac-incorpora-al-micro-uav-pd-100-black-hornet-unidades/>.
 35. "Los dos primeros aviones no tripulados WASP AE para el EZAPAC," *Infodrones.es*, 1 January 2014, <http://www.infodron.es/id/2014/01/01/noticia-primeros-aviones-tripulados-ezapac.html>.
 36. J. Arias Borque, "El Mando de Operaciones Especiales ya cuenta con el minidron PD-100 Black Hornet," *Libertad*, 1 February 2017, <https://www.libertaddigital.com/espana/2017-02-01/el-mando-de-operaciones-especiales->

- ya-cuenta-con-el-minidron-pd-100-black-hornet-1276591834/.
37. Julio Maiz Sanz, “La Legion se dota del nuevo micro dron Black Hornet,” *defensa.com*, 24 April 2018, <https://www.defensa.com/espana/legion-dota-nuevo-micro-drone-black-hornet>.
 38. Miguel Angel Perez Cabrera, “Escuela de UAS de las FAS,” presentation, Catedra Isdefe, 2014, <http://catedrais-defe.etsit.upm.es/wp-content/uploads/2014/04/Ponencia-PEREZ-CABRERA-RPAS-2014.pdf>.
 39. Ibid
 40. Ejercito del Aire, “El Grupo de Escuelas de Matacán (GRUEMA) recibe el Sistema Remotamente Tripulado (RPAS) ‘Tucán’,” news release, 8 February 2018, <http://www.ejercitodelaire.mde.es/EA/ejercitodelaire/es/noticias/noticia/El-Grupo-de-Escuelas-de-Matacan-GRUEMA-recibe-el-Sistema-Remotamente-Tripulado-RPAS-Tucan/>.
 41. “El Ejercito del Aire forma a los futuros operadores del Reaper,” *infodron.es*, 26 September 2016, <http://www.infodron.es/id/2016/09/26/noticia-ejercito-forma-futuros-operadores-reaper.html>.
 42. Jose Daniel Vázquez del Pozo, “UPASI: Afganistán a vista de pájaro,” *Revista Ejército*, May 2014, http://www.ejercito.mde.es/en/Galerias/multimedia/revista-ejercito/2014/Revista_Ejercito_878_Extra_Mayo_2014.pdf.
 43. Estado Mayor de la Defensa, “Los ingenieros de Salamanca finalizan con éxito su misión en Irak,” news release, 19 March 2018, <http://www.emad.mde.es/MOPS/novoperaciones/noticias/2018/03/Listado/180317-uing-iv-bes-mayah.html>.
 44. Armada Espanola, “11ª Escuadrilla en Irak,” Flickr, 13 November 2018, <https://www.flickr.com/photos/armadamde/45807455162>.
 45. Armada Espanola, “The 11th Aircraft Squadron wraps up its third deployment in Operation ‘Atalanta’,” news release, 31 July 2017, http://www.armada.mde.es/ArmadaPortal/page/Portal/ArmadaEspanola/conocenosnoticias/prefLang-en/00noticias--2017--07--NT-138-11A-ESC-ATALANTA-en;jsessionid=MJH7hqPL5W6gyBV71pS5X-kjhs1nbKXgycTX1xBqXlMPjhvhHS85Q!-228653420?_selectedNodeID=3083159&_pageAction=selectItem.
 46. “Gallery: ESPS Galicia’s ScanEagle UAV helps track pirates,” *NavalToday.com*, 30 March 2017, <https://navaltoday.com/2017/03/30/gallery-esps-galicias-scan-eagle-uav-helps-track-pirates/>.
 47. “El dron que vigila incendios en León contabiliza ya 130 horas de vuelo,” *Lavanguardia*, 24 August 2018, <https://www.lavanguardia.com/tecnologia/20180824/451423365987/el-dron-que-vigila-incendios-en-leon-contabiliza-ya-130-horas-de-vuelo.html>.
 48. Marta Blanco Sanchez, “España planea la compra de 15 RPAS Euromale,” *infodron.es*, 7 November 2018, <http://infodron.es/id/2018/11/07/noticia-espana-planea-compra-euromale.html>.

SWEDEN

INVENTORY

Model	Make	Origin	Class	Intro	Qty	Operator	Notes
RQ-12 Wasp ¹	AeroVironment	USA	I	2012		Army	“UAV05A Svalan”
RQ-20 Puma ²	AeroVironment	USA	I	2012		Army	“UAV05B Korpen”
RQ-7 Shadow ³	AAI	USA	II	2011	8 (2)	Army	“UAV03 Öرنen”

INACTIVE

Model	Make	Origin	Class	Period	Qty	Operator	Notes

Sperwer ⁴	Sagem	France	II	1998-2010		Army	“UAV01 Ugglan”
Skylark 1LE ⁵	Elbit	Israel	I	2007-2015	48	Army	“UAV02 Falken”

PERSONNEL

ARMY

Name	HQ	Type	Equipment	Activated
TUAV Platoon, 320th Squadron, 32nd Intelligence Battalion, Life Regiment Hussars K 3	<i>TUAV-pluton, 320. skvadron, 32. Under-rättelsebataljonen, Livregementets husarer K 3</i> Karlsborg	D	RQ-7 Shadow	2008

The TUAV Platoon is one of five platoons that in the 320th Sqn, which is responsible for the 32nd Reconnaissance Battalion’s staff and support operations.^{6,7}

TRAINING

- The Flight Unit (*FlygEnheten*) is a division of Life Regiment Hussars K 3 (*Livregementets husarer K 3*) responsible for UAV and parachute training.⁸ It was established in 2009.

OPERATIONS

Country	Base	Equipment	Period	Operation
Afghanistan	Camp Marmal, Afghanistan	RQ-7 Shadow, Skylark	2011-2013	ISAF
Sweden deployed the TUAV Platoon to Afghanistan with RQ-7 Shadows in 2011. ⁹ Camp Marmal in northern Afghanistan served as the launch and recovery base for the aircraft, which were then remotely operated by personnel at Camp Northern Lights in Mazar-e-Sharif. Afghanistan was the first deployment for the Swedish Shadows, which the Army rushed into service within months of delivery. The Shadows completed over 300 missions during the nearly two-year deployment.				
Mali	Timbuktu	RQ-7 Shadow, Puma	2015-2017	MINUSMA
In 2015, Sweden deployed the 32nd Intelligence Battalion with Shadow and Puma drones to Timbuktu for the United Nations Stabilization Mission in Mali (MINUSMA). ¹⁰ Alongside the 32nd Btn’s TUAV Platoon, the Swedish ISR Task Force included a small UAV team responsible for supporting the motorised reconnaissance platoon. ¹¹ In November 2017, the Swedish Defence Research Agency (FOI) released a comprehensive analysis of Sweden’s operations under MINUSMA based on interviews with deployed personnel. ¹²				

INFRASTRUCTURE

Name	Country	Latitude	Longitude	Affiliation	Activity	Notes
F 6 Karlsborg	Sweden	58°30'50"N	14°30'26"E	K 3	HQ	



Swedish RQ-7 Shadow operations in Mali in support of the MINUSMA peacekeeping operation. Credit: Johan Lundahl, Forsvarmakten

EXPORTS

Country	Model	Make	Class	Status	Notes
Indonesia	Skeldar V-200	UMS Skeldar	II	Active	
Germany	Skeldar V-200	UMS Skeldar	II	Active	
Spain	Skeldar V-200	UMS Skeldar	II	Inactive	

NOTES

1. AeroVironment, "Swedish Defence Material Administration Orders AeroVironment Puma AE and Wasp Small Unmanned Aircraft Systems," news release, 11 June 2012, https://www.avinc.com/resources/press-releases/view/swedish_defence_materiel_administration_orders_aerovironment_puma_ae_and_wa.
2. Ibid
3. "TUAV-System Öرنen," Forsvarmakten, accessed July 2019, <https://www.forsvarsmakten.se/sv/information-och-fakta/materiel-och-teknik/luft/tuav-system-ornen/>.
4. Jens Ramhöj, "Sista flygningen med Ugglan," Forsvarsmakten, accessed 3 October 2018, <https://www.forsvarsmakten.se/sv/aktuellt/2010/09/sista-flygningen-med-ugglan/>.
5. "SUAV-System Falken," Forsvarsmakten, accessed 3 October 2018, <https://www.forsvarsmakten.se/sv/information-och-fakta/materiel-och-teknik/avvecklade-materielsystem/suav-system-falken/>.
6. Michael Reinholtz and Anders Torstensson, "Verkar i tre världsdelar - samtidigt!," Livhusaren, 2011, <http://livhusarenaskamratforening.se/wp-content/uploads/sites/1725/2016/07/Livhusaren2011.pdf>.
7. "32. UNDERRÄTTELSEBATALJONEN," Forsvarsmakten, accessed 16 September 2018, <https://www.forsvarsmakten.se/sv/organisation/livregementets-husarer-k-3/k-3s-insatsforband/32-underrattelsebataljonen/>.
8. "Flygheten," Forsvarsmakten, accessed 3 October 2018, <https://www.forsvarsmakten.se/sv/organisation/livregementets-husarer-k-3/flygheten-flyge/>.
9. Kajsa Linnarsson, "Öرنen har landat," Forsvarsmakten, accessed 3 October 2018, <https://www.forsvarsmakten.se/>

sv/aktuellt/2013/04/ornen-har-landat/.

10. Beth Stevenson, "Swedish army evaluates Mali UAV deployment," Flight Global, 28 October 2015, <https://www.flightglobal.com/news/articles/swedish-army-evaluates-mali-uav-deployment-418264/>.
11. Erwan De Cherisey, "Desert watchers: MINUSMA's Intelligence Capabilities," *IHS Jane's Defence Weekly*, 2017, https://www.janes.com/images/assets/319/71319/Desert_watchers_MINUSMA_s_intelligence_capabilities.pdf.
12. Cecilia Hull Wiklund and Helené Lackenbauer. "Insatsuppföljning Mali 04/05: En analys av Sveriges fjärde och femte förbandsbidrag till FN:s insats i Mali," Swedish Defence Research Agency, November 2017.

SWITZERLAND

INVENTORY

Model	Make	Origin	Class	Intro	Qty	Operator	Notes
Hermes 900 ¹	Elbit	Israel	III	2019*	6	Air Force	"ADS 15"
Ranger	IAI, RUAG	Israel, Switzerland	II	2001	28 (4)	Air Force	"ADS 95"

**Estimate*

ACTIVE ACQUISITIONS

- The Mini-Drone program is an active acquisition effort by the Swiss Federal Department of Defense (DDPS) to acquire Class I UAVs for the Army.² It is expected to acquire a mix of rotary- and fixed-wing aircraft for short-range ISR. In April 2018, the program evaluated the Israeli-made Aeronautics Orbiter 2B and the Polish-made WB Electronics FlyEye. The total value of the program is CHF 8 million, or approximately \$8 million. The DDPS is expected to award a contract in 2019 and to complete the program by 2021.

PERSONNEL

AIR FORCE

Name	HQ	Type	Equipment	Activated
Drone Squadron 7, Drone Command 84 ³	<i>Drostaffel 7, Drohnen Kommando 84</i> Emmen	D	RUAG Ranger, Hermes 900	1995

INFRASTRUCTURE

Name	Country	Latitude	Longitude	Affiliation	Activity	Notes
Emmen Air Base	Switzerland	47°05'32"N	8°18'16"E	Drone Sqn 7	HQ	

NOTES

1. Beth Stevenson, “Switzerland Orders Hermes 900 UAV,” *FlightGlobal*, 26 November 2015, <https://www.flight-global.com/news/articles/switzerland-orders-hermes-900-uav-419504/>.
2. Switzerland, Eidgenössisches Departement für Verteidigung, *Projektbericht VBS: Projektbeurteilung per 31.12. 2018*, 2018, https://www.vbs.admin.ch/de/dokumente/projektberichte.detail.document.html/vbs-internet/de/documents/projektberichte/80_191_d_Projektbericht_VBS_2018_web.pdf.html.
3. Switzerland, Eidgenössisches Departement für Verteidigung, *Informationsschrift ADS 95*, 9 July 2008, https://www.vtg.admin.ch/content/vtg-internet/de/organisation/kdo-op/lw/lw-at-br/dro-kdo-84/_jcr_content/contentPar/tabs/items/dokumente/tabPar/downloadlist/downloadItems/119_1487776812460.download/080709_Infos-chrift_D.pdf.

UNITED KINGDOM

INVENTORY¹

Model	Make	Origin	Class	Intro	Qty	Operator	Notes
Black Hornet 3 PRS ²	FLIR	USA	I	2019	90	Army	
T-Hawk	Honeywell	USA	I	2010	5	Army	
Desert Hawk Mk3	Lockheed Martin	USA	I	2004	240	Army	“MUAV” 221 Active
Watchkeeper	Thales UK, Elbit Systems	UK, Israel	II	2014	54	Army	“TUAV” 49 Active
MQ-9 Reaper	GA-ASI	USA	III	2007	10	Air Force	“RPAS”

ACTIVE ACQUISITIONS

- The General Atomics MQ-9B SkyGuardian—known in the U.K. as Protector RG.Mk1—is an upgraded variant of the MQ-9 Reaper.³ The Protector was designed to meet NATO STANAG 4681 airworthiness standards and will be equipped with “sense-and-avoid” and auto take-off and landing capabilities. The MoD intends to initially acquire 16 Protectors to replace its fleet of MQ-9 Reapers. The Protectors will be assigned to the No. 31 Squadron and based at RAF Waddington and are expected to enter service by 2024.⁴
- In the coming years, the British Army will likely seek a replacement for the Desert Hawk Mk3. Media reports in 2017 suggested that the Army was exploring potential replacement options, including an industry partnership to lease aircraft.⁵ The Desert Hawk is scheduled to remain in service until 2021.

INACTIVE

Model	Make	Origin	Class	Period	Qty	Operator	Notes
Hermes 450	Elbit	Israel	II	2007-2014	9	Army	Leased
Black Hornet 1 ⁶	Prox Dynamics	Norway	I	2013-2017	160	Army	
ScanEagle ⁷	Insitu	USA	I	2013-2017	50	Navy	
Phoenix ⁸	BAE	UK	I	1999-2008		Army	

PERSONNEL

ARMY

Name	HQ	Type	Equipment	Activated
32nd Regiment Royal Artillery, 1st Intelligence, Surveillance, and Reconnaissance Brigade ⁹	Horne Barracks, Larkhill	D	Desert Hawk III	2003
The 32nd Regiment is comprised of 22nd Battery, 18th Battery, 57th Battery, and 46th Battery (HQ). Between 2003 and 2008, the 22nd Battery was equipped with the Phoenix. Beginning in 2007, the 32nd leased nine Hermes 450 aircraft for operations in Iraq and Afghanistan.¹⁰ Under the Army 2020 restructuring plan, the 32nd is scheduled to be disbanded in 2021 and primary responsibility for UAV operations will be shifted to the 47th Regt.				
47th Regiment Royal Artillery, Joint Helicopter Command ^{11,12}	Horne Barracks, Larkhill	D	Watchkeeper	2010
The 47th Regiment is comprised of the 10th Battery, 43rd Battery, 74th Battery (Support), and the 31st Battery (HQ). In 2007, while serving as an air defense unit, the 47th assumed responsibility for the Desert Hawk in Iraq as a way to relieve pressure on the 32nd Regiment. Although this arrangement was initially intended to be temporary, the 47th retained responsibility for the Desert Hawk for the remainder of the U.K.'s mission in Iraq. In 2010 the 47th was officially reformed as a dedicated UAV regiment. It began focusing on Watchkeeper operations in 2015.				



A British Army Watchkeeper (left) and Desert Hawk 3 (right). Credit: U.K. Ministry of Defence/Crown copyright

AIR FORCE

Name	HQ	Type	Equipment	Activated
No. 13 Squadron ¹³	RAF Waddington	D	MQ-9 Reaper	2012
The RAF converted the 13th Squadron from a Tornado fighter squadron to an MQ-9 Reaper squadron in 2012. The 13th remotely operates the Reaper in foreign deployments from RAF Waddington.				
No. 39 Squadron ¹⁴	RAF Waddington, Creech Air Force Base	D	MQ-9 Reaper	2007
Formed as a fighter squadron in 1916, the 39th Squadron became the U.K.'s first MQ-9 Reaper unit in 2007 in order to meet an urgent operational need for U.K. forces in Afghanistan. 39th Sqn is located primarily at Creech Air Force Base in Nevada, where it works alongside U.S. counterpart units that also operate Reapers. As of 2014, 39th Squadron had 90 personnel based at Creech. Additional 39th Squadron personnel are based at RAF Waddington in the U.K. and in Afghanistan.				
No. 216 Squadron ¹⁵		D		
The Royal Air Force announced in July 2019 that the 216th Sqn would be reactivated as an experimental unit dedicated to implementing a drone swarm capability.				

TRAINING

- Classroom and simulator instruction on the British Army's Watchkeeper takes place at the Watchkeeper Training Facility at Larkhill while live training takes place at Aberporth Airport in Wales and Ascension Island in the south Atlantic.^{16,17}
- RAF Reaper pilot training takes place at Holloman Air Force Base and Creech Air Force Base in the United States. The course is organized and led by U.S. personnel, a small number of RAF instructors participate in the training. The course of instruction is based on that of U.S. MQ-9 pilots and sensor operators.

OPERATIONS

Country	Base	Equipment	Period	Operation
Iraq ¹⁸	Shaibah Air Base, Basra; Other	Phoenix, Desert Hawk, Hermes 450	2003-2009	Telic
The 32nd Regiment deployed to Shaibah Air Base in November 2003 to provide ISR the U.K.-led Multi-National Division South East in southern Iraq. Equipped with the Phoenix, the 32nd's 57th Battery was the first British UAV unit to deploy to Iraq. In spring 2004, the 57th Battery was replaced by the 22nd Battery, which equipped with the Desert Hawk 1 in addition to the Phoenix. When the Phoenix was withdrawn from Iraq in mid-2006, it was replaced with leased Hermes 450s that would serve as a stop-gap capability until the Watchkeeper could enter service. In 2007, the 47th Regiment, then serving as an air defense unit, assumed responsibility for Desert Hawk operations from the 32nd, which continued to operate the Hermes. Elements of both regiments served in Iraq until 2009.				

Afghanistan ^{19,20,21}	Kandahar Airfield, Kandahar; Camp Bastion, Helmand	Desert Hawk 1, Desert Hawk 3, T-Hawk, Black Hornet, Hermes 450, MQ-9 Reaper	2006-2014	Herrick

The U.K. first equipped British Army forces in Afghanistan with drones in 2006, with the introduction of the Desert Hawk 1. The following year, the Desert Hawk 1 was replaced by the Desert Hawk 3, which flew more than 18,000 flight hours during Operation Herrick, the U.K.'s name for operations in Afghanistan. Leased Elbit Hermes 450s were deployed in 2007 and accumulated more than 85,000 flying hours operating from Camp Bastion in Helmand province. In 2010, Royal Engineer counter-IED teams deployed the T-Hawk. The Army deployed with the Black Hornet micro-UAV in 2012. The RAF deployed the Reaper in Afghanistan in 2007. Between 2007 and 2014, RAF Reapers conducted around 5,300 sorties in Afghanistan, accumulating approximately 71,000 flight hours. By 2014, RAF Reaper operations accounted for approximately three fourths of all flight hours by RAF aircraft in Afghanistan.

Iraq, Syria	Ali Al Salem, Kuwait	Reaper	2014-	Shader

In 2014, the RAF deployed two MQ-9 Reapers with 13 Squadron to Ali Al Salem Air Base in Kuwait for Operation Shader, the U.K.'s counter-ISIS campaign in Syria and Iraq.²² In August 2015, an RAF Reaper carried out an airstrike in Syria that killed Reyaad Khan, a U.K. citizen who had joined ISIS.²³ As of March 2018, RAF Reapers had conducted over 2,600 sorties in Iraq and Syria and approximately 880 air strikes.²⁴

INFRASTRUCTURE

Name	Country	Latitude	Longitude	Affiliation	Activity	Notes
RAF Waddington	UK	53°10'21"N	00°31'51"W	13 Sqn, 39 Sqn, 31 Sqn	Headquarters	Planned headquarters of 31 Sqn
RAF Wideawake Airfield, Ascension Island	UK	07°58'10"S	14°23'38"W	47 Regt	Training	
West Wales Airport, Aberporth	UK	52°06'53"N	04°33'34"W	47 Regt	Training	
Creech Air Force Base	USA	36°35'32"N	115°40'00"W	39 Sqn	HQ	
Ali Al Salem Air Base	Kuwait	29°20'48"N	47°31'14"E	13 Sqn	Deployment	
Kandahar Airfield	Afghanistan	31°30'21"N	065°50'52"E	39 Sqn	Deployment	

DEVELOPMENT

- The MoD has ordered the development of three Airbus Defence & Space Zephyr drones, a solar-powered unmanned aircraft that can stay aloft for weeks at a time. At the time of writing, the Zephyr remains in its development and testing phase.²⁵
- The MoD announced in February 2019 that it was launching an effort to develop swarms of drones, which the MoD intends to field by the early 2020s.²⁶

NOTES

1. United Kingdom, House of Commons, *Overview of military drones used by the UK Armed Forces*, Number 06493, Louisa Brooke-Holland, 8 October 2015.
2. FLIR Systems, "British Army signs \$1.8 million contract with FLIR Systems for Black Hornet 3 nano recon UAV," news release, 15 April 2019, <https://www.intelligent-aerospace.com/military/article/16543510/british-army-signs-18-million-contract-with-flir-systems-for-black-hornet-3-nano-recon-uav>.
3. Gareth Jennings, "UK prepares for Protector UAV," *IHS Jane's Defence Weekly*, 13 March 2018, <https://www.janes.com/article/78529/uk-prepares-for-protector-uav>.
4. Gareth Jennings, "UK's Protector UAS faces further delay," *IHS Jane's Defence Weekly*, 29 March 2018, <https://www.janes.com/article/78928/uk-s-protector-uas-faces-further-delay>.
5. Tim Ripley, "UK looks to replace Desert Hawk mini UAV," *IHS Jane's Defence Weekly*, 20 October 2017, <https://www.janes.com/article/75052/uk-looks-to-replace-desert-hawk-mini-uav>.
6. George Allison, "British armed forces cut 37% of unmanned aircraft systems in one year," UK Defence Journal (blog), 6 July 2017, <https://ukdefencejournal.org.uk/british-armed-forces-cut-37-unmanned-aircraft-systems-one-year/>.
7. Andrew Chuter, "British Navy Plans To Let ScanEagle Drone Go Next Year," *Defense News*, 19 July 2016, <https://www.defensenews.com/home/2016/07/19/british-navy-plans-to-let-scanegale-drone-go-next-year/>.
8. Ministry of Defence, "Unmanned Air Vehicle Regiment Bids Farewell to the Phoenix," news release, 25 March 2008, <http://www.defense-aerospace.com/articles-view/release/3/92510/british-army-retires-phoenix-uav-after-9-years.html>.
9. "32nd Regiment Royal Artillery," Army.mod.uk, accessed 13 September 2018, <https://www.army.mod.uk/who-we-are/corps-regiments-and-units/royal-artillery/32nd-regiment-royal-artillery/>.
10. Chris Pocock, "From H450 to Watchkeeper: Will the Long and Costly Journey Be Worthwhile?," Aviation International Online, 15 February 2012, <https://www.ainonline.com/aviation-news/defense/2012-02-15/h450-watchkeeper-will-long-and-costly-uav-journey-be-worthwhile>.
11. "47th Regiment Royal Artillery," Army.mod.uk, accessed 13 September 2018, <https://www.army.mod.uk/who-we-are/corps-regiments-and-units/royal-artillery/47th-regiment-royal-artillery/>.
12. Maj. Sam Harvey RA, "The Army's Watchkeeper Regiment," LZDZ, 2016, <http://www.lzdzonline.co.uk/wp-content/uploads/LZDZ-issue-3-2016.pdf>.
13. "13 Squadron," Royal Air Force, accessed 13 September 2018, <https://www.raf.mod.uk/our-organisation/squadrons/13-squadron/>.
14. "39 Squadron," Royal Air Force, accessed 13 September 2018, <https://www.raf.mod.uk/our-organisation/squadrons/39-squadron/>.
15. Gareth Jennings, "RAF announces AEW&C, space, 'drone' test squadrons," *Jane's Defence Weekly*, 17 July 2016, <https://www.janes.com/article/89925/raf-announces-aew-c-space-drone-test-squadrons>.
16. Tony Osborne, "British Pilots Finally Training on Watchkeeper," Aviation Week and Space Technology, 15 May 2014, <http://aviationweek.com/defense/british-pilots-finally-training-watchkeeper>.
17. The Shephard News Team, "British Army trains on Watchkeeper," Shephard Media, 13 July 2016, <https://www.shephardmedia.com/news/training-simulation/british-army-trains-watchkeeper/>.
18. Tim Ripley, *British Army Aviation in Action: Kosovo to Helmand* (Havertown: Pen and Sword, 2011), 128-142.
19. Ministry of Defence, Op HERRICK (Afghanistan) Aircraft Statistics, 2015, https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/471395/Op_Herrick_Aircraft_Annex_A_-_Bulletin.pdf.
20. Ministry of Defence, "'Flying Robot' pilot helps find IEDs in Helmand," news release, 11 August 2010, <https://www.gov.uk/government/news/flying-robot-pilot-helps-find-ieds-in-helmand>.
21. Nick Hopkins, "UK starts controlling drones in Afghanistan from British soil," *The Guardian*, 25 April 2013, <https://www.theguardian.com/world/2013/apr/25/uk-controlling-drones-afghanistan-britain>.
22. Beth Stevenson, "RAF Reapers to operate over Iraq," *FlightGlobal*, 16 October 2014, <https://www.flightglobal.com/news/articles/raf-reapers-to-operate-over-iraq-404840/>.
23. "'Lack of transparency' over drone strike, committee finds," *BBC*, 26 April 2017, <https://www.bbc.com/news/uk-39718044>.
24. "UK Drone Strike Stats," Drone Wars UK, accessed 13 September 2018, <https://dronewars.net/uk-drone-strike-list-2/>.
25. Dan Thisdell, "Airbus sets flight endurance record with Zephyr UAV," *FlightGlobal*, 8 August 2018, <https://www.flightglobal.com/news/articles/airbus-sets-flight-endurance-record-with-zephyr-uav-451006/>.

26. Kelsey D. Atherton, "The United Kingdom wants a drone swarm by 2022," *C4ISRNET*, 13 February 2019, <https://www.c4isrnet.com/unmanned/2019/02/13/the-united-kingdom-wants-a-drone-swarm-by-2022/>.

LATIN AMERICA

ARGENTINA	.....	157
BOLIVIA	.....	159
BRAZIL	.....	159
CHILE	.....	162
COLOMBIA	.....	163
DOMINICAN REPUBLIC	.....	167
ECUADOR	.....	168
GUYANA	.....	169
HONDURAS	.....	169
PARAGUAY	.....	170
PERU	.....	170
URUGUAY	.....	171
VENEZUELA	.....	172

ARGENTINA

INVENTORY

Model	Make	Origin	Class	Intro	Qty	Operator	Notes
Aukán	DGIyD	Argentina	II	2017		Air Force	Test and training platform
Vigía 2B	DGIyD	Argentina	II	2017		Air Force	Test and training platform
Phantom 4 ¹	DJI	China	I	2019		Army	
Matrice 210 ²	DJI	China	I	2019		Army	

PERSONNEL

AIR FORCE

Name	HQ	Type	Equipment	Activated	
Unmanned Aerial System Squadron, 2nd Aerial Brigade, Training and Enlistment Command ³	<i>Escuadrón Sistema Aéreo No Tripulados (SANT), II Brigada Aérea, Comando de Adiestramiento y Alistamiento</i>	Chemical Air- port	D	Aukán, Vigía 2B	2014

TRAINING

- In 2016 the Argentine Air Force created a training program dedicated to the operation of unmanned aircraft (*Curso de Operadores de Sistemas No Tripulados*) at the School of Military Aviation (*Escuela de Aviación Militar*).⁴ Practical training occurs at Chemical Air Base. Also in 2016, the Air Force created the Operator of Unmanned Aerial Systems specialization (*Operador de Sistemas Aéreos No Tripulados*, or OSANT).⁵

INFRASTRUCTURE

Name	Country	Latitude	Longitude	Affiliation	Activity	Notes
Chemical Airport ^{6,7}	Argentina	30°20'43"S	66°17'37"W	UAS Sqn	Test site, Training	

OTHER

Name	Country	Latitude	Longitude	Affiliation	Activity	Notes
5th Air Brigade at Villa Reynolds	Argentina	33°43'31"S	65°22'41"W		Test site	

DEVELOPMENT

- Beginning in 2010, under a program known as Project FAS 0091, the Air Force's Directorate General for Research and Development (*Dirección General de Investigación y Desarrollo*, or DGID) and the Center for Applied Research (*Centro de Investigaciones Aplicadas*, or CIA) developed two systems, the Aukán, a Class I aircraft, and the Vigía 2B, a Class II aircraft. Both entered service as test platforms in 2017.⁸ Flight tests for the aircraft were conducted in 2017 and 2018.⁹ The Air Force carried out more complex tests of the Aukán at Villa Reynolds Air Base in San Luis province. The DGID has also developed a ground control system for the aircraft, the Estación de Control Terrestre.¹⁰

NOTES

- Santiago Rivas, "Argentine Army receives new equipment," *Jane's Defence Weekly*, 13 March 2019, <https://www.janes.com/article/87209/argentine-army-receives-new-equipment>.
- Ibid
- Luis Piñeiro, "El nuevo Escuadrón de Sistemas Aéreos No Tripulados de la Fuerza Aérea Argentina," *Defensa.com*, 29 December 2016, <https://www.defensa.com/argentina/nuevo-escuadron-sistemas-aereos-no-tripulados-fuerza-aerea>.
- Escuela de Aviación Militar, "Ceremonia de Egreso del Curso de Operador de Sistemas Aéreos No Tripulados II," news release, accessed 23 September 2018, <http://www.noticiasenvuelo.faa.mil.ar/articulos.asp?idn=2564>.
- "Operador de Sistemas Aéreos No Tripulados (OSANT)," Escuela de Aviación Militar, 13 October 2017, accessed 23 September 2018, <http://www.eam.iaa.edu.ar/eam/services/operador-de-sistemas-aereos-no-tripulados-osant/>.
- "Argentina invertirá 50 millones de pesos en la reactivación de la Base Aérea de Chamental, futuro centro operativo de drones," *Defensa.com*, 1 March 2017, <https://www.defensa.com/argentina/argentina-invertira-50-millones-pesos-reactivacion-base-aerea>.
- Luis Piñeiro, "La Fuerza Aérea Argentina reabre la Base Aérea de Chamental, sede del Centro de Experimentación y Lanzamiento de proyectiles Autopropulsados," *Defensa.com*, 26 June 2018, <https://www.defensa.com/argentina/fuerza-aerea-argentina-reabre-base-aerea-chamental-sede-centro>.
- Carlos Borda Bettolli, "Vigía 2B, el SART Clase III de la Fuerza Aérea Argentina," *Zona Militar*, 12 September 2017, <https://www.zona-militar.com/2017/09/12/vigia-2b-sart-clase-iii-la-fuerza-aerea-argentina/>.
- "La Fuerza Aérea Argentina desarrolla los prototipos Vigía 2B y Aukán," *Infodron.es*, 7 November 2017, <http://infodron.es/id/2017/11/07/noticia-desarrolla-prototipos-vigia-aukan.html>.
- Luis Piñeiro, "Argentina avanza en las pruebas de vuelo de su vehículo aéreo no tripulado Aukán," *Defensa.com*, 12 March 2018, <https://www.defensa.com/argentina/argentina-avanza-pruebas-vuelo-vehiculo-aereo-no-tripulado-aukan>.

BOLIVIA

INVENTORY	Model	Make	Origin	Class	Intro	Qty	Operator	Notes
	Remoeye 006 ¹	Ucon System	South Korea	2013		2	Air Force	
	Typhoon H ²	Yuneec	China	2017			Army	

NOTES

1. “La Fuerza Aérea boliviana presenta sus primeros UAV,” *Infodefensa.com*, 4 June 2013, <http://www.infodefensa.com/es/2013/06/04/noticia-la-fuerza-aerea-boliviana-presenta-sus-primeros-uav-2.html>.
2. “El Ejército de Bolivia incorpora drones Typhoon H, vehículos y equipos de comunicación,” *Infodefensa.com*, 22 October 2017, <https://www.infodefensa.com/latam/2017/10/22/noticia-ejercito-bolivia-recibe-drones-vehiculos-equipos-comunicaciones.html>.

BRAZIL

INVENTORY	Model	Make	Origin	Class	Intro	Qty	Operator	Notes
	Phantom 3 ¹	DJI	China	I	2015		Army	
	FT-100 Horus ^{2,3}	FT Sistemas	Brazil	I	2015	6 (3)	Army, Navy	
	Hermes 450 ⁴	Elbit	Israel	II	2010	4	Air Force	
	Heron 1	IAI	Israel	III	2010	2	Air Force	Transferred to the Air Force from Federal Police in 2018 ⁵
	Hermes 900 ⁶	Elbit	Israel	III	2014	3	Air Force	“RQ-900”

PERSONNEL

AIR FORCE

Name		HQ	Type	Equipment	Activated
1/12 “Horus” Squadron, 4th Wing ⁷	1°/12° GAv Es-quadrão Hórus, Ala 4	Santa Maria Air Base	D	Hermes 450, Hermes 900, Heron 1	2011

INACTIVE

- In 2014 the Brazilian Army activated the Target Reconnaissance Battery, 9th Field Artillery Group, 5th Army Division (Bateria de Busca de Alvos, 9º Grupo de Artilharia de Campanha, 5ª Divisão de Exército) for a three-year program to explore ways of integrating UAVs into artillery operations.⁸ Army personnel trained to use the FT-100 remotely piloted aircraft system (Sistema de Aeronave Remotamente Pilotada or SARP). The first two dedicated operators graduated from the program in 2016. The Army deactivated the Target Reconnaissance Battery in 2017.⁹

OPERATIONS

- Brazil’s first operational deployment of the Hermes 450 occurred in 2011 during Operation Agate 1, a massive counter-smuggling operation that sought to secure Brazil’s border with Colombia.¹⁰
- In 2013 the Federal Police and the Air Force together deployed the Heron 1 and Hermes 450 to San Miguel Do Iguaçu Airport to surveil Brazil’s border with Paraguay.¹¹
- In 2014 the Air Force deployed the newly-acquired Hermes 900 for security during the World Cup.¹² In 2016 and 2018, the Horus Sqn temporarily moved from Santa Maria Air Base to Santa Cruz Air Force Base near Rio de Janeiro in order to support security operations at the 2016 Rio Olympics.¹³
- In January 2019 the Horus Sqn was deployed during Operation Posse 2019, the military effort to support security operations during the inauguration of President Jair Bolsonaro.¹⁴ The operation was notable for the fact that it was the first time that the Horus Sqn flew the Hermes 900 via satellite communications.

INFRASTRUCTURE

Name	Country	Latitude	Longitude	Affiliation	Activity	Notes
Santa Maria Air Base	Brazil	29°42’39”S	53°41’32”W	1/12 Sqn	HQ	
Botucatu Airport	Brazil	22°56’22”S	48°28’04”W	Avionics Services	Test site	
Santa Cruz Air Force Base	Brazil	22°55’56”S	43°43’09”W	1/12 Sqn	Deployment	Site of Hermes 450 deployments in 2015, 2016, and 2018
San Miguel Do Iguaçu Airport	Brazil	25°23’35”S	54°16’05”W	1/12 Sqn	Deployment	Heron 1 base

DEVELOPMENT

- The Caçador is a Class III UAV developed by Brazilian firm Avionics Services, a subsidiary of Israel Aeronautics Industries. It is a variant of the IAI Heron 1, modified to meet the requirements of the Brazilian Ministry of Defense. Work on the Caçador began following a 2013 technology transfer agreement between Avionics Services and IAI to advance Brazil's domestic drone industry. The Caçador made its first flight at Botucatu Airport in 2016.¹⁵

NOTES

1. Olívia Freitas, "Militares brasileiros testam drones para operações no Haiti," *Folha*, 20 April 2015, <https://www1.folha.uol.com.br/mundo/2015/04/1618715-militares-brasileiros-usam-drones-no-haiti.shtml>.
2. "La Marina de Brasil compra el UAV SARP FT-100," *Defensa.com*, 12 July 2016, <https://www.defensa.com/brasil/marina-brasil-compra-uav-sarp-ft-100>.
3. "El UAV Horus homologado por el Ministerio de Defensa brasileño," *Defensa.com*, 27 January 2015, <https://www.defensa.com/brasil/uav-horus-homologado-ministerio-defensa-brasileño>.
4. Tahiane Stochero, "FAB recebe dois novos aviões não tripulados para vigiar as fronteiras," *Globo*, 18 February 2013, <http://g1.globo.com/brasil/noticia/2013/02/fab-recebe-dois-novos-avioes-nao-tripulados-para-vigiar-fronteiras.html>.
5. Victor Barreira, "Brazil to resume operations with Heron 1 UAVs," *Jane's Defence Weekly*, 15 January 2019, <https://www.janes.com/article/85703/brazil-to-resume-operations-with-heron-1-uavs>.
6. Elbit Systems, "Elbit Systems Awarded Contract to Supply Brazil with Hermes 900 UAS," news release, 26 March 2014, <http://ir.elbitsystems.com/phoenix.zhtml?c=61849&p=irol-newsArticle&ID=1912412>.
7. "1º/12º GAv Esquadrão Hórus," Força Aérea Brasileira, accessed 28 March 2019, <http://www.fab.mil.br/organizacoes/mostra/409/PRIMEIRO%20ESQUADRO%20C3%83O%20DO%20D%20C3%89CIMO%20SEGUNDO%20GRUPO%20DE%20AVIA%20C3%87%20C3%83O>.
8. "FT e EB iniciam Operação do SARP HORUS FT100," *Defesanet*, 2 December 2014, <http://www.defesanet.com.br/vant/noticia/17609/FT-e-EB-iniciam-Operacao-do-SARP-HORUS-FT100/>.
9. Roberto Caiafa, "Brasil finaliza las pruebas de detección de objetivos de artillería con RPAS," *Infodefensa.com*, 19 February 2016, <https://www.infodefensa.com/latam/2016/02/19/noticia-ejercito-brasil-finaliza-pruebas-horus-ft100.html>.
10. Brazilian Air Force, "Operate Agate - Remotely Piloted Aircraft Locates Runway on Border," news release, 22 August 2011, <http://www.defense-aerospace.com/article-view/release/128161/brazil-af-debuts-uav-operations-in-amazon.html>.
11. Agência Força Aérea, "FAB e Polícia Federal empregam VANTs em ação conjunta na fronteira com o Paraguai," news release, 23 May 2013, <http://www.fab.mil.br/noticias/mostra/15033/%C3%81GATA-7---FAB-e-Pol%C3%ADcia-Federal-empregam-VANTs--em-a%C3%A7%C3%A3o-conjunta-na-fronteira-com-o-Paraguai>.
12. Arie Egozi, "Brazil to boost World Cup security with unmanned Hermes 900," *Flight International*, 26 March 2014, <https://www.flightglobal.com/news/articles/brazil-to-boost-world-cup-security-with-unmanned-hermes-397427/>.
13. 10 Minutes, "Esquadrão Hórus - VANTs da FAB voarão 24 horas durante Jogos Olímpicos #Rio2016," YouTube, 4 August 2016, <https://www.youtube.com/watch?v=zig7kSvEuNQ>.
14. Belo Horizonte, "Brazil: UAV, helicópteros e satélites para proteger o Bolsonaro," *Infodefensa.com*, 4 January 2019, <https://www.infodefensa.com/latam/2019/01/04/noticia-brasil-implanta-helicopteros-protger-bolsonaro.html>.
15. David Donald, "Brazilian Hunter Takes Flight," *Aviation International Online*, 11 July 2016, <https://www.ainonline.com/aviation-news/defense/2016-07-11/brazilian-hunter-takes-flight>.

CHILE

INVENTORY

Model	Make	Origin	Class	Intro	Qty	Operator	Notes
Inspire 2 ¹	DJI	China	I	2018	2	Army	
Mavic Pro ²	DJI	China	I	2018		Navy, Marines	
Phantom 3 SE ³	DJI	China	I	2018		Navy	
SpyLite ⁴	BlueBird	Israel	I	2013		Army	
Hermes 900 ⁵	IAI	Israel	III	2013	3	Air Force	

PERSONNEL

AIR FORCE

Name	HQ	Type	Equipment	Activated
2nd Air Group, 1st Air Brigade ⁶	<i>Grupo de Aviación N°2, 1ª Brigada Aérea</i> Los Cóndores Air Base, Iquique	P	Hermes 900	2013

OPERATIONS

- During the summer of 2018-2019, the Chilean Air Force deployed a Hermes 900 to support firefighting efforts in central and southern Chile.⁷ According to a February 2019 Air Force news release, the Hermes 900 was deployed to Quintero Air Base and Temuco Maquehue Airport and conducted 43 missions, detecting 11 fires.

INFRASTRUCTURE

Name	Country	Latitude	Longitude	Affiliation	Activity	Notes
Los Cóndores Air Base, Iquique	Chile	20°32'08"S	70°10'53"W	2nd Air Group	HQ	

OTHER

Name	Country	Latitude	Longitude	Affiliation	Activity	Notes
Quintero Air Base	Chile	32°47'30"S	71°31'15"W	2nd Air Group	Deployment	Base for Hermes 900 firefighting operations
Temuco Maquehue Air Base	Chile	38°46'00"S	72°38'10"W		Deployment	Base for Hermes 900 firefighting operations

NOTES

1. Nicolás García, "Dronestore vende al Ejército de Chile dos ART 'Inspire' 2," *Infodefensa.com*, 19 June 2018, <https://www.infodefensa.com/latam/2018/06/19/noticia-dronestore-vende-ejercito-chile-inspire.html>.
2. Nicolás García, "KineStore vende un dron Mavic Pro a la Infantería de Marina de Chile," *Infodefensa.com*, 16 August 2018, <https://www.infodefensa.com/latam/2018/08/16/noticia-kinestore-vende-drone-mavic-infanteria-marina-chile.html>.
3. "Cyma vende dos drones DJI a la Armada de Chile," *Infodefensa.com*, 23 November 2018, <https://www.infodefensa.com/latam/2018/11/23/noticia-cyma-vende-drones-armada-chile.html>.
4. "Chile adquiere a BlueBird Aero Systems el mini UAV Spylite," *Infodefensa.com*, 5 April 2013, <http://www.infodefensa.com/es/2013/04/05/noticia-chile-adquiere-a-bluebird-aero-systems-el-mini-uav-spylite-2.html>.
5. David Donald, "Chile Is First Export Success for Hermes 900," *Aviation International Online*, 13 June 2011, <https://www.ainonline.com/aviation-news/defense/2011-06-13/chile-first-export-success-hermes-900>.
6. Nicolás García, "Elbit difunde en Chile las capacidades marítimas del 'Hermes' 900," *Infodefensa.com*, 7 August 2018, <https://www.infodefensa.com/latam/2018/08/07/noticia-elbit-difunde-chile-capacidades-control-maritimo-hermes.html>.
7. Fuerza Aérea de Chile, "Fuerza Aérea Apoya a CONAF en el Combate de Incendios," news release, 22 February 2019, https://www.fach.mil.cl/noticias/2019/febrero/22_apoyo/22_apoyo.html.

COLOMBIA

INVENTORY

Model	Make	Origin	Class	Intro	Qty	Operator	Notes
AR-Drone ¹	Parrot	France	I			Army	
Inspire 1 ²	DJI	China	I	2016	2	Air Force	
RQ-11B Raven ³	AeroVironment	USA	I	2013	12+ (4)	Army	
RQ-20 Puma ⁴	AeroVironment	USA	I			Army	

ScanEagle ⁵	Insitu	USA	I	2006	50	Air Force, Navy
NightEagle	Insitu	USA	I	2013		Air Force, Navy
Silver Fox ⁶	BAE, Raytheon	USA	I	2006	4	Air Force, Navy
Hermes 450 ⁷	Elbit	Israel	II	2013	6	Air Force
Hermes 900 ⁸	Elbit	Israel	III	2013	2	Air Force

INACTIVE

Model	Make	Origin	Class	Period	Qty	Operator	Notes
AutoCopter	Neural Robotics	USA	I	2005-2016		Air Force	

PERSONNELAIR FORCE

Name		HQ	Type	Equipment	Activated
217th “Quimera” Squadron, 21st Combat Group, 2nd Air Combat Command ⁹	<i>Escuadrón de Combate 217 “Quimera”, Grupo de Combate 21, Comando Aéreo de Combate N° 2</i>	Apiay Air Base	D	Hermes 450, Hermes 900	2016
Base for Launching Unmanned Aerial Vehicles, 6th Air Combat Command ¹⁰	<i>Base de Lanzamiento de Aeronaves Remotamente Tripuladas (BLART), Comando Aéreo de Combate N° 6</i>	Captain Ernesto Esguerra Cubides Air Base, Tres Esquinas	D	ScanEagle, NightEagle	2015
Base for Launching Unmanned Aerial Vehicles, 7th Air Combat Command ^{11,12}	<i>Base de Lanzamiento de Aeronaves Remotamente Tripuladas (BLART), Comando Aéreo de Combate N° 7</i>	Marco Fidel Suárez Air Base, Cali	D	ScanEagle, NightEagle	2018

ARMY

Name	HQ	Type	Equipment	Activated
Unmanned Aerial Systems Company, Special Operations Aviation Brigade, Aviation Assault Division ¹³	<i>Compañía de Sistemas Aéreos No Tripulados Para la Maniobra Terrestre (SANMT), Operaciones Especiales de Aviación, División de Aviación Asalto Aéreo</i>	D	RQ-11 Raven	

TRAINING

- The Basic School for Remotely Piloted Aircraft (*La Escuela Básica de Aeronaves Remotamente Tripuladas* or EBART) is located at the 3rd Air Combat Command (CACOM-3) at Malambo Airport.¹⁴ Founded in 2014, the school trains pilots and sensor operators from the Air Force, Army, Navy, and National Police. It is equipped with ScanEagle aircraft and the Simulator for Remotely Piloted Aircraft (*Simulador de Aeronaves Remotamente Tripuladas* or SIMART) developed by CODALTEC, a Colombian defense firm.^{15,16} The school has also trained personnel from Peru and Chile. As of early 2018, EBART had trained more than 700 students in flight operations and imagery analysis, accumulating more than 1,800 flight hours on the simulators.¹⁷

OPERATIONS

- Colombia military UAV operations are largely—though not exclusively—focused on counter-narcotics and counter-insurgency operations. Some units such as the BLART at CACOM 7 were created explicitly to engage in counter-trafficking operations. In September 2018 intelligence collected by Colombian Air Force drones enabled the arrest of three men associated with Ivan Mordisco, a FARC rebel.¹⁸ Air Force drones have also been used for other missions such as monitoring traffic and road conditions.¹⁹

INFRASTRUCTURE

Name	Country	Latitude	Longitude	Affiliation	Activity	Notes
Captain Luis F. Gómez Niño Air Base	Colombia	04°04'34"N	73°33'46"W	217th Sqn	HQ	

DEVELOPMENT

- The Quimbaya is a Class II tactical UAV developed by the Colombian Ministry of Defense and the Colombian Aeronautics Industry Corporation (CIAC). CIAC unveiled the Quimbaya in December 2018. It has a 5.24 meter wingspan, a 4.1 meter fuselage, and an endurance of up to 10 hours. As of December 2018, flight tests were scheduled to begin in early 2019.^{20,21}
- The Atlante II (also known as Atlante+) is a Class III UAV development project led by the Colombian Aeronautics Industry Corporation and Airbus Defense and Space Spain. The project originated in March 2016, when Colombia and Spain's Ministry of Defense began exploring ways of partnering on the development of a large, long-endurance aircraft based on the Airbus Atlante.²² In February 2019 Colombia and Spain signed a memorandum of understanding to begin manufacturing an Atlante II prototype. The two countries are hoping to introduce the Atlante II by 2023.²³

NOTES

1. Tania Martínez Tomás, *Sistemas Aéreos No Tripulados de Defensa y Seguridad en Latinoamérica* (Madrid: IDS, March 2018), [https://www.infodefensa.com/archivo/files/af%20informe%20vant%20latam%20\(6\)%20ok%20ok.pdf](https://www.infodefensa.com/archivo/files/af%20informe%20vant%20latam%20(6)%20ok%20ok.pdf).
2. Erich Saumeth, “La alcaldía de Melgar dona dos UAV de DJI al Cacom N°4 de la Fuerza Aérea de Colombia,” *infodefensa.com*, 17 February 2016, <https://www.infodefensa.com/latam/2016/02/17/noticia-comando-aereo-combate-fuerza-aerea-colombiana-recibe-drones-seguridad-vigilancia.html>.
3. “Sistema aéreo no tripulado RQ-11B Raven entra en servicio con el Ejército de Colombia,” *WebInfoMil.com*, 2013, <http://www.webinfomil.com/2013/06/sistema-aereo-no-tripulado-rq-11b-raven.html>.
4. Tania Martínez Tomás, *Sistemas Aéreos No Tripulados de Defensa y Seguridad en Latinoamérica* (Madrid: IDS, March 2018), [https://www.infodefensa.com/archivo/files/af%20informe%20vant%20latam%20\(6\)%20ok%20ok.pdf](https://www.infodefensa.com/archivo/files/af%20informe%20vant%20latam%20(6)%20ok%20ok.pdf).
5. Roberto García, “Aeronaves No Tripuladas en Colombia: El ScanEagle,” *webmilinfo.com*, December 2011, <http://www.webinfomil.com/2011/12/aeronaves-no-tripuladas-en-colombia-el.html>.
6. “Colombia Receives New Silver Fox UAVs from BAE Systems,” *Dialogo Americas*, 8 July 2013, <https://dialogo-americas.com/en/articles/colombia-receives-new-silver-fox-uavs-bae-systems>.
7. Erich Saumeth Cadavid, “Colombian drones on show,” *Air Forces Monthly*, <https://s33.postimg.cc/locldn7fj/AFM-2.jpg>.
8. Ibid
9. Ami Rojkes Dombé, “Colombia introduces its Hermes 450 UAV Squadron,” *Israel Defense*, October 10, 2016, <http://www.israeldefense.co.il/en/content/colombia-introduces-its-hermes-450-uav-squadron>.
10. “Fuerza Aérea Colombiana inaugura base de lanzamiento de Aviones No Tripulados,” *Webmilinfo.com*, 4 March 2015, <http://www.webinfomil.com/2015/03/fuerza-aerea-colombiana-inaugura-base.html>.
11. Fuerza Aérea Colombiana, “Fuerza Aérea Colombiana activa escuadrón de aeronaves remotamente tripuladas en el Departamento de Nariño,” news release, 11 May 2018, <https://www.fac.mil.co/fuerza-a%C3%A9rea-colombiana-activa-escuadr%C3%B3n-de-aeronaves-remotamente-tripuladas-en-el-departamento-de-1>.
12. “Colombia activó un escuadrón de drones,” *El Comercio*, 14 May 2018, <https://www.elcomercio.com/actualidad/colombia-frontera-escuadron-drones-ecuador.html>.
13. División de Aviación Asalto Aéreo Ejército Nacional, “Aviadores entrenados para combatir efectivamente objetivos de alto valor,” news release, 16 April 2016, <https://www.ejercito.mil.co/?idcategoria=394549>.
14. “Aeronaves Remotamente Tripuladas: el corazón de la FAC en Malambo,” *El Heraldo*, 1 May 2015, <https://www.elheraldo.co/tecnologia/aeronaves-remotamente-tripuladas-el-corazon-de-la-fac-en-malambo-193642/>.
15. “SIMART,” CODALTEC, accessed 19 September 2018, <https://www.codaltec.com/es/productos/3/simart>.
16. CACOM-3, “Primer curso básico internacional de Aeronaves Remotamente Tripuladas ScanEagle,” news release, 21 November 2014, <http://www.webinfomil.com/2014/11/scan-eagle-colombia-peru-uav-drone.html>.
17. “Fuerza Aérea Colombiana graduó analistas de video de aeronaves remotamente tripuladas,” *Webinfomil.com*, 6 February 2018, <http://www.webinfomil.com/2018/02/fuerza-aerea-colombiana-gradu.html>.
18. “Así fue como drones de la Fuerza Aérea permitieron dar de baja a tres disidentes de las FARC,” *Noticias Caracol*, 24 September 2018, <https://noticias.caracoltv.com/colombia/asi-fue-como-drones-de-la-fuerza-aerea-permitieron-dar-de-baja-tres-disidentes-de-las-farc>.
19. Erich Saumeth, “La Fuerza Aérea colombiana despliega sus Hermes y ScanEagle para controlar el tráfico,” *Infodefensa.com*, 15 January 2018, <https://www.infodefensa.com/latam/2018/01/15/noticia-colombianota14es-fuerza-aerea-colombiana-despliega-drones-hermes-durante-epoca-vacaciones.html>.
20. Erich Saumeth, “N. Castro (Ciac): ‘El prototipo del Quimbaya estará listo a finales de 2018’,” *Infodefensa.com*, 4 July 2018, <https://www.infodefensa.com/latam/2018/07/04/noticia-castro-primer-prototipo-quimbaya-estaria-listo-finales-presente.html>.
21. Carlos Vanegas, “La colombiana CIAC lanza sus UAVs Coelum y Quimbaya,” *defensa.com*, 7 December 2018, <https://www.defensa.com/colombia/colombiana-ciacy-lanza-uavs-coelum-quimbaya>.
22. “España y Colombia estudian el desarrollo conjunto de un dron táctico,” *Infodefensa.com*, 15 March 2016, <https://www.infodefensa.com/latam/2016/03/15/noticia-espana-colombia-estudian-desarrollo-conjunto-tactico.html>.
23. Carlos Vanegas, “Colombia y España diseñarán y construirán una aeronave no tripulada basada en el Atlante,” *defensa.com*, 28 February 2019, <https://www.defensa.com/colombia/colombia-espana-disenaran-construiran-aeronave-no-tripulada>.

DOMINICAN REPUBLIC

INVENTORY	Model	Make	Origin	Class	Intro	Qty	Operator	Notes
	Matrice 210 ¹	DJI	China	I	2018	2	General Staff	
	Mavic ²	DJI	China	I	2019	3		
	Hovermast 150 ³	Sky Sapi-ence	Israel	I	2018	3	General Staff	

ACTIVE ACQUISITIONS

- In 2018 the Ministry of Defense announced plans to acquire 30 drones as part of a broader acquisition program designed to enhance border security.⁴ The MoD's recent acquisitions of the Hovermast 150, Matrice 210, and Mavic drones appear to be part of this effort, which is likely ongoing.

PERSONNEL

GENERAL STAFF

Name	HQ	Type	Equipment	Activated
Drone Unit, Intelligence Directorate of the Joint Staff (J-2)	<i>Unidad de Dron, Dirección de Inteligencia del Estado Mayor Conjunto (J-2)</i>	D	Hovermast 150, Matrice 210, Mavic	

OPERATIONS

- The Intelligence Directorate's Drone Unit has deployed the Hovermast 150 and Matrice 210 for border surveillance operations along the Dominican Republic's border with Haiti.⁵

NOTES

1. Ministerio de Defensa, *Solicitud de Compra o Contratación: Adquisición de Drone Topográfico*, MIDE-CCC-CP-2018-0005, Santo Domingo: February 2018, <https://www.mide.gob.do/transparencia/transparencyfile.aspx?id=2163>.
2. Ministerio de Defensa, *Adquisición de Equipos*, MIDE-2019-00151, Santo Domingo: March 2019.
3. Rafael Castro, "El IDAC dona tres drones a Ministerio de Defensa para vigilancia fronteriza," *Listin Diario*, 14 May 2018, <https://listindiario.com/la-republica/2018/05/14/514930/el-idac-dona-tres-drones-a-ministerio-de-defensa-para-vigilancia-fronteriza>.
4. Ministerio de Defensa, "MIDE Refuerza plan Vigilancia y Control en la Frontera con nuevos Soldados, Vehículos y Equipos de alta Tecnología," news release, 8 March 2018, <https://mide.gob.do/detail.aspx?id=2578>.
5. Erick Montilla, "Se intensifica inteligencia militar en la frontera de República Dominicana y Haití," *alMomento.net*, 3 June 2019, <https://almomento.net/inteligencia-militar-dominicana-en-la-frontera-con-haiti/>.

ECUADOR

INVENTORY

Model	Make	Origin	Class	Intro	Qty	Operator	Notes
Heron ¹	IAI	Israel	III	2009	2	Navy	
Searcher ²	IAI	Israel	II	2009	4	Navy	

PERSONNEL

NAVY

Name	HQ	Type	Equipment	Activated
Naval UAV Squadron, Naval Air Command ³	<i>Escuadrón Aeronaval “UAV”, Comando de la Aviación Naval</i> Manta Naval Air Station (Eloy Alfaro Air Base)	D	Heron, Searcher	2009

INFRASTRUCTURE

Name	Country	Latitude	Longitude	Affiliation	Activity	Notes
Manta Naval Air Station (Eloy Alfaro Air Base)	Ecuador	00°56'45"S	80°40'43"W	UAV Sqn	HQ	

NOTES

1. JoséGabriel Vargas Molina, *Historia Resumida de La Armada del Ecuador*, (Guayaquil: 2014), 404–405, https://issuu.com/anahimi/docs/historia_resumida_de_la_armada_part_afc0f61f3874b0.
2. Ibid
3. Isabel Estrada, “Vehículos aéreos no tripulados ayudan a la Armada ecuatoriana a atrapar narcotraficantes,” *Diálogo Americas*, 17 October 2011, <https://dialogo-americas.com/es/articles/vehiculos-aereos-no-tripulados-ayudan-la-armada-ecuatoriana-atrapar-narcotraficantes>.

GUYANA

INVENTORY

- In its 2019 budget, the Guyana Defense Force has allocated an unspecified amount for drones, which will reportedly be used for maritime surveillance operations.¹

NOTES

1. Carlos E. Hernández, “Guyana comprará drones para operaciones de vigilancia marítima,” *Infodefense.com*, 23 February 2019, https://www.infodefensa.com/latam/2019/02/23/noticia-guyana-empleara-drones-operaciones-vigilancia-maritima.html?utm_source=dlvr.it&utm_medium=twitter.

HONDURAS

INVENTORY

Model	Make	Origin	Class	Intro	Qty	Operator	Notes
Skylark III ¹	Elbit	Israel	I	2018	6 (3)	Army	Used for border security ²

NOTES

1. “Honduras incorpora drones para vigilar sus fronteras,” *Infodron.es*, 7 August 2018, <http://www.infodron.es/id/2018/08/07/noticia-honduras-incorpora-drones-vigilar-fronteras.html>.
2. Yony Bustillo, “Honduras: Seis aviones no tripulados comenzarán a llegar en junio,” *El Heraldo*, 25 March 2018, <http://www.elheraldo.hn/pais/1163646-466/honduras-seis-aviones-no-tripulados-comenzar%C3%A1n-a-llegar-en-junio>.

PARAGUAY

DEVELOPMENT

- The Taguato I and II are fixed-wing Class I UAVs jointly developed by the Paraguayan Air Force and the Polytechnic Faculty of the National University of Asuncion. A prototype of the Taguato I conducted its maiden flight in 2011 and was unveiled to the public in 2015.¹ Both the Taguato I and II reportedly weigh around 90 kilograms and have an operational range of 50 kilometers.² It is not clear whether these aircraft are in active service.

NOTES

- Oscar Lescano Barreto, "El primer VANT paraguayo," *ABC*, 14 December 2015, <http://www.abc.com.py/especiales/fin-de-semana/el-primer-vant-paraguayo-1435737.html>.
- Holger Alava, "Paraguay Creates Nation's First Domestically Produced UAV," *Dialogo*, 14 March 2016, <https://dialogo-americas.com/en/articles/paraguay-creates-nations-first-domestically-produced-uav>.

PERU

INVENTORY

Model	Make	Origin	Class	Intro	Qty	Operator	Notes
Ricuk ¹	CIDEP	Peru	I	2018	3	Air Force	
Amaru ²	CIDEP	Peru	I	2018		Air Force	

INACTIVE

- In 2010 the Peruvian Army purchased several Orbiter IIs and MicroFalcons from Israel. These were reportedly delivered in 2011³ According to a 2013 media report, the Army deactivated the drones after determining that they did not meet the Army's requirements.⁴

Model	Make	Origin	Class	Period	Qty	Operator	Notes
Orbiter II	Aeronautics	Israel	I	2011-2013	3	Army	
MicroFalcon	Innocon	Israel	I	2011-2013	2	Army	

PERSONNEL

AIR FORCE

Name	HQ	Type	Equipment	Activated
330th Remote Air Reconnaissance Squadron, Directorate of Aerial Surveillance and Reconnaissance ^{5,6}	<i>Escuadrón Aéreo de Reconocimiento Remoto 330, Dirección de Vigilancia y Reconocimiento Aéreo</i> Las Palmas Air Base	Dedicated	Amaru, Ricuk	2014

DEVELOPMENT

- The Peruvian Air Force's Center for Investigation and Research Projects (Centro de Investigación y Desarrollo de Proyectos or CIDEP) has been developing drones since 2010. It has produced one Class I system, the Ricuk, that is currently in service with the Air Force. The Amaru, a Class II system, may also have entered active service. Prototypes for both systems were unveiled in 2017.⁷

NOTES

1. Alejo Marchessini, "UAV 'Ricuk' para la Dirección de Vigilancia y Reconocimiento Aéreo del Perú," *Defensa.com*, 19 September 2018, <https://www.defensa.com/peru/uav-ricuk-para-direccion-vigilancia-reconocimiento-aereo-peru>.
2. Ibid
3. Arie Egozi, "Paris: Innocon completes tests of Peru's MicroFalcon UAS," *FlightGlobal*, 21 June 2011, <https://www.flightglobal.com/news/articles/paris-innocon-completes-tests-of-perus-microfalcon-358243/>.
4. Ángel Páez, "Ejército reclama por compra de 5 aviones espía que no funcionan," *La Republica*, 30 April 2013, <https://larepublica.pe/politica/707848-ejercito-reclama-por-compra-de-5-aviones-espia-que-no-funcionan>.
5. "La Fuerza Aérea peruana empleará RPAS nacionales desde julio," *Infodefensa.com*, 29 April 2014, <https://www.infodefensa.com/latam/2014/04/29/noticia-fuerza-aerea-peruana-empleara-nacionales-desde-julio.html>.
6. Peter Watson, "Perú despliega drones del Cidep en el 'Ecodex VII,'" *Infodefensa.com*, 15 June 2018, <https://www.infodefensa.com/latam/2018/06/15/noticia-despliega-drones-cidep-ecodex.html>.
7. Gonzalo Silva Infante, "Peruvian Air Force Develops Two New Drones," *Diálogo*, 10 August 2017, <https://dialogo-americas.com/en/articles/peruvian-air-force-develops-two-new-drones>.

URUGUAY

INVENTORY

Model	Make	Origin	Class	Intro	Qty	Operator	Notes
Phantom ¹	DJI	China	2017		22	Army	Intend- ed for emergency response operations
ANT	CIACA	Uruguay	2017			Army	

PERSONNEL

ARMY

Name	HQ	Type	Equipment	Activated
Aerial Observation Squadron, Observation Battery, Artillery Division ^{2,3}	<i>Escuadra de Observación Aérea, Batería de Observación, Artillería Divisionaria</i>	D	ANT	2018

NOTES

1. Gabriel Porfilio, "El Ejército Uruguayo adquiere drones para sus fuerzas de respuesta inmediata," *Infodefensa.com*, 4 December 2017, <https://www.infodefensa.com/latam/2017/12/04/noticia-ejercito-uruguayo-adquiere-drones-fuerzas-respuesta-inmediata.html>.
2. "El avión no tripulado al empleo del Ejército," *La Fuerza de Todos*, 19 October 2018, http://cge10.ejercito.mil.uy/html/Revista_31.pdf.
3. Gabriel Porfilio, "El Ejército Uruguayo prueba su UAV para artillería," *Infodefensa.com*, 28 December 2018, <https://www.infodefensa.com/latam/2018/12/28/noticia-ejercito-uruguayo-prueba-artilleria.html>.

VENEZUELA

INVENTORY

Model	Make	Origin	Class	Intro	Qty	Operator	Notes
Mohajer-2 ¹	Qods Aviation Industry, CAVIM	Iran, Venezuela	II	2013	12	Air Force	"SANT Arpía" Licensed for domestic production ²

PERSONNEL

AIR FORCE

Name	HQ	Type	Equipment	Activated
83rd Unmanned Flight Squadron, 8th Aerial Intelligence, Surveillance, and Electronic Reconnaissance Group ³	<i>Escuadrón de Vuelo No Tripulado No.83, Grupo Aéreo de Inteligencia, Vigilancia y Reconocimiento Electrónico N°8</i> El Libertador Air Base	Dedicated	Arpía	2013

TRAINING

- In 2017 the Integrated Airspace Command (*Comando de Defensa Aeroespacial Integral*) and the Operational Strategic Command (*Comando Estratégico Operacional de la FAN*) of the Venezuelan Air Force launched a Basic Course on the Operation of Unmanned Aircraft Systems (*Primer curso básico de pilotos vectores aéreos remotos*).⁴ Trainees come from both the Air Force and the Directorate of Military Counterintelligence. It is not clear whether this program remains active.

NOTES

1. Jeffrey Lewis, “Venezuela-Iran UAVs,” Arms Control Wonk, 20 June 2013, <https://www.armscontrolwonk.com/archive/205390/venezuela-iran-uavs/>.
2. Brian Ellsworth, “Venezuela says building drones with Iran’s help,” *Reuters*, 14 June 2012, <https://www.reuters.com/article/us-venezuela-iran-drone/venezuela-says-building-drones-with-irans-help-idUSBRE85D14N20120614>.
3. “La Fuerza Aérea Venezolana recibirá los dos primeros vehículos aéreos no tripulados Mohajer 2,” *Infodron.es*, 23 May 2013, <http://www.infodron.es/id/2013/05/23/noticia-la-fuerza-aerea-venezolana-recibira-los-dos-primeros-vehiculos-aereos-no-tripulados-mohajer-2.html>.
4. Carlos E. Hernández, “Venezuela gradúa a los primeros operadores militares de drones,” *Infodron.es*, 4 October 2017, <http://infodron.es/id/2017/10/04/noticia-venezuela-gradua-primeros-operadores-militares-drones.html>.

MIDDLE EAST AND NORTH AFRICA

ALGERIA	.....	176
EGYPT	.....	177
IRAN	.....	179
IRAQ	.....	185
ISRAEL	.....	187
JORDAN	.....	194
LEBANON	.....	196
MOROCCO	.....	196
OMAN	.....	197
QATAR	.....	197
SAUDI ARABIA	.....	198
SYRIA	.....	200
TUNISIA	.....	200
TURKEY	.....	201
UNITED ARAB EMIRATS	.....	207

ALGERIA

INVENTORY	Model	Make	Origin	Class	Intro	Qty	Operator	Notes
	Seeker II ¹	Denel Dynamics	South Africa	II	1999		Air Force	
	CH-3 ²	CASC	China	II	2018	5	Air Force	
	CH-4 ³	CASC	China	III	2018	5	Air Force	
	Yabhon Flash-20* ⁴	ADCOM Systems	UAE	III	2018	1	Air Force	“Algeria 54” “الجزائر - 54”
	Yabhon Unit-ed-40* ⁵	ADCOM Systems	UAE	III	2018	2	Air Force	Algeria 55” الجزائر - 55”

**Reportedly licensed for production in Algeria.*

PERSONNEL

AIR FORCE

Name	HQ	Type	Equipment	Activated
545th Reconnaissance and Electronic Warfare Squadron, 5th Reconnaissance and Electronic Warfare Wing ⁶	545e Escadron de Reconnaissance et de Guerre Electronique, 5e Escadre de Reconnaissance et de Guerre Electronique Aïn Oussera Air Base	D	Seeker II, CH-3, CH-4	

INFRASTRUCTURE

Name	Country	Latitude	Longitude	Affiliation	Activity	Notes
Aïn Oussera Air Base	Algeria	35°31'20"N	02°52'56"E	Air Force	HQ	
Tindouf Air Base	Algeria	27°42'08"N	8°09'55"W	Air Force	Deployment, Test site	Seeker II base

NOTES

1. "SIPRI Arms Transfers Database," Stockholm Peace Research Institute, accessed 16 April 2019, <https://www.sipri.org/databases/armstransfers>.
2. Derek Liam, "Algerian Military displays Chinese-made CASC CH-4 and CH-3 Unmanned Combat Aerial Vehicles," *African Military Blog*, 3 November 2018, <https://www.africanmilitaryblog.com/2018/11/algerian-military-displays-chinese-made-casc-ch-4-and-ch-3-unmanned-aerial-vehicles>.
3. Ibid
4. Gareth Jennings, "Algeria shown to be operating UAE-developed UAVs," *Jane's Defence Weekly*, 21 December 2018, <https://www.janes.com/article/85378/algeria-shown-to-be-operating-uae-developed-uavs>.
5. Ibid
6. Akram Kharief, "L'Algérie aura enfin ses drones d'attaque," *El Watan*, 1 November 2013, <https://www.elwatan.com/edition/actualite/lalgerie-aura-enfin-ses-drones-dattaque-01-11-2013>.

EGYPT

INVENTORY

Model	Make	Origin	Class	Intro	Qty	Operator	Notes
Wing Loong 1 ¹	AVIC	China	III	2016		Air Force	
RQ-20B Puma AE II ²	AeroVironment	USA	I	2019*		Army	
ASN-209 ^{3**}	Xi'an ASN Technology Group	China	II			Army	(status unclear)

*Estimate

**Licensed for domestic production by the Arab Organization for Industrialization.

ACTIVE ACQUISITIONS

- According to an October 2018 media report, Egypt reportedly purchased 32 Wing Loong I-Ds at the 2018 Zhuhai Air Show.⁴ As of this writing, this acquisition has not been verified.

INACTIVE

Model	Make	Origin	Class	Period	Qty	Operator	Notes
Scarab ⁵	Northrop Grumman	USA		1980s-1990s	56	Navy	
R4E-50 SkyEye ⁶	BAE Systems	USA		1989-Unknown		Army	(status unclear)

OPERATIONS

- Egypt has deployed Wing Loong 1 drones to the Sinai Peninsula for counter-insurgency operations against a coalition of Islamist militants and Bedouin tribesmen. According to satellite images from 2016, the Wing Loong 1s were among the first military aircraft to be deployed to Bir Gifgafa Air Base.⁷ Although there are few official statements regarding the role that drones are playing in the peninsula, satellite images and media reports have repeatedly confirmed that the Chinese-made drones are present during operations.
- Egypt may have also deployed drones along its western border for border security and counter-smuggling operations. Satellite images show Wing Loong 1s at Uthman Air Base, near the Siwa Oasis, beginning in 2016.⁸
- In addition to Bir Gifgafa and Uthman, Egypt has deployed the Wing Loong 1 to Dakhla Oasis Airport in western Egypt.⁹

INFRASTRUCTURE

Name	Country	Latitude	Longitude	Affiliation	Activity	Notes
Bir Gifgafa Air Base	Egypt	30°24'26"N	33°9'15"E	Air Force	Deployment	Wing Loong 1 site
Uthman Air Base	Egypt	29°33'18"N	25°35'20"E	Air Force	Deployment	Wing Loong 1 site
Dakhla Oasis Airport	Egypt	25°24'40"N	29°00'10"E	Air Force	Deployment	Wing Loong 1 site

DEVELOPMENT

- Egypt has licensed the production of China's ASN-209, a fixed-wing Class II UAV. Domestic production of the ASN-209 reportedly began in 2012. Egypt presented a model of its ASN-209 (ASN-٢٠٩) at the IDEX 2018 military trade show.¹⁰

NOTES

1. "SIPRI Arms Transfers Database," Stockholm Peace Research Institute, accessed 16 April 2019, <https://www.sipri.org/databases/armstransfers>.
2. "Contracts for March 16, 2018," U.S. Department of Defense, accessed 26 November 2018, <https://dod.defense.gov/News/Contracts/Contract-View/Article/1468905/>.
3. "Egypt starts the production of Chinese Unmanned Aerial Vehicle ASN-209," Army Recognition, 7 June 2012, https://www.armyrecognition.com/june_2012_new_army_military_defence_industry_uk/egypt_starts_the_production_of_chinese_unmanned_aerial_vehicle_asn-209_egyptian_armed_forces_0706122.html.
4. "Egypt purchased 32 additional Chinese upgraded Pterodactyl-1D UAVs," Air Recognition, 23 November 2018, https://www.armyrecognition.com/november_2018_global_defense_security_army_news_industry/egypt_purchased_32_additional_chinese_upgraded_pterodactyl-1d_uavs.html.
5. Joseph Trevithick and Tyler Rogoway, "The U.S. Sold This Unique Stealth Drone Called 'Scarab' To Egypt In The 1980s," *The Drive*, 17 November 2018, <http://www.thedrive.com/the-war-zone/24966/the-united-states-sold-egypt-this-unique-stealth-recon-drone-called-scarab-in-the-1980s>.
6. Michael A. Dornheim, "Egypt Begins Using Unmanned Aircraft for Reconnaissance," *Aviation Week and Space Technology*, 23 January 1989.
7. Dan Gettinger, "Drone Bases Updates: Bir Gifgafa, Egypt," Center for the Study of the Drone, 4 February 2017, <https://dronecenter.bard.edu/drone-bases-updates/>.
8. Dan Gettinger, "Drone Bases Updates: Uthman, Egypt," Center for the Study of the Drone, 31 March 2017, <https://dronecenter.bard.edu/drone-bases-updates/>.
9. "Third Egyptian Wing Loong Deployment Located," *Offiziere* (blog), 21 June 2019, <https://www.offiziere.ch/?p=36025>.
10. "2018 مصرية بدون طيار في إيديكس 2018," *Akhbar Al-Youm*, 3 December 2018, <https://bit.ly/2JXnBOP>.

IRAN

INVENTORY	Model	Make	Origin	Class	Intro	Qty	Operator	Notes
	Farpad ¹		Iran	I	2016		Army	"فرپاد"
	Ababil 3 ²	HESA	Iran	II	2014		Paramilitary	"ابابیل 3"
	Mohajer 2 ³	Qods	Iran	II	Mid-1990s		Army, Paramilitary	"مهاجر 2"
	Mohajer 4 ⁴	Qods	Iran	II	Early 2000s		Army, Paramilitary	"مهاجر 4"
	Mohajer 6 ⁵	Qods	Iran	II	2017		Paramilitary	"مهاجر 6"
	Shahed 123	HESA	Iran	II			Paramilitary	"شاهد 123"
	Shahed 129 ⁶	HESA	Iran	III	2012		Paramilitary	"شاهد 129"
	Saegheh ⁷	Shahed Aviation Industries	Iran	III	2016		Paramilitary	"صاعقه"

INACTIVE

Model	Make	Origin	Class	Period	Qty	Operator	Notes
Mohajer 1 ⁸	Qods	Iran	II	1980s		IRGC	



Several Shahed 123 (left) and Saegheh (center) UAVs and one Shahed 129 (right) at the March 2019 exercise in the Persian Gulf. Image via Iran Military Tube / YouTube

PERSONNEL

PARAMILITARY

Name	HQ	Type	Equipment	Activated
UAV Unit*, Aero-space Force of the Islamic Revolutionary Guard Corps	یگان پهپاد نیروی هوافضای سپاه	D	Mohajer-6, Shahed 123, Saegheh, Shahed 129	1985

The Iranian Revolutionary Guards Corps established the Ra'ad Reconnaissance Battalion (گردان شناسایی رعد) in 1983 or 1984 to operate UAVs.⁹ After the creation of the IRGC Aerospace Force (IRGC-AF) in 1985, the Ra'ad Battalion was transferred to the Aerospace Force and renamed the UAV Unit (یگان پهپادی). The IRGC-AF's UAV Unit is believed to encompass several subsidiary units that together operate Iran's most advanced UAVs. Following an exercise in March 2019 that featured multiple Shahed-123, Shahed-129, and Saegheh UAVs, an IRGC spokesperson said that the drones belonged to IRGC units based in the Khuzestan, Buhehr, Fars, and Hormozgan provinces.¹⁰ The IRGC-AF's UAV Unit has operational experience in Syria, where some of its members are believed to have been killed fighting in the Syrial Civil War.¹¹

UAV Unit, Ground Force of the Islamic Revolutionary Guard Corps	یگان پهپادی نیروی زمینی سپاه	D		2017

Mohammad Pakpour, the commander of the IRGC Ground Forces (IRGC-GF), announced in early 2017 that the IRGC-GF was establishing a UAV unit.¹² According to media reports, this unit conducted its first operation in July 2019, targeting Kurdish militants that had reportedly attacked an IRGC base in the western city of Piranshahr.¹³

**The exact name of the IRGC-AF's UAV parent organization is unclear, although it is frequently referred to in Iranian press reports as the "UAV Unit."*

ARMY

Name	HQ	Type	Equipment	Activated
Vali-e-Asr UAV Group, Army Aviation, Islamic Republic of Iran Army (Artesh)	گروه پهپادهای گروه حضرت ولیعصر عج	D	Mohajer-6	2011

The Vali-e-Asir UAV Group was created in 2011 after an Army-wide restructuring.¹⁴ According to a 2013 media report, the UAV Group is responsible for five subsidiary units that were located in different parts of the country.¹⁵ In 2015, Colonel Reza Khaki, then commander of the UAV Group, announced that subsidiary drone units had been established at every Army Aviation base in the country, though it is unclear whether this remains the case.¹⁶ The current commander of the Vali-e-Asr UAV Group is believed to be General Shahram Hassannejad. In an April 2019 interview, Hassannejad said that the group's unmanned aircraft could eventually assume responsibility for conducting all reconnaissance from manned helicopters.¹⁷ In a ceremony in July 2019, Hassannejad announced the creation of a detachment of the UAV Group at Gonabad in northeast Iran.¹⁸ The detachment is equipped with the Mohajer-6, the most advanced drone in service with the Artesh.

TRAINING

- Iranian Army Aviation opened the UAV School (دانشکده پهپاد نیروی هوایی ارتش) in June 2019 at Kushke Nosrat Airport near Qom in Qom Province. According to Iranian media report, Army Aviation is the first branch of the Iranian military to open a school dedicated to training UAV pilots.¹⁹



(Left) General Shahram Hassannejad (امیر شهرام حسن نژاد), commander of the Army Aviation's UAV Group, in an April 2019 interview. Credit: Fars News Agency. (Right) General Aziz Nasirzadeh, commander of Army Aviation, inaugurates the Army UAV Academy (دانشکده پهپاد نیروی هوایی ارتش) in July 2019. Credit: Tasnim News

OPERATIONS

Country	Base	Equipment	Period	Operation
Syria	T-4 Air Base, Others	Ababil-3, Mohajer 4, Shahed 129	2012-	

Iranian drones have been spotted at various air bases in Syria since 2012. Detachments of the Iranian Revolutionary Guard Corps are believed to be responsible for drone operations in the country. Iranian media outlets published a video in 2016 that appeared to show Iranian drones striking targets in northern Syria—the first reports of an Iranian operational drone strike.²⁰ In mid-2017 U.S. fighter aircraft downed Iranian drones, including at least one Shahed-129, that the U.S. believed were threatening American-backed forces in near Al-Tanf in Homs Governorate.²¹ In early 2018 the Israeli Defense Force destroyed an Iranian Saegheh drone after it entered Israel's airspace from Syria.²² Israel responded to the incursion by carrying out an airstrike on the T-4 Air Base near Homs, Syria, where Iranian Shahed-129s were based at the time.²³

DOMESTIC OPERATIONS

- Iran has deployed drones to patrol the Persian Gulf and Gulf of Oman. At least four airfields along Iran's southwestern coast—Choghadak, Qeshm, Jask, and Konarak—support drone operations. With the exception of Jask, these facilities appear to be mostly or wholly dedicated for UAV use. Beginning in 2015 or 2016, Iranian drones began monitoring and sometimes interfering with U.S. Navy operations in the Persian Gulf.²⁴ In 2017 the U.S. Navy reported that Iranian drones were putting U.S. ships and aircraft moving through the Gulf at risk.²⁵ Iran has said that its drones would continue to patrol the Gulf.²⁶ In early 2019 Iran conducted an exercise with as many as 50 Saegheh, Shahed-123, and Shahed-129 drones in the Persian Gulf.²⁷ The aircraft took off from Qeshm Island and appeared to conduct mock airstrikes on a nearby island. In July 2019, U.S. forces aboard the amphibious assault ship USS Boxer downed an Iranian drone in the Strait of Hormuz after it, according to the U.S. Navy, came within 1,000 yards of the vessel.²⁸ The incident occurred nearly one month after Iran shot down a U.S. RQ-4 Global Hawk surveillance drone in the same area. Iran has denied that it lost a drone in the encounter.
- In the southwestern regions of Sistan and Balochistan, IRGC drones have been used in military operations against Sunni separatists. Pakistan claimed in July 2017 to have shot down an Iranian drone that had strayed across the border in what was presumed to have been a mission against these groups.²⁹

Photos posted on social media in July 2019 suggest that an Iranian Ababil-3 UAV may have crashed in in Chaghi District in Pakistan's Balochistan Province.³⁰

- Iranian drones have also been deployed to Iran's western border with Iraq. A mid-2017 satellite image revealed that Iran temporarily deployed drones to a remote airstrip near the border with Iraq.³¹ In July 2019, after Kurdish militants reportedly attacked an IRGC base in the western city of Piranshahr, the IRGC-GF's UAV Unit reportedly conducted a retaliatory operation.³²

INFRASTRUCTURE	Name	Country	Latitude	Longitude	Affiliation	Activity	Notes
	Kashan Airport	Iran	33°53'43"N	051°34'37"E		Test site	
	Konarak Airfield	Iran	25°19'55"N	060°21'23"E		Deployment	
	Jask Airport	Iran	25°39'13"N	057°47'57"E		Deployment	
	Qeshm Airfield	Iran	26°42'32"N	055°57'35"E		Deployment	
	Choghadak Airfield	Iran	26°42'32"N	055°57'35"E		Deployment	
	Hamadan Air Base	Iran	35°12'42"N	48°39'12"E		Deployment	Mohajer-4 base in 2017, 2018
	Kushke Nosrat Airport	Iran	34°59'02"N	50°48'22"E	Army	Training	
	Gonabad Airfield	Iran	34°25'15"N	58°42'16"E	Army	Deployment	
OTHER							
	Name	Country	Latitude	Longitude	Affiliation	Activity	Notes
	T-4 Tiyas Air Base	Syria	34°31'21"N	37°37'47"E	IRGC	Deployment	(status unclear)
	Marjan Airstrip	Iran	34°15'06"N	45°49'57"E		Deployment	Site of UAV operations in 2017 (status unclear)

DEVELOPMENT

- The Kaman-12 (کمان ۱۲) is a Class II fixed-wing system developed by the Army Air Force Self Sufficiency Jihad Organization, or ASF SSJO.³³ The aircraft's twin-boom design was unveiled in early 2019. According to media reports, the Kaman-12 has a 10 hour endurance and a 1,000 kilometer operational radius. The Army Air Force displayed the Kaman-12 at the National Army Day parade in Tehran on 18 April 2019.^{34,35}
- In April 2019 the Iranian Army Ground Forces unveiled the Intelligent Multirotor Bomber (مولتی روتور بمب افکن هوشمند), a Class I UAV developed by the Army Air Force Self Sufficiency Jihad Organization.³⁶ The multirotor bomber drone reportedly has a payload capacity of 8 kilograms, a 30-minute endurance, and a range of 5 kilometers.

EXPORTS

Country	Model	Make	Class	Status	Notes
Venezuela	Mohajer 2	Qods	I	Active	
Syria	Ababil 3	HESA	II	Active	
Sudan	Ababil 3	HESA	II	Inactive	

NOTES

1. Ami Rojkes Dombé, "Watch: Iranian 'Farpad' UAV," *Israel Defense*, 12 December 2016, <https://www.israeldefense.co.il/en/node/27866>.
2. Galen Wright, "Ababil UAV," *The Arkenstone*, 5 February 2011, <https://thearkenstone.blogspot.com/2011/02/ababil-uav.html>.
3. Galen Wright, "Mohajer UAV," *The Arkenstone*, 5 March 2015, <https://thearkenstone.blogspot.com/2015/03/mohajer-uav.html>.
4. Ibid
5. Jeremy Binnie, "Iran's Mohajer 6 armed UAV goes into production," *Jane's Defence Weekly*, 7 February 2018, <https://www.janes.com/article/77677/iran-s-mohajer-6-armed-uav-goes-into-production>.
6. Jpost.com Staff, "Iran Announces Mass Production of Shahed 129 Drone," *Jerusalem Post*, 27 September 2013, <https://www.jpost.com/Iranian-Threat/News/Iran-announces-mass-production-of-Shahed-129-drone-327262>.
7. Tyler Rogoway, "Iran Unveils Fleet of Combat Drones, Claims They're Copies of Captured RQ-170," *The Drive*, 3 October 2016, <http://www.thedrive.com/the-war-zone/5405/iran-unveils-fleet-of-combat-drones-claims-theyre-copies-of-captured-rq-170>.
8. Galen Wright, "Mohajer UAV," *The Arkenstone*, 5 March 2015, <https://thearkenstone.blogspot.com/2015/03/mohajer-uav.html>.
9. "پهپاد از آغاز تاکنون ۲-امیزگرد اولین فرماندهان یگان پهپادی سپاه/ نام "پهپاد" از کجا آمد؟" *Tasnim News*, 23 May 2019, <https://bit.ly/2Z2fmY9>.
10. "IRGC Holds Massive Drone Exercise Over Persian Gulf," *Tasnim News Agency*, 14 March 2019, <https://www.tasnimnews.com/en/news/2019/03/14/1968900/ircg-holds-massive-drone-exercise-over-persian-gulf>.
11. Amir Toumaj, "Israel kills Iranian Guard Corps members in Syria," *Long War Journal* (blog), 9 April 2018, <https://www.longwarjournal.org/archives/2018/04/israel-kills-iranian-guard-corps-members-in-syria.php>.
12. "نیروی زمینی سپاه پاسداران "سازمان پهپادی" تشکیل داد " *Tasnim News*, 8 March 2017, <https://bit.ly/2SvXlim>.
13. "پن دستاور دنظامی، قدرت سپاه را چندین برابر کرد/ تصاویر " *Khabar Online*, July 2019, <https://bit.ly/2M8khwW>.
14. Adam Rawnsley, "The Artesh Ground Forces Vali-e-Asr Drone Group (Updated)," *rawnslnotebook* (blog), 6 January 2015, <https://rawnslnotebook.tumblr.com/post/107343663537/the-artesh-ground-forces-vali-e-asr-drone-group>.
15. "A report on Iran's drone units: Army's online eyes monitoring border moves," *Fars News Agency*, 26 August 2013, <https://theiranproject.com/blog/2013/08/26/a-report-on-irans-drone-units-armys-online-eyes-monitoring-border-moves/>.
16. "نبروی هوایی ارتش در تمام پایگاه‌های خود "گردان پهپادی" تشکیل داد " *Tasnim News*, 10 March 2015, <https://bit.ly/2YjZd31>.
17. "فرمانده گروه پهپاد ارتش: جزء ۵ کشور برتر دنیا هستیم/ انجام ۲۵ سورتی پرواز در مناطق سیلزد" *Fars News Agency*, 17 April 2019, <https://bit.ly/2VM42Ok>.
18. Jeremy Binnie, "Iranian army deploys armed UAVs," *Jane's Defence Weekly*, 18 July 2019, <https://www.janes.com/article/89947/iranian-army-deploys-armed-uavs>.
19. "دانشکده پهپاد نیروی هوایی ارتش افتتاح شد " *Tasnim News*, 25 June 2019, <https://bit.ly/2y8tO4Q>.
20. Paul McLeary, "Iranian Drones Now Hitting Rebel Targets in Syria," *Foreign Policy*, 29 February 2016, <https://foreignpolicy.com/2016/02/29/iranian-drones-now-hitting-rebel-targets-in-syria/>. AND Galen Wright, "Examining Iranian Drone Strikes in Syria," *Offiziere.ch*, 29 February 2016, <https://offiziere.ch/?p=26604>.

21. W.J. Hennigan, "U.S. forces shoot down Iranian drone over Syria as fighting escalates," *Los Angeles Times*, 20 June 2017, <https://www.latimes.com/politics/washington/la-na-essential-washington-updates-us-forces-shoot-down-iranian-drone-over-1497972506-htmlstory.html>.
22. Isabel Kershner, "Iranian Drone Launched From Syria was Armed, Israel Says," *New York Times*, 14 April 2018, <https://www.nytimes.com/2018/04/14/world/middleeast/syria-iran-israel-drone.html>.
23. Jack Houry, "Russia Outs Israel, Says Two Israeli Fighter Jets Struck Iranian Base in Syria," *Reuters*, 10 April 2018, <https://www.haaretz.com/middle-east-news/syria/russia-outs-israel-two-israeli-fighter-jets-struck-iranian-base-in-syria-1.5979943>.
24. Helene Cooper, "Iranian Drone Buzzes U.S. Fighter Jet Over Persian Gulf," *New York Times*, 8 August 2017, <https://www.nytimes.com/2017/08/08/world/middleeast/iran-drone-navy-fighter-persian-gulf-close-call.html>.
25. Ben Werner, "Iranian Drone Overflights of U.S. Warships in Persian Gulf Now Common," *USNI News*, 16 October 2018, <https://news.usni.org/2018/10/16/37344>.
26. "IRGC Vows to Maintain Drone Patrols to Protect Iran's Airspace in Persian Gulf," *Tasnim News Agency*, 15 August 2017, <https://www.tasnimnews.com/en/news/2017/08/15/1492089/irgc-vows-to-maintain-drone-patrols-to-protect-iran-s-airspace-in-persian-gulf>.
27. Sean Gallagher, "Iran pumps up 'massive' offensive exercise with as many as 50 drones," *Ars Technica*, 14 March 2019, <https://arstechnica.com/information-technology/2019/03/iran-pumps-up-massive-offensive-exercise-with-over-50-drones-maybe/>.
28. Zachary Cohen, Kevin Liptak, Barbara Starr, and Ryan Browne, "US Navy ship 'destroyed' an Iranian drone, Trump says," *CNN*, 19 July 2019, <https://www.cnn.com/2019/07/18/politics/trump-us-destroyed-iranian-drone/index.html>.
29. "Pakistan confirms shooting down Iranian drone," *The Express Tribune*, 22 June 2017, <https://tribune.com.pk/story/1441595/violating-airspace-fo-confirms-shooting-iranian-drone/>.
30. Faran. Jeffrey (@Natsecjeff), "CONFIRMED: Pakistani security have found a crashed drone in damaged condition in Chaghi, Balochistan. The drone has been seized by local FC forces. As per my sources, the drone belongs to Iran. #Pakistan," Twitter, 21 July 2019, https://twitter.com/I_M_KN/status/1152964555179323392.
31. See page 300.
32. Seth J. Frantzman, "Iran Says It used New IRGC Drone Unit To Attack Kurdish Dissidents," *The Jerusalem Post*, 13 July 2019, <https://www.jpost.com/Middle-East/Iran-says-it-used-new-IRGC-drone-unit-to-attack-Kurdish-dissidents-595516>.
33. "فرمانده گروه پهپاد ارتش: جزء ۵ کشور برتر دنیا هستیم/ انجام ۲۵ سورتی پرواز در مناطق سیلزده" *Fars News Agency*, 17 April 2019, <https://bit.ly/2VM42Ok>.
34. "The Drone Index: ASF SSJO Kaman-12," *21st Century Asian Arms Race*, 11 March 2019, <https://21stcenturyasianarmsrace.com/2019/03/11/the-drone-index-asf-ssjo-kaman-12/>.
35. "Iran Celebrates National Army Day with Nationwide Parades," *Tasnim News Agency*, 19 April 2019, <https://www.tasnimnews.com/en/media/2019/04/19/1992863/iran-celebrates-national-army-day-with-nationwide-parades/photo/9>.
36. "تسلیمات جدید ارتش رونمایی شد," *IRNA*, 19 April 2019, <http://www.irna.ir/fa/News/83284943>.

IRAQ

INVENTORY

Model	Make	Origin	Class	Intro	Qty	Operator	Notes
RQ-11 Raven ¹	AeroVi-ronment	USA	I	Early 2010s		Army	
RQ-20 Puma AE II ²	AeroVi-ronment	USA	I	2020*			
ScanEagle ³	Insitu	USA	I	2014	17	Army	
CH-4B ⁴	CASC	China	III	2015	5	Army	

INACTIVE

Model	Make	Origin	Class	Period	Qty	Operator	Notes
Al Musa-yara-20 ⁵	Ibn-Firnas General Company	Iraq	I	2002-2003		Army	
Al-Quds RPV-20A	Ibn-Firnas General Company	Iraq	I	Late 1990s-2003	8	Air Force	Test platform

PERSONNEL

ARMY

Name	HQ	Type	Equipment	Activated
100th Squadron, Army Aviation		Dedicated	CH-4B	2016

Originally subordinated to the Air Force and based at Al Kut Air Base in southern Iraq, the 100th transferred to Army Aviation in 2016 and appears to have relocated to Balad Air Base in around 2017 or 2018.⁶

OPERATIONS

- Iraqi Army CH-4 drones participated in operations against the Islamic State. The CH-4 carried out its first operational mission in December 2015, targeting ISIS forces with anti-tank missiles in the Battle for Ramadi.⁷ According to the Iraqi military, the CH-4s carried out 260 airstrikes against the Islamic State between 2015 and 2017.⁸

INFRASTRUCTURE

Name	Country	Latitude	Longitude	Affiliation	Activity	Notes
Balad Air Base	Iraq	33°56'00"N	044°22'00"E	Army	HQ	

OTHER

Name	Country	Latitude	Longitude	Affiliation	Activity	Notes
Al Kut Air Base	Iraq	32°30'20"N	45°49'29"E	Army	HQ	(status unclear)

DEVELOPMENT

- The Furat-1 is a scaled-down prototype for the Furat-3, a Class III medium-altitude long-endurance drone under development by Iraq's Najaf Technical University. It was unveiled in early 2018.⁹
- The State Company for Military Industries unveiled a Class II UAV at the IQDEX defense trade show in March 2019.¹⁰ The unnamed aircraft has a twin-boom tail and high-mounted wings. The aircraft bears a strong resemblance to Iran's Mohajem-92. In a statement to the UN security council in June 2019, an Israeli official confirmed that Iran had licensed Iraq to produce the Mohajem-92.¹¹

NOTES

1. Sgt. Cody Harding, "Iraqi Army's UAVs give troops the big picture," U.S. Army, 18 February 2010, https://www.army.mil/article/34601/iraqi_armys_uavs_give_troops_the_big_picture.
2. "Contracts for March 14, 2019," U.S. Department of Defense, accessed 16 April 2019, <https://dod.defense.gov/News/Contracts/Contract-View/Article/1785615/>.
3. Defense Security Cooperation Agency, "DOD Speeds Delivery of Surveillance Assets to Iraq," news release, 7 January 2014, <http://www.dsca.mil/news-media/news-archive/dod-speeds-delivery-surveillance-assets-iraq>.
4. Jeffrey Lin and P.W. Singer, "Iraq flies Chinese-made Drones," *Popular Science*, 13 October 2015, <https://www.popsci.com/iraq-flies-chinese-made-drones>.
5. United States, Central Intelligence Agency, *Comprehensive Report of the Special Advisor to the DCI on Iraq's WMD*, Washington, D.C.: 2004, https://www.cia.gov/library/reports/general-reports-1/iraq_wmd_2004/chap3.html.
6. Iraqi Ministry of Defense, "الطائرات المسييرة تكنولوجيا حديثة في عمل طيران الجيش," YouTube, 12 February 2018, <https://www.youtube.com/watch?v=kN9o3ipoem0>.
7. Jeffrey Lin and P.W. Singer, "Iraq's New Chinese Drone Draws First Blood: CH-4 smashes ISIS position," *Popular Science*, 15 December 2015, <https://www.popsci.com/iraqs-new-chinese-armed-drone-draws-first-blood>.
8. Arnaud Delalande, "Iraq's Chinese-Made Killer Drones Are Actually Pretty Good," *War is Boring*, 21 February 2018, <https://warisboring.com/iraqs-chinese-made-killer-drones-are-actually-pretty-good/>.
9. SURA, "#LATEST - #Iraq's Najaf Technical University submits first prototype for indigenous Iraqi armed UAV," posted on 6 February 2018, <https://twitter.com/AlSuraEnglish/status/960919670391017472>.
10. Mohammed Najib, "Iraq unveils indigenous UAV," *Jane's Defence Weekly*, 27 March 2019, <https://www.janes.com/article/87482/iraq-unveils-indigenous-uav>.
11. Jeremy Binnie, "Israel says Iran continues ballistic missile launches," *Jane's Defence Weekly*, 5 June 2019, <https://www.janes.com/article/89058/israel-says-iran-continues-ballistic-missile-launches>.

ISRAEL

INVENTORY

Model	Make	Origin	Class	Intro	Qty	Operator	Notes
Harpy	IAI	Israel	I				Loitering munition
Phantom ¹	DJI	China	I	2017		Army	
Mavic ²	DJI	China	I	2017		Army	
Matrice ³	DJI	China	I	2017		Army	
Skylark	Elbit	Israel	I	2004*		Army	
Skylark 3	Elbit	Israel	I	2017		Army	“Dohar Shamay-im”
Hermes 450	IAI	Israel	II	Late 1990s		Army, Air Force	“Zik”
Hermes 900 ⁴	Elbit	Israel	III	2014		Air Force	“Kochav”
Heron 1 ⁵	IAI	Israel	III	2006		Air Force	“Shoval” Formally inducted in 2007
Heron TP ⁶	IAI	Israel	III	2009		Air Force	“Eitan” Formally inducted in 2010

**Estimate*

ACTIVE ACQUISITIONS

- The Israeli army is seeking to acquire a Class I system for organic infantry reconnaissance. According to media reports, the new aircraft will replace a fleet of DJI consumer drones, which the Army acquired on an interim basis in 2017. In March 2019 the IDF awarded CopterPix Pro a contract to develop the new system.⁷

INACTIVE

Model	Make	Origin	Class	Period	Qty	Operator	Notes

Firebee	Tele-dyne-Ryan	USA	II	1971-1996	Air Force	“Mabat”
Chukar	Northrop	USA	II	1973-1990	Air Force	“Telem”
Firebee II	Teledyne Ryan	USA	II	1975-1996	Air Force	“Shadamat”
Searcher	IAI	Israel	II	1992-2007	Air Force	“Hugla”
Scout	IAI	Israel	II	1981-2004	Air Force	“Zahavan”

PERSONNEL

AIR FORCE

Name		HQ	Type	Equipment	Activated
161 “Black Snake” Squadron ⁹	תסי”ט 161	Palmachim Air Base	D	Hermes 450, Hermes 900	2012
166 “First Flame” Squadron, RPAV Division ⁹	תסי”ט 166	Palmachim Air Base	D	Hermes 450, Hermes 900	1999
200 “First UAV” Squadron, RPAV Division ¹⁰	תסי”ט 200	Palmachim Air Base	D	Heron 1	1971
210 “White Eagle” Squadron, RPAV Division ¹¹	תסי”ט 210	Tel Nof Air Base	D	Heron TP	2010

ARMY

Name		HQ	Type	Equipment	Activated
Sky Rider Unit, Army Artillery Corps ¹²	סיימש בכור תדיחי	Camp Ramon	D	Skylark, Skylark 3	2010
The Sky Rider Unit provides the Army with battalion-level intelligence, surveillance, and reconnaissance. Although it has existed since the IDF acquired Skylarks in 2004, the IDF only recognized it as an independent unit in 2010. As of early 2018, it consisted of 20 teams of five personnel that are embedded with other Army units.					
Zik Unit, Army Artillery Corps ¹³	קז תדיחי	Palmachim Air Base	D	Hermes 450	2001*

NAVY

Name	HQ	Type	Equipment	Activated
Naval Reconnaissance Division ¹⁴ סִי יָרֹוּסָּ הָגָ	Palmachim Air Base	D	Heron 1	2017

The Naval Reconnaissance Division began working with the IAF's 200th Sqn to use Heron 1s to patrol Israel's maritime borders in 2009.¹⁵ In 2017 the Heron 1 replaced the manned Sea Scan (Shachaf) as the Navy's primary maritime patrol aircraft.¹⁶ Navy imagery specialists from the Naval Reconnaissance Division work with the Air Force, which owns the aircraft, to carry out each mission.

TRAINING

- Initially known as the UAV Training School, the Israeli Air Force established the RPAV Academy in 2001 at Ain Shemer Air Base.¹⁷ In 2004 the Academy was transferred to its current location at Palmachim Air Base where it provides instruction to RPAV Operators. Aircraft are borrowed from one of the active units stationed at the facility. The Academy is also equipped with simulators, which are used for approximately 30 percent of all training sorties performed there.¹⁸
- The Israeli Air Force's RPAV Division is comprised of two classes of drone pilots: RPAV External Pilots and RPAV Operators. RPAV External Pilots¹⁹ are typically enlisted personnel who are responsible for controlling the aircraft at take-off and landing, while RPAV Operators²⁰ are officers responsible for the aircraft in-flight. Air Force RPAV Operator training typically takes place in three stages. During the first phase, RPAV Operators attend the IAF Flight Academy for up to one year of basic training and instruction on aeronautical concepts. In the second phase, trainees attend the RPAV Operator Course, a six-month unmanned aircraft piloting program. In the third phase, trainees complete a three-month Operational Training Course, which is designed to familiarize students with the protocols, missions, and processes of the RPAV Division as well as the specific norms of the unit to which they are assigned.

OPERATIONS

Country	Base	Equipment	Period	Operation
Lebanon		Scout, Firebee, Chukar	1981-1982	Mole Cricket 19
In the months prior to the start of the First Lebanon War in 1982, Israeli Scouts and Firebees were used to identify Syrian fixed surface-to-air missile sites in southern Lebanon and to monitor Syrian fighter aircraft. ²¹ It was the first operational deployment for the Scout. In order to reveal the Syrian SAM and anti-aircraft batteries in Lebanon's Bekaa Valley, Israeli UAVs emitted false signals that made them appear as manned aircraft on Syrian radar feeds. One Scout, two Firebees, and two Chukars were lost.				
Lebanon		Scout, Searcher	1993	Accountability
Israeli UAVs conducted 27 sorties during Operation Accountability, a brief Israeli campaign against Hezbollah in southern Lebanon. ²²				
Lebanon		Scout, Searcher	1996	Grapes of Wrath
Israeli UAVs were deployed in the 1996 Grapes of Wrath Operation to identify Hezbollah targets in southern Lebanon. ²³				

Lebanon	Palmachim Air Base	Skylark, Searcher, Hermes 450, Heron 1	2006	Change of Direction
Israel deployed drones in the Second Lebanon War to monitor friendly ground operations, locate Hezbollah rocket launchers, and verify targets for manned aircraft.²⁴ The aircraft accumulated approximately 16,500 flight hours over the course of 1,350 sorties. This operation was the first deployment of the Heron 1 and Skylark, though the majority of drone missions were conducted by Hermes 450s. Three Hermes 450s were lost in the 34-day-long operation. Most missions were conducted from Palmachim Air Base, although the IAF also deployed systems to forward operating stations in northern Israel. Press reports suggested that Operation Change of Direction also saw the first deployment of armed Israeli drones, although these reports were not confirmed by the IDF.²⁵				
Palestinian Territories	Palmachim Air Base	Skylark, Searcher, Hermes 450, Heron 1, Heron TP	2008-2009	Cast Lead
Israeli UAVs were a sustained presence in Operation Cast Lead, an IDF incursion in Gaza, where they were used to assist ground forces and to conduct extensive airstrikes.²⁶ Cast Lead marked the first operational missions for the Heron TP, although the drone wasn't formally inducted until 2010. A 2009 report by Human Rights Watch found that Israeli drone-launched airstrikes during the operation killed several dozen Palestinian civilians.²⁷				
Palestinian Territories	Palmachim Air Base, Tel Nof Air Base	Skylark, Heron TP, Hermes 900	2014	Protective Edge
The 2014 Israel-Gaza conflict, also known as Operation Protective Edge, was a 7-week-long Israeli military intervention in the Gaza Strip. Protective Edge saw the first operational deployment of the Hermes 900.²⁸				

INFRASTRUCTURE

Name	Country	Latitude	Longitude	Affiliation	Activity	Notes
Palmachim Air Base	Israel	31°53'52"N	034°41'27"E	Air Force, Army	HQ	
Tel Nof Air Base	Israel	31°50'22"N	034°49'18"E	Air Force	HQ	

EXPORTS

Country	Model	Make	Class	Status	Notes
Australia	Skylark	Elbit Systems	I	Inactive	
Australia	Heron 1	IAI	III	Inactive	Leased
Azerbaijan	Aerostar	Aeronautics	II	Active	
Azerbaijan	Harop	IAI	I	Active	
Azerbaijan	Hermes 450	Elbit Systems	II	Active	
Azerbaijan	Hermes 900	Elbit Systems	III	Active	

Azerbaijan	Heron TP	IAI	III	Active	
Azerbaijan	Orbiter-1K	Aeronautics	I	Active	
Azerbaijan	Orbiter-3	Aeronautics	I	Active	
Azerbaijan	Sky Striker	Elbit Systems	I	Active	
Belgium	RQ-5 Hunter-B	IAI, Northrop Grumman	III	Active	
Botswana	Hermes 450	Elbit Systems	II	Inactive	
Brazil	Hermes 450	Elbit Systems	II	Active	
Brazil	Hermes 900	Elbit Systems	III	Active	
Brazil	Heron 1	IAI	III	Active	
Cameroon	Orbiter 2	Aeronautics	I	Active	
Canada	Skylark	Elbit Systems	I	Inactive	
Canada	Heron 1	IAI	III	Inactive	Leased
Chile	Hermes 900	Elbit Systems	III	Active	
Chile	SpyLite	Bluebird Aero	I	Active	
China	Harpy	IAI	I	Active	
Colombia	Hermes 450	Elbit Systems	II	Active	
Colombia	Hermes 900	Elbit Systems	III	Active	
Côte D'Ivoire	Aerostar	Aeronautics	II	Active	
Croatia	Orbiter 3B	Aeronautics	I	Active	
Croatia	Skylark	Elbit Systems	I	Active	
Dominican Republic	Hovermast 150	Sky Sapience	I	Active	
Ecuador	Heron 1	IAI	III	Active	
Ecuador	Searcher	IAI	II	Active	
Ethiopia	SpyLite	Bluebird Aero	I	Active	
Finland	Orbiter 2B	Aeronautics	I	Active	
France	Heron 1	IAI, EADS	III	Inactive	Heron 1 variant "Harfang"
France	RQ-5 Hunter	IAI, Northrop Grumman	III	Inactive	
France	Skylark-1LE	Elbit Systems	I	Active	
Georgia	Aerostar	Aeronautics	II	Inactive	
Georgia	Hermes 450	Elbit Systems	II	Inactive	
Georgia	Skylark	Elbit Systems	I	Active	
Germany	Heron 1	IAI	III	Active	Leased
Germany	Heron TP	IAI	III	Active	Leased
Honduras	Skylark 3	Elbit Systems	I	Active	
Hungary	Skylark 1LE	Elbit Systems	I	Active	
India	Harop	IAI	I	Active	

India	Heron 1	IAI	III	Active	
India	Searcher	IAI	II	Active	
India	SpyLite	Bluebird Aero	I	Active	
Indonesia	Aerostar	Aeronautics	II	Active	
Ireland	Orbiter 2B	Aeronautics	I	Active	
Kazakhstan	Skylark I-LEX	Elbit Systems	I	Active	
Mexico	Hermes 450	Elbit Systems	II	Active	
Mexico	Orbiter 2	Aeronautics	I	Active	
Netherlands	Aerostar	Aeronautics	II	Inactive	Leased
Nigeria	Aerostar	Aeronautics	II	Inactive	
Peru	Orbiter 2	Aeronautics	I	Inactive	
Peru	MicroFalcon	Innocon	I	Inactive	
Philippines	Hermes 450	Elbit Systems	II	Active	
Philippines	Blue Horizon	EMIT Aviation	II	Inactive	
Poland	MicroFalcon	Innocon	I	Active	
Poland	Orbiter	Aeronautics	I	Active	
ROK	Searcher	IAI	II	Active	
Russia	Bird Eye 400	IAI	I	Active	
Russia	Searcher Mk II	IAI	II	Active	
Serbia	Orbiter	Aeronautics	I	Active	
Singapore	Hermes 450	Elbit Systems	II	Active	
Singapore	Heron 1	IAI	III	Active	
Singapore	Scout	IAI	II	Inactive	
Singapore	Searcher	IAI	II	Inactive	
Slovakia	MicroFalcon	Innocon	I	Active	
Slovakia	Skylark I-LE	Elbit Systems	I	Active	
South Africa	Scout	IAI	II	Inactive	
Spain	Orbiter	Aeronautics	I	Active	
Spain	Searcher	IAI	II	Active	
Sri Lanka	Blue Horizon II	EMIT Aviation	II	Active	
Sri Lanka	Super Scout	IAI	II	Inactive	
Sri Lanka	Searcher	IAI	II	Active	
Sweden	Skylark 1LE	Elbit Systems	I	Inactive	
Switzerland	Hermes 900	Elbit Systems	III	Active	
Thailand	Aerostar	Aeronautics	II	Active	
Thailand	Dominator	Aeronautics	III	Active	
Thailand	Hermes 450	Elbit Systems	II	Active	

Thailand	Searcher Mk II	IAI	II	Active	
Turkey	Harpy	IAI	I	Active	
Turkey	Heron 1	IAI	III	Active	
Turkey	Aerostar	Aeronautics	II	Inactive	
Turkmenistan	Orbiter-3	Aeronautics	I	Active	
Uganda	Orbiter 2	Aeronautics	I	Active	
UK	Hermes 450	Elbit, Thales UK	II	Active	Hermes 450 variant "Watchkeeper"
UK	Hermes 450	Elbit Systems	II	Inactive	Leased
USA	Mastiff	Tadiran	II	Inactive	
USA	RQ-5 Hunter	IAI, Northrop Grumman	III	Active	
Vietnam	Orbiter 2	Aeronautics	I	Active	
Zambia	Hermes 450	Elbit Systems	II	Active	
Zambia	Skylark	Elbit	I	Active	

NOTES

1. Judah Ari Gross, "Low-tech drones give every IDF commander an eye in the sky," *Times of Israel*, 20 November 2017, <https://www.timesofisrael.com/low-tech-drones-give-every-idf-commander-an-eye-in-the-sky/>.
2. Ibid
3. Ibid
4. Anna Ahronheim, "IAF Declares Hermes-900 Drone Fully Operational," *The Jerusalem Post*, 24 August 2017, <https://www.jpost.com/Israel-News/IAF-declares-Hermes-900-drone-fully-operational-503282>.
5. Nadav Shaham, "Ten Years of 'Shoval,'" Israeli Air Force, 8 March 2017, <http://www.iaf.org.il/4458-49068-en/IAF.aspx>.
6. Nir Dvori, "לארשי לע מינגמש מישיוואם יתלבה סיטה ילכ: מיימשב ונלש מייניעה," *Mako*, 20 September 2017, https://www.mako.co.il/news-military/security-q3_2017/Article-c9bc8a313df9e51004.htm.
7. Sagi Cohen, "Tiny Startup Beats the Giants for Israeli Army Drone Contract," *Haaretz*, 18 March 2019, <https://www.haaretz.com/israel-news/business/.premium-tiny-startup-beats-the-giants-for-israeli-army-drone-contract-1.7025982?=&ts=1552913791856>.
8. Israeli Air Force, "The 'Black Snake' Squadron wishes you a Happy Sukkot!," Facebook, 28 September 2018, <https://www.facebook.com/IsraeliAirForce.EN/photos/a.247957101913936/2109185899124371/?type=3&theater>.
9. "הנושאה קיזה' תסייטל מינש 20," Israeli Air Force, accessed 5 July 2019, <https://www.iaf.org.il/9073-50936-he/IAF.aspx>.
10. "The First UAV Squadron," Israeli Air Force, accessed 6 December 2018, <http://www.iaf.org.il/4968-33518-en/IAF.aspx>.
11. "Launching a New Squadron," Israeli Air Force, 21 December 2010, accessed 6 December 2018, <http://www.iaf.org.il/4363-35979-en/IAF.aspx>.
12. Dan Arkin, "The Aerial Arm of the IDF Ground Forces," *IsraelDefense*, 27 September 2017, <https://www.israel-defense.co.il/en/node/31263>.
13. Tal Lev Ram, "מוליצה תמרב רופישו ודנמוק תגלפ," *Maariv*, 22 January 2018, <https://www.maariv.co.il/news/military/Article-618947>.
14. Yael Fuchs and Carmel Stern, "The Naval Scouting Division and the 200th ('First RPAV') Squadron are responsible for everything occurring in Israel's territorial waters," Israel Air Force, 26 November 2018, <http://www.iaf.org.il/4479-50725-en/IAF.aspx>.
15. Arie Egozi, "IAI's Heron UAV to make maritime patrol debut," *Flight International*, 21 January 2009, <https://www.flightglobal.com/news/articles/iais-heron-uav-to-make-maritime-patrol-debut-321411/>.
16. Arie Egozi, "Israel bids farewell to Sea Scan maritime patrol aircraft," *FlightGlobal*, 10 January 2017, <https://www.flightglobal.com/news/articles/israel-bids-farewell-to-sea-scan-maritime-patrol-air-433011/>.
17. Yaakov Lappin, "IAF Drone Training Center Growing Above and Beyond," *The Jerusalem Post*, 24 December 2014, <https://www.jpost.com/Israel-News/IAF-drone-training-center-growing-above-and-beyond-385575>.
18. Hadas Levav, "Next Level: RPAV Simulators," Israeli Air Force, 9 July 2018, <http://www.iaf.org.il/4475-50291-en/IAF.aspx>.

19. Hadas Levav, "Enlisted Personnel Piloting Aircraft," Israeli Air Force, 11 December 2017, <http://www.iaf.org.il/4467-49801-en/IAF.aspx>.
20. Lt. M', "RPAV Operator Personal Column," Israeli Air Force, 19 June 2018, <http://www.iaf.org.il/4474-50225-en/IAF.aspx>.
21. "The First UAV Squadron," Israeli Air Force, accessed 6 December 2018, <http://www.iaf.org.il/4968-33518-en/IAF.aspx>.
22. Ibid
23. Ralph Sanders, "An Israeli Military Innovation: UAVs," *Joint Forces Quarterly*, Winter 2002-03, 114-118 <https://apps.dtic.mil/dtic/tr/fulltext/u2/a483682.pdf>.
24. Benjamin S. Lambeth, *Air Operations in Israel's War Against Hezbollah: Learning from Lebanon and Getting it Right in Gaza*, (Washington, D.C.: RAND Corporation, 2011), <https://apps.dtic.mil/dtic/tr/fulltext/u2/a544046.pdf>.
25. Arie Egozi, "Israel praises UAV abilities during Operation Change of Direction anti-Hezbollah Lebanon campaign," *Flight International*, 29 August 2006, <https://www.flightglobal.com/news/articles/israel-praises-uav-abilities-during-operation-change-of-direction-anti-hezbollah-lebanon-campaign-208706/>.
26. Peter La Franchi, "Israel fields armed UAVs in Lebanon," *Flight International*, 8 August 2006, <https://www.flightglobal.com/news/articles/israel-fields-armed-uavs-in-lebanon-208315/>.
27. Marc Garlasco, "Precisely Wrong: Gaza Civilians Killed by Israeli Drone-Launched Missiles," Human Rights Watch, 30 June 2009, <https://www.hrw.org/report/2009/06/30/precisely-wrong/gaza-civilians-killed-israeli-drone-launched-missiles>.
28. Nadav Berger, "A 'Star' in the Sky: The 'Hermes 900' is Operational," Israeli Air Force, 30 July 2014, <http://www.iaf.org.il/4410-42217-en/IAF.aspx>.

JORDAN

INVENTORY

Model	Make	Origin	Class	Intro	Qty	Operator	Notes
Camcopter S-100 ¹	Schiebel	Austria	II	2010	12	Air Force	At least two aircraft have been lost
CH-4B ²	CASC	China	III	2016	5	Air Force	RJAF is reportedly seeking to sell these aircraft

ACTIVE ACQUISITIONS

- In an October 2018 interview with *Air Forces Monthly* magazine, Commander of the RJAF Major General Yousef al-Huneiti indicated that the RJAF is seeking to replace the CH-4B with a U.S. system.³ Jordan has previously sought to acquire the GA-ASI Predator from the U.S. In June 2019 Jordan announced that it was seeking a buyer for its CH-4s.⁴

INACTIVE

Model	Make	Origin	Class	Period	Qty	Operator	Notes
Falco	Leonardo	Italy	II	2013-2018*	4	Air Force	

*Estimate

PERSONNEL

AIR FORCE

Name	HQ	Type	Equipment	Activated
9th Squadron, Sahel Nesab Group, Prince Hussein II ISR Wing ⁵	Sahl Nsab Air Base	D	Camcopter S-100, CH-4B	2010

INFRASTRUCTURE

Name	Country	Latitude	Longitude	Affiliation	Activity	Notes
Sahl Nsab Air Base (Zarqa Airport) ⁶	Jordan	32°01'30"N	036°08'41"E	9th Sqn	HQ	

OTHER

Name	Country	Latitude	Longitude	Affiliation	Activity	Notes
King Abdullah II Air Base	Jordan	32.0065° N	36.2193° E	9th Sqn	HQ	Previously served as Falco HQ (status unclear)

NOTES

1. Marco Dijkshoorn and Patrick Roegies, "Fit for the Fight," *Air Forces Monthly*, February 2016, 84-89, <https://www.4aviation.nl/wp-content/uploads/2016/12/Jordan-feb16-AirForces-Monthly-PatrickRoegies-Marco-Dijkshoorn.pdf>.
2. David Donald, "Wraps lifted off Jordan's armed UAV," *Jane's 360*, 9 May 2018, <http://www.janes.com/article/79923/wraps-lifted-off-jordan-s-armed-uav-sofex18d2>.
3. Marco Dijkshoorn, "Jordan Modernises," *Air Forces Monthly*, October 2018, <https://airforcesmonthly.keypublishing.com/the-magazine/view-issue/?issueID=7462>.
4. Garrett Reim, "Jordan Military Tries to Sell Off Chinese UAVs," *FlightGlobal*, 4 June 2019, <https://www.flightglobal.com/news/articles/jordan-military-tries-to-sell-off-knock-off-chines-458706/>.
5. Marco Dijkshoorn, "Jordan Modernises," *Air Forces Monthly*, October 2018, <https://airforcesmonthly.keypublishing.com/the-magazine/view-issue/?issueID=7462>.
6. See page 302.

LEBANON

INVENTORY

Model	Make	Origin	Class	Intro	Qty	Operator	Notes
RQ-11 Raven ¹	AeroVi-ronment	USA	I	2009	36 (12)	Army	
ScanEagle ²	Insitu	USA	I	2019 ³	6	Army	

NOTES

1. “Lebanon gets Raven mini UAV from U.S.,” UPI, 23 March 2009, <https://www.upi.com/Lebanon-gets-Raven-mini-UAV-from-US/71721237838143/>.
2. Fergus Kelly, “Lebanon to get \$120 million in US military aid including ScanEagle drones and helicopters,” The Defense Post, 13 December 2017, <https://thedefensepost.com/2017/12/13/lebanon-120-million-us-military-aid/>.
3. Fergus Kelly, “Lebanon receives 6 Scan Eagle drone systems from US,” The Defense Post, 4 April 2019, <https://thedefensepost.com/2019/04/04/lebanon-scan-eagle-drone-us/>.

MOROCCO

INVENTORY

- Media outlets reported in 2014 that France had agreed to sell Morocco three Israel Aerospace Industries Heron 1 variants known as the Harfang, which were produced in coordination with EADS.¹ A February 2016 satellite image of Ben Guerir Air Base shows a Heron 1 (or Harfang) located at the base—perhaps to conduct trials with the Air Force—but the drone did not appear in successive images.² The French Air Force, which was the original owner of the Harfangs, officially retired the aircraft in 2018.³ As of this writing, it is unclear whether Morocco still intends to acquire these aircraft or whether they are already active with the Moroccan Air Force.

NOTES

1. “Morocco Acquired IAI’s Heron,” *Israel Defense*, 21 January 2014, <https://www.israeldefense.co.il/en/content/morocco-acquired-iais-heron>.
2. See page 305.
3. French Air Force, “The Harfang Drone Bids Farewell to the Armed Forces,” news release, 11 January 2018, <http://www.defense-aerospace.com/articles-view/release/3/189833/french-air-force-retires-harfang-unmanned-aircraft.html>.

OMAN

INVENTORY	Model	Make	Origin	Class	Intro	Qty	Operator	Notes
	RQ-21A Blackjack	Insitu	USA	I	2020*			
*Estimate								

NOTES	1. Allen Cone, "Insitu nets \$390.4M for Blackjack, ScanEagle drones for U.S. military, allies," <i>UPI</i> , 1 July 2019, https://www.upi.com/Defense-News/2019/07/01/Insitu-nets-3904M-for-Blackjack-ScanEagle-drones-for-US-military-allies/8101561982511/ .

QATAR

INVENTORY	Model	Make	Origin	Class	Intro	Qty	Operator	Notes
	Bayrakar Mini ¹	Baykar Makina	Turkey	I	2012	10	Army	
	Bayraktar- TB2 ²	Baykar Makina	Turkey	III	2019*	6		
	Aerosonde 3**	Textron	USA	I	2020			Leased
*Estimate								
**Reported, but unconfirmed.								

PERSONNEL	GENERAL STAFF				
	Name	HQ	Type	Equipment	Activated
	Reconnaissance and Surveillance Center ⁴	مركز الاستطلاع والمراقبة القطري	D	Bayraktar- TB2	

The Reconnaissance and Surveillance Center is responsible for implementing Qatar's military drone program by acquiring UAVs and developing a training program. It is believed to have operational control of the country's Bayraktar-TB2s. It is commanded by General Mohammed Owaida Al-Ramzani.

NOTES

1. Baykar, "Turkey sells mini drones to Qatar," news release, 13 March 2012, <http://baykarmakina.com/en/turkey-sells-mini-drones-to-qatar/>.
2. "Turkey's Baykar to export armed UAVs to Qatar military," *Anadolu Agency*, 14 March 2018, <https://www.daily-sabah.com/defense/2018/03/14/turkeys-baykar-to-export-armed-uavs-to-qatar-military>.
3. David Wren, "Charleston aerospace firm tied to Qatar military buys spy drone," *The Post & Courier*, 11 July 2019, https://www.postandcourier.com/business/charleston-aerospace-firm-tied-to-qatar-military-buys-spy-drone/article_419b8d1c-a3ea-11e9-963e-6beb025920fb.html.
4. "تحديث أسطول مركز الاستطلاع والمراقبة," *Al Watan*, 15 March 2018, <http://www.al-watan.com/news-details/id/126981>.

SAUDI ARABIA

INVENTORY

Model	Make	Origin	Class	Intro	Qty	Operator	Notes
Luna X-2000	EMT Penzberg	Germany	I				
Seeker 400 ¹	Denel Dynamics	South Africa	II	Mid-2010s			
CH-4B ²	CASC	China	III	2014	4	Air Force	

ACTIVE ACQUISITIONS

- The King Abdulaziz City for Science and Technology reportedly partnered in 2017 with the China Aerospace Science and Technology Corporation (CASC) to open a facility to manufacture Chinese CH-4 drones.³ The facility could also be used to maintain and repair Chinese drones flown by other countries in the Middle East. The status of this agreement is not clear.

OPERATIONS

Country	Base	Equipment	Period	Operation
Yemen	Jizan Airport	CH-4, Luna X-2000	2015-	Decisive Storm

Saudi Arabia has deployed drones in its intervention in Yemen against the Houthi group. Saudi-operated CH-4s have been spotted at both Jizan Airport and King Khalid Air Base in southwest Saudi Arabia.⁴ Several Luna X-2000 and CH-4Bs appear to have crashed or been downed in Yemen since the conflict began.^{5,6}

INFRASTRUCTURE

Name	Country	Latitude	Longitude	Affiliation	Activity	Notes
King Khalid Air Base	Saudi Arabia	18°18'25"N	42°48'33"E	Air Force	Deployment	CH-4 base ⁷

OTHER

Name	Country	Latitude	Longitude	Affiliation	Activity	Notes
Thumamah Airport	Saudi Arabia	25°12'47"N	046°38'28"E		Test site	Saqr-1 test site (status unclear)
King Abdulaziz Military Academy Airport	Saudi Arabia	24°56'11"N	046°23'58"E		Test site	SkyGuard test site (status unclear)
Jizan Airport	Saudi Arabia	16°54'04"N	042°35'09"E	Air Force	Deployment	CH-4 base in 2018 (status unclear)

DEVELOPMENT

- The Saqr-1 is a Class III fixed-wing system developed by the King Abdulaziz City for Science and Technology (KACST). It was unveiled in May 2017 in Riyadh.⁸ According to KACST's Supervisor General for Special Programs, Khaled al-Hussan, the Saqr-1 is equipped with a Ka-band satellite communications capability and has a range of more than 2,500 kilometers. Footage in a promotional video released in 2017 indicated that some flight tests were conducted at Thumamah Airport north of Riyadh.⁹
- The SkyGuard is a Class II fixed-wing system developed by the Autonomous Vehicles Laboratory at the Prince Sultan Advanced Technology Research Institute (PSATRI). It was unveiled at the IDEX 2017 defense trade show.¹⁰ It has a 200-kilometer range, 10-hour endurance, and 250-kilogram MTOW. Flight tests were conducted at King Abdulaziz Military Academy Airport west of Riyadh in 2017.¹¹ A strike-capable version was displayed at the AFED 2018 defense trade show.

NOTES

1. "SIPRI Arms Transfers Database," Stockholm Peace Research Institute, accessed 16 April 2019, <https://www.sipri.org/databases/armstransfers>.
2. Ibid
3. Christopher Diamond, "China to open a drone factory in Saudi Arabia," *Defense News*, 28 March 2017, <https://www.defensenews.com/air/2017/03/28/china-to-open-a-drone-factory-in-saudi-arabia/>.
4. See page 308.
5. "Saudi CH-4B armed UAV shot down by Houthi rebels in Yemen," Defence Blog, 30 August 2018, <https://defence-blog.com/news/saudi-ch-4b-armed-uav-shot-down-by-houthi-rebels-in-yemen.html>.
6. Jeremy Binnie, "German-made UAV crashes in Yemen," *Jane's Defence Weekly*, 14 February 2019, <https://www.janes.com/article/86394/german-made-uav-crashes-in-yemen>.

7. Aviation Analysis Wg (@Avianalysiswing), "Saudi RSAF Ch-4 Combat drone pictures revealed," Twitter, 17 August 2018, <https://twitter.com/avianalysiswing/status/1030528713316872193>.
8. Al Arabiya English, "Saudi Arabia unveils new strategic drone program 'Saqr 1,'" YouTube, 14 May 2017, <https://www.youtube.com/watch?v=GyzA18Z4bzw>.
9. "Advanced UAV flies in from Saudi Arabia," *Jane's 360*, 23 February 2017, <https://www.janes.com/article/68169/advanced-uav-flies-in-from-saudi-arabia-index17d5>.
10. "KSA's Prince Sultan Center for Defense Studies reveals its advanced projects during AFED 2018," *Arab News*, 4 March 2018, <http://www.arabnews.com/node/1258651/saudi-arabia>.
11. محمد بن خالد (@MbKS15) "Video: #SkyGuard surveillance UAV developed by Prince Sultan Advanced Technology Research Institute (#PSATRI) during field testing," Twitter, 21 July 2017, <https://twitter.com/mbks15/status/888339731200843776?lang=en>.

SYRIA

INVENTORY

Model	Make	Origin	Class	Intro	Qty	Operator	Notes
Ababil-3 ¹ *	Ghods	Iran	II				

**Iran is believed to have exported the Ababil-3² to Syria, though it is not clear whether this aircraft is piloted by Syrian or Iranian personnel.*

NOTES

1. "SIPRI Arms Transfers Database," Stockholm Peace Research Institute, accessed 16 April 2019, <https://www.sipri.org>.
2. Encyclopedia of Syrian military (@syr_mil_wik), "السورية بلا طيار .. غالباً انها نسخة ABABIL-3 اول صورة لاحدى طائرات " محلية الصنع من هذه الطائرة " Twitter, 10 June 2018, https://twitter.com/Syr_Mil_Wik/status/1005890107021373441.

TUNISIA

INVENTORY

Model	Make	Origin	Class	Intro	Qty	Operator	Notes
ScanEagle ¹	Insitu	USA	I	2012*		Navy	

NOTES

1. Michael Peck, "Insitu awarded Tunisian ScanEagle drone contract," *C4ISRNET*, 14 October 2016, <https://www.c4isrnet.com/unmanned/uas/2016/10/14/insitu-awarded-tunisian-scaneagle-drone-contract/>.

TURKEY

INVENTORY

Model	Make	Origin	Class	Intro	Qty	Operator	Notes
Black Hornet ¹	FLIR	USA	I	2018*		Special Forces	
Serçe-1 ²	Aselsan	Turkey	I	2018	500+	Army, Gendarmerie	
Harpy ³	IAI	Israel	I	1999	100	Army	
Kargu ⁴	STM	Turkey	I	2018*	160+		
Bayraktar Mini ⁵	Baykar	Turkey	I	2007	200+	Army, Gendarmerie	
Bayraktar TB2 ⁶	Baykar Makina	Turkey	III	2015	86	Army, Gendarmerie, Navy	
Heron 1 ⁷	IAI	Israel	III	2010	7	Air Force	
Anka ^{8,9}	TAI	Turkey	III	2016*	12+	Air Force, Navy, Gendarmerie, MIT	Anka-A, Anka-B, Anka-S variants
Karayel-SU ¹⁰	Vestel Defence	Turkey	III				Leased

**Estimate*

INACTIVE

Model	Make	Origin	Class	Intro	Qty	Operator	Notes
Aerostar ¹¹	Aeronautics	Israel	II	2005-2012	4		
Gnat 750	GA-ASI	USA	III	1993-Unknown	22	Air Force	

PERSONNEL

AIR FORCE

Name		HQ	Type	Equipment	Activated
14th UAV Systems Base Command ¹²	<i>14. İnsansız Uçak Sistemleri Üs Komutanlığı</i>	Batman Air Base	D	Heron 1, Anka, Bayraktar-TB2	

The 14th UAV Systems Base Command is likely comprised of up to three UAV Squadrons (*İHA Filo*) and a maintenance unit. The squadron that is most frequently referenced in Turkish press is the 2nd UAV Squadron (2. *İHA Filo*), which the Air Force stood up to operate the Heron.¹³

GENDARMERIE (NATIONAL MILITARY POLICE)

Name		HQ	Type	Equipment	Activated
Elazığ Tactical UAV Unit Command, Gendarmerie General Command	<i>Elazığ Taktik İha Birlik Komutanlığı, Jandarma Genel Komutanlığı</i>	Elazığ Airport	D	Bayraktar-TB2, Anka, Anka-S	

The Gendarmerie General Command (GGC) reportedly began leasing two Ankas in 2016, though it's not clear whether these remain in active service.¹⁴ The GGC took delivery of 12 Bayraktar-TB2s in early 2017 and six Bayraktar-TB2s in May 2018.^{15,16} In April 2019 the GGC took delivery of the first two of six Anka-S UAVs, a satellite-controlled variant of the Anka-B.¹⁷

NAVY

Name		HQ	Type	Equipment	Activated
313th Naval UAV-S Unmanned Aerial Vehicle Fleet Command	<i>313. Deniz İHA-S İnsansız Hava Aracı Filo Komutanlığı</i>	Çanakkale Airport	D	Bayraktar-TB2, Anka	2018

The Naval Air Command (*Deniz Hava Komutanlığı*) activated the 313th UAV Fleet Command in August 2018.¹⁸ Turkish Navy UAVs are based at both Çanakkale Airport and Dalaman Naval Air Base.¹⁹ According to media reports, the Navy's Bayraktar-TB2s became operational in December 2018.²⁰



(Left) The Bayraktar TB2 at Kesan Airport. Credit: Bayhaluk/Wikimedia (Right) The TAI Anka at the 2016 Farnborough Airshow. Credit: Oren Rozen/Wikimedia

OPERATIONS	Country	Base	Equipment	Period	Operation
	Syria	Batman Air Base	Bayraktar-TB2	2016-	Euphrates Shield, Olive Branch
Turkey has deployed drones for operations in northern Syria.²¹ In Operation Euphrates Shield, the Turkish military supported Syrian opposition forces in a cross-border campaign against the Islamic State. In Operation Olive Branch, the Turkish military and allied forces launched a campaign in January 2018 to take territory held by Kurdish militias. Several months into Olive Branch, Turkey claimed that over its Bayraktar-TB2s had killed over 400 members of Kurdish militias in 382 sorties in the operation.²² Several Bayraktar-TB2s have been lost in Syria.²³					
	Iraq		Bayraktar-TB2	2019-	Claw
According to a statement and video released by the Turkish MoD in May 28, Bayraktar-TB2s have been involved in Operation Claw, a Turkish retaliatory operation against Kurdish militias in northern Iraq in 2019.²⁴					

DOMESTIC OPERATIONS

- Since 2016, Turkey has extensively used drones in strikes against Kurdistan Workers' Party (PKK) militants in southeast Turkey.^{25, 26} These operations are likely conducted by the Gendarmerie, the Turkish military police, using Bayraktar-TB2s operated from a network of airports, including Elâzığ Airport, Van Ferit Melen Airport, and Şırnak Şerafettin Elçi Airport.²⁷ Operations are also likely conducted at Hakkari Yüksekova Airport and Gaziantep Airport. Turkey has been criticised for using drones to target Kurdish civilians with airstrikes.²⁸
- The Turkish Navy has deployed Anka drones to Dalaman Air Base and Bayraktar-TB2s to Çanakkale Airport and Dalaman. In April 2018, Greek Air Force fighters intercepted a Turkish Anka near the island of Rhodes, some 50 kilometers from Dalaman Air Base.²⁸ In 2019, Turkish Navy Bayraktar-TB2s provided surveillance for the *Fatih*, a drillship operating off the coast of Cyprus in the eastern Mediterranean.²⁹

INFRASTRUCTURE	Name	Country	Latitude	Longitude	Affiliation	Activity	Notes
	Kesan Air-port	Turkey	40°47'10"N	26°36'22"E	Baykar Makina	Test site	
	Akıncı Air-port	Turkey	40°04'44"N	32°33'53"E	TAI	Test Site	
	Batman Air Base	Turkey	37°55'57"N	41°07'22"E	Air Force	HQ	
	Elâzığ Air-port	Turkey	38°36'24"N	039°17'29"E	Gendarmerie	HQ	
	Sivrihisar Air Base	Turkey	39°27'12"N	31°21'58"E	TAI	Test Site	Anka, Kayar-el test site

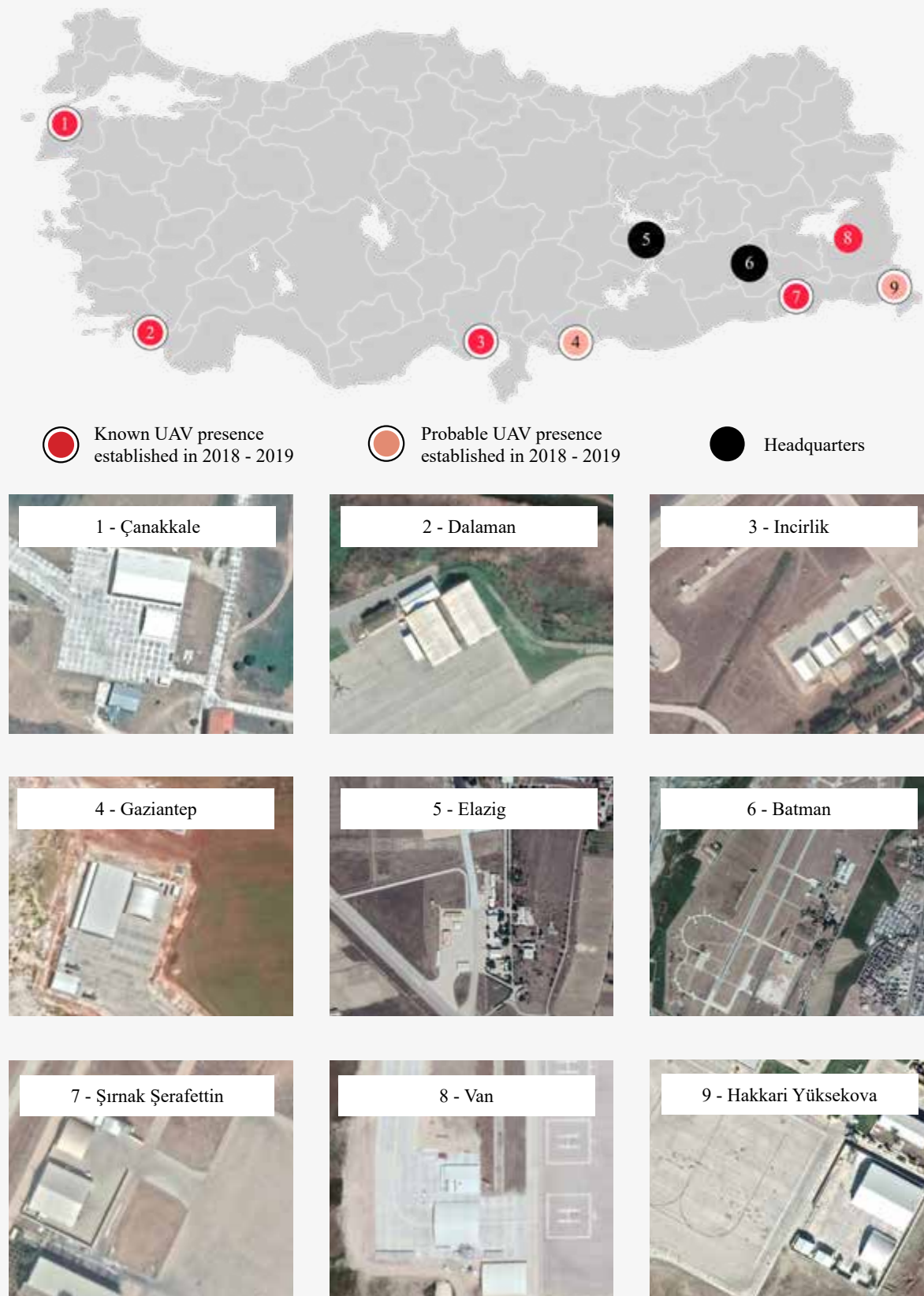
Van Airport	Turkey	38°28'06"N	43°19'56"E	Gendarmerie	Deployment	Baykar TB2 site
Dalaman Naval Air Base	Turkey	36°42'45"N	028°47'29"E	Navy	HQ, Deployment	
Şırnak Şerafettin Elçi Airport	Turkey	36°42'45"N	028°47'29"E	Gendarmerie	Deployment	Bayraktar TB2 site
Çanakkale Airport	Turkey	40°08'15"N	026°25'36"E	Navy	Deployment	Bayraktar TB2 site
Incirlik Air Base	Turkey	37°00'07"N	035°25'33"E		Deployment	Anka site
Hakkari Yüksekova Airport	Turkey	37°44'27"N	44°15'23"E	Gendarmerie	Deployment	Probable Bayraktar TB2 site
Gaziantep Airport	Turkey	36°56'52"N	37°28'44"E		Deployment	Probable Bayraktar TB2 site

DEVELOPMENT

- The Akıncı is a Class III fixed-wing UAV developed by Baykar Makina. It was unveiled in 2018.³⁰ The Akıncı's design is notable for its twin engines and gull wings. At approximately 5 tons, it will be Turkey's heaviest unmanned aircraft. In a promotional video released in May 2019, Baykar Makina indicated that the Akıncı could be capable of launching swarms of Alpago loitering munitions.³¹ It is scheduled to begin flight tests in 2019, with production slated to begin in 2020 and deliveries commencing in 2021.
- The Anka-Aksungur, also known as the Anka-2, is a Class III fixed-wing UAV developed by Turkish Aerospace Industries. This twin-engine, twin-tailed system was unveiled in January 2019 and conducted its first flight at Akıncı Airport in March 2019.³² According to TAI, the Anka-Aksungur will have a payload of over 700 kilograms, more than three times that of the Anka.

EXPORTS

Country	Model	Make	Class	Status	Notes
Qatar	Bayraktar Mini	Baykar Makina	I	Active	
Qatar	Bayraktar TB2	Baykar Makina	III	Active	
Ukraine	Bayraktar TB2	Baykar Makina	III	Active	

Figure 10: Turkey's UAV Outposts

See pages 313 to 316 for more information.

NOTES

1. "Özel Kuvvetler'de 'Nano' ve 'Mini' İHA'lar görevde video," Gokyuzu Haberci, 14 January 2018, <http://www.gokyuzuhaberci.com/video.php?id=41773>.
2. "TSK'ya 499 adet çok rotorlu Altınay İHA teslim edilecek," *Kokpit.aero*, 29 December 2016, <http://www.kokpit.aero/tsk-499-adet-cok-rotorlu-ih-a-alacak>.
3. "SIPRI Arms Transfers Database," Stockholm Peace Research Institute, accessed 16 April 2019, <https://www.sipri.org/databases/armstransfers>.
4. SSB, "TSK'NIN 'KAMIKAZELERİ' ARTIYOR," news release, 16 January 2019, <https://www.ssb.gov.tr/Website/contentList.aspx?PageID=1614&LangID=1>. AND "Döner Kanatlı Vurucu İHA Sistemi Kargu'nun teslimatı yapıldı," *Kamudan HABER*, 1 May 2019, <http://www.kamudanhaber.net/ekonomi/doner-kanatli-vurucu-ih-a-sistemi-kargunun-teslimati-yapildi-h397666.html>.
5. "Bayraktar Mini UAS," Baykar, accessed 1 December 2018, <http://baykarmakina.com/en/sistemler/bayraktar-mini-ih-a/>.
6. "Turkish Army Reinforces Air Support Capability with 8 New Armed Drones," *Daily Sabah*, 21 March 2018, <http://www.defense-aerospace.com/cgi-bin/client/modele.pl?shop=dae&modele=release&prod=191757&cat=3>.
7. "Turkey won't return Heron UAVs to Israel," *Hurriyet Daily News*, 3 November 2012, <http://www.hurriyetdailynews.com/turkey-wont-return-heron-uavs-to-israel-33852>.
8. Tolga Ozbek, "Turkey signs for more Anka UAVs," *FlightGlobal*, 15 October 2018, <https://www.flightglobal.com/news/articles/turkey-signs-for-more-anka-uavs-452671/>.
9. "TAI delivers first satellite-controlled ANKA-S system to Turkey," Air Force Technology, 12 April 2018, <https://www.airforce-technology.com/news/tai-delivers-first-satellite-controlled-anka-s-system-turkey/>.
10. Kayarel
11. Arie Egozi, "Turkey set to axe Aerostar UAV deal," *Flight International*, 5 November 2012, <https://www.flight-global.com/news/articles/turkey-set-to-axe-aerostar-uav-deal-378532/>.
12. "Batman'daki İnsansız Hava Uçakları Sistemleri Üssü ilk kez görüntüldü," *Sabah*, 1 January 2018, <https://www.sabah.com.tr/yasam/2018/01/01/batmandaki-insansiz-hava-ucaklari-sistemleri-ussu-ilk-kez-goruntulendi>.
13. "Uludere'deki komutanlar uyarılmış: Terörist değil kaçakçı bunlar," *Hurriyet*, 26 September 2015, <http://www.hurriyet.com.tr/gundem/uludere-deki-komutanlar-uyarmis-terorist-degil-kacakci-bunlar-30168711>.
14. İbrahim Sünnetci, "Recent Developments in the Anka UAS Programme," Mönch Publishing Group, 16 May 2018, <https://www.monch.com/mpg/news/air/3356-anka-dev.html>.
15. "Jandarma artık İnsansız Hava Aracı kullanıyor," *Kokpit.aero*, 8 February 2017, <http://www.kokpit.aero/jandarma-ya-ilk-ih-a>.
16. "Baykar's combat drones delivered to Turkish gendarmerie," *Daily Sabah*, 31 May 2018, <https://www.dailysabah.com/defense/2018/06/01/baykars-combat-drones-delivered-to-turkish-gendarmerie>.
17. Gökse Yıldıırım, "Jandarma Anka-S ile sınırlılıkları aşacak," *Anadolu Agency*, 12 April 2019, <https://www.aa.com.tr/tr/turkiye/jandarma-anka-s-ile-sinirliliklari-asacak/1450473/>.
18. Talha Menteş, "Akdeniz'in bekçileri," *Yeni Safak*, 8 September 2019, <https://www.yenisafak.com/gundem/akdenizin-bekcileri-3505069>.
19. İbrahim Sünnetci, "Recent Developments in the Anka UAS Programme," Mönch Publishing Group, 16 May 2018, <https://www.monch.com/mpg/news/air/3356-anka-dev.html>.
20. "Bayraktar TB2 UAVs make first flight for Turkish Naval Forces," *Daily Sabah*, 17 December 2018, <https://www.dailysabah.com/defense/2018/12/17/bayraktar-tb2-uavs-make-first-flight-for-turkish-naval-forces>.
21. Vladimir Karnozov, "Turkey's Use of UCAVs Over Syria Detailed," *Aviation International Online*, 1 May 2018, <https://www.ainonline.com/aviation-news/defense/2018-05-01/turkeys-use-ucavs-over-syria-detailed>.
22. "Göklerde 50 bin saat," *Defence and Technology*, 14 June 2018, <http://defenceandtechnology.com/2018/06/14/goklerde-50-bin-saat/>.
23. Fergus Kelly, "SDF claims it shot down a Turkish Bayraktar drone that crashed in Afrin," *The Defence Post*, 12 February 2018, <https://thedefensepost.com/2018/02/12/turkey-drone-crash-afrin-bayraktar-sdf/>.
24. Baykar Savunma "Bayraktar TB2 milli İHA ve SİHA'larımız her zaman Mehmetçüğimizin yanında," Facebook, 27 May 2019, https://www.facebook.com/BaykarMakina/videos/336788550342343/?comment_id=2735638896478458&comment_tracking=%7B%22tn%22%3A%22R%22%7D.
25. "4 PKK terrorists killed in airstrike in Turkey's Şırnak province," *Daily Sabah*, 10 June 2017, <https://www.dailysabah.com/war-on-terror/2017/06/10/4-pkk-terrorists-killed-in-airstrike-in-turkeys-sirnak-province>.
26. Ari Khalidi, "Armed Turkish drone kills civilian in Kurdish province," *Kurdistan24*, 1 September 2017, <http://www.kurdistan24.net/en/news/b740cade-2224-48e7-b22a-220cebb9f798>.
27. "Irak-Suriye sınırı İHA birliği," *Defence and Technology*, 28 August 2018, <http://defenceandtechnology.com/2018/08/28/irak-suriye-sinira-ih-a-birligi/>.
28. Vassilis Nedos, "Greece intercepts Turkish drone over Rhodes," *ekathimerini.com*, 6 April 2018, <http://www.ekathimerini.com/227472/article/ekathimerini/news/greece-intercepts-turkish-drone-over-rhodes>.
29. "Turkey's domestic UAVs protecting drilling operations in Eastern Mediterranean," *Daily Sabah*, 8 July 2019, <https://www.dailysabah.com/defense/2019/07/08/turkeys-domestic-uavs-protecting-drilling-operations-in-eastern-mediterranean>.
30. "Baykar's latest twin-engine armed drone to complete test flights in 2019, commissioning due 2020," *Daily Sabah*, 14 June 2018, <https://www.dailysabah.com/defense/2018/06/15/baykars-latest-twin-engine-armed-drone-to-complete-test-flights-in-2019-commissioning-due-2020>.

31. “Akıncı sürü İHA taşıyacak,” *Kokpit.Aero*, 27 May 2019, <http://www.kokpit.aero/akinci-alpagu-yerli-ih>.
 32. “Yeni milli İHA Anka-Aksungur gökyüzüyle buluştu,” *Hurriyet*, 22 March 2019, <http://www.hurriyet.com.tr/teknoloji/yeni-milli-ih-anka-aksungur-gokyuzuyle-bulustu-41157668>.

UNITED ARAB EMIRATES

INVENTORY

Model	Make	Origin	Class	Intro	Qty	Operator	Notes
Seeker 2 ¹	Denel Dynamics	South Africa	II	2003	7	Army	(Status unclear)
Camcopter S-100 ^{2**}	Schiebel	Austria	II	2006	80	Army	“Al Sabr”
Wing Loong 1 ³	AVIC	China	III	2017	3+	Air Force	
Wing Loong 2 ⁴	AVIC	China	III	2018	3+	Air Force	
RQ-1E Predator XP ⁵	GA-ASI	USA	III	2017	10*	Air Force	

**Estimate*

*** Licensed for production by the UAE’s Abu Dhabi Autonomous Systems Investments*

ACTIVE ACQUISITIONS

- The UAE has requested to buy 20 Insitu RQ-21 Blackjack aircraft from the United States.⁶ The proposed sale, which includes associated equipment such as ground control stations, amounts to approximately \$80 million. In May 2019 the U.S. State Department approved the sale as part of a broader arms deal with the UAE, Saudi Arabia, and Jordan.⁷ The deal is opposed by some members of Congress who are against the continuation of U.S. support for the Saudi-led war in Yemen and who may act to prevent the arms deal from going through.

OPERATIONS

Country	Base	Equipment	Period	Operation
Afghanistan		Seeker 200	2009	Enduring Freedom (US)
The UAE deployed a Seeker II to assist British operations in Helmand Province in 2009. ⁸				

Yemen	Assab Airport	Seeker 200, Wing Loong I, Wing Loong II, Predator XP	2015-	Decisive Storm
The UAE deployed several drones as part of the Saudi-led intervention in Yemen. In 2015, a Seeker II, likely belonging to the UAE, was shot down in Yemen.⁹ In 2017 and 2018, both the Wing Loong 1 and 2 were deployed to Assab Airport, a UAE-operated base in Eritrea.¹⁰ It was the first operational deployment for the UAE's Wing Loong 1s and 2s. According to satellite images, it appears as though an Emirati-operated Predator XP was based at Jizan Airport in Saudi Arabia in 2018.¹¹				
Libya	Al Khadim Air Base	Wing Loong I, Camcopter S-100	2016-	
The UAE has deployed Wing Loong Is to Libya in support of the Libyan National Army, a faction that controls the eastern part of the country. The UAE renovated an air base east of Benghazi in Marj province to host the drones and other manned aircraft.¹² Uthman Air Base in Egypt may also have served as a forward base for Emirati aircraft.				

INFRASTRUCTURE	Name	Country	Latitude	Longitude	Affiliation	Activity	Notes
	Assab Air-port	Eritrea	13°04'18"N	42°38'42"E		Deployment	
	Qusahwira Air Base	UAE	22°46'28"N	55°03'51"E	Air Force	HQ	Wing Loong II base
	Liwa Air Base	UAE	23°39'05"N	53°49'21"E	Air Force	HQ	"Al-Safran Air Base" RQ-1E base
	Jizan Air Base	Saudi Arabia	16°54'04"N	042°35'09"E		Deployment	
<u>OTHER</u>							
	Name	Country	Latitude	Longitude	Affiliation	Activity	Notes
	Al Khadim Air Base	Libya	32°00'02"N	21°11'54"E		Deployment	(status unclear)

NOTES

1. "Seeker II UAV shot down in Yemen," defenceWeb, 8 July 2015, http://www.defenceweb.co.za/index.php?option=com_content&view=article&id=39813:seeker-ii-uav-shot-down-in-yemen&catid=35:Aero-space&Itemid=107.
2. "UAE UAVs delivered," *Flight International*, 18 October 2005, <https://www.flightglobal.com/news/articles/uae-uavs-delivered-202192/>.
3. Jeremy Page and Paul Sonne, "Unable to Buy U.S. Military Drones, Allies Place Orders With China," *Wall Street*

- Journal*, 17 July 2017, <https://www.wsj.com/articles/unable-to-buy-u-s-military-drones-allies-place-orders-with-china-1500301716>.
4. Christopher Biggers, "UAE revealed as Wing Loong II launch customer," *Jane's Defence Weekly*, 26 January 2018, <https://www.janes.com/article/77379/uae-revealed-as-wing-loong-ii-launch-customer>.
 5. Ed Clowes, "General Atomics completes delivery of Predator drones to UAE," *Gulf News Business*, 22 February 2017, <https://gulfnews.com/business/general-atomics-completes-delivery-of-predator-drones-to-uae-1.1982936>.
 6. Jeremy Binnie, "UAE orders Insitu Integrator UAVs," *Jane's Defence Weekly*, 1 March 2018, <https://www.janes.com/article/78268/uae-orders-insitu-integrator-uavs>.
 7. Joe Gould, "US lawmakers hope to block Trump's Saudi arms sale push," *Defense News*, 29 May 2019, <https://www.defensenews.com/congress/2019/05/29/us-lawmakers-hope-to-block-trumps-saudi-arms-sale-push/>.
 8. "Seeker II UAV shot down in Yemen," defenceWeb, 8 July 2015, http://www.defenceweb.co.za/index.php?option=com_content&view=article&id=39813:seeker-ii-uav-shot-down-in-yemen&catid=35:Aerospace&Itemid=107.
 9. "Seeker II UAV shot down in Yemen," defenceWeb, 8 July 2015, http://www.defenceweb.co.za/index.php?option=com_content&view=article&id=39813:seeker-ii-uav-shot-down-in-yemen&catid=35:Aerospace&Itemid=107.
 10. Jeremy Binnie, "UAE deploys Wing Loong II UAV to Eritrea," *Jane's Defence Weekly*, 15 August 2018, <https://www.janes.com/article/82382/uae-deploys-wing-loong-ii-uav-to-eritrea>.
 11. Dan Gettinger, "Drone Bases Updates: Jizan, Saudi Arabia," Center for the Study of the Drone, 1 March 2018, <http://dronecenter.bard.edu/drone-bases-updates/>.
 12. "UAE Ops using Wing Loong drones," Arabian Aerospace, 29 March 2017, <https://www.arabianaerospace.aero/uae-ops-using-wing-loong-drones.html>.

NORTH AMERICA

Canada	.....	212
Mexico	.....	215
United States	.....	217

CANADA

INVENTORY

Model	Make	Origin	Class	Intro	Qty	Operator	Notes
RQ-11B Raven ¹	AeroVi-ronment	USA	I	2014		Army	
RQ-20B Puma II AE ²	AeroVi-ronment	USA	I	2018		Navy	
RQ-21 Blackjack ³	Insitu	USA	I	2017	5 (1)	Army	

ACTIVE ACQUISITIONS

- The Royal Canadian Air Force (RCAF) is evaluating options for a strike-capable Class III system under the banner of the Remotely Piloted Aircraft Systems (RPAS) procurement project. The Canadian military began to express an interest in a Class III capability in 2000 with the launch of the Joint Unmanned Surveillance and Target Acquisition System (JUSTAS).⁴ Although the original schedule anticipated that the aircraft would be delivered by 2012, the JUSTAS program was stalled until 2016 due to disagreements over requirements and cost as well as public pushback against the idea. In 2016, the Canadian military released a new request for information, signalling a renewed interest in a Class III UAV capability. In 2017 the government's "Strong, Secure, Engaged" defense strategy called for the procurement of strike drones for the Air Force.⁵ Later that year, the JUSTAS program was renamed the RPAS project. The main competitors for this requirement are General Atomics Aeronautical Systems and Israel Aerospace Industries. Both companies announced partnerships with Canadian firms in 2018 to submit bids for the project.⁶ According to an updated request for information released in April 2019, the RCAF will continue to refine the requirements for the system until it issues a request for proposals in 2021.⁷ It intends to award a contract for the RPAS project by 2023 and begin taking deliveries by 2025.⁸
- Canada has reportedly submitted a bid to purchase an RQ-4 Global Hawk that served as the prototype for the German military's EuroHawk program, which was cancelled in 2013 due to cost overruns.⁹ Canada is considering using the aircraft to surveil its remote Arctic territories. According to media reports, this program may be led by Canada's transportation ministry.¹⁰

INACTIVE

Model	Make	Origin	Class	Period	Qty	Operator	Notes
Sperwer ¹¹	Sagem	France	II	2003-2009	16	Army	Acquired for use in Afghanistan
Silver Fox ¹²	Advanced Ceramics Research	USA	I	2004-2006	9	Army	

Maveric ¹³	Prioria Robotics	USA	I	2010-2011		Army	
Skylark ¹⁴	Elbit	Israel	I	2007-2009		Army	
ScanEagle	Insitu	USA	I	2008-2014		Army, Navy	Leased
Heron ¹⁵	IAI	Israel	III	2008-2011	3	Air Force	Leased

PERSONNEL

ARMY

Name	HQ	Type	Equipment	Activated
4th Artillery Regiment (General Support), Canadian Combat Support Brigade ^{16,17}	CFB Gagetown	P	RQ-21A Blackjack	2014
The 4th Air Defense Regiment (4th AD Regt) began operating drones in 2003 with the acquisition of the Sperwer. In 2014, the 4th AD Regt merged with the 4th Field Regiment Self-Propelled to form the 4th Artillery Regiment General Support, or 4 Regt (GS). In 2017, the 4th Regt (GS) assumed responsibility for the RQ-21A Blackjack. In addition to drones, the 4th Regt (GS) also operates radar systems.				

OPERATIONS

Country	Base	Equipment	Period	Operation
Afghanistan	Multiple	Multiple	2003-2011	Enduring Freedom
The Canadian Armed Forces deployed the Sperwer to Kabul, Afghanistan in October 2003, marking Canada's first operational UAV deployment. ¹⁸ The 2nd Royal Canadian Horse Artillery and the 4th Air Defense Artillery Regiment (4 AD Regt) were initially responsible for these operations. In 2006 the 4 AD Regt partnered with the Air Force's 408 Tactical Helicopter Squadron to operate the Sperwer from Kandahar Air Base. Canada withdrew the Sperwer from Afghanistan in 2009 and retired the aircraft from service. In 2008 and 2009, Canadian forces introduced leased ScanEagles and Herons for its operations in the country. ¹⁹ The deployment of these new systems was driven in part by the Manley report, a January 2008 assessment of Canada's force structure in Afghanistan which determined that Canadian Forces urgently needed a persistent, high-performance UAV in theater. ²⁰ To operate the ScanEagle, the Army activated the Small UAV Troop, 4th Air Defense Artillery Regiment, which deployed to Afghanistan in September 2008. The Air Force's Heron UAV Detachment, also known as Task Force Erebus, deployed to Kandahar in early 2009. The Air Force and Army withdrew their ScanEagles and Herons from Afghanistan in 2011 following the end of Canada's combat mission. Over the course of the deployment, Canadian Forces in Afghanistan were also variously equipped with the Class I drones such as the Silver Fox, Skylark, and Maveric.				

Mediterranean	ScanEagle	2012-2014	Metric (CA)

Between 2012 and 2014, the Royal Canadian Navy and Army jointly deployed ScanEagles in Operation Metric, the Canadian contribution to Operation Active Endeavor, a NATO-led maritime security and counter-terrorism operation in the Mediterranean Sea.²¹ The aircraft, which were operated by small team of specialists from the Army's 4th Air Defense Artillery Regiment, were deployed on board the *HMCS Charlottetown* (2012), *HMCS Toronto* (2013), and *HMCS Regina* (2014).

NOTES

1. Graham Warwick, "Canada Will Deploy Raven UAV to Field Units," *Aviation Week*, 23 December 2013, <http://aviationweek.com/defense/canada-will-deploy-raven-uav-field-units>.
2. David Pugliese, "Royal Canadian Navy getting new miniature maritime drone this summer- Update on defence industry news and contracts," *Ottawa Citizen*, 24 April 2018, <https://ottawacitizen.com/news/national/defence-watch/royal-canadian-navy-getting-new-miniature-maritime-drone-this-summer-update-on-defence-industry-news-and-contracts>.
3. Beth Stevenson, "Canada Becomes First Export Customer For Blackjack," *Flight Global*, 30 August 2016, <https://www.flightglobal.com/news/articles/canada-becomes-first-export-customer-for-blackjack-u-428899/>.
4. Danny Garrett-Rempel, "Will JUSTAS Prevail? Procuring a UAS Capability for Canada," *The Royal Canadian Air Force Journal* 4, no. 1 (Winter 2015), <http://www.rcaf-arc.forces.gc.ca/en/cf-aerospace-warfare-centre/library/journal/2015-vol4-iss1-05-will-justas-prevail.page>.
5. Murray Brewster and Peter Zimonjic, "Armed drones are the future, but discussion needed on how we use them, Trudeau says," *CBC*, 8 June 2017, <https://www.cbc.ca/news/politics/trudeau-drone-vance-armed-1.4152342>.
6. Chris Pocock, "Teams Form To Bid For Canada's RPAS," *Aviation International Online*, 31 May 2018, <https://www.ainonline.com/aviation-news/defense/2018-05-31/teams-form-bid-canadas-rpas>.
7. "RPAS Project - Draft ITQ (W847A-190247/A)," [Buyandsell.gc.ca](http://buyandsell.gc.ca), accessed 11 April 2019, <https://buyandsell.gc.ca/procurement-data/tender-notice/PW-RPS-002-27265>.
8. "Remotely Piloted Aircraft System (RPAS)," Canada.ca, last modified 2 July 2019, <https://www.canada.ca/en/department-national-defence/services/procurement/remotely-piloted-aircraft-system.html>.
9. Andrea Shalal, "Canada bids for mothballed prototype drone from Germany," *Reuters*, 20 February 2019, https://www.reuters.com/article/us-germany-military-eurohawk-idUSKCN1Q91IH?utm_campaign=trueAnthem:+Trending+Content&utm_content=5c6dea4700bd470001700e95&utm_medium=trueAnthem&utm_source=twitter.
10. Murray Brewster, "Transport Canada looking at used German drone to patrol Arctic," *CBC*, 25 September 2018, <https://www.cbc.ca/news/politics/drone-arctic-transport-canada-1.4838364>.
11. Sara Keddy, "UAV display brings modern history to Greenwood museum," *Royal Canadian Air Force*, accessed 24 September 2018, <http://www.rcaf-arc.forces.gc.ca/en/article-template-standard.page?doc=uav-display-brings-modern-history-to-greenwood-museum/hwn8upn9>.
12. Canadian Department of National Defence, "Canadian Forces Purchases Mini UAV System," news release, 4 May 2004, http://www.defense-aerospace.com/articles-view/release/3/38284/canada-to-buy-silver-fox-mini_uav-%28may-5%29.html.
13. "New Wings Coming to the CAF in 2014," *Canadian Armed Forces*, accessed on 25 September 2018, <http://www.forces.gc.ca/en/news/article.page?doc=new-wings-coming-to-the-caf-in-2014/hpf8gsvq>.
14. Ibid
15. Steve Rennie, "Military to disband drone team after Afghan mission ends," *The Globe and Mail*, 11 January 2011, <https://www.theglobeandmail.com/news/national/military-to-disband-drone-team-after-afghan-mission-ends/article561248/>.
16. Ken Pole, "Blackjack: Army Hits 21 With New Ace In The Sky," *Canadian Army Today*, Fall 2017: 59–61, <https://s3.amazonaws.com/canadianarmytoday/downloads/CanadianArmyToday-Issue1.pdf>.
17. MCpl Dave McCord, "Army gets on board for equipment testing," *Canadian Army*, accessed on 29 September 2018, <http://www.army-armee.forces.gc.ca/en/news-publications/national-news-details-no-menu.page?doc=army-gets-on-board-for-equipment-testing/isvdlmu1>.
18. Murray Brewster, "Pilot-less in Afghanistan," *The Globe and Mail*, 18 March 2006, <https://www.theglobeandmail.com/news/national/pilot-less-in-afghanistan/article1096213/>.
19. Capt. Nick Morris, "ScanEagle," *The Maple Leaf*, 29 October 2008, <https://manualzz.com/doc/18253258/wel-come-to-rmc-bienvenue-au-cmr>.
20. Independent Panel on Canada's Future Role in Afghanistan, John Manley, et al. No: FR5-20/1-2008, 2008, http://publications.gc.ca/collections/collection_2008/dfa/maeci/FR5-20-1-2008E.pdf.
21. T.F.J. Leversedge, "Boeing/Insitu CU-165 ScanEagle Canadian Forces Serial Number 165909," *Canada Aviation and Space Museum Aircraft*, <https://documents.techno-science.ca/documents/CASM-AircraftHistories-BoeingScanEagle.pdf>.

MEXICO

INVENTORY

Model	Make	Origin	Class	Intro	Qty	Operator	Notes
Orbiter II ¹	Aeronautics	Israel	I	2013	5		
T-20 JUMP ²	Arcturus	USA	I	2016	6 (2)	Navy	
S4 Ehécatl ³	Hydra Technologies	Mexico	I	2012	10	Air Force	
G1 Guerrero ⁴	Hydra Technologies	Mexico	I	2012		Air Force	
S45 Baalam ⁵	Hydra Technologies	Mexico	II	2017	3*	Air Force	
Hermes 450 ⁶	Elbit Systems	Israel	II	2009	3	Air Force	

PERSONNEL

AIR FORCE

Name	HQ	Type	Equipment	Activated
601st Air Squadron ^{7,8}	Escuadrón Aéreo 601	Air Station No. 9 Atlangatepec	D	Hermes 450, S4 Ehécatl, G1 Guerrero

Formerly the Unmanned Aircraft Systems Squadron (Escuadrón de Sistemas Aéreos No Tripulados), the 601st is reportedly comprised of approximately 250 personnel. Since 2010 it has supported the Secretariat of Defense's Command and Control Center of the Integrated Air Surveillance System (Centro de Mando y Control del Sistema Integrado de Vigilancia Aérea).

TRAINING

- The Mexican Navy created the Center for Training in Unmanned Aerial Systems (Centro de Capacitación de Sistemas Aéreos No Tripulados or CENCASANT) at the Heroica Escuela Naval Militar, the service's officer training academy in Veracruz, in 2015. The Center offers a six-month training course for the positions of Mission Coordinator, Pilot, and Maintenance Technician. In July 2017 the Center graduated 26 students in these fields, some of whom came from other government agencies besides the

Navy.⁹**OPERATIONS**

- The Mexican military has deployed its unmanned aircraft for counter-drug, counter-piracy, and border security operations. In the 2017 National Development Plan, the Mexican Air Force reported that its unmanned aircraft—the Hermes 450, S4 Ehécatl, and G1 Guerrero—had accumulated 2,780 flight hours during the 2017 calendar year in these roles.¹⁰

INFRASTRUCTURE

Name	Country	Latitude	Longitude	Affiliation	Activity	Notes
Air Station No. 9 Atlán- gatepec	Mexico	19°31'54"N	98°10'38"W	UAV Sqn	HQ	
Agualeguas National Airport	Mexico	26°20'02"N	99°32'33"W	UAV Sqn	Deployment	H450 site

DEVELOPMENT

- The *Sistema de Patrullaje Autónomo y de Reconocimiento Táctico Aéreo de la Armada de México* (SPARTAAM) is a Class I UAV designed by the Mexican Navy's Institute of Research and Technological Development (INIDETAM). The drone is designed to assist search and rescue and disaster relief operations. The Mexican Navy announced in July 2018 that it would begin production of the SPARTAAM with the goal of equipping three dedicated teams with the system.¹¹

NOTES

1. "La Defensa Nacional de México confirma el uso de UAV para vigilar infraestructura petrolera," *Infodefensa.com*, 8 November 2013, <http://www.infodron.es/id/2013/11/08/noticia-la-defensa-nacional-de-mexico-confirma-el-uso-de-uav-para-vigilar-infraestructura-petrolera-2.html>.
2. Secretaría de Marina, "Entrega e inicio de operaciones de un Sistema Aereo no Tripulado," news release, 29 July 2016, <https://www.gob.mx/semar/prensa/entrega-e-inicio-de-operaciones-de-un-sistema-aereo-no-tripulado?idiom=es>.
3. Peter La Franchi, "Mexico throws its hat into the ring with Ehecattl," *FlightGlobal*, 18 June 2007, <https://www.flightglobal.com/news/articles/mexico-throws-its-hat-into-the-ring-with-ehecattl-214770/>.
4. Secretaría de la Defensa Nacional, "5to Informe de Labores 2016–2017," 1 September 2017, <http://gaceta.diputados.gob.mx/Gaceta/63/2017/sep/Sedena-20170912.pdf/>.
5. Jesús Aranda, "La Sedena usa aviones no tripulados en la lucha contra el crimen organizado," *La Jornada*, August 23, 2010, <http://www.jornada.com.mx/2010/08/23/politica/008n1pol>.
6. "El S45 Balaam de la FAM se estrella en México," *Infodron.es*, 9 September 2018, <http://infodron.es/id/2018/09/11/noticia-balaam-estrella-mexico.html>.
7. Kaiser David Konrad, "La Fuerza Aérea mexicana en la guerra contra el narcotráfico," *Diálogo*, 18 July 2016, <https://dialogo-americas.com/es/articles/mexican-air-force-engaged-fight-against-drug-trafficking>.
8. M. Garcia and J.A. Quevedo, "La Fuerza Aérea mexicana premia a Hydra por uno de sus UAV," *Infodron.es*, May 17, 2017, <http://www.infodron.es/id/2017/05/17/noticia-hydra-technologies-reconocido-fuerza-aerea-mexicana.html>.
9. Universidad Naval, "Se gradúa la 5ta. Generación de Sistemas Aéreos No Tripulados (SANT)," news release, 2017, <https://www.gob.mx/universidadnaval/articulos/se-gradua-la-5ta-generacion-de-sant-del-cencasant>.
10. Secretaría de Hacienda y Crédito Público, *Plan Nacional de Desarrollo 2013-2018*, (Ciudad de México: Gobierno de los Estados Unidos Mexicanos, March 2018), https://www.gob.mx/cms/uploads/attachment/file/313371/5_IE_PND_VERSION_FINAL_190318_RGB.pdf.
11. "La Armada de México producirá en serie su UAV Spartaam," *Infodron.es*, 20 July 2018, <http://infodron.es/id/2018/07/20/noticia-armada-mexico-producira-serie-spartaam.html>.

UNITED STATES

INVENTORY

Model	Make	Origin	Class	Intro	Qty*	Operator	Notes
PD-100 Black Hornet 2	FLIR Sys- tems	USA	I	2016	1,284	Army, Marines	
SkyRanger	Aeryon Labs	Canada	I	Mid-2010s		Ma- rines,Air Force	
Switch- blade	AeroVi- ronment	USA	I	Mid-2010s		Army, Marines	Loitering munition
RQ-11B Raven	AeroVi- ronment	USA	I	2006	8,610	Army,Ma- rines, Air Force	
RQ-20 Puma	AeroVi- ronment	USA	I	2008	1,541	Army,Air Force,Ma- rines, Special Operations	
RQ-12 Wasp	AeroVi- ronment	USA	I		1,080	Ma- rines,Spe- cial Opera- tions	
ScanEagle	Insitu	USA	I	2004	206		Contractor- operated
RQ-21 Integrator	Insitu	USA	I		60	Marines	
InstantEye Mk2 Gen3	Physical Sciences	USA	I	Mid-2010s	72	Marines	
Stalker	Lockheed Martin	USA	I			Special Operations	
MQ-19 Aerosonde	AAI	USA	I			Special Operations	
RQ-7 Shadow	Textron	USA	II	2003	544	Army	

* Estimate based on DoD Unmanned Systems Roadmaps and annual budget justification documents up to FY19.

RQ-23 Tigershark	Navmar Applied Sciences Corpora- tion	USA	II		6	Test plat- form
RQ-5 Hunter	Northrop Grumman, IAI	USA,Israel	III	1995		Fmr. Army system; contractor- operated
MQ-8B Fire Scout	Northrop Grumman	USA	III	2007	32	Navy
MQ-8C Fire Scout	Northrop Grumman	USA	III	2019		Navy
MQ-9 Reaper	GA-ASI	USA	III	2007	275	Air Force
MQ-1C Gray Eagle	GA-ASI	USA	III	2009	134	Army
RQ-4 Global Hawk	Northrop Grumman	USA	III	2001	36	Air Force
MQ-4 Triton	Northrop Grumman	USA	III	2018	4	Navy
RQ-170 Sentinel	Lockheed Martin	USA	III	2007		Air Force
RQ-180	Northrop Grumman	USA	III	2015		Air Force
MQ-25 Stingray	Boeing	USA	III	2025		Navy

ACTIVE ACQUISITIONS

- The Army's Future Tactical Unmanned Aerial System (FTUAS) program is evaluating potential replacements for the RQ-7 Shadow. The Army is seeking an aircraft that, unlike the RQ-7 Shadow, does not need a runway for launch or recovery, unlike the Shadow.¹ The Army selected Martin UAV and Textron Systems' AAI Corporation to compete to provide the FTUAS systems in March 2019.² The Army awarded both companies \$99.5 million indefinite delivery, indefinite quantity contracts to produce demonstrator aircraft—the Martin UAV VBAT and Textron AAI Aerosonde HQ—that will be fielded with six TUAS Platoons for testing and evaluation. The Army expects to begin the formal acquisition process for the FTUAS in 2021, though this may change depending on the results of these tests.³
- The Army's Short Range Reconnaissance (SRR) UAS program (previously known as Short Range Micro) is evaluating a low-cost, backpackable Class I UAV for platoon and company-level units. According to desired specifications published in November 2018, it should weigh no more than 1.36 kilograms and have a 30 minute flight endurance.⁴ In April 2019, the U.S. Defense Innovation Unit and the Army awarded six companies—Parrot, Skydio, Altavian, Teal Drones, Vantage Robotics, and Lumenier—con-

tracts to develop drones for the SRR program.⁵

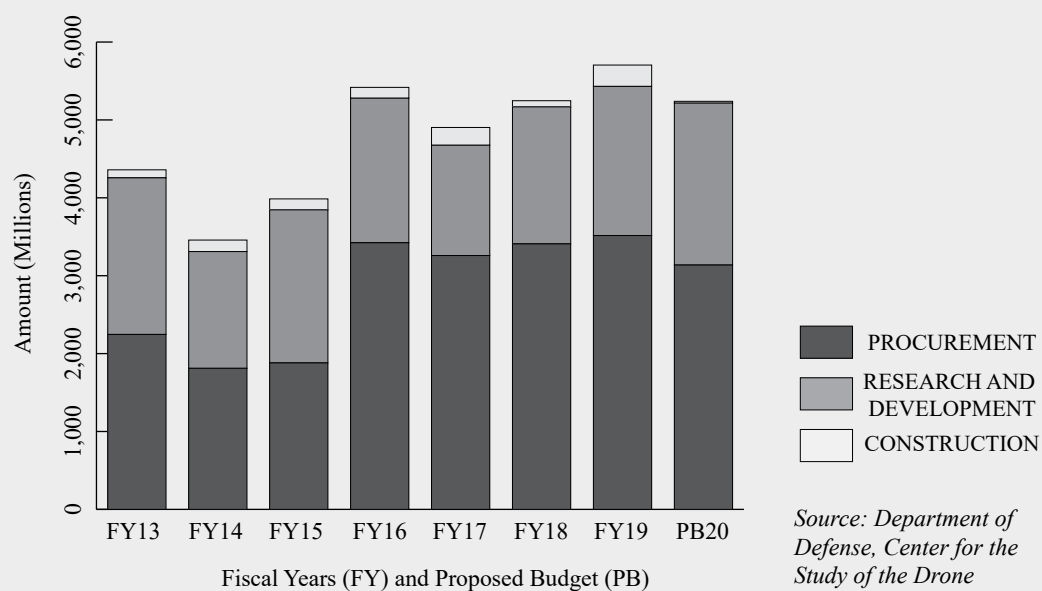
- The Army's Soldier Borne Sensor (SBS) is a program aimed at outfitting every Army squad with an ultra-portable, backpackable drone. In May 2018 the Army awarded FLIR an initial \$2.6 million contract for 60 Black Hornet III micro-drones under the program, and then another \$39.6 million in January 2019.^{6,7} Although FLIR did not disclose the exact number of Black Hornets the Army intends to acquire under the second contract, the quantity is estimated at around 2,000 based on Army budget documents. Ultimately, the Army could acquire as many as 7,000 systems under the SBS program, although it is not certain as of this writing that all of these will be Black Hornets.⁸
- The Marine Corps' Marine Air-Ground Task Force UAS Expeditionary program (MUX) is evaluating the acquisition of a Class III high-altitude long-endurance system with a range of 350 to 700 nautical miles and an endurance of up to 48 hours, capable of deploying on board helicopter-capable amphibious ships. In 2018 the Marines began refining the requirements for the MUX and intends to select a prototype aircraft in Fiscal Year 2020 for testing and evaluation.⁹ In its Fiscal Year 2020 budget, the Navy and Marine Corps announced that it would procure several MQ-9 Reapers, which could help prepare the Corps for acquiring and operating a future MUX system.¹⁰
- The Navy's Carrier Based Aerial Refueling System (CBARS) is a program to acquire an aircraft carrier-based refueler drone that could extend the operational range of manned fighter jets. The Navy unveiled the concept in 2016, designating the system as the MQ-25 Stingray.¹¹ In 2018, after a competition between Boeing, General Atomics Aeronautical Systems, and Lockheed Martin, the Navy selected Boeing's design, awarding it an \$805 million contract for an initial four aircraft.¹² The Navy is intending to continue to develop and test the Stingray until 2024, when it hopes to be able to make an initial operational capability decision. Meanwhile, according to a March 2019 media report, the Air Force may also be considering acquiring a similar unmanned aircraft to replace some of its manned tankers.¹³
- Beginning in Fiscal Year 2019, the Air Force launched a small program to procure the RQ-20B Puma. The Air Force intends to acquire a total of 111 systems—approximately 222 aircraft—through Fiscal Year 2024. The Pumas are expected to be used for base perimeter security.¹⁴
- The Air Force's Low-Cost Attritable Strike Demonstrator is a program to develop an unmanned aircraft that is capable of accompanying fighter aircraft. A June 2019 media report indicated that the Air Force may acquire another 20 to 30 Valkyries in the coming years in an effort to accelerate the development of this system.¹⁵ See page 245 for more information.

INACTIVE

Model	Make	Origin	Class	Period	Qty	Operator	Notes
FQM-151 Pointer	AeroVironment	USA	I	1989-Early 2000s	200 (100)	Army, Marines, Special Operations	
RQ-14A Dragon Eye	AeroVironment	USA	I	2001- Unknown	400	Marines	"ISURSS"
RQ-11A Pathfinder	AeroVironment	USA	I	2004- mid-2010s		Army, Special Operations	Interim solution prior to RQ-11B
Desert Hawk	Lockheed Martin	USA	I			Air Force	
T-Hawk	Honeywell	USA	I			Army	"MAV" (status unclear)

Nighthawk		USA	I	Early 2000s - Unknown	Air Force	“BAT-CAM”
Silver Fox	BAE	UK	I	Early 2000s - Unknown	Marines	
XPV-1 Tern	BAI Aerosys-tems	USA	I	2001	Navy, Special Operations	
XPV-2 Mako	BAI Aerosys-tems	USA	I	Early 2000s - Unknown	Navy, Special Operations	
RQ-2 Pioneer ¹⁶	AAI, IAI	USA, Israel	II	1986-2007	Navy/Marines	
Mastiff	Tadiran	Israel	II	1985-Late 1980s	Navy/Marines	
GNAT-750	GA-ASI	USA	III	1994		Trial platform
Improved GNAT	GA-ASI	USA	III	2004-Unknown	Army	“I-GNAT”;
R/MQ-1 Predator ¹⁷	GA-ASI	USA	III	1995-2018	110	Air Force

Figure 11: U.S. Defense Spending on Unmanned Aircraft



PERSONNEL

AIR FORCE

- The following tables reflect the Air Force units that are responsible for piloting the RQ-4 Global Hawk and MQ-9 Reaper. An undisclosed number of Air Force units are variously equipped with Class I drones.¹⁸ The Air Force's Special Tactics Teams and the Security Forces are equipped with the RQ-11B Raven, RQ-20 Puma, and RQ-12 Wasp.¹⁹ Air Force civil engineer squadrons are incorporating the SkyRanger into the Rapid Airfield Damage Assessment System, an effort to use various manned and unmanned systems to assess and repair base infrastructure.²⁰

Name	HQ	Type	Equipment	Activated
1st Reconnaissance Squadron, 9th Operations Group, 9th Reconnaissance Wing, Air Combat Command	Beale AFB	P	RQ-4 Global Hawk	2002
Formed in 1913 as the 1st Provisional Aero Squadron, the 1st Reconnaissance Sqn today provides initial pilot training for the RQ-4 Global Hawk and the manned U-2 Dragon Lady. ²¹ It is the oldest flying unit in the U.S. military.				
12th Reconnaissance Squadron, 69th Reconnaissance Group, 9th Reconnaissance Wing, Air Combat Command	Beale AFB	D	RQ-4 Global Hawk	2001
Formed in 1917 as the 12th Aero Squadron, the 12th served in various capacities until 1992 when it was deactivated. ²² It was reactivated in 2001 as the first unit to operate the Global Hawk and participated in Operations Enduring Freedom (Afghanistan) and Iraqi Freedom. In 2017 the 12th became one of the first two units since 1942 to allow enlisted (non-officer) airmen to fly aircraft in operational sorties. ²³				
7th Reconnaissance Squadron, 69th Reconnaissance Group, 9th Reconnaissance Wing, Air Combat Command	NAS Sigonella	D	RQ-4 Global Hawk	2015
Formed in 1917 as the 7th Aero Squadron, the 7th was deactivated in 1946. It was reactivated in March 2015 as the 7th Reconnaissance Squadron and equipped with the Global Hawk. ²⁴ It is based in Sicily and, as of 2016, is comprised of 85 active duty and 67 civilian personnel.				
348th Reconnaissance Squadron, 69th Reconnaissance Group, 9th Reconnaissance Wing, Air Combat Command	Grand Forks AFB	D	RQ-4 Global Hawk	2011
Formed in 1942 as the 348th Bombardment Squadron, the 348th was deactivated in 1973. It was reactivated in 2011 as the 348th Reconnaissance Squadron and tasked with conducting Global Hawk operations. ²⁵				



6th Attack Squadron, 49th Operations Group, 49th Wing, Nineteenth Air Force, Air Educa- tion and Training Command	Holloman AFB	D	MQ-9 Reaper	2009

The 6th Attack Sqn provides pilot and sensor operator training for the MQ-9 Reaper. As of early 2017, it had trained 752 pilots and 544 sensor operators. It transitioned from the Predator to the Reaper in 2017.²⁶

9th Attack Squadron, 49th Operations Group, 49th Wing, Nineteenth Air Force, Air Educa- tion and Training Command	Holloman AFB	D	MQ-9 Reaper	2009

Formed in 1941 as the 9th Fighter Squadron, the Air Force redesignated the 9th in 2012 as the 9th Attack Squadron in 2012 and tasked it with training new Reaper pilots and sensor operators.²⁷

29th Attack Squadron, 49th Operations Group, 49th Wing, Nineteenth Air Force, Air Educa- tion and Training Command	Holloman AFB	D	MQ-9 Reaper	2009

Formed in 1942 as the 13th Observation Squadron, the 29th was reactivated in 2009 after a period of inactivity. It is responsible for training Reaper pilots and sensor operators.²⁸

26th Weapons Squadron, 57th Wing, Air Com- bat Command	Nellis AFB	D	MQ-9 Reaper	2008

Formed in 1940 as the 26th Pursuit Squadron, the 26th was reactivated as the 26th Weapons Squadron in 2008 after a period of inactivity.²⁹ As a part of the Weapons School at Nellis Air Force Base, the 26th provides specialized combat training to Reaper sensor operators in a program called the Weapons Officer and Sensor Operator Advanced Tactics Course.³⁰

11th Attack Squadron, 432nd Operations Group, 432nd Wing, Air Combat Command	Creech Air Force Base	D	MQ-9 Reaper	1995

Formed in World War II, the 11th Sqn began operating drones in the 1970s. After a period of inactivity in the 1980s, the Air Force redesignated the unit in 1995 as the 11th Reconnaissance Squadron and equipped it with the MQ-1 Predator, becoming the first Air Force unit to operate the Predator.³¹ In 2016 the Air Force equipped it with the Reaper and redesignated it as the 11th Attack Squadron.³²

15th Attack Squadron, 432nd Operations Group, 432nd Wing, Air Combat Command	Creech Air Force Base	D	MQ-9 Reaper	1997

Formed in May 1917 as the 2nd Aviation School Squadron, the 15th began operating drones in 1997.³³ It was redesignated the 15th Reconnaissance Sqn and equipped with the MQ-1 Predator, the second Air Force squadron after the 11th Sqn to operate the Predator. It transitioned to the Reaper in 2016, becoming the 15th Attack Sqn.



20th Attack Squadron, 432nd Operations Group, 432nd Wing, Air Combat Command	Whiteman AFB	D	MQ-9 Reaper	2011

Formed in 1940 as the 20th Transport Squadron, the 20th began operating drones in 2011 when it was redesignated as the 20th Reconnaissance Sqn and equipped with the MQ-1 Predator.³⁴ It transitioned to the Reaper in 2016, becoming the 20th Attack Sqn.³⁵

42nd Attack Squadron, 432nd Operations Group, 432nd Wing, Air Combat Command	Creech AFB	D	MQ-9 Reaper	2006

Formed in 1917 as the 42nd Aero Squadron, the 42nd began operating drones in 2006, when it was equipped with the MQ-9 Reaper and redesignated the 32nd Attack Squadron.³⁶ It was the first Air Force unit activated to operate the Reaper.³⁷

89th Attack Squadron, 432nd Operations Group, 432nd Wing, Air Combat Command	Ellsworth AFB	D	MQ-9 Reaper	2011

Formed as the 89th Aero Squadron in 1917, the 89th began operating drones in 2012. It was redesignated the 89th Attack Sqn in 2016.^{38,39}

489th Attack Squadron, 432nd Operations Group, 432nd Wing, Air Combat Command	Creech AFB	D	MQ-9 Reaper	2016

Formed as the 77th Aero Squadron in 1917, the 489th began operating drones in 2016, when it was tasked with remotely operating the MQ-1 Predator and MQ-9 Reaper.⁴⁰ Personnel from the 489th operated the final Air Force MQ-1 Predator flight in 2018 before the aircraft was decommissioned.⁴¹

17th Attack Squadron, 732nd Operations Group, 432nd Wing, Air Combat Command	Creech AFB	D	MQ-9 Reaper	2002

Formed as the 17th Photographic Reconnaissance Squadron in 1942, the 17th began operating drones in 2002, when it was equipped with the MQ-1 Predator and redesignated the 17th Reconnaissance Sqn.⁴² It transitioned to the Reaper in 2007, becoming the 17th Attack Sqn.

22nd Attack Squadron, 732nd Operations Group, 432nd Wing, Air Combat Command	Creech AFB	D	MQ-9 Reaper	2012

Formed as the 46th Bombardment Squadron in 1940, the 22nd began operating drones in 2012, when it was equipped with the MQ-9 Reaper.⁴³

30th Reconnaissance Squadron, 732nd Operations Group, 432nd Wing, Air Combat Command	Creech AFB	D	RQ-170 Sentinel	

The 30th Reconnaissance Squadron has operated the secretive RQ-170 reconnaissance drone since at least 2011.^{44,45}



44th Reconnaissance Squadron, 732nd Operations Group, 432nd Wing, Air Combat Command	Creech AFB	D		2015

Formed as the 44th Aero Squadron in 1917, the 44th began operating drones in 2015 when it was reactivated to operate a classified unmanned aircraft.⁴⁶ The exact type of aircraft and mission of this unit is not known.⁴⁷

867th Attack Squadron, 732nd Operations Group, 432nd Wing, Air Combat Command	Creech AFB	D	MQ-9 Reaper	2012

Formed as the 92nd Aero Squadron in 1917, the 867th began operating drones in 2012. It is believed to be equipped with the MQ-9 Reaper.^{48,49}

50th Attack Squadron, 25th Attack Group, 432nd Wing, Air Combat Command	Shaw AFB	D	MQ-9 Reaper	2018

Formed as the 50th Aero Squadron in 1917, the 50th began operating drones in 2018 when the Air Force reactivated the unit to operate the MQ-9 Reaper. It is subordinated to the 25th Attack Group, which was also stood up in 2018.⁵⁰

482nd Attack Squadron, 25th Attack Group, 432nd Wing, Air Combat Command	Shaw AFB	D	MQ-9 Reaper	2018

Formed as the 70th Aero Squadron in 1917, the Air Force activated the 482nd as an MQ-9 Reaper squadron in 2018. It is subordinated to the 25th Attack Group, which was also stood up in 2018.⁵¹

78th Attack Squadron, 726th Operations Group, 926th Wing, Air Force Reserve Command	Creech AFB	D	MQ-9 Reaper	2006

Formed as the 78th Aero Squadron in 1918, the Air Force Reserve Command reactivated the unit as the 78th Reconnaissance Squadron in 2006 to conduct UAV operations.⁵² The 78th Sqn provides reservist UAV pilots and sensor operators to active-duty units with the 432nd Wing. It was redesignated the 78th Attack Sqn in 2010.

91st Attack Squadron, 726th Operations Group, 926th Wing, Air Force Reserve Command	Creech AFB	D	MQ-9 Reaper	2013

The Air Force Reserve Command activated the 91st Attack Squadron in 2013 to conduct UAV operations.⁵³ Like the 78th Attack Squadron, the 91st provides reservist UAV pilots and sensor operators to active-duty units with the 432nd Wing.



13th Reconnaissance Squadron, 726th Operations Group, 926th Wing, Air Force Reserve Command	Beale Air Force Base	D	RQ-4 Global Hawk	2005

Formed as the 13th Photographic Reconnaissance Squadron in 1942, the 13th began operating drones in 2005, when the Air Force Reserve Command activated it to operate the Global Hawk.⁵⁴ The 13th provides reservist UAV pilots and sensor operators to active-duty units with the 9th Reconnaissance Wing.

429th Attack Squadron, 726th Operations Group, 926th Wing, Air Force Reserve Command	Holloman AFB	D	MQ-9 Reaper	2013

Formed in 1917 as the 41st Aero Squadron, the 429th was reactivated in 2013 to support MQ-1 and MQ-9 Reaper training at Holloman Air Force Base.⁵⁵

AIR FORCE NATIONAL GUARD

Name	HQ	Type	Equipment	Activated

136th Attack Squadron, 107th Operations Group, 107th Attack Wing, New York Air National Guard	Niagara Falls Air Reserve Station	D	MQ-9 Reaper	2017

Although it began operating drones in 2014, the 136th Squadron formally transitioned from flying the manned C-130 Hercules transport aircraft to the MQ-9 Reaper in 2017, becoming the 136th Attack Squadron.^{56,57}

110th Air Operations Group, 110th Wing, Michigan Air National Guard	Battle Creek Air National Guard Base	D	MQ-9 Reaper	2015

The 110th Wing transitioned from the C-21 Learjet to the MQ-9 Reaper in 2015.⁵⁸

103rd Attack Squadron, 111th Operations Group, 111th Attack Wing, Pennsylvania Air National Guard ⁵⁹	Horsham Air National Guard Station	D	MQ-9 Reaper	2016

118th Operations Group, 118th Wing, Tennessee Air National Guard	Berry Field Air National Guard Base	D	MQ-9 Reaper	2012



The 118th transitioned from flying the C-130 Hercules transport aircraft to the MQ-9 Reaper in 2012.⁶⁰

178th Attack Squadron, 119th Operations Group, 119th Wing, North Dakota Air National Guard	Fargo Air National Guard Base	D	MQ-9 Reaper	2007

The 119th Wing transitioned from flying the F-16 fighter to the MQ-1 Predator in 2007.^{61,62,63}

124th Attack Squadron, 132d Operations Group, 132d Wing, Iowa Air National Guard ⁶⁴	Des Moines Air National Guard Base	D	MQ-9 Reaper	2017

111th Attack Squadron, 147th Operations Group, 147th Attack Wing, Texas Air National Guard	Ellington Field Joint Reserve Base	D	MQ-9 Reaper	2008

Formed as the 111th Observation Squadron in 1923, the 111th began flying the MQ-1B Predator in 2008 as the 11th Reconnaissance Squadron.^{65,66} In 2015 the 111th had accumulated 100,000 combat flight hours with the Predator.⁶⁷ It transitioned to flying the Reaper in 2017, becoming the 111th Attack Squadron.⁶⁸

196th Attack Squadron, 163rd Operations Group, 163rd Attack Wing, California Air National Guard	March Air Reserve Base	D	MQ-9 Reaper	2006

The 163rd Wing transitioned from flying the KC-135 to the MQ-1B Predator in 2006, becoming the first Air National Guard unit to fly the Predator.⁶⁹ It was redesignated the 163rd Attack Wing in 2015 after transitioning to the MQ-9 Reaper.

178th Operations Group, 178th Wing, Ohio Air National Guard	Springfield Air National Guard Base	D	MQ-9 Reaper	2014

The 178th formally transitioned from flying the F-16 Falcon fighter jet to the MQ-1B Predator in 2014, becoming the 178th Wing. It transitioned from the Predator to the MQ-9 Reaper in 2017.⁷⁰

214th Attack Squadron, 214th Attack Group, 162d Wing, Arizona Air National Guard	Davis-Monthan Air Force Base	D	MQ-9 Reaper	2007

The 214th began operating the MQ-1 Predator in 2007. It transitioned to the Reaper in 2014, becoming the 214th Attack Group.⁷¹



138th Attack Squadron, 174th Attack Wing, New York Air National Guard	Hancock Field Air National Guard Base	D	MQ-9 Reaper	2012
The 174th Wing began transitioning from the F-16 Fighting Falcon to the MQ-9 Reaper in 2009, when it was still known as the 174th Fighter Wing. It was redesignated the 174th Attack Wing in 2012. ⁷²				
184th Attack Squadron, 188th Operations Group, 188th Wing, Arkansas Air National Guard ⁷³	Ebbing Air National Guard Base	D	MQ-9 Reaper	2015

NAVY

- The Navy's Helicopter Marine Strike (HSM) and Helicopter Sea Combat (HSC) squadrons are responsible for operating the MQ-8 Fire Scout. These units, which typically fly the manned MH-60 helicopter, are equipped with the Fire Scout for deployments on board air-capable ships such as the Littoral Combat Ship.⁷⁴ In addition to the three units below, other Navy HSM and HSC squadrons may deploy with the Fire Scout on a regular basis.

Name	HQ	Type	Equipment	Activated
Unmanned Patrol Squadron One Nine (VUP-19), Patrol and Reconnaissance Wing 11 ⁷⁵	NAS Jacksonville, NB Ventura County	D	MQ-4C Triton	2013
Air Test and Evaluation Squadron 24 (UX-24) ⁷⁶	Webster Outlying Field	D	MQ-8C Fire Scout	2018
Helicopter Marine Strike Squadron 35 "Magicians" (HSM-35) ⁷⁷	NAS North Island	P	MQ-8B Fire Scout	2013

MARINES

Name	HQ	Type	Equipment	Activated
Marine Unmanned Aerial Vehicle Squadron 1 (VMU-1), Marine Aircraft Group 13, 3rd Marine Aircraft Wing	Marine Corps Air Station Yuma	D	RQ-21A Blackjack, MQ-9	1994
The Marine Corps activated VMU-1 in 1994 after merging the 1st and 3rd Remotely Piloted Vehicle Companies, both of which had been active since the early 1990s. ⁷⁸ VMU-1 was equipped with the RQ-2 Pioneer until 2007, when it transitioned to the RQ-7 Shadow. ⁷⁹ It transitioned to the RQ-21A Blackjack in 2016. The Marine Corps intends to establish a detachment of VMU-1 equipped with the MQ-9 Reaper by 2021. ⁸⁰				
Marine Unmanned Aerial Vehicle Squadron 2 (VMU-2), Marine Aircraft Group 14, 2nd Marine Aircraft Wing	Marine Corps Air Station Cherry Point	D	RQ-21A Blackjack	1986

Formed in 1984 as Detachment 1, Target Acquisition Battery, 10th Marine Regiment, 2nd Marine Division and equipped with the Mastiff, VMU-2 was the first Marine unit established to operate drones.⁸¹ It was reorganized into the 2nd Remotely Piloted Vehicle Company in 1986 and transitioned to operating the Pioneer the following year. In 1996 it was redesignated the Marine Unmanned Aerial Vehicle Squadron 2 (VMU-2). Since 2000, it has been subordinated to the 2nd Marine Aircraft Wing. In 2008, VMU-2 transitioned from the Pioneer to the Shadow and ScanEagle. It has been equipped with the Blackjack since 2016.

Marine Unmanned Aerial Vehicle Squadron 3 (VMU-3), Marine Aircraft Group 24, 1st Marine Aircraft Wing	Marine Corps Air Station Kaneohe Bay	D	RQ-21A Blackjack	2008

Formed in 2008 at Twentynine Palms, California, VMU-3 has been equipped with the RQ-7 Shadow, ScanEagle, and Aerosonde. It relocated to MCAS Kaneohe Bay in 2014 and transitioned to the RQ-21A Blackjack in 2018.⁸²

Marine Unmanned Aerial Vehicle Squadron 4 (VMU-4), Marine Aircraft Group 41, 4th Marine Aircraft Wing	Camp Pendleton	D	RQ-21A Blackjack	2010

VMU-4 was the first Marine reserve unit created to operate drones. It transitioned from the Shadow to the Blackjack in 2018.⁸³



ARMY

- The U.S. Army has at least 11 units equipped with the MQ-1C Gray Eagle. These units are organized into companies, most of which are attached to Army Aviation Regiments that are subordinated to Army Divisions. Some Military Intelligence Brigades and Special Operations Command Groups (listed here in the “Special Forces” section”) also have MQ-1C Gray Eagle companies. A typical MQ-1C Gray Eagle company within an Army Aviation Regiment contains 12 aircraft and 125 personnel that are organized into three platoons.⁸⁴
- The U.S. Army has fielded at least 30 and as many as 60 units equipped with the RQ-7 Shadow. These units are typically organized into platoons and subordinated to Brigade Engineering Battalions, which are themselves subordinated to Brigade Combat Teams. Within a typical Brigade Engineering Battalion, the battalion’s intelligence company (D Company) is responsible for RQ-7 Shadow operations. Known alternatively as “Detachment 1” or as the “TUAS Platoon,” the RQ-7 Shadow unit usually consists of 22 personnel, four aircraft, two unmanned ground control stations, and other associated supporting systems.⁸⁵ The Army is in the process of acquiring a replacement for the Shadow, which could result in organizational changes.

Name	HQ	Type	Equipment	Activated
F Company, 2nd Battalion, 227th Aviation Regiment, 1st Air Cavalry Brigade, 1st Cavalry Division, III Corps ⁸⁶	Fort Hood	D	MQ-1C Gray Eagle	2011
F Company, 1st Attack Reconnaissance Battalion, 1st Aviation Regiment, 1st Combat Aviation Brigade, 1st Infantry Division ⁸⁷	Fort Riley	D	MQ-1C Gray Eagle	2012
E Company, 1st Battalion, 3rd Aviation Regiment, 3rd Combat Aviation Brigade, 3rd Infantry Division ⁸⁸	Fort Stewart	D	MQ-1C Gray Eagle	2014
D Company, 10th Aviation Regiment, 10th Combat Aviation Brigade, 10th Mountain Division ⁸⁹	Fort Drum	D	MQ-1C Gray Eagle	2014
2nd Battalion, 13th Aviation Regiment, 1st Aviation Brigade ^{90,91}	Fort Huachuca	D	MQ-1C Gray Eagle, RQ-7 Shadow	2011
B Company, 229th Aviation Regiment, 449th Combat Aviation Brigade ⁹²	Fort Irwin	D	MQ-1C Gray Eagle	2014
F Company, 1st Attack Reconnaissance Battalion, 82nd Combat Aviation Brigade, 82nd Airborne Division ⁹³	Fort Bragg, Camp Mackall	D	MQ-1C Gray Eagle	2017
The 82nd Combat Aviation Brigade is based at Fort Bragg, though the brigade's MQ-1C Gray Eagles are located at Camp Mackall.				
A Company, 224th Military Intelligence Battalion, 116th Military Intelligence Brigade, Intelligence and Security Command ⁹⁴	Fort Stewart	D	MQ-1C Gray Eagle	2014
Activated in the mid-1990s to operate the RQ-5A Hunter. Transitioned to the MQ-5A Hunter in 2006. Subordinated to the 116th MIB in 2014.				
A Company, 15th Military Intelligence Battalion, 116th Military Intelligence Brigade, Intelligence and Security Command ⁹⁵	Fort Hood	D	MQ-1C Gray Eagle, MQ-1C ER	2014
D Company, 25th Aviation Regiment, 25th Combat Aviation Brigade, 25th Infantry Division ⁹⁶	Fort Wainwright	D	MQ-1C Gray Eagle	2016
B Company, 101st Aviation Regiment, 101st Airborne Division ⁹⁷	Fort Campbell Army Airfield	D	MQ-1C Gray Eagle	2015

2nd Combat Aviation Brigade, 2nd Infantry Division ⁹⁸	Kunsan Air Base	P	MQ-1C Gray Eagle	Late 2010s
An unnamed company subordinated to the 2nd Combat Aviation Brigade is equipped with the MQ-1C Gray Eagle and based in South Korea. The unit was activated in 2018 or 2019.				
Detachment 1, D Company, 578th Brigade Engineer Battalion, 79th Infantry Brigade Combat Team, California Army National Guard ⁹⁹	Camp Roberts, California	D	RQ-7 Shadow	
Detachment 1, D Company, 150th Brigade Engineer Battalion, 155th Armored Brigade Combat Team, Mississippi Army National Guard ¹⁰⁰	Camp Shelby	D	RQ-7 Shadow	
TUAS Platoon, 239th Brigade Engineering Battalion, 39th Infantry Brigade Combat Team, Arkansas Army National Guard ¹⁰¹	Conway, Arkansas	D	RQ-7 Shadow	
Detachment 1, D Company, 236th Brigade Engineer Battalion, 30th Armored Brigade Combat Team, North Carolina Army National Guard ¹⁰²	Durham, North Carolina	D	RQ-7 Shadow	
TUAS Platoon, D Company, 127th Airborne Engineer Battalion, 1st Brigade Combat Team, 82nd Airborne Division ¹⁰³	Fort Bragg, North Carolina	D	RQ-7 Shadow	
TUAS Platoon, D Company, 588th Brigade Engineer Battalion, 4th Armored Brigade Combat Team, 4th Infantry Division ¹⁰⁴	Fort Carson, Colorado	D	RQ-7 Shadow	
TUAS Platoon, D Company, 52nd Brigade Engineer Battalion, 2nd Infantry Brigade Combat Team, 4th Infantry Division ¹⁰⁵	Fort Carson, Colorado	D	RQ-7 Shadow	
TUAS Platoon, D Company, 299th Brigade Engineer Battalion, 1st Stryker Brigade Combat Team, 4th Infantry Division ¹⁰⁶	Fort Carson, Colorado	D	RQ-7 Shadow	
Detachment 1, D Company, 152nd Brigade Engineer Battalion, 27th Infantry Brigade Combat Team, 42nd Infantry Division, New York Army National Guard ¹⁰⁷	Fort Drum, New York	D	RQ-7 Shadow	
D Company, 41st Engineer Battalion, 2nd Brigade Combat Team, 10th Mountain Division ¹⁰⁸	Fort Drum, New York	P	RQ-7 Shadow	
TUAS Platoon, D Company, 8th Brigade Engineer Battalion, 2nd Brigade Combat Team, 1st Cavalry Division, 2nd Infantry Division ¹⁰⁹	Fort Hood, Texas	D	RQ-7 Shadow	
Detachment 1, D Company, 91st Brigade Engineer Battalion, 1st Armored Brigade Combat Team, 1st Cavalry Division ¹¹⁰	Fort Hood, Texas	D	RQ-7 Shadow	

D Company, 23rd Brigade Engineer Battalion, 1st Stryker Brigade Combat Team, 2nd Infantry Division ¹¹¹	Fort Lewis, Washington	D	RQ-7 Shadow
Detachment 1, D Company, 229th Brigade Engineer Battalion, 116th Infantry Brigade Combat Team, 29th Infantry Division, Virginia Army National Guard ¹¹²	Fort Pickett, Virginia	D	RQ-7 Shadow
TUAS Platoon, D Company, 1st Engineer Battalion, 1st Armored Brigade Combat Team, 1st Infantry Division ¹¹³	Fort Riley, Kansas	D	RQ-7 Shadow
D Company, 9th Brigade Engineer Battalion, 2nd Armored Brigade Combat Team, 3rd Infantry Division ¹¹⁴	Fort Stewart, Georgia	D	RQ-7 Shadow
D Company, 10th Brigade Engineer Battalion, 1st Armored Brigade Combat Team, 3rd Infantry Division ¹¹⁵	Fort Stewart, Georgia	D	RQ-7 Shadow
Detachment 1, D Company, 766th Brigade Engineer Battalion, 33rd Infantry Brigade Combat Team, 35th Infantry Division, Illinois Army National Guard ¹¹⁶	Fort Wainwright, Alaska	D	RQ-7 Shadow
D Company, 116th Brigade Engineering Battalion, 116th Cavalry Brigade Combat Team, 34th Infantry Division, Idaho Army National Guard ¹¹⁷	Idaho	P	RQ-7 Shadow
D Company, 224th Brigade Engineering Battalion, 2nd Infantry Brigade Combat Team, 34th Infantry Division, Iowa Army National Guard ¹¹⁸	Iowa	P	RQ-7 Shadow
UAS Platoon, D Company, 70th Brigade Engineer Battalion, 1st Stryker Brigade Combat Team, 25th Infantry Division ¹¹⁹	Joint Base Elmendorf-Richardson, Alaska	D	RQ-7 Shadow
UAS Platoon, D Company, 6th Brigade Engineer Battalion, 4th Infantry Brigade Combat Team, 25th Infantry Division ¹²⁰	Joint Base Elmendorf-Richardson, Alaska	D	RQ-7 Shadow
Detachment 1, D Company, 104th Brigade Engineer Battalion, 50th Infantry Brigade Combat Team, New Jersey Army National Guard ¹²¹	Joint Base McGuire-Dix-Lakehurst, N.J.	D	RQ-7 Shadow
TUAS Platoon, 741st Brigade Engineer Battalion, 41st Infantry Brigade Combat Team, Oregon Army National Guard ¹²²	Orchard Combat Training Center, Oregon	D	RQ-7 Shadow
UAV Platoon, D Troop, Regimental Engineer Squadron, 2nd Cavalry Regiment ¹²³	Rose Barracks, Germany	D	RQ-7 Shadow

TUAS Platoon, D Company, 29th Brigade Engineer Battalion, 3rd Brigade Combat Team, 25th Infantry Division ¹²⁴	Schofield Barracks, Hawaii	D	RQ-7 Shadow
Detachment 1, D Company, 334th Brigade Engineer Battalion, 1st Armored Brigade Combat Team, 34th Infantry Division, Minnesota Army National Guard ¹²⁵	Stillwater, Minnesota	D	RQ-7 Shadow
UAS Platoon, D Company, 54th Brigade Engineering Battalion, 173rd Airborne Brigade Combat Team ¹²⁶	Vincenza, Italy	D	RQ-7 Shadow
Detachment 1, D Company, 173rd Brigade Engineer Battalion, 32nd Infantry Brigade, Wisconsin Army National Guard ¹²⁷	Volk Field, Wisconsin	D	RQ-7 Shadow
TUAS Platoon, D Company, 898th Brigade Engineer Battalion, 81st Striker Brigade Combat Team, 7th Infantry Division, Washington Army National Guard ¹²⁸	Yakima Training Center, Washington	D	RQ-7 Shadow
Detachment 1, D Company, 545th Brigade Engineer Battalion, 45th Infantry Brigade Combat Team, Oklahoma Army National Guard ¹²⁹		D	RQ-7 Shadow
Detachment 1, D Company, 156th Brigade Engineer Battalion, 56th Infantry Brigade Combat Team, 36th Infantry Division, Texas Army National Guard ¹³⁰		D	RQ-7 Shadow

SPECIAL OPERATIONS

Name	HQ	Type	Equipment	Activated
3rd Special Operations Squadron, 27th Special Operations Group, Air Force Special Operations Command ¹³¹	Cannon Air Force Base	D	MQ-9 Reaper	2005
Formed as the Photographic Section No. 1 in 1918, the 3rd Special Operation Squadron began operating the MQ-1 Predator in 2005.				
12th Special Operations Squadron, 27th Special Operations Group, Air Force Special Operations Command ¹³²	Cannon Air Force Base	D	MQ-9 Reaper	2015
33rd Special Operations Squadron, 27th Special Operations Group, Air Force Special Operations Command ¹³³	Cannon Air Force Base	D	MQ-9 Reaper	2009

65th Special Operations Squadron, 1st Special Operations Group, Air Force Special Operations Command ¹³⁴	Hurlburt Field	D	MQ-9 Reaper	2018
2nd Special Operations Squadron, 919th Operations Group, Air Force Reserve Command ¹³⁵	Hurlburt Field	D	MQ-9 Reaper	2009
E Company, 160th Special Operations Aviation Regiment, Army Special Operations Aviation Command	Sabre Army Airfield, Fort Campbell	D	MQ-1C Gray Eagle	2010
After deactivating E Company as a manned helicopter unit in 2007, the Army reactivated E Company in 2010 to operate the MQ-1C Gray Eagle. ¹³⁶ According to a 2019 mediate report, E Company is among the U.S. military's most deadly drone units and has deployed extensively in the Middle East and across the African continent. ¹³⁷				
F Company, 160th Special Operations Aviation Regiment, Army Special Operations Aviation Command ¹³⁸	Fort Campbell	D	MQ-1C ER	2018



TRAINING

- In 2009 and 2010, the Air Force overhauled the way it trains MQ-1, MQ-9, and RQ-4 pilots in order to meet growing demand. It created a dedicated career field—known as 18X—for officers who enter the Air Force to be trained as UAV pilots.¹³⁹ It activated four new squadrons—the 6th Reconnaissance Squadron, 16th Training Squadron, 29th Attack Squadron, and 9th Attack Squadron—to train new pilots and sensor operators.¹⁴⁰ And it moved specialized training for the MQ-1/9 from Creech Air Force Base to Holloman Air Force Base. In 2015, the Air Force took additional steps to prioritize UAV pilot training and retainment by expanding the number of Air National Guard units that fly drones and by permitting enlisted personnel to pilot the RQ-4 Global Hawk, the first time that non-officers were allowed to pilot aircraft since 1942.¹⁴¹ As of 2016, approximately one-third of MQ-1 and MQ-9 Reaper pilots were part of the 18X career field, the remainder being a mix of manned aircraft pilots who are temporarily assigned to fly drones and former manned aircraft pilots who had transferred to flying drones permanently.
- MQ-9 Reaper and RQ-4 Global Hawk pilot training begins with Undergraduate Remotely Piloted Aircraft Training (RPA URT), a program managed by the 558th Flying Training Squadron.¹⁴² At the Initial Flight Training course in Pueblo, Colorado, the future drone pilots learn to fly a manned trainer airplane. This course lasts between six and nine weeks. After earning their private pilot's certificate, recruits move on to the RPA Instrument Qualification Course and RPA Fundamentals Course at Randolph Air Force Base in Texas. These two courses last between three to four months. After completing the RPA URT, recruits move on to Formal Training Units, which are located at Beale Air Force Base if they are training to fly the RQ-4 Global Hawk and at Holloman Air Force Base if they are training on the MQ-9 Reaper. The Holloman program consists of several months of training on the Predator/Reaper Mission Aircrew Training System (PMATS), a simulator that replicates a ground control station, followed by

- live flight training.
- Based at Fort Huachuca, the Army’s 2nd Battalion, 13th Aviation Regiment is responsible for training all new RQ-7 Shadow and MQ-1C Gray Eagle operators and maintainers.¹⁴³ Unlike in the Air Force, Army UAV operators—known as 15Ws—are typically enlisted personnel. In 2006, the Army created the UAS Training Battalion Provisional, which was redesignated the 2nd Battalion, 13th Aviation Regiment in 2011. The Battalion is comprised of three companies that manage five programs of instruction. Phase one, which is known as the Common Core and lasts approximately nine weeks, provides instruction on basic aeronautical concepts, safety, and navigational. Phase two provides simulator and live flight instruction. In 2016, the Army announced that it was working to acquire a common control architecture that would allow operators to be able to pilot both the RQ-7 and MQ-1C with the same training.¹⁴⁴
 - The Navy provides training for MQ-8 Fire Scout pilots at NAS North Island, NAS Norfolk, and NAS Jacksonville.¹⁴⁵ Unlike in the Air Force MQ-9 and RQ-4 community, the Navy does not have a unique class of MQ-8 pilots. Instead, the Fire Scouts are typically crewed by the pilots of the manned MH-60 helicopter who are trained to operate both aircraft. Air Vehicle Operator training lasts five weeks and Mission Payload Operator training lasts three weeks.
 - The Navy and Marine Corps maintain three Training and Logistics Support Activity (TALSA) facilities dedicated to training personnel to fly Class I UAVs.¹⁴⁶ The facilities are located at Marine Corps Base (MCB) Camp Lejeune, North Carolina in; MCB Camp Pendleton, California; and MCB Kaneohe Bay, Hawaii. TALSAs offer basic instruction and qualification for the RQ-20B Puma, RQ-11B Raven, RQ-12A Wasp IV, PD-100 Black Hornet, InstantEye, and SkyRanger.

OPERATIONS	Country	Base	Equipment	Period	Operation
	Iraq,Kuwait		RQ-2 Pioneer,FQM-151 Pointer	1991	Desert Shield,Desert Storm

The Army and Marine Corps were equipped with FQM-151 pointers for short-range reconnaissance; the Army, Marine Corps, and Navy were each equipped with RQ-2 Pioneers.¹⁴⁷ The Marine Corps’ 1st, 2nd, and 3rd RPV Companies flew a combined 336 RQ-2 Pioneer sorties during Desert Storm and Desert Shield.¹⁴⁸ The Army’s UAV Platoon, E Company, 304th Military Intelligence Battalion, 111th Military Intelligence Brigade completed 46 sorties during Desert Storm.¹⁴⁹ The Navy’s RPV Detachment 1 and RPV Detachment 2, which were deployed on board the *USS Missouri* and *USS Wisconsin* for naval artillery spotting and reconnaissance, flew a total of 163 sorties.¹⁵⁰ In one notable incident, a group of Iraqi soldiers on Faylaka Island surrendered to a Navy RQ-2 Pioneer, marking the first—and perhaps only—time that humans have surrendered to a drone. Twelve Pioneers were lost and 18 damaged over the course of operations.¹⁵¹



(Right) An RQ-2 Pioneer on the *USS Wisconsin* in Desert Storm. Credit: U.S. Navy
(Left) A downed RQ-1 Predator in Bosnia om 1996. Image via the U.S. Library of Congress.

Bosnia	Gjader, Albania; Taszar, Hungary; Tuzla, Bosnia	RQ-2 Pioneer, Gnat-750, RQ-1 Predator	1994-1998	Joint Endeavor
In 1994, the U.S. government deployed the Gnat-750, the predecessor to the RQ-1 Predator, and the RQ-2 Pioneer for Joint Task Force Provide Promise, the NATO intervention in Bosnia and Herzegovina. Gnat-750 operations over Bosnia were conducted by a small team of CIA personnel and General Atomics contractors from an airfield in Gjadar, Albania.¹⁵² The following year, a team of military personnel led by the Army deployed with the Predator to Gjadar. In 1996, the Predator was re-deployed to Taszar, Hungary, for surveillance missions over Bosnia. In September 1996, the Air Force's newly-formed 11th Reconnaissance Squadron assumed operational control of the Predator from the Army.¹⁵³ The Predator completed approximately 380 sorties over Bosnia in 1995 and 1996, accumulating some 2,290 flight hours. In 1996, the Marine Corps' VMU-1 deployed with the RQ-2 Pioneer to Boyington Airfield near Tuzla, Bosnia and completed 36 sorties in support of NATO peacekeeping forces.¹⁵⁴				
Iraq, Kuwait		RQ-1 Predator, Desert Hawk	1998-2003	Southern Watch
Operation Southern Watch was a U.S. campaign to monitor Iraqi military movements in southern Iraq and enforce a no-fly zone following the First Gulf War. Air Force RQ-1 Predators were deployed to the operation from 1998 until the operation ended in 2003.¹⁵⁵ Towards the end of Southern Watch, the Air Force deployed Desert Hawk small surveillance drones—which were then known as the Force Protection Airborne Surveillance System—for security at air bases in Kuwait.				
Serbia, Kosovo	Taszar, Hungary; Petrovec Airfield, Macedonia	RQ-2 Pioneer, RQ-5 Hunter, RQ-1 Predator	1999-2001	Allied Force, Task Force Hunter
During Allied Force, the NATO air campaign against Serbia in 1999, the U.S. used drones to identify Serbian military targets for airstrikes by manned aircraft and to conduct battle damage assessments.¹⁵⁶ The Air Force initially deployed the Predator to Tuzla, Bosnia, before moving operations to Taszar, Hungary. The Army sent Hunters to Skopje, Macedonia. Navy Pioneers deployed aboard the <i>USS Ponce</i> and were used to surveil Yugoslav naval vessels and to identify landing areas for U.S. Marines. Four RQ-1 Predators, eight RQ-5 Hunters, and three RQ-2 Pioneers were lost during the operation. In its after-action report to Congress, the DoD noted that although UAVs were “used at unprecedented levels during Operation Allied Force,” the experience exposed several issues with Pentagon drone operations, such as poor sensor quality and the inability to properly disseminate the intelligence.¹⁵⁷ Following the end of Allied Force, U.S. UAVs were deployed at least once more to the Balkans to support peacekeeping operations. U.S. Army deployed Hunters again to Petrovec Airfield in May 2001 amid clashes between a Macedonian militant group and the government.				
Afghanistan		RQ-1 Predator	2000	“Summer Project”
In the year prior to the U.S.-led invasion of Afghanistan in 2001, the Central Intelligence Agency deployed Predators to Uzbekistan to search for Osama bin Laden in neighboring Afghanistan, a mission known as the Summer Project.¹⁵⁸				

Afghanistan	(Multiple)	(Multiple)	2001-	Enduring Freedom, Freedom's Sentinel
In October 2001, the U.S. launched Enduring Freedom (OEF), marking the first operational deployment of the RQ-4 Global Hawk and the armed MQ-1 Predator. A handful of other drones such as the Army's RQ-5 Hunter and FQM-151 Pointer were also deployed at the outset of the war. The opening days of the conflict saw the first drone strike in combat, when a Predator targeted Mullah Omar, the leader of the Taliban, on October 7 (the strike was unsuccessful).^{159,160} Drones were gradually introduced in greater numbers as the conflict wore on.¹⁶¹ By 2012, the Army's UAVs alone had accumulated 376,203 flight hours in Afghanistan.¹⁶² Between 2011 and 2014, the Marines deployed the K-MAX to ferry cargo to remote bases, the first operational mission for cargo-carrying drones.¹⁶³ The Air Force's Reaper made its operational debut in Afghanistan in 2007.¹⁶⁴ In January 2018 the Air Force reported that it had deployed the equivalent of three squadrons of MQ-9 Reapers to Kandahar Airfield, the largest single deployment of the Reaper.¹⁶⁵				
Pakistan, Yemen, Somalia, Libya	(Multiple)	MQ-1 Predator, MQ-9 Reaper, RQ-170	2002-	
Since 2002, the U.S. government has engaged in a campaign of surveillance and strike operations against Al-Qaeda outside of areas of active hostilities. The scope of this campaign has gradually expanded to include groups affiliated with Al-Qaeda such as Al-Qaeda in the Arab Peninsula (Yemen), Al-Shabaab (Somalia), and Al-Qaeda in the Islamic Maghreb (Libya), as well as various regional affiliates of the Islamic State. Collectively, these operations are commonly referred to as the "targeted killing campaign" and have occurred primarily in Pakistan, Yemen, and Somalia, and, to a lesser extent, Libya. By and large, these operations are conducted by drones, though some of the operations have been carried out by manned aircraft and by special operations teams. The first targeted killing was conducted in Yemen's Marib province in November 2002, killing Qaed Salim Sinan Al-Harethi, an Al-Qaeda operative who is believed to have led the attack on the <i>USS Cole</i> in 2000, and five other individuals.¹⁶⁶ U.S. airstrikes in Pakistan peaked in 2010—around 120 strikes are thought to have been conducted in that year alone. Operations in Yemen and Somalia intensified between 2016 and 2018. As of early April 2019, the New America Foundation estimates that the U.S. has conducted a total of 414 strikes in Pakistan, 283 in Yemen, and 151 in Somalia since 2002.^{167,168,169} The U.S. government has argued that the strikes are the best way of targeting Al-Qaeda's leadership in their remote bases while limiting risk to U.S. personnel and civilians.¹⁷⁰ However, the U.S. has attracted criticism for injuring and killing civilians in the targeted killing campaign and for the government's lack of transparency.¹⁷¹ In 2013, President Obama issued new policies designed to limit the number of drone strikes and improve transparency.¹⁷² Since taking office in 2017, President Trump has lifted some of these requirements, including the requirement that the Department of Defense create and publish an annual report that contained estimates of civilian casualties.¹⁷³				
Iraq	(Multiple)	(Multiple)	2003-2011	Iraqi Freedom, New Dawn
At the outset of the Iraq War, the Air Force deployed one RQ-1 Predator, seven MQ-1 Predators, and one RQ-4 Global Hawk to the region.¹⁷⁵ Though the U.S. relied on this fleet in the opening months of the war—in one month, the Air Force's single Global Hawk located 55 percent of all time-sensitive enemy air defense targets—a December 2003 Defense Science Board report argued that "Service leadership still has not fully embraced the integration of UAVs into the force structure."¹⁷⁶ OIF gradually saw the widespread introduction of unmanned aircraft at the tactical, operational, and strategic level. This enabled lower-echelon formations to have unprecedented access to overhead ISR capabilities.¹⁷⁷ In order to meet growing demand from commanders in the field, a number of new systems made their operational debut in Iraq, including the Dragon Eye, RQ-11 Raven, ScanEagle, RQ-7 Shadow, and MQ-1C Gray Eagle.				

Haiti ¹⁷⁸	Rafael Hernandez Airport, Puerto Rico	RQ-1 Predator, Global Hawk	2010	Unified Response
The U.S. Air Force deployed the RQ-1 Predator and RQ-4 Global Hawk to support humanitarian efforts in the wake of the 2010 Haiti earthquake. The two drones surveilled the damage done to critical infrastructure, providing real-time video footage to international aid workers and first responders. Unified Response marked the first time that either the Predator or the Global Hawk had been used to support a humanitarian operation.				
Libya	NAS Sigonella, Italy	RQ-4 Global Hawk, MQ-1 Predator	2011	Unified Protector
Three RQ-4 Global Hawks and multiple armed MQ-1B Predators conducted approximately 450 sorties in Unified Protector, a NATO intervention in the Libyan Civil War that followed the U.S.-led aerial campaign known as Operation Odyssey Dawn.¹⁷⁹ Between April and August, the Predators conducted 101 strikes in the country.¹⁸⁰				
Mali, Niger	AB 101, Niger; AB 201, Niger	MQ-1 Predator, MQ-9 Reaper	2013-	Serval (FR), Barkhane (FR)
In 2013, the U.S. deployed Predators to Niamey, Niger to provide intelligence and targeting for French counter-terrorism operations in Mali.^{181,182} The deployment was initially led by the 3rd Special Operations Squadron. Over the course of the deployment U.S. Predators and Reapers have participated in other counterterrorism, counter-insurgency, and counter-crime missions in the Sahel, including operations by regional partner nations. In 2018 the DoD announced that the Nigerien government had permitted the U.S. to begin flying armed Reapers from its bases in Niger.¹⁸³ In 2019, the Air Force intends to shift these operations from Air Base 101 in Niamey to a much larger facility, Air Base 201, further north in Agadez. According to media reports, the CIA may also run drone operations from an outpost near Dirkou in northeastern Niger.¹⁸⁴				
Iraq, Syria	(Multiple)	(Multiple)	2014-	Inherent Resolve
Drones have figured in the U.S. campaign against the Islamic State began in August and September 2014.¹⁸⁵ Air Force Predators, Reapers, and Global Hawks involved in the campaign are based in Turkey (Incirlik AB), Jordan (Muwaffaq Salti AB and H4 AB), Kuwait (Ali Al Salem AB), and the United Arab Emirates (Al Dhafra AB), while Army Gray Eagles are based in Al Asad AB (S) in Iraq. Forward-deployed forces have also employed a range of Class I drones in the ground campaign in Syria and Iraq; for example, the Marines have deployed the Blackjack in both countries. In a January 2018 budget reprogramming request, the Navy reported that funding for the flight hours of the Marines' Blackjack in Inherent Resolve exceeded the appropriated budget by 300 percent, underscoring the extent to which the Marines were making use of the system.¹⁸⁶ U.S. ground special operations forces in Syria are believed to be equipped with the RQ-20B Puma and the Switchblade loitering munition.¹⁸⁷				
Chad	N'Djamena International Airport	MQ-1 Predator	2014	
In 2014, the U.S. deployed one MQ-1 Predator to Chad as part of an operation to rescue 250 Nigerian schoolgirls who were kidnapped by Boko Haram, an Islamist militant group.¹⁸⁸ The operation is believed to have lasted less than one year.				

Cameroon	Garoua Airport	MQ-1C Gray Eagle	2015-	
The U.S. deployed at least one drone to Cameroon in October 2015 to support Cameroonian forces fighting Boko Haram. ⁸⁹ Approximately 200 personnel and at least one unarmed Army MQ-1C Gray Eagle remain stationed in Garoua, some 40 kilometers east of Cameroon's border with Nigeria. ^{190,191}				
Latvia	Lielvarde Air Base	MQ-1 Predator	2015-Unknown	
In 2015, the Texas Air National Guard's 147th Reconnaissance Wing deployed two MQ-1 Predators and 70 personnel to Lielvarde Air Base in Latvia. ¹⁹² The Predators were used to patrol Latvia's territorial borders and conduct training missions with personnel from Baltic partner nations. The deployment was funded by the European Reassurance Initiative, a U.S. program to support NATO allies in the wake of Russia's 2014 annexation of Crimea.				
Philippines		MQ-1C Gray Eagle, RQ-7B Shadow, RQ-20B Puma	2000s, 2017-	Enduring Freedom-Philippines, Pacific Eagle-Philippines
U.S. special operations forces have deployed with UAVs to the Philippines on several occasions since the early 2000s as part of operations targeting Abu Sayyef, an Islamic terrorist group aligned with Al-Qaeda. ¹⁹³ These UAVs included the Gnat, ScanEagle, Raven, Aqua Puma, and other unarmed systems for reconnaissance. ¹⁹⁴ A Gnat UAV crashed near Zamboanga in 2002. ¹⁹⁵ Although OEF-P ended in 2015, the U.S. military returned to the Philippines in 2017 to support the Philippine military's campaign against Islamic State-linked militant groups around the city of Marawi. ¹⁹⁶ Based on satellite imagery, it is possible that the Gray Eagle remains, as of this writing, deployed to Edwin Andrews Air Base on the Zamboanga Peninsula. The Marines deployed with the RQ-7B Shadow to support ground operations in the battle for Marawi. ¹⁹⁷ U.S. special operations forces are also believed to have deployed to the Philippines with the RQ-20B Puma. ¹⁹⁸				
Poland, Romania	Mirowslawiec Air Base, Camp Turzii	MQ-9 Reaper	2018-	
The Air Force deployed an MQ-9 Reaper to Mirowslawiec Air Base in May 2018 to conduct ISR and training missions. ¹⁹⁹ After a series of renovations and the addition of new facilities at Mirowslawiec, the Air Force declared the MQ-9 mission in Poland to be fully operational in March 2019. ²⁰⁰ The Reapers are operated by a mix of contractors and U.S. military personnel. In July 2019, the U.S. Air Force announced that it was temporarily relocating the Reapers from Poland to Camp Turzii, Romania while the runway at Mirowslawiec underwent repairs. ²⁰¹				
South Korea	Kunsan Air Base	MQ-1C Gray Eagle	2018-	
The U.S. Army announced in March 2017 that it intended to deploy the MQ-1C Gray Eagle to Korea. ²⁰² According to a statement by a U.S. State Department spokesperson, the Gray Eagle deployment was part of a package of measures that the U.S. took in response to North Korean missile tests. Based on satellite imagery, the deployment probably began in either mid-to-late 2018 or early 2019.				

EXERCISES AND PARTNERSHIPS

- In addition to foreign operational deployments, the U.S. has a long history of deploying drones overseas to participate in exercises and capacity building operations with partner nations. In one of the first of these deployments, the Army sent the 304th Military Intelligence Battalion equipped with the RQ-2 Pioneer to participate in the 1993 Team Spirit exercises in South Korea.²⁰³ More recently, a number of U.S. deployments of this kind have been to eastern Europe, where the U.S. has accelerated efforts to train partner militaries in the wake of Russia's 2014 annexation of Crimea and support for pro-Russian separatists in eastern Ukraine. In 2015, the Army's 173rd Airborne Brigade deployed with the RQ-7B Shadow to Yavoriv, Ukraine to participate in the Fearless Guardian training exercise with the Ukrainian national guard.²⁰⁴ In 2018, the Army's 1st Cavalry Division deployed the RQ-7B Shadow first from Zagan and then from Trzebień in Poland, part of the ongoing Operation Atlantic Resolve training mission.²⁰⁵ Other deployments, such as those to Latvia and Poland, have also supported capacity building.²⁰⁶

DOMESTIC OPERATIONS

- The U.S. military has at various times deployed drones to assist civilian public safety agencies with border security missions, counter-drug operations, and disaster response. In 1990, 1998, 1999, 2001, and 2002, the U.S. Marine Corps deployed with the RQ-2 Pioneer to the southern border as part of Joint Task Force Six, an inter-agency drug interdiction and immigration enforcement campaign.²⁰⁷ These operations, which are distinct from the Department of Homeland Security's drone operations, have each typically lasted for several months. According to a 2015 DoD Inspector General report, the U.S. military deployed drones in support of civil authorities fewer than 20 times between 2006 and 2015, although the report did not specify when or where these operations occurred.²⁰⁸ In 2017 and 2018, the Army deployed the MQ-1C and the Marines deployed the RQ-21 Blackjack for security operations on the U.S.-Mexico border.²⁰⁹ In 2018, the Air Force deployed the MQ-9 Reaper in support of firefighters in California and Oregon. In November 2018, the DoD revised its policy governing the use of UAVs in support of civil authorities.²¹⁰ The new policy delegates the authority required to approve some types of domestic operations from the Secretary of Defense to regional military commanders, a move designed to make the approval process less onerous.

INFRASTRUCTURE

Name	Country	Latitude	Longitude	Affiliation	Activity	Notes
Andersen Air Force Base	USA	13°34'34"N	144°55'28"E	69th RS	Deployment	RQ-4 deployment
Battle Creek Air National Guard Base	USA	42°18'23"N	85°15'00"W	Air National Guard	Headquarters	
Beale Air Force Base	USA	39°08'10"N	121°26'11"W	9th RS Wing	Headquarters, Training	
Berry Field Air National Guard Base	USA	36°07'36"N	086°40'55"W	Air National Guard	Headquarters	
Camp Pendleton, California	USA	33°20'N	117°25'W	Marine Corps	Headquarters	

Camp Shelby	USA	31°10'36"N	89°11'22"W	Army	HQ, Training	Home to the Unmanned Aircraft Flight Center
Cannon Air Force Base	USA	34°22'58"N	103°19'20"W	27th SOG	Headquarters	
Creech Air Force Base	USA	36°35'22"N	115°40'47"W	432d Wing	Headquarters, Training	
Davis-Monthan Air Force Base	USA	32°09'59"N	110°52'59"W	162nd Wing	Headquarters	
Des Moines Air National Guard Base	USA	41°32'02"N	093°39'47"W	Air National Guard	Headquarters	
Ebbing Air National Guard Base	USA	35°20'12"N	094°22'03"W	Air National Guard	Headquarters	
El Mirage Airfield	USA	34°37'24"N	117°35'59"W	GA-ASI	Test site	
Ellington Joint Reserve Base	USA	29°36'26"N	95°09'32"W	147th Wing	Headquarters	
Fargo Air National Guard Base	USA	46°55'14"N	096°48'56"W	Air National Guard	Headquarters	
Fort Carson, Colorado	USA	38°31'34"N	104°54'34"W	Army	Headquarters	
Fort Hood	USA	31°04'13"N	097°49'23"W	227th AR, 15th MIB	Headquarters	
Fort Huachuca	USA	31°35'19"N	110°20'40"W	2-13 Regt	Headquarters, Training	
Fort Irwin	USA	35°15'46"N	116°41'04"W	Army	Headquarters	
Fort Lewis, Washington	USA	47°06'21"N	122°33'52"W	Army	Headquarters	

Grand Forks Air Force Base	USA	47°57'40"N	097°24'04"W	9th RS Wing, Northern Plains UAS Test Site	Headquarters, Training, Industry
Gray Butte Field Airport	USA	34°33'59"N	117°40'13"W	GA-ASI	Test site
Hancock Field Air National Guard Base	USA			Air National Guard	Headquarters
Holloman Air Force Base	USA	32°51'09"N	106°06'23"W	49th Wing	Headquarters, Training
Horsham Air National Guard Station	USA	40.209°N	75.145°W	Air National Guard	Headquarters
Hunter Army Airfield, Fort Stewart, Georgia	USA	32°00'36"N	081°08'44"W	Army	Headquarters
Hurlburt Field	USA	30°25'40"N	086°41'22"W	1st SOG	Headquarters
Joint Base Elmendorf-Richardson, Alaska	USA	61°17'26"N	149°41'09"W	Army	Headquarters
Joint Base San Antonio-Randolph	USA			Air Force	Headquarters
Ladd Army Airfield, Fort Wainwright, Alaska	USA	64°50'13"N	147°36'56"W	25th ID	Headquarters
Mackall Army Airfield	USA	35°02'11"N	079°29'51"W	82nd CAB	Headquarters
March Air Reserve Base	USA	33°52'55"N	117°15'32"W	163rd Wing	Headquarters

Marine Corps Air Station Cherry Point	USA			Marine Corps	Headquarters	
Marine Corps Air Station Kaneohe Bay	USA	21°26'45"N	157°46'11"W	VMU-3, TALSA	Headquarters, Training	
Marshall Army Airfield, Fort Riley, Kansas	USA	39°03'09"N	096°45'52"W	Army	Headquarters	
Michael Army Airfield	USA	40°11'58"N	112°56'15"W	Rapid Integration Acceptance Center	Test site	Army test site at Dugway Proving Ground
Naval Air Station Jacksonville	USA	30°14'11"N	81°40'51"W	VUP-19	Headquarters, Training	
Naval Air Station Patuxent River	USA	38°17'10"N	76°24'42"W	Navy	Test site	
Naval Air Weapons Station China Lake	USA	35°41'08"N	117°41'31"W	DoD-Wide	Test site	
Naval Base Ventura County Point Mugu	USA	34°07'13"N	119°07'16"W	VUP-19	Headquarters	
Naval Outlying Field Webster	USA	38°08'47"N	76°25'47"W	UX-24	Headquarters, Testsite	
Sabre Army Airfield, Fort Campbell, Kentucky	USA	36°34'05"N	87°28'51"W	Army	Headquarters	
Schofield Barracks, Hawaii	USA			Army	Headquarters	

Shaw Air Force Base	USA	33°58'23"N	80°28'22"W	25th Attack Group	Headquarters	
Springfield Air National Guard Base	USA			Air National Guard	Headquarters	
Wheeler Sack Army Airfield, Fort Drum, New York	USA	44°03'20"N	75°43'10"W	Army	Headquarters	
Yakima Training Center, Washington	USA			Army National Guard	Headquarters	
Kandahar Airfield	Afghanistan	31°30'21"N	65°50'52"E	DoD	Deployment	
Garoua Airport	Cameroon	09°20'09"N	13°22'12"E	Army	Deployment	
Chabelley Airfield	Djibouti	11°31'N	43°04'E		Deployment	
Larissa Air Base	Greece	39°38'56"N	22°27'55"E	Air Force	Deployment	US MQ-9 Reaper deployment in 2017, 2018
Al Asad Air Base	Iraq	33°47'44"N	42°27'01E	Army	Deployment	
Naval Air Station Sigonella	Italy	37°24'06"N	14°55'20"E	Navy, Air Force	Deployment	
Misawa Air Base	Japan	40°42'19"N	141°22'19"E	Air Force	Deployment	Intermittent RQ-4 deployment
H4 Air Base	Jordan	32°32'26"N	038°11'28E		Deployment	
Muwaffaq Salti Air Base	Jordan	31°49'55"N	036°47'28E	Air Force	Deployment	
Ali Al Salem Air Base	Kuwait	29°20'48"N	47°31'14"E	Air Force	Deployment	

Air Base 101, Niamey	Niger	13°28'54"N	02°10'13"E	Air Force	Deployment	
Air Base 201, Agadez	Niger	16°57'06"N	08°00'57"E	Air Force	Deployment	
Kunsan Air Base	ROK	35°54'13"N	126°36'57"E	Army	Headquarters	MQ-1C site
Bizerte-Sidi Ahmed Air Base	Tunisia	37°14'36"N	009°47'11"E		Deployment	MQ-1C site
Incirlik Air Base	Turkey	37°00'07"N	035°25'33"E	Air Force	Deployment	
Al Dhafra Air Base	UAE	24°14'24"N	054°32'54"E	Air Force	Deployment	
Yokota Air Base	Japan	35°44'55"N	139°20'55"E	Air Force	Deployment	RQ-4 site

OTHER

Name	Country	Latitude	Longitude	Affiliation	Activity	Notes
Dirkou Airport	Niger	18°58'10"N	12°52'10"E	Air Force	Deployment	Possible UAV site (status unclear)
Edwin Andrews Air Base	Philippines	06°55'31"N	122°03'39"E	Army	Deployment	Probable MQ-1C site (status unclear)
Mirosławiec Air Base	Poland	53°20'38"N	16°5'14"E		Deployment	MQ-9 Reaper site (undergoing renovations)
Misawa Air Base	Japan	40°42'19"N	141°22'19"E	Air Force	Deployment	Intermittent RQ-4 deployment

DEVELOPMENT

- The XQ-58A Valkyrie is an experimental jet-powered Class III UAV built by Kratos Defense & Security for the Air Force's Low-Cost Attritable Strike Demonstrator (LCASD), also known as Loyal Wingman, program. The Valkyrie is designed to accompany manned fighter aircraft into combat and carry out a range of missions such as attacking enemy air defenses. It has an internal payload capacity of 227 kilograms, enough to carry two GBU-39 Small Diameter Bombs. Kratos unveiled a digital mockup of the Valkyrie in January 2017.²¹⁰ The Valkyrie completed its maiden flight at Yuma Proving Grounds in Arizona in 2019.²¹¹
- Skyborg is an Air Force concept for an autonomous low-cost attritable strike drone that could serve as a vessel for testing different artificial intelligence technologies that would enable complex, autonomous operations. The Air Force launched the program in October 2018 and unveiled a conceptual design for the system in March 2019.²¹² The Skyborg program appears to be separate and apart from the LCASD program. A future Skyborg UAV could operate alongside the Valkyrie. The Air Force expects to begin flight testing a Skyborg drone in 2021.²¹³
- The Orion is a long-endurance Class III fixed-wing UAV developed by Aurora Flight Sciences, a subsidiary of Boeing. Aurora began developing the Orion in 2006 and conducted the first flight of the aircraft in 2013.²¹⁴ Although the Air Force contributed funding to the development of the Orion, it has so far declined to acquire any of the drones, noting that it no longer has a requirement for such an aircraft. In January 2018 the Air Force awarded Aurora a \$48 million contract to continue the development of the system.²¹⁵
- Gremlins is a Defense Advanced Research Project Agency program to develop a swarm of low-cost, reusable Class I UAVs. Under the concept, the Gremlins, each of which are a few meters in length, would be launched and recovered by a manned C-130 transport aircraft. The Gremlins could be configured to carry out different tasks such as reconnaissance or electronic warfare. In May 2018, DARPA conducted a flight test at Yuma Proving Ground that involved launching and recovering a Gremlins air vehicle mid-air.²¹⁶ In March 2019, the U.S. Air Force announced that it was exploring a partnership with India's Defense Research and Development Organization to continue the development of Gremlins after the DARPA program ends.²¹⁷



(Left) The XQ-58A Valkyrie demonstrator aircraft during its inaugural flight on 5 March 2019. Credit: Senior Airman Joshua Hoskins.(Right) An artist's concept for DARPA's Gremlins swarming drone program.

EXPORTS

Country	Model	Make	Class	Status	Notes
Afghanistan	ScanEagle	Insitu	I	Active	
Australia	MQ-4C Triton	Northrop Grumman	III	Active	
Australia	MQ-9 Reaper	GA-ASI	III	Active	
Australia	PD-100 Black Hornet 2	FLIR Systems	I	Active	
Australia	RQ-12 WASP AE	AeroVironment	I	Active	
Australia	RQ-7B Shadow	AAI	II	Active	
Australia	ScanEagle	Insitu	I	Active	
Belgium	RQ-11 Raven	AeroVironment	I	Active	
Bulgaria	Phoenix 30	UAV Solutions	I	Active	
Bulgaria	RQ-11B Raven	AeroVironment	I	Active	
Burundi	RQ-11 Raven	AeroVironment	I	Active	
Cameroon	ScanEagle	Insitu	I	Active	
Canada	Silver Fox	Advanced Ceramics Research	I	Inactive	
Canada	ScanEagle	Insitu	I	Inactive	
Canada	Maveric	Prioria Robotics	I	Inactive	
Canada	RQ-11B Raven	AeroVironment	I	Active	
Canada	RQ-20B Puma II AE	AeroVironment	I	Active	
Canada	RQ-21 Black-jack	Insitu	I	Active	
Colombia	AutoCopter	Neural Robotics	I	Inactive	
Colombia	NightEagle	Insitu	I	Active	
Colombia	RQ-11B Raven	AeroVironment	I	Active	
Colombia	RQ-20 Puma	AeroVironment	I	Active	
Colombia	ScanEagle	Insitu	I	Active	
Colombia	Silver Fox	BAE, Raytheon	I	Active	
Czech Republic	RQ-11B Raven	AeroVironment	I	Active	
Czech Republic	ScanEagle	Insitu	I	Active	
Czech Republic	Wasp AE	AeroVironment	I	Active	
Denmark	RQ-11 Raven	AeroVironment	I	Inactive	
Denmark	RQ-20A Puma	AeroVironment	I	Active	
Egypt	Scarab	Northrop Grumman		Inactive	

Egypt	RQ-20B Puma AE II	AeroVironment	I	Active
Estonia	RQ-11 Raven	AeroVironment	I	Active
Estonia	RQ-20B Puma	AeroVironment	I	Active
France	Black Hornet 3	FLIR	I	Active
France	MQ-9 Reaper	GA-ASI	III	Active
Germany	RQ-20 Puma AE II	AeroVironment	I	Active
Germany	Black Hornet	FLIR	I	Active
Hungary	RQ-11 Raven	AeroVironment	I	Active
Indonesia	ScanEagle	Insitu	I	Active
Iraq	RQ-11 Raven	AeroVironment	I	Active
Iraq	RQ-20 Puma AE II	AeroVironment	I	Active
Iraq	ScanEagle	Insitu	I	Active
Israel	Chukar	Northrop	II	Inactive
Israel	Firebee	Teledyne Ryan	II	Inactive
Israel	Firebee II	Teledyne Ryan	II	Inactive
Italy	MQ-1 Predator	GA-ASI	III	Active
Italy	MQ-9 Reaper	GA-ASI	III	Active
Italy	FQM-151 Pointer	AeroVironment	I	Inactive
Italy	RQ-11A/B Raven	AeroVironment	I	Active
Italy	RQ-11C Raven DDL	AeroVironment	I	Active
Italy	RQ-7 Shadow	AAI	II	Active
Japan	RQ-4 Global Hawk	Northrop Grumman	III	Active
Japan	ScanEagle	Insitu	I	Active
Kenya	RQ-11 Raven	AeroVironment	I	Active
Kenya	ScanEagle	Insitu	I	Active
Latvia	RQ-20A Puma	AeroVironment	I	Active
Lebanon	RQ-11 Raven	AeroVironment	I	Active
Lebanon	ScanEagle	Insitu	I	Active
Lithuania	RQ-11 Raven	AeroVironment	I	Active
Lithuania	ScanEagle	Insitu	I	Active
Luxembourg	RQ-11	AeroVironment	I	Active
Malaysia	ScanEagle	Insitu	I	Active
Malaysia	ScanEagle 2	Insitu	I	Active
Mexico	T-20 JUMP	Arcturus	I	Active

Netherlands	MQ-9 Reaper	GA-ASI	III	Active
Netherlands	PD-100 Black Hornet	FLIR	I	Active
Netherlands	RQ-11 Raven	AeroVironment	I	Active
Netherlands	ScanEagle	Insitu	I	Active
New Zealand	InstantEye	Physical Sciences	I	Active
New Zealand	BlackHornet	FLIR	I	Active
North Macedonia	RQ-11 Raven	AeroVironment	I	Active
Norway	Black Hornet	FLIR	I	Active
Norway	RQ-11 Raven	AeroVironment	I	Active
Norway	RQ-12A Wasp Block IV DDL M1	AeroVironment	I	Active
Norway	RQ-20B Puma AE II DDL M1	AeroVironment	I	Active
Oman	RQ-21A Black-jack	Insitu	I	Active
Pakistan	ScanEagle	Insitu	I	Active
Philippines	RQ-11B Raven	AeroVironment	I	Active
Philippines	ScanEagle	Insitu	I	Active
Poland	Black Hornet 3	FLIR	I	Active
Poland	RQ-21A Black-jack	Insitu	I	Active
Poland	ScanEagle	Insitu	I	Active
Portugal	Karma	GoPro	I	Active
Portugal	RQ-11 Raven	AeroVironment	I	Active
ROK	RQ-4 Global Hawk	Northrop Grumman	III	Active
Romania	Phoenix 30	UAV Solutions	I	Active
Romania	RQ-11 Raven	AeroVironment	I	Active
Romania	RQ-7 Shadow	AAI	II	Active
Romania	ScanEagle	Insitu	I	Active
Singapore	ScanEagle	Insitu	I	Active
Spain	Black Hornet	FLIR	I	Active
Spain	MQ-9 Reaper	GA-ASI	III	Active
Spain	RQ-11B/DDL Raven	AeroVironment	I	Active
Spain	RQ-12 Wasp	AeroVironment	I	Active
Spain	ScanEagle	Insitu	I	Active
Sweden	RQ-12 Wasp	AeroVironment	I	Active
Sweden	RQ-20 Puma	AeroVironment	I	Active

Sweden	RQ-7 Shadow	AAI	II	Active
Thailand	RQ-11 Raven	AeroVironment	I	Active
Tunisia	ScanEagle	Insitu	I	Active
Turkey	Black Hornet	FLIR	I	Active
Turkey	GNAT-750	GA-ASI	III	Inactive
UAE	Integrator	Insitu	I	Active
UAE	RQ-1E Predator XP	GA-ASI	III	Active
Uganda	RQ-11 Raven	AeroVironment	I	Active
UK	Black Hornet PRS	FLIR	I	Active
UK	Desert Hawk	Lockheed Martin	I	Active
UK	MQ-9 Reaper	GA-ASI	III	Active
UK	ScanEagle	Insitu	I	Inactive
UK	Black Hornet	Prox Dynamics	I	Inactive
UK	T-Hawk	Honeywell	I	Active
Ukraine	RQ-11B Raven	AeroVironment	I	Active
Uzbekistan	RQ-11B Raven	AeroVironment	I	Active

NOTES

1. Jen Judson, "Army seeks new tactical unmanned aircraft for demo, testing in brigade combat teams," *Defense News*, 9 October 2018, <https://www.defensenews.com/digital-show-dailies/ausa/2018/10/10/army-seeks-new-tactical-unmanned-aircraft-for-demo-testing-in-brigade-combat-teams/>.
2. Sydney J. Freedberg Jr., "Textron Martin Win \$99.5M For Army Scout Drone: FTUAS," *Breaking Defense*, 28 March 2019, <https://breakingdefense.com/2019/03/textron-martin-win-army-scout-drone-ftuas/>.
3. Garrett Reim, "Analysis: US Hunts for Future Tactical Unmanned Aerial Vehicle," *FlightGlobal*, 8 April 2019, <https://www.flightglobal.com/news/articles/analysis-us-hunts-for-future-tactical-unmanned-aeri-456926/>.
4. Garrett Reim, "Defense Department accepting proposals for rugged short range reconnaissance," *FlightGlobal*, 13 November 2018, <https://www.flightglobal.com/news/articles/defense-department-accepting-propos-als-for-rugged-sh-453600/>.
5. Malek Murison, "Parrot Among Manufacturers Chosen by DoD for U.S. Army Recon Drone Program," *droneLife* (blog), 29 May 2019, <https://dronelife.com/2019/05/29/parrot-among-manufacturers-chosen-by-dod-for-u-s-army-recon-drone-program/>.
6. Argie R. Sarantios-Perrin, "Army to purchase additional Soldier Borne Sensor Systems," U.S. Army, 21 August 2018, https://www.army.mil/article/210155/army_to_purchase_additional_soldier_borne_sensor_systems.
7. "FLIR to deliver Black Hornet PRS UAV for US Army SBS programme," *Army Technology*, 28 January 2019, <https://www.army-technology.com/news/flir-black-hornet-sbs-programme/>.
8. Garrett Reim, "US Army Looks For Another Quadrotor Drone For Its Squads," *FlightGlobal*, 4 April 2019, <https://www.flightglobal.com/news/articles/us-army-looks-for-another-quadcopter-drone-for-its-s-457250/>.
9. Megan Eckstein, "Marines Won't Need a Carrier for High-End Fight with MUX Unmanned System," *USNI News*, 6 June 2018, <https://news.usni.org/2018/06/06/marines-wont-need-carrier-high-end-fight-mux-unmanned-system>.
10. Frank Wolfe, "MUX Looks for Persistent 'Red Jug' ISR in Combat Zones," *Rotor&Wing International*, 31 January 2019, <https://www.rotorandwing.com/2019/01/31/mux-looks-persistent-red-jug-isr-combat-zones/>.
11. Sam LaGrone, "Unmanned CBARS Tanker Air Segment Draft RFP Expected Later This Year," *USNI News*, 11 February 2016, <https://news.usni.org/2016/02/11/unmanned-cbars-tanker-air-segment-draft-rfp-expected-later-this-year>.
12. Valerie Insinna and David B. Larter, "US Navy selects builder for new MQ-25 Stingray aerial refueler drone," *Defense News*, 30 August 2018, <https://www.defensenews.com/naval/2018/08/30/us-navy-selects-builder-for-new-mq-25-stingray-aerial-refueling-drone/>.
13. Steve Trimble, "Next U.S. Air Force Tanker Likely Autonomous," *Aviation Week*, 21 March 2019, <https://>

- aviationweek.com/defense/next-us-air-force-tanker-likely-autonomous?NL=AW-05&Issue=AW-05_20190322_AW-05_309&sfvc4enews=42&cl=article_2&utm_rid=CPEN1000002522837&utm_campaign=18876&utm_medium=email&elq2=c2424c5a7a5f401db09411139886d1fc.
14. Dan Gettinger, "Summary of Drone Spending in the FY 2019 Defense Budget Request," Center for the Study of the Drone, 9 April 2018, <https://dronecenter.bard.edu/drones-in-the-fy19-defense-budget/>.
 15. Valerie Insinna, "US Air Force looks to fast track cash to Kratos Defense for more Valkyrie drones," *Defense News*, 17 June 2019, <https://www.defensenews.com/digital-show-dailies/paris-air-show/2019/06/17/us-air-force-looking-to-fast-track-cash-to-kratos-defense-for-additional-valkyrie-drones/>.
 16. Laura K. Stegherr, "UAV DET Launches Final Pioneer Flight," Navy.mil, 8 November 2007, https://www.navy.mil/submit/display.asp?story_id=32916.
 17. Senior Airman James Thompson, "Sunsetting the MQ-1 Predator: A history of innovation," U.S. Air Force, 20 February 2018, <https://www.af.mil/News/Article-Display/Article/1445531/sunsetting-the-mq-1-predator-a-history-of-innovation/>.
 18. United States, Department of the Air Force, *United States Air Force RPA Vector: Vision and Enabling Concepts 2016-2036*, 2.
 19. Shanda De Anda, "Flying force-multiplier provides eyes forward," U.S. Air Force, published 15 July 2005, accessed 7 February 2019, <https://www.af.mil/News/Article-Display/Article/133951/flying-force-multiplier-provides-eyes-forward/>.
 20. Jasmonet D. Jackson, "Kunsan Air Base Launches USAF's First-ever Rapid Airfield Damage Assessment System Test Flight," U.S. Indo-Pacific Command, published 19 September 2018, accessed 7 January 2019, <http://www.pacom.mil/Media/News/News-Article-View/Article/1639488/kunsan-air-base-launches-usafs-first-ever-rapid-airfield-damage-assessment-syst/>.
 21. "1st Reconnaissance Squadron," Beale Air Force Base, 1 June 2016, accessed 15 January 2019, <https://www.beale.af.mil/Library/Fact-Sheets/Display/Article/279940/1st-reconnaissance-squadron/>.
 22. "12th Reconnaissance Squadron," Beale Air Force Base, 17 May 2016, accessed 15 January 2019, <https://www.beale.af.mil/Library/Fact-Sheets/Display/Article/279937/12th-reconnaissance-squadron/>.
 23. Tristan Viglianco, "Flying High: Enlisted Pilots' integral role in the 12th RS," Defense Visual Information Distribution Service, 27 February 2019, <https://www.dvidshub.net/news/312181/flying-high-enlisted-pilots-integral-role-12th-rs>.
 24. "7th Reconnaissance Squadron," Beale Air Force Base, 17 May 2016, accessed 15 January 2019, <https://www.beale.af.mil/Library/Fact-Sheets/Display/Article/279937/12th-reconnaissance-squadron/>.
 25. "348th Reconnaissance Squadron (ACC)," Air Force Historical Research Agency, 30 July 2012, accessed 15 January 2019, <https://www.afhra.af.mil/About-Us/Fact-Sheets/Display/Article/432021/348-reconnaissance-squadron-acc/>.
 26. Jacqueline Devine, "Holloman retires MQ-1 aircraft from service," *Alamogordo Daily News*, 27 February 2017, <https://www.alamogordonews.com/story/news/local/community/2017/02/27/holloman-retires-mq-1-aircraft-service/98502228/>.
 27. "9th Attack Squadron stands up at Holloman," Holloman Air Force Base, 4 October 2012, accessed 15 January 2019, <https://www.holloman.af.mil/News/Display/Article/317481/9th-attack-squadron-stands-up-at-holloman/>.
 28. Sondra Escutia, "MQ-9 Reaper makes first local flight," Holloman Air Force Base, 7 October 2009, accessed 15 January 2019, <https://www.holloman.af.mil/Article-Display/Article/317984/mq-9-reaper-makes-first-local-flight/>.
 29. Ryan Whitney, "U.S. Air Force Weapons School reactivates historic squadron for Unmanned Aircraft Systems," Nellis Air Force Base, 2 October 2008, <https://www.nellis.af.mil/News/Article/285734/us-air-force-weapons-school-reactivates-historic-squadron-for-unmanned-aircraft/>.
 30. Susan Garcia, "26th WPS graduates first-ever Sensor Operator Advanced Course Instructor Course," Nellis Air Force Base, 21 June 2017, <https://www.nellis.af.mil/News/Article/1224910/26th-wps-graduates-first-ever-sensor-operator-advanced-instructor-course/>.
 31. Nadine Barclay, "America's oldest RPA unit celebrates 75 years," Creech Air Force Base, 6 March 2017, accessed 15 January 2019, <https://www.creech.af.mil/News/Article-Display/Article/1104122/americas-oldest-rpa-unit-celebrates-75-years/>.
 32. "11 Attack Squadron (ACC)," Air Force Historical Research Agency, accessed 5 June 2019, <https://www.afhra.af.mil/About-Us/Fact-Sheets/Display/Article/862033/11-attack-squadron-acc/>.
 33. Christian Clausen, "MQ-1 squadron celebrates 100 years," U.S. Air Force, 12 May 2017, accessed 15 January 2019, <https://www.af.mil/News/Article-Display/Article/1181419/mq-1-squadron-celebrates-100-years/>.
 34. "20th Attack Squadron (ACC)," Air Force Historical Research Agency, 8 August 2017, <https://www.afhra.af.mil/About-Us/Fact-Sheets/Display/Article/862029/20-attack-squadron-acc/>.
 35. Deirdre Shesgreen, "Air Force to recognize Whiteman drone pilots as 'attack squadron,'" *Springfield News-Leader*, 19 April 2016, <https://www.news-leader.com/story/news/politics/2016/04/19/air-force-recognize-whiteman-drone-pilots-attack-squadron/83194968/>.
 36. "42 Attack Squadron (ACC)," Air Force Historical Research Agency, 15 May 2012, <https://www.afhra.af.mil/About-Us/Fact-Sheets/Display/Article/432047/42-attack-squadron-acc/>.
 37. Christian Clausen, "First MQ-9 squadron looks good for 100," U.S. Air Force, 13 June 2017, <https://www.af.mil/News/Article-Display/Article/1212901/first-mq-9-squadron-looks-good-for-100/>.
 38. "432nd ATKS renamed the 89th ATKS, honors heritage," Ellsworth Air Force Base, 23 June 2016, accessed 15 January 2019, <https://www.ellsworth.af.mil/News/Article-Display/Article/810809/432nd-atks-renamed-the-89th-atks-honors-heritage/>.

39. “89 Attack Squadron (ACC),” Air Force Historical Research Agency, 8 August 2017, <https://www.afhra.af.mil/About-Us/Fact-Sheets/Display/Article/432130/89-attack-squadron-acc/>
40. Kristan Campbell, “Centennial Squadron reactivates at Creech,” Creech Air Force Base, 9 December 2016, <https://www.creech.af.mil/News/Article-Display/Article/1025692/centennial-squadron-reactivates-at-creech/>.
41. David Donald, “U.S. Air Force Ends Predator Operations,” *Aviation International Online*, 13 March 2018, <https://www.ainonline.com/aviation-news/defense/2018-03-13/us-air-force-ends-predator-operations>.
42. “17th Attack Squadron (ACC),” Air Force Historical Research Agency, 8 August 2017, <https://www.afhra.af.mil/About-Us/Fact-Sheets/Display/Article/862031/17-attack-squadron-acc/>.
43. “22 Attack Squadron (ACC),” Air Force Historical Research Agency, 24 June 2016, <https://www.afhra.af.mil/About-Us/Fact-Sheets/Display/Article/862028/22-attack-squadron-acc/>.
44. David Axe, “Stealth Drone’s Secret Pacific Missions,” *War is Boring*, 7 December 2013, <https://medium.com/war-is-boring/stealth-drones-secret-pacific-missions-3f12eee5c0d1>.
45. Joseph Trevithick and Tyler Rogoway, “Shedding Some Light On The Air Force’s Most Shadowy Drone Squadron,” *The Drive*, 25 April 2018, <http://www.thedrive.com/the-war-zone/19318/uncovering-the-air-forces-most-mysterious-drone-squadron>
46. “44 Reconnaissance Squadron (ACC),” Air Force Historical Research Agency, last modified 4 December 2015, accessed 11 February 2019, <https://www.afhra.af.mil/About-Us/Fact-Sheets/Display/Article/862147/44-reconnaissance-squadron-acc/>.
47. Joseph Trevithick and Tyler Rogoway, “Shedding Some Light On The Air Force’s Most Shadowy Drone Squadron,” *The Drive*, 25 April 2018, <http://www.thedrive.com/the-war-zone/19318/uncovering-the-air-forces-most-mysterious-drone-squadron>.
48. “867 Reconnaissance Squadron (ACC),” Air Force Historical Research Agency, last modified 6 December 2013, accessed 11 February 2019, <https://www.afhra.af.mil/About-Us/Fact-Sheets/Display/Article/862318/867-reconnaissance-squadron-acc/>.
49. Joseph Trevithick and Tyler Rogoway, “Shedding Some Light On The Air Force’s Most Shadowy Drone Squadron,” *The Drive*, 25 April 2018, <http://www.thedrive.com/the-war-zone/19318/uncovering-the-air-forces-most-mysterious-drone-squadron>.
50. Benjamin Ingold, “25th Attack Group activated at Shaw,” Air Combat Command, last modified 4 October 2018, accessed 28 February 2019, <https://www.acc.af.mil/News/Article-Display/Article/1655882/25th-attack-group-activated-at-shaw/>.
51. “482 Attack Squadron (ACC),” Air Force Historical Research Agency, 26 March 2018, <https://www.afhra.af.mil/About-Us/Fact-Sheets/Display/Article/1475388/482-attack-squadron-acc/>.
52. “78 Attack Squadron (AFRC),” Air Force Historical Research Agency, 26 November 2012, <https://www.afhra.af.mil/About-Us/Fact-Sheets/Display/Article/431985/78-attack-squadron-afrc/>.
53. Jessica Martin, “Reserve unit earns AFA President’s Award,” Creech Air Force Base, 23 July 2013, <https://www.creech.af.mil/News/Article-Display/Article/670077/reserve-unit-earns-afa-presidents-award/>.
54. “13 Reconnaissance Squadron (AFRC),” Air Force Historical Research Agency, 18 October 2016, accessed 15 January 2019, <https://www.afhra.af.mil/About-Us/Fact-Sheets/Display/Article/432066/13-reconnaissance-squadron-afrc/>.
55. “429th Attack Squadron,” 926th Wing, 19 February 2016, <https://www.926wing.afrc.af.mil/About-Us/Fact-Sheets/Display/Article/678230/429th-air-combat-training-squadron/>.
56. “Aircrew from the 107th Airlift Wing complete first combat MQ-9 mission as a team,” 107th Attack Wing, 3 October 2015, <https://www.107attackwing.af.mil/What-We-Do/Article-Display/Article/864742/aircrew-from-the-107th-airlift-wing-complete-first-combat-mq-9-mission-as-a-team/>.
57. Elaine Nowak, “Lt Col Douglas Eoute becomes 107th Operations Group commander as unit undergoes mission change,” 107th Attack Wing, 16 October 2015, accessed 16 January 2019, <https://www.107attackwing.af.mil/What-We-Do/Article-Display/Article/1015970/lt-col-douglas-eoute-becomes-107th-operations-group-commander-as-unit-undergoes/>.
58. Jason Boyd, “110th Attack Wing ribbon cutting ceremony and open house,” Air National Guard, 26 September 2016, <https://www.ang.af.mil/Media/Article-Display/Article/1015840/110th-attack-wing-ribbon-cutting-ceremony-and-open-house/>.
59. Dann Cuellar, “Horsham Air Base is far from out of business,” *ABC*, 20 April 2019, <https://6abc.com/travel/horsham-air-base-is-far-from-out-of-business/5261038/>.
60. Kristin M. Hall, “Air National Guard base in Tenn. has openings for new mission,” *Stars and Stripes*, 30 August 2012, <https://www.stripes.com/news/air-force/air-national-guard-base-in-tenn-has-openings-for-new-mission-1.187521>.
61. “Happy Hooligans fly first UAS mission from Fargo,” National Guard, 6 July 2007, <https://www.nationalguard.mil/News/Article/573002/happy-hooligans-fly-first-uas-mission-from-fargo/>.
62. “119th Wing Factsheet,” 119th Wing, 28 March 2017, <https://www.119wg.af.mil/About-Us/Fact-Sheets/Display/Article/1132682/119th-wing-factsheet/>.
63. Tu-Uyen Tran, “ND Air National Guard: Don’t fear the Reaper,” *Grand Forks Herald*, 1 August 2017, <https://www.grandforksherald.com/news/4306225-nd-air-national-guard-dont-fear-reaper>
64. “132d Wing Fact Sheet,” 132d Wing, 22 August 2017, <https://www.132dwing.af.mil/About-Us/Fact-Sheets/Display/Article/1285828/132d-wing-fact-sheet/>.
65. Steven E. Clay, *US Army Order of Battle 1919-1941 Volume 3*, Fort Leavenworth: Combat Studies Institute Press, 2010, 1445-1446.
66. “History of the 147th Attack Wing,” 147th Attack Wing, 10 August 2009, <https://www.147atkw.af.mil/>

- About-Us/Fact-Sheets/Display/Article/450152/history-of-the-147th-attack-wing/.
67. “147th Reconnaissance Wing reaches 100K flying hours on MQ-1 Predator,” Air National Guard, 8 November 2015, <https://www.ang.af.mil/Media/Article-Display/Article/862895/147th-reconnaissance-wing-reaches-100k-flying-hours-on-mq-1-predator/>.
 68. Andria Allmond, “111th Attack Wing reaches MQ-9 initial operational capability,” Air National Guard, 4 April 2016, <https://www.ang.af.mil/Media/Article-Display/Article/862755/111th-attack-wing-reaches-mq-9-initial-operational-capability/>.
 69. “163d Reconnaissance Wing,” 163d Attack Wing, 30 March 2009, <https://www.163atkw.ang.af.mil/About-Us/Fact-Sheets/Display/Article/452904/163d-reconnaissance-wing/>.
 70. “178th transitions to MQ-9 Reaper mission,” 178th Wing, 7 December 2017, accessed 15 January 2019, <https://www.178wing.ang.af.mil/News/Article/1391330/178th-transitions-to-mq-9-reaper-mission/>.
 71. “214th Attack Group,” 162nd Wing, last modified 26 September 2012, <https://www.162wing.ang.af.mil/About-Us/Fact-Sheets/Display/Article/1292865/214th-attack-group/>.
 72. Jeffrey D. Brown, “174th Fighter Wing Becoming 174th Attack Wing,” 174th Attack Wing, 26 July 2012, accessed 16 January 2019, <https://www.174attackwing.ang.af.mil/News/Article-Display/Article/439362/174th-fighter-wing-becoming-174th-attack-wing/>.
 73. “About the 188th Wing,” 188th Wing, accessed 16 January 2019, <https://www.188wg.ang.af.mil/About-Us/>.
 74. USS Simpson, “Simpson, HSM-46 Deploy to 6th Fleet AOR,” news release, 25 September 2013, <https://www.jacksonville.com/military/mayport-mirror/2013-09-25/story/simpson-hsm-46-deploy-6th-fleet-aor>.
 75. Mark D. Faram, “Navy’s MQ-4C Triton community gets its very first squadron,” *Navy Times*, 2 November 2016, <https://www.navytimes.com/news/your-navy/2016/11/02/navy-s-mq-4c-triton-community-gets-its-very-first-squadron/>.
 76. David Donald, “U.S. Navy Commissions Dedicated UAS Test Squadron,” *Aviation International Online*, 22 October 2018, <https://www.ainonline.com/aviation-news/defense/2018-10-22/us-navy-commissions-dedicated-uas-test-squadron>.
 77. U.S. Navy, “Magicians Reborn as Navy’s First Squadron to Operate Manned and Unmanned Aircraft,” news release, 3 May 2013, https://www.navy.mil/submit/display.asp?story_id=73876.
 78. “VMU-1 History,” Marines, accessed 16 January 2019, <https://www.3rdmaw.marines.mil/Units/MAG-13/VMU-1/History/>.
 79. “US Marine Corps Begins Transitioning to Shadow Tactical UAS,” *Space War*, 20 July 2007, http://www.spacewar.com/reports/US_Marine_Corps_Begins_Transitioning_To_Shadow_Tactical_UAS_999.html.
 80. United States, Department of Defense, *2019 Marine Corps Aviation Plan*, (Washington, D.C., 2019), <https://www.aviation.marines.mil/Portals/11/2019%20AvPlan.pdf>.
 81. “VMU-2 History,” Marines, accessed 16 January 2019, <https://www.mag14.marines.mil/MAG-14-Units/VMU-2/About/>.
 82. “VMU-3 History,” Marines, accessed 16 January 2019, <https://www.1stmaw.marines.mil/Subordinate-Units/Marine-Aircraft-Group-24/VMU-3/History/>.
 83. Austin Hazard, “New Marine unmanned aircraft unit stationed at Yuma air station,” MCAS Yuma, 8 July 2010, <https://www.mcasyma.marines.mil/News/Article/550147/new-marine-unmanned-aircraft-unit-stationed-at-yuma-air-station/>.
 84. U.S. Congress, Congressional Budget Office, *The U.S. Military’s Force Structure: A Primer*, (Washington, D.C., 2016), <https://www.cbo.gov/publication/51535>.
 85. “RQ-7Bv2 Shadow Tactical Unmanned Aircraft System (TUAS),” U.S. Army, accessed 11 February 2019, https://asc.army.mil/web/portfolio-item/aviation_shadow-tuas/.
 86. Staff Sgt. Christopher Calvert, “1st Air Cav Soldiers keep Gray Eagles soaring,” U.S. Army, 3 September 2014, https://www.army.mil/article/132987/1st_air_cav_soldiers_keep_gray_eagles_soaring.
 87. Michael Needham, “Gray Eagle transitions authority after successful mission in Middle East,” *DVIDS*, 23 October, 2015, <https://www.dvidshub.net/news/printable/180292>.
 88. Corey Dickstein, “Fort Stewart soldiers prepare for Afghanistan drone-flying mission,” *Savannah Morning News*, 16 June 2014, <https://www.savannahnow.com/news/2014-06-16/fort-stewart-soldiers-prepare-afghanistan-drone-flying-mission>.
 89. Jaegun Lee, “Army and Air Force drone usage takes off at Fort Drum,” *Stars and Stripes*, 7 September 2014, <https://www.stripes.com/news/us/army-and-air-force-drone-usage-takes-off-at-fort-drum-1.301972>.
 90. Daniel L. Isabell and Justin M. Kuhlmann, “Something Different in Advanced Individual Training,” *Army Aviation Magazine*, <http://www.armyaviationmagazine.com/index.php/archive/not-so-current/891-something-different-in-advanced-individual-training>.
 91. “2-13 Aviation Regiment,” Fort Rucker, accessed 17 January 2019, <https://www.rucker.army.mil/us-aace/1ab/2-13th/>.
 92. Gustavo Bahena, “‘Flying Tigers’ to receive world-class facility at National Training Center,” U.S. Army, 13 January 2016, https://www.army.mil/article/160919/flying_tigers_to_receive_world_class_facility_at_national_training_center.
 93. Drew Brooks, “For Bragg promises watchful eye over new unmanned aerial vehicle ahead of first flight,” *The Fayetteville Observer*, 4 August 2017, <https://www.fayobserver.com/news/20170804/fort-bragg-promises-watchful-eye-over-new-unmanned-aerial-vehicle-ahead-of-first-flight>.
 94. “224th Military Intelligence Battalion,” Fort Stewart-Hunter Army Airfield, accessed 23 January 2019, <https://home.army.mil/stewart/index.php/units/tenant-units/224-MI-BN>.
 95. “Intelligence and Security Command Mission Command,” *Military Intelligence Professional Bulletin*, 2018,

- https://fas.org/irp/agency/army/mipb/2018_03.pdf.
96. Sean Brady, "First Gray Eagle Flight Expands Army Aviation Capability in Alaska," U.S. Indo-Pacific Command, last modified 20 April 2016, accessed 12 February 2019, <https://www.pacom.mil/Media/News/article/738108/first-gray-eagle-flight-expands-army-aviation-capability-in-alaska/>.
 97. Duncan Brennan, "Gray Eagles take first flight," *Fort Campbell Courier*, 11 June 2015, http://fortcampbellcourier.com/news/article_00e72148-107b-11e5-845c-dbbb0752f235.html.
 98. Kim Gamel, "US to deploy new Gray Eagle attack drone system in South Korea," *Stars and Stripes*, 13 March 2017, <https://www.stripes.com/news/us-to-deploy-new-gray-eagle-attack-drone-system-in-south-korea-1.458364>.
 99. "Camp Roberts Debuts Three New Facilities," DVIDS, 6 February 2014, <https://www.dvidshub.net/image/1359605/camp-roberts-debuts-three-new-facilities>.
 100. Camp Shelby Joint Forces Training Center, "#Soldiers from the 150th Engineer Battalion conduct the last flight for the Shadow 1 legacy at the Camp Shelby Joint Forces Training Center," Facebook, 25 June 2019, <https://www.facebook.com/campshelby1917/videos/vb.870042446424822/2254339674647447/?type=2&theater>.
 101. 239th Brigade Engineer Battalion, "The TUAS Platoon launched and landed the first Shadow V2 flight for Arkansas this morning," Facebook, <https://www.facebook.com/watch/?v=36175577758143>.
 102. Staff Sgt. Mary Junell, "New Shadow Unmanned Aerial System provides Soldiers better military intelligence, longer flight time," U.S. Army, 1 September 2017, https://www.army.mil/article/193224/new_shadow_unmanned_aerial_system_provides_soldiers_better_military_intelligence_longer_flight_time.
 103. 127th Airborne Engineer Battalion, "CSM Cory Bell (Devil Strike 9) gets an update on ISR operations from Aircraft Operator, SPC Summy and Aircraft Commander and Payload Operator, SPC Robles," Facebook, 27 March 2019, https://www.facebook.com/permalink.php?story_fbid=10155843936581097&id=126548836096&__tn__=-R.
 104. Capt. Scott Walters, "Shadow play - UAS operators show hasty landing abilities," *Fort Carson Mountaineer*, 27 May 2017, <https://www.fortcarsonmountaineer.com/2017/05/shadow-play-uas-operators-show-hasty-landing-abilities/>.
 105. Sgt. William Howard, "1SBCT flies Shadow for 1st time," *Fort Carson Mountaineer*, 7 July 2014, <https://www.fortcarsonmountaineer.com/2014/07/1sbct-flies-shadow-for-1st-time/>.
 106. Sgt. Nelson Robles, "2nd IBCT UAS provides 'eyes in sky,'" *Fort Carson Mountaineer*, 18 August 2015, <https://www.fortcarsonmountaineer.com/2015/08/2nd-ibct-uas-provides-eyes-in-sky/>.
 107. Sgt. 1st Class Raymond Drumsta, "New York Army National Guard Soldiers fly high, see all via unmanned aircraft," U.S. Army, last modified 18 April 2011, https://www.army.mil/article/55156/new_york_army_national_guard_soldiers_fly_high_see_all_via_unmanned_aircraft.
 108. Spc. Robert Cook, "'Dark Knights' soar in the desert with unmanned aerial vehicles," U.S. Army, last modified 24 March 2016, https://www.army.mil/article/164850/dark_knights_soar_in_the_desert_with_unmanned_aerial_vehicles.
 109. Maj. Carson Petry, "New Shadow takes flight," *Fort Hood Sentinel*, 18 October 2018, http://www.forthoodsentinel.com/news/new-shadow-takes-flight/article_9b9cec1e-d246-11e8-a1ad-0b737cb04a19.html.
 110. Sgt. Lisa Vines, "IRONHORSE puts a Shadow in the sky," DVIDS, last modified 1 November 2018, <https://www.dvidshub.net/image/4878383/ironhorse-puts-shadow-sky>.
 111. 1-2 Stryker Brigade Combat Team, "23rd BEB Soldiers provide eyes on the battlefield," Flickr, 1 February 2018, <https://www.flickr.com/photos/ghostbrigade/28235752009>.
 112. Virginia Guard Public Affairs, "229th BEB Soldiers conduct flight operations at Fort Pickett," Flickr, 2 February 2019, <https://www.flickr.com/photos/vanguardpao/46157301535>.
 113. "U.S. soldiers to train with RQ-7 Shadow UAS in Poland," Army Recognition (blog), 10 April 2019, https://armyrecognition.com/armies_in_the_world_analysis_focus/u.s._soldiers_to_train_with_rq-7_shadow_uas_in_poland.html.
 114. Spc. Efren Rodriguez, "Shadows over live fire," DVIDS, last modified 25 February 2017, <https://www.dvidshub.net/image/3148269/shadows-over-live-fire>.
 115. Pfc. Malik Gibson, "Combined Resolve VII," DVIDS, 6 February 2016, <https://www.dvidshub.net/image/2845971/combined-resolve-vii>.
 116. Pfc. Justin Snyder, "766th Brigade Engineer Battalion launches drones [Image 4 of 5]," DVIDS, 9 May 2015, <https://www.dvidshub.net/image/1930544/766th-brigade-engineer-battalion-launches-drones>.
 117. Sgt. Mason Cutrer, "Tactical Unmanned Aircraft System [Image 1 of 3]," DVIDS, 17 January 2019, <https://www.dvidshub.net/image/5049042/tactical-unmanned-aircraft-system>.
 118. Defense Video News, "RQ-7B Shadow Tactical Unmanned Aircraft System," YouTube, 24 July 2019, <https://www.youtube.com/watch?v=0W9eVm7fh6k>.
 119. Arctic Wolves 1st SBCT, "70th BEB June 8," Flickr, 8 June 2017, https://www.flickr.com/photos/arctic_wolves/34337921384.
 120. Capt. Ashley Bain Sangster, "Spartans perform maintenance on Unmanned Aircraft Systems [Image 1 of 7]," DVIDS, 22 August 2018, <https://www.dvidshub.net/image/4675969/spartans-perform-maintenance-unmanned-aircraft-systems>.
 121. Tech. Sgt. Matt Hecht, "NJ Army Guard RQ-7 Shadow [Image 1 of 9]," DVIDS, 16 June 2015, <https://www.dvidshub.net/image/2004873/nj-army-guard-rq-7-shadow>.
 122. "Oregon Army National Guard's 41st Special Troops Battalion gets hands-on Unmanned Aerial Vehicle flight experience at annual training," *Gazette Times*, 20 June 2013, https://www.gazettetimes.com/oregon-army-national-guard-s-st-special-troops-battalion-gets/image_9aa85622-e8c8-50a2-aab6-ab3a04df46ca.html.

123. Staff Sgt. Steven Colvin, "2nd Cavalry Regiment launches 'Shadow' in Estonia," U.S. Army, last modified 14 April 2016, https://www.army.mil/article/165997/2nd_cavalry_regiment_launches_shadow_in_estonia.
124. Staff Sgt. Armando Limon, "'Wayfinders' eye in sky performs recon, defends brigade," U.S. Army, 27 September 2016, https://www.army.mil/article/175680/wayfinders_eye_in_sky_performs_recon_defends_brigade.
125. "334th Brigade Engineer Battalion," Minnesota National Guard, <https://minnesotanationalguard.ng.mil/334beb/>.
126. 1st Lt. Peter Ingram, "Sky Soldier's new engineer battalion integrates seamlessly," U.S. Army, 2 November 2015, https://www.army.mil/article/158052/sky_soldiers_new_engineer_battalion_integrates_seamlessly.
127. Col. J. Ray Davis, "The Tougher Nut," *Army Aviation Magazine*, <http://www.armyaviationmagazine.com/index.php/archive/not-so-current/971-the-tougher-nut>.
128. Washington National Guard, "SSG Josh Guidice, SPC Kyle McElmurray and SPC Chris Green, Det 1, D Co. 898th BEB, push a Shadow TUAS to the maintenance area after landing at the Yakima Training Center on April 29, 2015," Facebook, 4 May 2015, <https://www.facebook.com/washingtonguard/photos/a.177579812731/10152993776947732/?type=1&theater>.
129. Staff Sgt. Jason Lay, "Oklahoma Army National Guard trains on flying the 'Shadow'," U.S. Army, 2 February 2018, https://www.army.mil/article/200004/oklahoma_army_national_guard_trains_on_flying_the_shadow.
130. "RQ-7 Shadow: The Eye in the Sky," *Star Dragoon-Telegram*, August 2016, https://static.dvidshub.net/media/pubs/pdf_30301.pdf.
131. "3rd Special Operations Squadron (AFSOC)," Air Force Historical Research Agency, 17 October 2016, accessed 15 January 2019, <https://www.afhra.af.mil/About-Us/Fact-Sheets/Display/Article/434097/3-special-operations-squadron-afsoc/>.
132. "12th Special Operations Squadron (AFSOC)," Air Force Historical Research Agency, 29 October 2018, accessed 15 January 2019, <https://www.afhra.af.mil/About-Us/Fact-Sheets/Display/Article/1674927/12-special-operations-squadron-afsoc/>.
133. "33 Special Operations Squadron (AFSOC)," Air Force Historical Research Agency, 18 May 2017, accessed 15 January 2019, <https://www.afhra.af.mil/About-Us/Fact-Sheets/Display/Article/433206/33-special-operations-squadron-afsoc/>.
134. Jim Thompson, "'Lucky Dicers' drone squadron activated at Hurlburt," *NWF Daily News*, 18 December 2018, <https://www.nwfdailynews.com/news/20181218/lucky-dicers-drone-squadron-activated-at-hurlburt>.
135. "2 Special Operations Squadron (AFRC)," Air Force Historical Research Agency, accessed 3 June 2019, <https://www.afhra.af.mil/About-Us/Fact-Sheets/Display/Article/433344/2-special-operations-squadron-afrc/>.
136. Joseph Trevithick, "Army's Elite Night Stalkers Quietly Stood Up A New Unit Ahead Of Getting New Drones," *The Drive*, 8 February 2019, <http://www.thedrive.com/the-war-zone/26407/armys-elite-night-stalkers-quietly-stood-up-a-new-unit-ahead-of-getting-new-drones>.
137. Sean D. Naylor, "The Army's killer drones: How a secretive special ops unit decimated ISIS," *Yahoo News*, 7 March 2019, <https://news.yahoo.com/how-a-secretive-special-ops-unit-of-killer-drones-decimated-isis-100000657.html>.
138. Joseph Trevithick, "Army's Elite Night Stalkers Quietly Stood Up A New Unit Ahead Of Getting New Drones," *The Drive*, 8 February 2019, <http://www.thedrive.com/the-war-zone/26407/armys-elite-night-stalkers-quietly-stood-up-a-new-unit-ahead-of-getting-new-drones>.
139. Dan Gettinger, "Training Drone Pilots," Center for the Study of the Drone, 29 June 2015, <https://dronecenter.bard.edu/training-drone-pilots/>.
140. Tara L. Terry, Chaitra M. Hardison, David Schulker, Alexander C. Hou, and Leslie Adrienne Payne, "Building a Healthy MQ-1/9 RPA Pilot Community," RAND Corporation, 2018, https://www.rand.org/content/dam/rand/pubs/research_reports/RR2000/RR2018/RAND_RR2018.pdf.
141. Kelsey D. Atherton, "Air Force Will Let Enlisted Pilots Fly Global Hawks," *Popular Science*, 21 December 2015, <https://www.popsoci.com/air-force-will-let-enlisted-pilots-fly-global-hawks>.
142. Lt. Col. Jack Stallworth, "Undergraduate Remotely Piloted Aircraft (RPA) Training (URT)," Presentation, <https://community.apan.org/wg/saf-llc/m/2017-san-antonio-stafdel/195447/download>.
143. "2-13 Aviation Regiment," Fort Rucker, accessed 17 January 2019, <https://www.rucker.army.mil/us-aace/1ab/2-13th/>.
144. J.D. Leipold, "Army to go universal with UAS operator training," U.S. Army, 27 January 2016, https://www.army.mil/article/161492/Army_to_go_universal_with_UAS_operator_training/.
145. Clark Pierce, "MQ-9B Fire Scout Training Facility Unveiled at Naval Air Station Jacksonville," *Jax Air News*, 11 July 2012, https://www.navy.mil/submit/display.asp?story_id=68333.
146. "Marines' new unmanned aircraft training facility opens doors," NAVAIR, 27 November 2018, <http://www.navair.navy.mil/news/Marines-new-unmanned-aircraft-training-facility-opens-doors/Sat-12222018-1206>.
147. Richard Major, "RQ-2 Pioneer: The Flawed System that Redefined US Unmanned Aviation," research report, Air Command and Staff College Air University, 2012, <https://apps.dtic.mil/dtic/tr/fulltext/u2/1022933.pdf>.
148. "VMU-1 History," Marines, accessed 16 January 2019, <https://www.3rdmaw.marines.mil/Units/MAG-13/VMU-1/History/>.
149. Ruth Quinn, "Intelligence Center Provides Support to Desert Shield/Desert Storm," U.S. Army, 13 January 2014, https://www.army.mil/article/118182/intelligence_center_provides_support_to_desert_shielddesert_storm.
150. "Pioneer Short Range (SR) UAV," Federation of American Scientists, <https://fas.org/irp/program/collect/pioneer.htm>.
151. Richard Major, "RQ-2 Pioneer: The Flawed System that Redefined US Unmanned Aviation," research report, Air Command and Staff College Air University, 2012, <https://apps.dtic.mil/dtic/tr/fulltext/u2/1022933.pdf>.
152. Richard Whittle, *Predator: The Secret Origins of the Drone Revolution* (Henry Holt and Co, 2014), 81, 100-102.

153. Ibid, 110.
154. Thomas P. Ehrhard, "Air Force UAVs: The Secret History," The Mitchell Institute for Airpower Studies, July 2010, <https://apps.dtic.mil/dtic/tr/fulltext/u2/a525674.pdf>.
155. Dr. Daniel L. Haulman, "U.S. Unmanned Aerial Vehicles in Combat, 1991-2003," Air Force Historical Research Agency, 9 June 2003, <https://apps.dtic.mil/dtic/tr/fulltext/u2/a434033.pdf>.
156. Daniel L. Haulman, "The U.S. Air Force in the Air War Over Serbia, 1999," Air Power History, 2015, https://media.defense.gov/2016/Mar/17/2001481638/-1/-1/0/PAGES%20FROM%20AIR_POWER_HISTORY_SUMMER-2015.PDF.
157. U.S. Department of Defense, *Report to Congress: Kosovo/Operation Allied Force After-Action Report*, (Washington, D.C.: 2000), <http://www.au.af.mil/au/awc/awcgate/kosovooa/kaar02072000.pdf>.
158. Richard Whittle, "Predator's Big Safari," Mitchell Institute for Airport Studies, https://secure.afa.org/Mitchell/reports/MP7_Predator_0811.pdf.
159. Richard Whittle, *Predator: The Secret Origins of the Drone Revolution* (Henry Holt and Co, 2014), 242-244.
160. Arthur Holland Michel, "How Rogue Techies Armed the Predator, Almost Stopped 9/11, and Accidentally Invented Remote War," *Wired*, 17 December 2015, <https://www.wired.com/2015/12/how-rogue-techies-armed-the-predator-almost-stopped-911-and-accidentally-invented-remote-war/>.
161. United States, Department of Defense, *U.S. Army Unmanned Aircraft Systems Roadmap 2010-2035*, Washington, D.C.: U.S. Army, 2010, <https://www.rucker.army.mil/usaace/uas/US%20Army%20UAS%20RoadMap%202010%202035.pdf>.
162. David Milburn, "Army PM UAS Spectrum Update," Presentation, 2012, <https://apps.dtic.mil/dtic/tr/fulltext/u2/a567397.pdf>.
163. Alex Davies, "The Marines' Self-Flying Chopper Survives a Three-Year Tour," *Wired*, 30 July 2014, <https://www.wired.com/2014/07/kmax-autonomous-helicopter/>.
164. "Reaper UAV now flying in Afghanistan," U.S. Air Force, last modified 11 October 2007, <https://www.af.mil/News/Article-Display/Article/125477/reaper-uav-now-flying-in-afghanistan/>.
165. Joseph Trevithick, "The USAF Expands MQ-9 Reaper Drone Force in Afghanistan to Its Largest Size Ever," *The Drive*, 26 January 2018, <http://www.thedrive.com/the-war-zone/18006/the-usaf-expands-mq-9-reaper-drone-force-in-afghanistan-to-its-largest-size-ever>.
166. "Sources: U.S. kills Cole suspect," *CNN.com*, 5 November 2002, <http://www.cnn.com/2002/WORLD/meast/11/04/yemen.blast/index.html>.
167. "Drone Strikes: Pakistan," New America Foundation, accessed 10 April 2019, <https://www.newamerica.org/in-depth/americas-counterterrorism-wars/pakistan/>.
168. "Drone Strikes: Yemen," New America Foundation, accessed 10 April 2019, <https://www.newamerica.org/in-depth/americas-counterterrorism-wars/us-targeted-killing-program-yemen/>.
169. "Drone Strikes: Somalia," New America Foundation, accessed 10 April 2019, <https://www.newamerica.org/in-depth/americas-counterterrorism-wars/somalia/>.
170. Greg Miller, "Brennan speech is first Obama acknowledgment of use of armed drones," *The Washington Post*, 30 April 2012, https://www.washingtonpost.com/world/national-security/brennan-speech-is-first-obama-acknowledgement-of-use-of-armed-drones/2012/04/30/gIQAq7B4rT_story.html?utm_term=.6c8fd3d71eb2.
171. John F. Burns, "U.N. Panel to Investigate Rise in Drone Strikes," *The New York Times*, 24 January 2013, <https://www.nytimes.com/2013/01/25/world/europe/un-panel-to-investigate-rise-in-drone-strikes.html>.
172. Peter Baker, "Pivoting From a War Footing, Obama Acts to Curtail Drones," *The New York Times*, 23 May 2013, <https://www.nytimes.com/2013/05/24/us/politics/pivoting-from-a-war-footing-obama-acts-to-curtail-drones.html?action=click&module=RelatedCoverage&pgtype=Article&region=Footer>.
173. Missy Ryan, "Trump administration alters Obama-era bill on civilian casualties in U.S. airstrikes," *The Washington Post*, 6 March 2019, https://www.washingtonpost.com/world/national-security/white-house-weakens-obama-era-rule-on-civilian-casualties/2019/03/06/b2940dfe-4031-11e9-9361-301ffb5bd5e6_story.html?utm_term=.7a7abc00c4f6.
174. T. Michael Moseley, "Operation Iraqi Freedom - By the Numbers," U.S. Central Air Forces, Assessment and Analysis Division, 30 April 2003, <https://www.comw.org/pda/fulltext/oifcentaf.pdf>.
175. T. Michael Moseley, "Operation Iraqi Freedom - By the Numbers," U.S. Central Air Forces, Assessment and Analysis Division, 30 April 2003, <https://www.comw.org/pda/fulltext/oifcentaf.pdf>.
176. United States, Department of Defense, *Defense Science Board Study on Unmanned Aerial Vehicles and Uninhabited Combat Aerial Vehicles*, Washington, D.C.: Office of the Under Secretary of Defense For Acquisition Technology and Logistics, 2004, <https://fas.org/irp/agency/dod/dsb/uav.pdf>.
177. Raymond T. Odierno, Nichol E. Brooks, and Francesco P. Mastracchio, "ISR Evolution in the Iraqi Theater," *Joint Forces Quarterly*, 2008, <https://apps.dtic.mil/dtic/tr/fulltext/u2/a516788.pdf>.
178. Raymond A. Millen, *Stability Operations in Haiti 2010: A Case Study*, U.S. Army Peacekeeping and Stability Operations Institute: 2016, 59-60, <http://pksoi.armywarcollege.edu/default/assets/File/Unified%20Response%20Haiti%20Case%20Study.pdf>.
179. Karl P. Mueller, *Precision and Purpose: Airpower in the Libyan Civil War* (Santa Monica: RAND Corporation, 2015), 146.
180. "Factbox: Pentagon says U.S. stepped up pace of Libya air strikes," *Reuters*, 22 August 2011, <https://www.reuters.com/article/us-libya-usa-strikes/factbox-pentagon-says-u-s-stepped-up-pace-of-libya-air-strikes-idUSTRE77L76C20110823>.
181. Joseph Trevithick, "The U.S. Air Force Can Build a Drone Base in Less Than a Month," *War is Boring*, 15 April 2016, <https://medium.com/war-is-boring/the-u-s-air-force-can-build-a-drone-base-in-less-than-a-month->

157e64f6a807.

182. Eric Schmitt, "Drones in Niger Reflect New U.S. Tack on Terrorism," *New York Times*, 10 July 2013, <https://www.nytimes.com/2013/07/11/world/africa/drones-in-niger-reflect-new-us-approach-in-terror-fight.html>.
183. "U.S. confirms deployment of armed drones in Niger," *Reuters*, 30 July 2018, <https://www.reuters.com/article/us-usa-niger-security-drones/u-s-confirms-deployment-of-armed-drones-in-niger-idUSKBN1KK18C>.
184. Joe Penney, Eric Schmitt, Rukmini Callimachi, and Christoph Koettl, "C.I.A. Drone Mission, Curtailed by Obama, Is Expanded in Africa Under Trump," *New York Times*, 9 September 2018, <https://www.nytimes.com/2018/09/09/world/africa/cia-drones-africa-military.html>.
185. Helene Cooper and Eric Schmitt, "Airstrikes by U.S. and Allies Hit ISIS Targets in Syria," *New York Times*, 22 September 2014, <https://www.nytimes.com/2014/09/23/world/middleeast/us-and-allies-hit-isis-targets-in-syria.html>.
186. Joseph Trevithick, "Marine RQ-21 Blackjack Drones Are Flying Three Times More than Expected in Iraq and Syria," *The Drive*, 14 May 2018, <http://www.thedrive.com/the-war-zone/20862/marine-rq-21-blackjack-drones-are-flying-three-times-more-than-expected-in-iraq-and-syria>.
187. Dan Gettinger, "Drones Operating in Syria and Iraq," Center for the Study of the Drone, 13 October 2016, <https://dronecenter.bard.edu/drones-operating-in-syria-and-iraq/>.
188. Jeff Seldin, "US Drone Flying from Chad in Search for Missing Nigerian Girls," *Voice of America*, 22 May 2014, <https://www.voanews.com/a/us-drone-flying-from-chad-in-search-for-missing-nigerian-girls/1920535.html>.
189. Helene Cooper, "To Aid Boko Haram Fight, Obama Orders 300 Troops to Cameroon," *The New York Times*, 14 October 2015, <https://www.nytimes.com/2015/10/15/world/africa/obama-orders-300-troops-to-cameroon-to-support-fight-against-boko-haram.html>.
190. Dan Gettinger, "The American Drone Base in Cameroon," Center for the Study of the Drone, 21 February 2016, <https://dronecenter.bard.edu/drone-base-cameroon/>.
191. Sean Kimmons, "Isolated from US military, small Army post looks to rid terrorism in West Africa," U.S. Army, 27 November 2017, accessed 29 January 2019, https://www.army.mil/article/187679/isolated_from_us_military_small_army_post_looks_to_rid_terrorism_in_west_africa
192. Holly Hess, "MQ-1s test deployment capability in Latvia," U.S. Air Forces in Europe and Air Forces in Africa, last modified 31 August 2015, accessed 14 February 2019, <https://www.usafe.af.mil/News/Article-Display/Article/748134/mq-1s-test-deployment-capability-in-latvia/>.
193. Linda Robinson, Patrick B. Johnston, Gillian S. Oak, *U.S. Special Operations Forces in the Philippines, 2001-2004*, Santa Monica: RAND Corporation, 2016, 30-31.
194. Ibid, 74-75.
195. Roael Pareno, "Spy plane crashes in Zamboanga," *PhilStar*, 1 April 2002, <https://www.philstar.com/headlines/2002/04/01/155626/spy-plane-crashes-zamboanga>.
196. Jake Maxwell Watts, "U.S. Deploys Drone to Philippines to Fight Against Islamic State-linked Militants," *Wall Street Journal*, 11 September 2017, <https://www.wsj.com/articles/u-s-deploys-drone-to-philippines-in-fight-against-islamic-state-linked-militants-1505130688>.
197. Shawn Snow, "RQ-7B Shadow makes its last flight in the Corps," *Marine Times*, 30 July 2018, <https://www.marinecorpstimes.com/news/your-marine-corps/2018/07/30/rq-7b-shadow-makes-its-last-flight-in-the-marine-corps/>.
198. Abraxas Spa (@AbraxasSpa), "US SOF flying drones in support of Philippine Armed Forces in Marawi RQ-20 Puma in the truck h/t @Operator 1798," Twitter, 12 July 2017, <https://twitter.com/AbraxasSpa/status/874229593477181444>.
199. Kyle Rempfer, "Air Force Reapers are now flying ISR missions from Poland," *Air Force Times*, 1 June 2018, <https://www.airforcetimes.com/news/2018/06/01/air-force-reapers-are-now-flying-isr-missions-from-poland/>.
200. Kyle Rempfer, "Air Force MQ-9 Reaper drones based in Poland are now fully operational," *Air Force Times*, 5 March 2019, <https://www.airforcetimes.com/news/your-air-force/2019/03/05/air-force-mq-9-reaper-drones-based-in-poland-are-now-fully-operational/>.
201. Stefano D'Urso, "U.S. MQ-9 Reaper Drones Move Closer to the Black Sea," *The Aviationist*, 8 July 2019, <https://theaviationist.com/2019/07/08/u-s-mq-9-reaper-drones-move-closer-to-the-black-sea/>.
202. Bill Carey, "Gray Eagle Stationing in South Korea Long Planned, Says U.S.," *Aviation International Online*, 15 March 2017, <https://www.ainonline.com/aviation-news/defense/2017-03-15/gray-eagle-stationing-south-korea-long-planned-says-us>.
203. Marilee D. Wilson, "Alone, Unarmed, and Unmanned—UAVs in Korea," *U.S. Army Aviation Digest*, July/August 1993, https://www.rucker.army.mil/aviationdigest/assets/archive/AVN_DIG_2017_04-06.pdf.
204. "Sky Soldiers train Ukrainian national guard soldiers on unmanned aerial systems [Image 1 of 3]," DVIDS, 25 August 2015, https://www.dvidshub.net/image/2143503/sky-soldiers-train-ukrainian-national-guard-soldiers-unmanned-aerial-systems?fb_comment_id=882960238437829_910864135647439.
205. Craig Norton, "First Team takes flight," *Fort Hood Sentinel*, 12 July 2018, http://www.forthoodsentinel.com/news/first-team-takes-flight/article_c1481484-853e-11e8-a8e3-fbee4593fb7b.html.
206. Lisa Vines, "1st Cavalry Division puts a Shadow in the sky," U.S. Army, last modified 7 November 2018, accessed 14 February 2019, https://www.army.mil/article/213443/1st_cavalry_division_puts_a_shadow_in_the_sky.
207. "VMU-1 History," Marines, accessed 16 January 2019, <https://www.3rdmaw.marines.mil/Units/MAG-13/VMU-1/History/>.
208. U.S. Department of Defense, Office of Inspector General, *Evaluation of DoD's Use of Unmanned Aircraft sys-*

- tems (UAS) for Support to Civil Authorities*, DODIG-2015-097, (Washington, D.C., 2015), <https://media.defense.gov/2015/Mar/20/2001713479/-1/-1/1/DODIG-2015-097.pdf>.
209. Dan Gettner, "Documents: DoD's Domestic Drone Missions," Center for the Study of the Drone, 21 January 2019, <https://dronecenter.bard.edu/documents-domestic-drone-missions/>.
 210. Stephen Trimble, "AFRL sets first flight date for XQ-58A," *FlightGlobal*, 11 July 2018, <https://www.flightglobal.com/news/articles/afrl-sets-first-flight-date-for-xq-58a-450091/>.
 211. Aaron Gregg, "Air Force completes first flight test of Valkyrie unmanned fighter jet," *The Washington Post*, 6 March 2019, https://www.washingtonpost.com/business/2019/03/07/air-force-completes-first-flight-test- Valkyrie-unmanned-fighter-jet/?utm_term=.6415a02bc0da.
 212. Rachel S. Cohen, "Meet the Future Unmanned Force," *Air Force Magazine*, 4 April 2019, <http://www.airforce-mag.com/Features/Pages/2019/April%202019/Meet-the-Future-Unmanned-Force.aspx>.
 213. Joseph Trevithick, "USAF Plans for its 'Skyborg' AI Computer Brain to be Flying Drones in the Next Two Years," *The Drive*, 20 March 2019, <https://www.thedrive.com/the-war-zone/27067/usaf-plans-for-its-skyborg-ai-computer-brain-to-be-flying-drones-in-the-next-two-years>.
 214. Richard Whittle, "Drone In Limbo: Orion Drone Maker Takes USAF's Otto To Task," *Breaking Defense*, 3 November 2015, <https://breakingdefense.com/2015/11/aurora-flight-sciences-ceo-takes-otto-to-task/>.
 215. "Aurora secures Orion UAS development contract," *Shephard News*, 5 January 2018, <https://www.shephardmedia.com/news/uv-online/aurora-secures-orion-uas-development-contract/>.
 216. Defense Advanced Research Project Agency, "Gremlins on Track for Demonstration Flights in 2019," news release, 9 May 2018, <https://www.darpa.mil/news-events/2018-05-09>.
 217. Aaron Mehta, "US, India collaborating on air-launched drone," *Defense News*, 18 March 2019, <https://www.defensenews.com/global/asia-pacific/2019/03/18/us-india-collaborating-on-air-launched-drone/>.

SUB-SAHARAN AFRICA

BOTSWANA	.....	260
BURUNDI	.....	260
CAMEROON	.....	261
COTE D'IVOIRE	.....	261
ETHIOPIA	.....	262
KENYA	.....	262
NIGERIA	.....	263
SOUTH AFRICA	.....	265
SUDAN	.....	267
UGANDA	.....	268
ZAMBIA	.....	269

BOTSWANA

INVENTORY

- The Botswana Defense Force (BDF) acquired at least one Hermes 450 from Israel in the early 2000s. A 2001 satellite image shows that at least one drone was based at Thebephatshwa Airport in southern Botswana.¹ In 2011, a Hermes 450 crashed outside of Thebephatshwa.² Although media reports at the time suggested that the crashed Hermes 450 would be replaced, there are no indications that the BDF Air Wing followed through with a replacement. Historical satellite imagery appears to show that the Hermes 450 ground control stations were removed from the air base in 2012 or 2013. It is probable that the BDF no longer operates the Hermes 450, although the current status of this aircraft is not clear as of this writing.

INACTIVE

Model	Make	Origin	Class	Period	Qty	Operator	Notes
Hermes 450	Elbit	Israel	II	Early 2000s - 2010s		Air Force	(status unclear)

NOTES

1. See page 287.
2. Bame Piet, "No injuries in the crashed BDF drone," *MmegiOnline*, 13 May 2011, <http://www.mmegi.bw/index.php?sid=1&aid=825&dir=2011/May/Friday13/>.

BURUNDI

INVENTORY

Model	Make	Origin	Class	Intro	Qty	Operator	Notes
RQ-11 Raven	AeroVironment	USA	I	2011	12 (4)		

NOTES

1. "Uganda, Burundi; Armies granted Raven UAV from US DoD," *Defence Market Intelligence*, 29 June 2011, <http://dmilt.com/africa/uganda-burundi-armies-granted-raven-uav-from-us-dod>.

CAMEROON

INVENTORY

Model	Make	Origin	Class	Intro	Qty	Operator	Notes
Orbiter II ¹	Aeronautics	Israel	I	2015			
ScanEagle ²	Insitu	USA	I	2016	5 (1)		

PERSONNEL

ARMY

Name	HQ	Type	Equipment	Activated
Air Observation Group, Rapid Intervention Bureau ³	Maroua	P	Orbiter II, ScanEagle	

NOTES

1. "Force Report: Cameroon Air Force," *Air Forces Monthly Magazine*, April 2016, <https://www.docdroid.net/KQu8FTy/force-report-cameroon-air-force-airforces-monthly-april-2016.pdf#page=3>.
2. "Insitu to Provide Scan Eagle to Kenya and Cameroon," *Signal Magazine*, 30 September 2015, <https://www.afcea.org/content/Blog-insitu-provide-scan-eagle-kenya-and-cameroon>.
3. "Fighting terror from the sky," *African Aerospace*, 12 May 2017, <https://www.africanaerospace.aero/fighting-terror-from-the-sky.html>.

COTE D'IVOIRE

INVENTORY

INACTIVE

Model	Make	Origin	Class	Intro	Qty	Operator	Notes
Aerostar ¹	Aeronautics	Israel	II	2003	2		(status unclear)

NOTES

1. “SIPRI Arms Transfers Database,” Stockholm Peace Research Institute, accessed 16 April 2019, <https://www.sipri.org/databases/armstransfers>.

ETHIOPIA

INVENTORY

Model	Make	Origin	Class	Intro	Qty	Operator	Notes
Spylite ¹	BlueBird	Israel	I	2011*		Army	
*Estimate							

NOTES

1. Arie Egozi, “Ethiopian Army to get BlueBird UAVs,” *Flight International*, 11 April 2011, <https://www.flight-global.com/news/articles/ethiopian-army-to-get-bluebird-uavs-355404/>

KENYA

INVENTORY

Model	Make	Origin	Class	Intro	Qty	Operator	Notes
RQ-11 Raven ¹	AeroVironment	USA	I	2012	8	Army	
ScanEagle ²	Insitu	USA	I	2015	5 (1)		

NOTES

1. Adam Entous, “U.S. to Provide Kenya With Drones to Fight Militants,” *Wall Street Journal*, 20 July 2012, <https://www.wsj.com/articles/SB10000872396390444097904577539362229840378>.
2. “Insitu to Provide Scan Eagle to Kenya and Cameroon,” *Signal Magazine*, 30 September 2015, <https://www.afcea.org/content/Blog-insitu-provide-scan-eagle-kenya-and-cameroon>.

NIGERIA

INVENTORY

Model	Make	Origin	Class	Intro	Qty	Operator	Notes
CH-3	CASC	China	II	2014		Air Force	
Tsaigumi ¹	431 Engineering Group, UAVision	Nigeria, Portugal	I	2018		Air Force	

INACTIVE

Model	Make	Origin	Class	Period	Qty	Operator	Notes
Aerostar ²	Aeronautics	Israel	II	2006-2014	9	Air Force	

PERSONNEL

AIR FORCE

Name	HQ	Type	Equipment	Activated
Reconnaissance Squadron, Nigerian Air Force Tactical Air Command ³	Maiduguri Air Base	Partial	CH-3A, Tsaigumi	

TRAINING

- The Nigerian Air Force runs a two-year training program for UAV pilots. The first phase of the program takes place at the 401 Flying Training School at Kaduna Air Base and provides theoretical instruction on aerospace operations. For this phase, the Air Force reactivated the Mugin, an indigenously-produced UAV trainer aircraft that had been decommissioned due to a lack of spares.⁴ The second phase provides technical instruction on the CH-3A at Maiduguri Air Base. During this phase, each of the five pilots gained nearly 100 flight hours on the CH-3A. The first class of five pilots graduated in March 2018.⁵ Training was suspended for the remainder of 2018 and part of 2019, resuming in June 2019.⁶

OPERATIONS

- The Nigerian Air Force has deployed drones to support counterterrorism operations against Boko Haram in northeast Nigeria. In January 2015 the crash of a CH-3 revealed that Nigeria had acquired the aircraft and an undisclosed number of the drones were participating in campaign.⁷ Since then, the NAF

- has published several videos that purport to show the CH-3 engaged in airstrikes against Boko Haram.⁸
- The Nigerian Air Force has suggested that its drones may be used for other missions unrelated to counterterrorism. In a March 2018 statement, the NAF said that it would deploy drones to monitor domestic energy infrastructure.⁹ In June 2018, the Nigerian Customs Service said that it was working with the Air Force to deploy drones to catch smugglers.¹⁰

INFRASTRUCTURE

Name	Country	Latitude	Longitude	Affiliation	Activity	Notes
Maiduguri Air Base	Nigeria	11°51'20"N	13°04'55"E	Air Force	Headquarters	
Kaduna Air Base	Nigeria	10°35'44"N	07°26'41"E	Air Force	Training, Test site	

DEVELOPMENT

- The Ichoku is a strike-capable drone reportedly under development by the Nigerian Air Force. It would be Nigeria's first indigenously-produced unmanned combat aircraft. The project was announced in February 2018.¹¹
-

NOTES

1. Fergus Kelly, "Nigerian Air Force inducts Tsaigumi, first operational indigenous drone," *Defence Post*, 19 February 2018, <https://thedefensepost.com/2018/02/19/nigeria-air-force-tsaigumi-drone-operational/>.
2. Oscar Nkala, "Nigerian Air Force UAV fleet grounded," *defenceWeb*, 22 May 2014, http://www.defenceweb.co.za/index.php?option=com_content&task=view&id=34782&Itemid=107.
3. "NAF Reconnaissance Squadron: Everything you need to know about," *Defence Nigeria*, 11 April 2018, <https://defensenigeria.blog/2018/04/11/naf-reconnaissance-squadron-everything-you-need-to-know-about/>.
4. "Nigerian Air Force Graduates first locally trained UAV pilots," *defenceWeb*, 7 March 2018, http://www.defenceweb.co.za/index.php?option=com_content&view=article&id=50955:nigerian-air-force-graduates-first-locally-trained-uav-pilots&catid=35:Aerospace&Itemid=107.
5. Nigerian Air Force, "NAF Locally Reactivates Trainer UAVs, Dornier 228 Aircraft," news release, http://www.airforce.mil.ng/post-naf_locally_reactivates_trainer_uavs_dornier_228_aircraft.
6. "Nigerian Air Force resumes training of pilots for drones," *Premium Times*, 23 June 2019, <https://www.premiumtimesng.com/news/more-news/236698-nigerian-air-force-resumes-training-pilots-drones.html>.
7. Jeffrey Lin and P.W. Singer, "Did An Armed Chinese-Made Drone Just Crash in Nigeria?," *Popular Science*, 28 January 2015, <https://www.popsci.com/did-armed-chinese-made-drone-just-crash-nigeria?cmpid=newscred>.
8. Alberto Fittarelli, "Tracking the Nigerian Armed Forces' COIN offensive in North-East Nigeria," *Bellingcat*, 20 February 2017, <https://www.bellingcat.com/news/africa/2017/02/20/tracking-nigerian-armed-forces-coin-offensive-north-east-nigeria/>.
9. Pulse News Agency, "NAF to partner Shell coys in Nigeria, deploy unmanned vehicles to secure oil installations," *Pulse.ng*, 20 May 2018, <https://www.pulse.ng/news/local/naf-to-partner-shell-coys-in-nigeria-deploy-unmanned-vehicles-id8399674.html>.
10. Samson Toromade, "Nigeria Customs Service plans to use Air Force drones to catch smugglers," *Pulse.ng*, 26 June 2018, <https://www.pulse.ng/news/local/customs-plans-to-use-air-force-drones-to-catch-rice-smugglers-id8543107.html>.
11. Jeremy Binnie, "Nigerian Air Force to develop armed UAV," *IHS Jane's Defence Weekly*, 16 February 2018, <https://www.janes.com/article/77980/nigerian-air-force-to-develop-armed-uav>.

SOUTH AFRICA

INVENTORY

Model	Make	Origin	Class	Intro	Qty	Operator	Notes
Seeker 400 ¹	Denel Dynamics	South Africa	II	2018*		General Staff	
Indiza ²	CSIR	South Africa	I	2019*		Army	

**Estimate*

ACTIVE ACQUISITIONS

- The South African National Defense Force (SANDF) is reportedly in the process of introducing the Seeker 400. In its 2018 financial review, Denel Dynamics reported that it had delivered Seeker 400s to the SANDF and that the system was undergoing additional test and evaluation in the 2018/2019 fiscal year.³ It is not entirely clear when these systems will become fully operational or which service will be responsible for operating them. Media reports have suggested that they will be flown by the Defense Intelligence Division, the SANDF's military intelligence wing.⁴

INACTIVE

Model	Make	Origin	Class	Period	Qty	Operator	Notes
Scout	IAI	Israel	II	1980s	5	Air Force	"RPV-1B"
Seeker 1	Denel Dynamics	South Africa	II	1987-Mid 1990s		Air Force, COCO	Operated by contractor for several years after the 10 Sqn was disbanded

PERSONNEL

INACTIVE

- The South African Air Force activated the 10th Squadron as a dedicated UAV squadron in 1986. The 10th was headquartered at Air Force Base Potchefstroom and equipped with the Scout and Seeker. Media reports in 2016 indicated that the South African Air Force had plans to reactivate 10th Sqn.⁵ This has not, however, been confirmed by an official record, nor does 10th Sqn appear on the SAAF's list of squadrons as of this writing.⁶

OPERATIONS

Country	Base	Equipment	Period	Operation
Angola		Scout, Seeker	1987-1988	Modular, Hooper, Packer
The SAAF's 10 Squadron was deployed in the South African Border War in the late 1980s. ⁷ Both the Scout and Seeker were deployed for ISR and artillery spotting. ⁸ Three Seekers were downed by enemy fire in various operations.				
Democratic Republic of Congo		Indiza	2019-	MONUSCO
The South African National Defence Force announced in March 2019 that it was equipping its peace-keeping force in the DRC with Indiza drones. ⁹ The 2nd South African Infantry Battalion was expected to deploy to the DRC by mid-2019. ¹⁰				

DEVELOPMENT

- The Long Endurance Modular Unmanned Aerial Vehicle (LEMU) is a twin-engine Class I aircraft developed by the Council for Scientific and Industrial Research (CSIR). Based on CSIR's Modular UAV, which first flew in 2009, work on the LEMU appears to have started in 2016. CSIR has developed two variants of the LEMU, one with an internal combustion engine and another with an electric engine.¹² For both variants, the max take-off weight is 65 kilograms with up to 20 kilograms of payload capacity. As of June 2019, CSIR intends to begin flight tests by 2020.¹³

EXPORTS

Country	Model	Make	Class	Status	Notes
Algeria ¹⁴	Seeker 200	Denel Dynamics	II	Active	
UAE ¹⁵	Seeker 200	Denel Dynamics	II	Active	
MENA Country*	Seeker 400	Denel Dynamics	II		

**In its 2018 financial review, Denel Dynamics reported that it had received an order for six Seeker 400s from a Middle Eastern country. Media reports suggest that this country is the UAE, though this has not been confirmed.*

NOTES

- Guy Martin, "New UAV orders for Denel Dynamics," *defenceWeb*, 14 September 2018, <https://www.defenceweb.co.za/aerospace/unmanned-aerial-vehicles/new-uav-orders-for-denel-dynamics/>.
- Guy Martin, "SANDF sending hand-launched UAVs to the DRC," *defenceWeb*, 25 March 2019, <https://www.defenceweb.co.za/aerospace/unmanned-aerial-vehicles/sandf-sending-hand-launched-uavs-to-the-drc/>.
- "Successes and challenges for Denel Dynamics," *defenceWeb*, 24 January 2019, <https://www.defenceweb.co.za/industry/industry-industry/successes-and-challenges-for-denel-dynamics/>.
- "Defence Industry Strategy document identifies two military UAV suppliers," *defenceWeb*, 13 July 2017, http://www.defenceweb.co.za/index.php?option=com_content&view=article&id=48550:defence-industry-strategy-document-identifies-two-military-uav-suppliers&catid=7:Industry&Itemid=116.
- Guy Martin, "SAAF confirms reactivation of 10 Squadron," *defenceWeb*, 18 March 2016, http://www.defenceweb.co.za/index.php?option=com_content&view=article&id=42784:saaf-confirms-reactivation-of-10-squadron-&catid=35:Aerospace.
- "Air Force Bases and Units," South African Air Force, accessed 7 June 2019, <http://www.af.mil.za/bases/bases>.

html.

7. Darren Olivier, "A history of South African UAVs," *African Defence Review*, 5 August 2015, <https://www.africandefence.net/a-history-of-south-african-uavs/>.
8. Leo Barnard, "Cross Border Operations of the SAAF In Angola: 1987-1989. Prelude to the Final Stages of the War," *Journal for Contemporary History*, February 2009, http://scholar.ufs.ac.za:8080/xmlui/bitstream/handle/11660/9161/contemp_v34_n1_a14.pdf?sequence=1&isAllowed=y.
9. Guy Martin, "SANDF sending hand-launched UAVs to the DRC," *defenceWeb*, 25 March 2019, <https://www.defenceweb.co.za/aerospace/unmanned-aerial-vehicles/sandf-sending-hand-launched-uavs-to-the-drc/>.
10. Guy Martin, "SANDF commemorates fallen peacekeepers ahead of next DRC rotation," *defenceWeb*, 29 May 2019, <https://www.defenceweb.co.za/featured/sandf-commemorates-fallen-peacekeepers-ahead-of-next-drc-rotation/>.
11. Shephard News Team, "Denel's Seeker 400 UAV completes first flights," *Shephard Media*, 27 February 2014, <https://www.shephardmedia.com/news/uv-online/denels-seeker-400-uav-completes-first-flights/>.
12. "Focus on CSIR: Long Endurance Modular UAV (LEMU)," Council for Scientific and Industrial Research, <https://www.csir.co.za/sites/default/files/Documents/Long%20Endurance%20Modular%20UAV.pdf>.
13. Guy Martin, "CSIR progressing with UAV developments," *defenceWeb*, 7 June 2019, <https://www.defenceweb.co.za/aerospace/unmanned-aerial-vehicles/csir-progressing-with-uav-developments/>.
14. "Algerian UAV deal," *Flight International*, 11 February 1998, <https://www.flightglobal.com/news/articles/algerian-uav-deal-32700/>.
15. "UAE orders Seekers from Denel," *defenceWeb*, 6 February 2018, <https://www.defenceweb.co.za/aerospace/aerospace-aerospace/uae-orders-seekers-from-denel/>.

SUDAN

INVENTORY

Model	Make	Origin	Class	Intro	Qty	Operator	Notes
CH-3*	CASC	China	II	2010s		Air Force	(status unclear)

**In a February 2019 interview with Shephard Media, Sudanese Air Force Commander Lt. Gen. Pilot Salah Eldin Abdelkhalig Saeed said the SAF had acquired at least one CH-3.¹ This statement has not, however, been confirmed by any other sources.*

INACTIVE

Model	Make	Origin	Class	Intro	Qty	Operator	Notes
Ababil-3*	Qods	Iran	II	2008-Unknown			(status unclear)
DB-2*	DB	China	I				(status unclear)

**It is probable that these systems are no longer active, though it is difficult to say with certainty.*

OPERATIONS	Country	Base	Equipment	Period	Operation
	South Sudan		Ababil-3, DB-2	Early 2010s	
The Sudanese Armed Forces (SAF) deployed drones to South Sudan before and after the 2011 referendum granting South Sudan its independence.² The SAF lost multiple Ababil-3s over South Sudan in 2008, 2012, and 2014.³ A report by Conflict Armament Research found that Sudanese forces had also deployed the DB-2, a Chinese-made fixed-wing remote-control aircraft, over South Sudan.⁴ At least two of these drones were reportedly captured by forces aligned with the Sudan People's Liberation Movement-North in 2014 and 2016.					

NOTES

1. Alan Warnes, "IDEX 2019: Sudan adapts to Western allies over Yemen," *Shephard Media*, 14 February 2019, <https://www.shephardmedia.com/news/defence-notes/idx-2019-sudan-adapts-western-allies-over-yemen/>.
2. Jonathan Hutson, "Sudanese Forces Implicated in Video Captured by Their Own Drone," *Satellite Sentinel Project*, 10 April 2012, <http://satsentinel.org/blog/sudan-armed-forces-implicated-video-captured-their-own-drone>.
3. "Sudan's Drones Are Dropping Like Flies," *War is Boring*, 5 May 2014, <https://warisboring.com/sudan-s-drones-are-dropping-like-flies/>.
4. "Sudanese Stockpiles and Regional Weapon Diversion," *Conflict Armament Research*, May 2017, <http://www.conflictarm.com/>.

UGANDA

INVENTORY	Model	Make	Origin	Class	Intro	Qty	Operator	Notes
	RQ-11 Raven ¹	AeroVironment	USA	I	2011	12 (4)	Air Force	
	Orbiter 2 ²	Aeronautics	Israel	I	2011	2	Army	

NOTES

1. "Ugandans train on Raven unmanned aerial vehicles," *defenceWeb*, 11 January 2012, http://www.defenceweb.co.za/index.php?option=com_content&view=article&id=22419:ugandans-train-on-raven-unmanned-aerial-vehicles&catid=35:Aerospace&Itemid=107.
2. "Ugandan army to acquire Orbiter UAVs," *Flight International*, 9 February 2011, <https://www.flightglobal.com/news/articles/ugandan-army-to-acquire-orbiter-uavs-352890/>.

ZAMBIA

INVENTORY

Model	Make	Origin	Class	Intro	Qty	Operator	Notes
Skylark ¹	Elbit	Israel	I	2019	18		
Hermes 450 ²	Elbit	Israel	II	2018		Air Force	

INFRASTRUCTURE

Name	Country	Latitude	Longitude	Affiliation	Activity	Notes
Mbala Air Base	Zambia	8°51'39"S	31°20'5"E		HQ	Reported HQ of Hermes 450

NOTES

1. Jeremy Binnie, "Zambia denies USD400 million Israeli deal," *IHS Jane's Defence Weekly*, 17 October 2018, <https://www.janes.com/article/83855/zambia-denies-usd400-million-israeli-deal>.
2. "Zambia Air Force thanks Government for the acquisition of new assets to modernise the operations," *Lusaka Times*, 17 December 2017, <https://www.lusakatimes.com/2017/12/17/zambia-air-force-thanks-government-acquisition-new-assets-modernise-operations/>.

REFERENCES

SYSTEM SPECIFICATIONS

Note:

This section describes the specifications of 168 unmanned aircraft systems currently in use or under development as of this writing. For more information on the status of a particular system, please visit the Country Profiles section.

Legend:

Class	Type	Endurance	Range	Mx Speed	MTOW	Payload	Wingspan	Length
I, II, III	Fixed-Wing, Rotary-Wing	Hours	Kilometers	Kilometers per hour	Kilograms	Kilograms	Meters	Meters

Model	Manufacturer	Class	Type	Endurance	Range	Mx Speed	MTOW	Payload	Wingspan	Length
ARGENTINA										
Aukán	DGIyD	II	Fw							
Vigía 2B	DGIyD	III	Fw	14			1020		12	8.3
ARMENIA										
Baze	Military Aviation Institute	I	Fw							
Krunk		I	Fw							
AUSTRIA										
CamCopter S-100	Schiebel	II	Rw	10	200	240	200	50	3.4	3.1
BERLARUS										
Berkut-2	JSC Agat Control Systems	I	Fw	2	35	100	10			
Mosquito	558 Aviation Repair Plant	I	Fw	0.75	12		2.8	0.35	1	0.58

Model	Manufacturer	Class	Type	Endurance	Range	Mx Speed	MTOW	Payload	Wing-span	Length
Burevestnik-MB	NPT MBK*	II	Fw	10	290	220	400	60		
Busel (M50)	NPT MBK*	II	Fw	2.5	70	100	14		3.47	
BRAZIL										
FT-100 Horus	FT Sistemas	I	Fw	2	20		7	3	2.7	1.9
CANADA										
NightHawk IV	ARA Robotics	I	Fw							
China										
ASN-104	Xi'an ASN Technology Group	I	Fw							
ASN-206	Xi'an ASN Technology Group	II	Fw	8	150	210	222	50	6	3.8
ASN-207	Xi'an ASN Technology Group	II	Fw	6		210	222		6	3.8
ASN-209	Xi'an ASN Technology Group	II	Fw	10	200	180	320	50	7.5	4.3
AV500W	AVIC	II	Rw	8	200	170	470	160		7.2
Blowfish 1	Ziyan	I	Rw	0.8		150	24.7	15	1.87	
BZK-005	Beihang	III	Fw	40		180	1250	150	18	10.5
BZK-007	GAIC	III	Fw	16		230	700	100	14.6	7.7
BZK-206	Beihang	I	Fw							
CH-7	CASC	III	Fw			926	13000	10	22	
CH-3	CASC	II	Fw	6	200	250		180	8	
CH-4	CASC	III	Fw	40	3500	180	1330	345	18	8.5
CH-5	CASC	III	Fw	48	250-2000				21	11
CH-802	CASC	I	Fw	2.5	125	70	10			
Cloud Shadow	AVIC	III	Fw		290		3000	400	17	9

Model	Manufacturer	Class	Type	Endurance	Range	Mx Speed	MTOW	Payload	Wing-span	Length
Fei Long 1	Zhong Tian Guide Control Technology Company	III	Fw			240	3200	1400	20	10
Divine Eagle	Shenyang Aircraft Corporation's 601 Institute	III	Fw						45	15
Feihong-98	AVIC	III	Fw					1360	18.2	12.4
HW-350	CASIC	II	Fw	26		160	220		7.9	5.25
Inspire	DJI	I	Rw	0.3		65	3.5		0.4	0.4
Matrice 210	DJI	I	Rw	0.5			6.14	2.3	0.79	0.4
Mavic	DJI	I	Rw							
Phantom	DJI	I	Rw	0.4		58	1.2			
Qi Mingxing	AVIC	III	Rw						50	21
SD-40 (Sea Cavalry)	Han's Eagle	I	Hybrid	6		180	40	6	3.7	2
Sky-09P	Taiyuan	I	Fw			100		3	1.92	
TB-001	Tengoen Technology	III	Fw	35	3000 (280)			1000	20	10
TB-002	Tengoen Technology	II	Fw							
Tian Ying	CASIC	III	Fw							
Typhoon H	Yuneec	I	Rw							
UV-10CAM	Microfly	I	Fw							
Wing Loong I	AVIC	III	Fw	20	200	280	1150	200	14	9
Wing Loong II	AVIC	III	Fw	20		370	4200	480	20.5	11
Wing Loon 1D	AVIC	III	Fw							
Xianglong	GAIG	III	Fw							
Yaoying 2	AVIC	III	Fw	16		230	1280			
DENMARK										

Model	Manufacturer	Class	Type	Endurance	Range	Mx Speed	MTOW	Payload	Wing-span	Length
Huginn X1	Sky-Watch	I	Rw							
FRANCE										
3S	Drone Protect Systems	I	Rw							
AR-Drone	Parrot	I	Rw	0.2		40	0.4		0.5	0.5
IT180-3EL-1	ECA Group,Infotron	I	Rw	0.8	10	80	21	3	1.8	
Patroller	Sagem	III	Fw	20	180	200	660	250	18	8.5
Sperwer	Sagem	II	Fw	6	200	166		50	4.2	3.5
Spy'Ranger	Thales	I	Fw	3	30	90	14.5	1.2	3.8	
Tracker	EADS Cassidian	I	Fw			100	8.5	1	3.6	1.4
NX70	Novadem	I	Rw	0.75	3		1			
GERMANY										
ALADIN	EMT	I	Fw	1	15	90	3.2	0	1.46	1.53
KZO	Rheinmetall	II	Fw	5.5		220	161	35	3.2	2.25
LUNA	EMT	I	Fw	8	100	70	40		4.2	2.4
LUNA NG	EMT	I	Fw	12	100	90	110		5.3	3
MIKADO	AirRobot	I	Rw	0.5				0.2	1	1
GREECE										
Pegasus II Block I	Hellenic Aerospace Industry	II	Fw			160	250		6.2	4.3
INDONESIA										
PUNA Wulung	BPPT,PTDI	I	Fw	6	150	128	120		6	4.3
IRAN										
Ababil-3	Qods Aviation	II	Fw	4	100	200			5	3.5
Mohajer-2	Qods Aviation	I	Fw	1.5	50	200	85	15	3.8	2.91
Mohajer-4	Qods Aviation	II	Fw	5	150	180	175		5.3	3.6

Model	Manufacturer	Class	Type	Endurance	Range	Mx Speed	MTOW	Payload	Wing-span	Length
Mohajer-6	Qods Aviation	II	Fw	12	200	200	600		10	5.7
Oghab-1	Farnas Aero-space	I	Fw	0.75	25		4.2		2	1.65
Saegheh	Shahed Aviation Industries	III	Fw							
Shahed-123	HESA	II	Fw							
Shahed-129	HESA	III	Fw	24	1700				15	7
IRAN, IRAQ										
UAV (Mohajem 92)	State Company for Military Industries (Iraq)	II	Fw	8	80	175		30	4	3
ISRAEL										
Bird Eye 400	IAI	I	Fw	2	10	83	5.6		2.2	0.8
Blue Horizon II	EMIT Aviation	II	Fw	16			180	37	6.5	3.2
Dominator	Aeronautics	III	Fw	20	300	277	1910	373	13.5	8.6
Harop	IAI	I	Fw	9	200	416		16		
Harpy	IAI	I	Fw		500	185	135	32	3	2.5
Hermes 450	Elbit Systems	II	Fw	17			550	180	10.5	6.1
Hermes 900	Elbit Systems	III	Fw	36		222	1180	350	15	9.1
Heron	IAI	III	Fw	45	1000	278	1270	470	16.6	8.5
Hovermast 150	Sky Sapience	I	Rw					8		
MicroFalcon	Innocon	I	Fw	4	40	120	10	2	2	
Orbiter (Orbiter 3)	Aeronautics	I	Fw	7	150	130	30	5.5	4.4	
Orbiter-1K	Aeronautics	I	Fw	2.5	100		11	2.6	2.2	
Hunter	IAI,Northrop Grumman	III	Fw	21			884	226	10.44	7.01
Searcher (Mk 3)	IAI	II	Fw	18	250	204	450	120	8.6	
Sky Striker	Elbit Systems	I	Fw	2	20			10		

Model	Manufacturer	Class	Type	Endurance	Range	Mx Speed	MTOW	Payload	Wing-span	Length
Skylark (Skylark 3)	Elbit	I	Fw	6	100		45	10	4.7	2.2
Skylark I-LE (Skylark I-LEX)	Elbit	I	Fw	3	40		7.5	1.2	3	
SpyLite	Bluebird Aero	I	Fw	4	80	120	9		2.7	1.4
ISRAEL, SWITZERLAND										
Ranger	IAI,RUAG	II	Fw	9		240	280		5.71	4.61
ISRAEL, UNITED KINGDOM										
Watchkeeper	Thales UK,Elbit Systems	II	Fw							
ISRAEL, UNITED STATES										
Hunter	IAI,Northrop Grumman	III	Fw	21			884	226	10.44	7.01
ITALY										
Falco Explorer	Leonardo	III	Fw	24			1300	350		
Falco	Leonardo	II	Fw	14	200	216	490	70	7.2	5.25
P.1HH Hammer-Head	Piaggio Aero-space	III	Fw	10.5	8148.8		6,146	226.796	15.6	14.4
RQ-24A Sixton	Alpi Aviation	I	Rw	0.5	5					
Strix-C	Alpi Aviation	I	Fw			86	8.65	1.5	3	
Strix-D	Alpi Aviation	I	Fw							
JAPAN										
JUXS-S1	Hitachi	I	Fw							
FFOS/FFRS	Fuji Heavy Industries	II	Rw							
LATVIA										
Penguin C	UAV Factory	I	Fw	20	100	115	23		3.3	2.3
MALAYSIA										
Aludra (Mk1)	CTRM	II	Fw	3	100	220	200	25	6	4.5

Model	Manufacturer	Class	Type	Endurance	Range	Mx Speed	MTOW	Payload	Wing-span	Length
MEXICO										
G1 Guerrero	Hydra Technologies	I	Fw	6	40		30		2.8	
S4 Ehécatl	Hydra Technologies	I	Fw	8		167	55	9	3.7	
S45 Balaam	Hydra Technologies	II	Fw	12				5		
Tsaigumi	431 Engineering Group, UAVision	I	Fw				95			
PAKISTAN										
Shahpar	GIDS	II	Fw	7	250	150	480	50	6.6	4.2
Uqab	GIDS	II	Fw	6	150		200		5.5	4
PERU										
Ricuk	CIDEP	I	Fw							
PERU										
FlyEye	WB Electronics	I	Fw	2.5	30	120	11	4	3.6	1.9
PGZ-19R	WZL-2	I	Fw	12	150	180	90	20	5.4	2.8
Warmate	WB Electronics	I	Fw	0.8	10		4		1.4	1.1
ROMANIA										
SACT Boreal 5	Military Equipment and Technologies Research Agency	I	Fw		6	75	5		1.6	1.4
RUSSIA										
Corsair	OKB Luch	II	Fw		100					
Eleron-3SV	Eniks	I	Fw	1.5		130	5.5	1	1.47	0.6
Granat-1	Kalashnikov	I	Fw	1.3		120	2.5	0.4		
Granat-4	Kalashnikov	I	Fw		70	145	30	3	3.2	2.4

Model	Manufacturer	Class	Type	Endurance	Range	Mx Speed	MTOW	Payload	Wing-span	Length
Orion	Kronshtadt Group	III	Fw	24	300		1000	60-200	16	8
Orlan-10	Special Technology Center	I	Fw	18	120-600	150	16.5		3.1	2
Ptero-5E	AFM Servers	I	Fw	8	15-75		30	5		
Takhion	Izhmash-UAV	I	Fw	6	40		25			
SINGAPORE										
Skyblade III	Singapore Technologies	I	Fw	1	8		5		2.6	1.4
SAUDI ARABIA										
Saqr-1	KACST	III	Fw	24	2500		1400	250	18	9.2
SLOVENIA										
Bramor	C-Astral	I	Fw	3	30	108	4.5		2.3	1
SOUTH AFRICA										
Indiza	CSIR	I	Fw	1	10			0.5	2	
Seeker 200	Denel Dynamics	II	Fw	10	250			40		
Seeker 400	Denel Dynamics	II	Fw	16	250	222	450	100	10	5.8
SOUTH KOREA										
RemoEye-002B	UconSystem	I	Fw	1	10	80	3.4		1.8	1.44
Remoeye-006	Ucon System	I	Fw	2	15	75			2.72	1.72
RQ-101 Falcon	KAI	II	Fw	6	80	185			6.4	4.7
RQ-102	KAI	II	Fw							
XeFI	NESTEC	I	Rw	0.5	3	36	3	0.5		
SPAIN										
Alpha 800	Alpha Unmanned Systems	I	Rw	2.5	30				1.8	1.7
Atlantic	SCR	I	Fw	5	100					
Condor	Drone Tools	I	Fw							

Model	Manufacturer	Class	Type	Endurance	Range	Mx Speed	MTOW	Payload	Wingspan	Length
Fulmar X	Thales España	I	Fw	8	80		20	4	3	1.2
Sistema integrado de vigilancia aérea (SIVA)	National Institute of Aerospace Technology	I	Fw			190	300		5.8	4
Atlante	Airbus		Fw	10	200	200	570	100	8	5.47
Tucan	SCR	I	Fw	0.8			5		2.73	
SWEDEN										
F-330	UMS Skeldar	I	Fw	8		120	23.7	10	3.3	2.27
V-200	UMS Skeldar	II	Rw	5	100-200	150	235		4.6	4
TAIWAN										
Teng Yun	National Chung-Shan Institute of Science and Technology	III	Fw	24					18	8
Cardinal II	NCSIST	I	Fw	1		55	5.5		1.9	1.3
Chung Shyang II	CSIST	II	Fw			180	450		8.7	5.3
THAILAND										
Tiger Shark II	DTI	I	Fw	12		185.2			6	4.2
U-1 Sky Scout	RV Connex	I	Fw							
Narai 3.0	Naval Research and Development Office (NRDO)	I	Rw							
TURKEY										
Anka	TAI	III	Fw	24		217	1600	200	17	8
Bayraktar Mini	Kale-Baykar	I	Fw	1.2	55	60			2	1.2
Bayraktar-TB2	Baykar Makina	III	Fw	20	150	130	630	55	12	6.5
Karayel	Vestel Defence	II	Fw	20	200		550	190	10.5	6.5
Kargu	STM	I	Rw							
Serçe-1	Aselsan	I	Rw	0.5	3		6.5	1		

Model	Manufacturer	Class	Type	Endurance	Range	Mx Speed	MTOW	Payload	Wing-span	Length
UKRAINE										
A1-S/M Fury	Athlone Air	I	Fw		50	130	2.5		1.6	1.06
ASU-1 Valkyrie	Aviation Systems of Ukraine	I	Fw	2	35	60	3.5		1.6	
Horlytsya	Antonov	II	Fw	7	1050	180	200	50	6.7	
Leleka-100	DeViro	I	Fw	2.25	50	120	5.5		1.98	1.1
Observer-S	Def C	I	Fw	1.5-5	75-100		6.5	1.5	3.4	1.65
Raybird-3	AVK Skateon	I	Fw	15	240	160	21	5	2.98	1.83
Sparrow	Spaitech	I	Fw	1.25	20	110	3		0.98	
Spectator-M	Politeco Aero	I	Fw	2	50	120	5.5	2	3	1.29
URUGUAY										
ANT	CIACA	I	Fw							
UNITED ARAB EMIRATES										
Yabhon Flash-20*	ADCOM Systems	III	Fw							
Yabhon Unit-ed-40*	ADCOM Systems	III	Fw				1500			11.3
UNITED STATES										
Black Hornet (PRS)	FLIR	I	Rw	0.4	2	18	0.033		0.12	0.168
Desert Hawk (3)	Lockheed Martin	I	Fw	1.5		92	3.7	0.9	1.5	
InstantEye (Gen3)	Physical Sciences	I	Rw	0.5	2		0.5	0.3		
Karma	GoPro	I	Rw							
K-MAX	Kaman	III	Rw	12	1852	185	5443		14.7	15.8
MQ-1 Predator	GA-ASI	III	Fw		1250	215	1020	204	16.8	8.22
MQ-19 Aero-sonde	AAI	I	Fw	14	140		36.4		11	

Model	Manufacturer	Class	Type	Endurance	Range	Mx Speed	MTOW	Payload	Wing-span	Length
MQ-1C Gray Eagle	GA-ASI	III	Fw	25		305	1633	261	17	9
MQ-25 Stingray	Boeing	III	Fw							
MQ-4C Triton	Northrop Grumman	III	Fw	24	15184	613	14628	1452	40	14.5
MQ-8 Fire Scout (C)	Northrop Grumman	III	Rw	12	2272	250	2721	227	10.7	12.6
MQ-9 Reaper	GA-ASI	III	Fw	27	1851	445	4763	386	20	11
Phoenix 30	UAV Solutions	I	Rw	0.5			4.5	0.9	0.5	0.5
RQ-11	AeroVironment	I	Fw	1.5	10	81	1.9		1.4	1
RQ-12 Wasp	AeroVironment	I	Fw	0.8	5	83	1.3		1	0.8
RQ-170 Sentinel	Lockheed Martin	III	Fw							
RQ-180	Northrop Grumman	III	Fw							
RQ-20 Puma (AE)	AeroVironment	I	Fw	3	20	83	6.3		2.8	1.4
RQ-21 Black-jack	Insitu	I	Fw	16		167	61	17.7	4.9	2.5
RQ-23 Tiger-shark	Navmar Applied Sciences Corporation	II	Fw	12		148	226	45	6.7	4.5
RQ-4 Global Hawk	Northrop Grumman	III	Fw	36	22780		14628	1360	39.9	14.5
RQ-7 Shadow	AAI	II	Fw	9	125	200	212	43	6	3.6
ScanEagle	Insitu	I	Fw	18		150	26.5	5	3.11	1.71
Silver Fox	BAE,Raytheon	I	Fw	10	37	93	13		2.4	
Stalker	Lockheed Martin	I	Fw	8		72	10	2.5	3.7	
Switchblade	AeroVironment	I	Fw	0.2	10	157	2.5			
T-20 JUMP	Arcturus	I	Fw	20		139	83	34	5.3	2.7
T-Hawk	Honeywell	I	Rw	0.8	10					

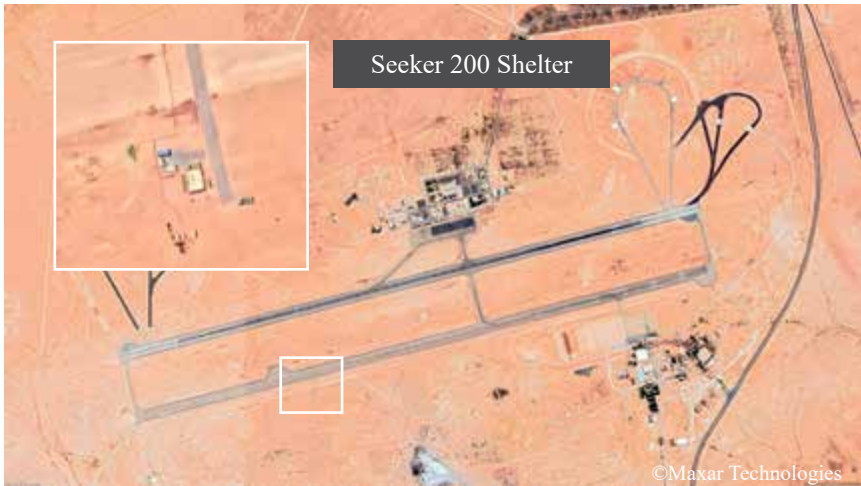
Model	Manufacturer	Class	Type	Endur- ance	Range	Mx Speed	MTOW	Payload	Wing- span	Length
VIETNAM										
Shikra	Viettel	I	Fw							

INFRASTRUCTURE

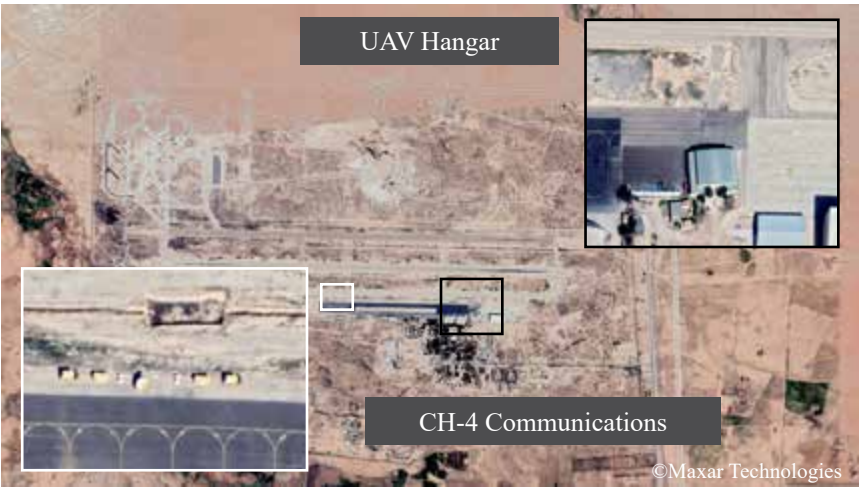
Note:

This section is comprised of satellite imagery for a selection of drone bases and test sites. Due to the lack of publicly-available imagery for certain areas and periods, some significant sites are not included in this section, such as Afghanistan’s Kandahar Air Base and Israel’s Palmachim Air Base. Annotations on the imagery highlight visible equipment used in drone operations. All imagery was sourced from Google Earth. Attribution information for third-party data providers is located in the bottom-right corner of each image. All bases in this section are believed to be in active use unless otherwise stated in the metadata. For images of drones deployed in foreign countries, the name of the state actor is included in the annotation and in the metadata.

ALGERIA



Tindouf Air Base	
Location	27°42'08"N 008°09'55"W
Image Date	17 April 2019
Activity	Deployment
Notes	



Aïn Oussera Air Base	
Location	35°31'20"N 002°52'56"E
Image Date	9 March 2019
Activity	Headquarters
Notes	

AZERBAIJAN



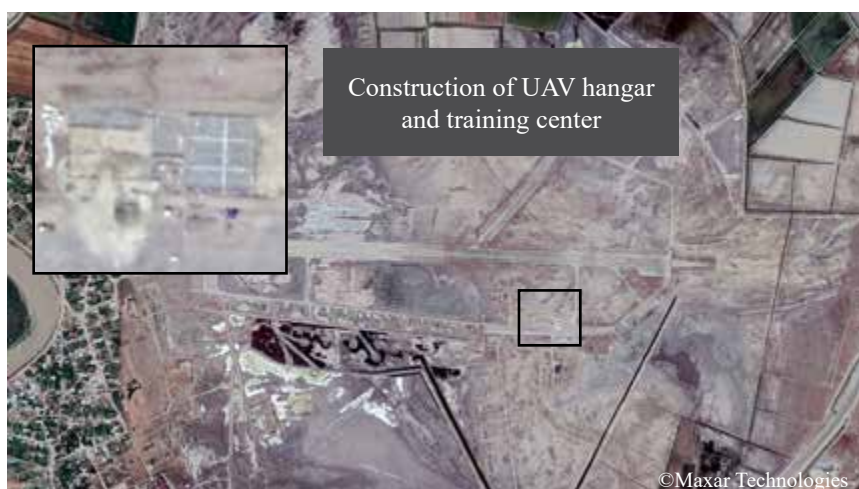
Baku Lokbatan Airport

Location 40°20'53"N 049°40'29"E

Image Date 16 September 2017

Activity Headquarters, Training

Notes



Salyany Air Base

Location 39°38'45"N 048°59'45"E

Image Date 29 April 2018

Activity Training

Notes Army training site.



Sangachaly Air Base

Location 40°07'47" N 049°27'18" E

Image Date 25 July 2017

Activity Deployment

Notes Probably remains an active Heron site, although the imagery is out of date.

BRAZIL



Santa Maria Air Base

Location 29°42'39"S 053°41'32"W

Image Date 29 July 2018

Activity Deployment

Notes Intermittently active as a Hermes 450 site.

BOTSWANA



Thebephatshwa Airport

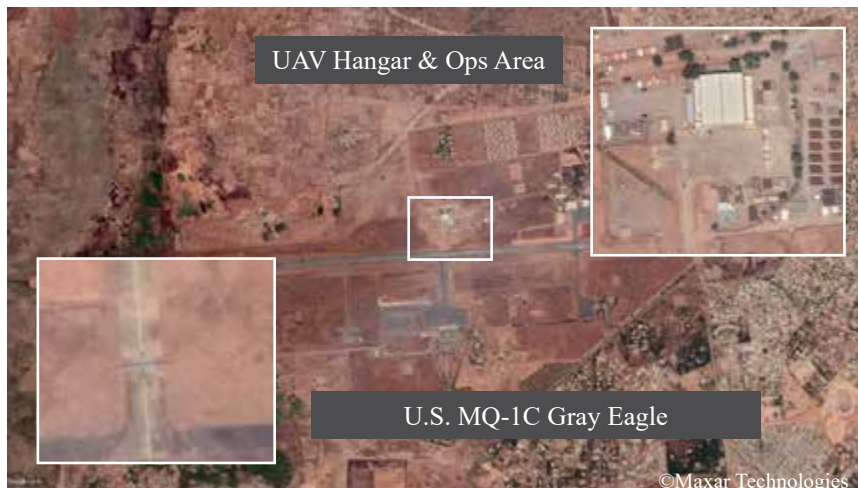
Location 24°13'15"S 25°20'55"E

Image Date 13 February 2003

Activity

Notes Inactive.

CAMEROON



Garoua Airport

Location 09°20'09"N 013°22'12"E

Image Date 30 November 2018

Activity Deployment (US)

Notes

CHINA



Aksu Airport

Location 41°15'45"N 80°17'30"E

Image Date 21 December 2018

Activity

Notes Possibly a CH-5 test site in 2018. Probably no longer active.



Anshun Huangguoshu Airport

Location 26°15'38"N 105°52'23"E

Image Date 8 November 2018

Activity Test site

Notes Also served as test site for the BZK-007, Divine Eagle, and Wing Loong 1D.



Baotou "UAV Test Site"

Location 40°52'28"N 109°35'08"E

Image Date 27 April 2018

Activity Test site

Notes FH-98 and BZK-005 test site. Several new hangars added later in the year.



Daishan Naval Air Base

Location Active

Image Date 15 March 2019

Activity Headquarters

Notes HQ for East Sea Fleet UAV Regt. First UAV activity noted in 2013. Aifield underwent renovations 2016 to 2017.



Dehong Mangshi Airport

Location 24°23'54"N 098°31'29"E

Image Date 9 April 2019

Activity Deployment

Notes



Guyuan Liupanshan Airport

Location 36°04'34"N 106°13'05"E

Image Date 25 July 2019

Activity Test site

Notes Wing Loong 2 site since 2017.
Probably still active.



Hotan Air Base

Location 37°2'22"N 079°51'48"E

Image Date 29 June 2019

Activity Deployment

Notes Site of an intermittent
Wing Loong 1 deployment
2016-2018. Wing Loong 2 site
since early 2019.



Jiayuguan Airport

Location 39°51'25"N 098°20'29"E

Image Date 4 April 2019

Activity Test site

Notes Caihong-series site



Kashi Air Base

Location 39°32'29"N 076°01'09"E

Image Date 19 February 2019

Activity Deployment

Notes Site of an intermittent Wing Loong 1 deployment 2014-2018. Wing Loong 2 site since early 2019.



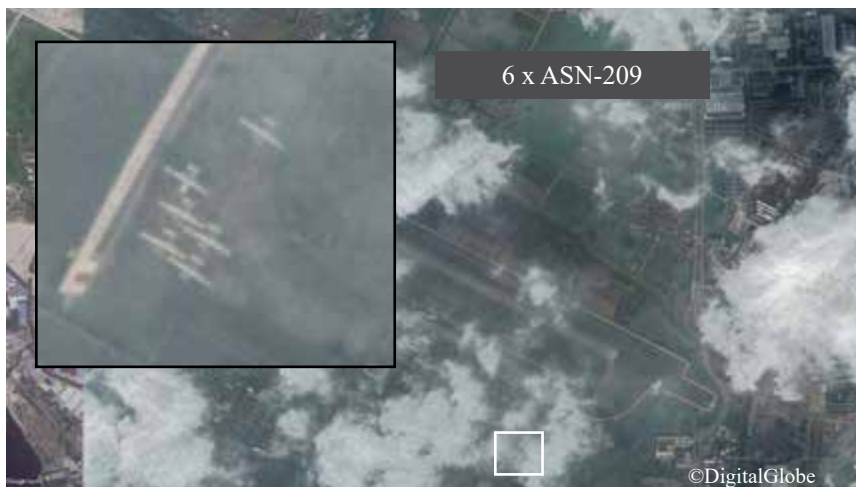
Lhasa Gonggar Airport

Location 29°17'52"N 090°54'43"E

Image Date 2 November 2017

Activity Deployment

Notes Status unclear.



Ningbo Air Base

Location 29°55'22"N 121°34'25"E

Image Date 17 January 2019

Activity Deployment

Notes Previously served as a BZK-005 site while Daishan AB underwent renovations.



Pucheng Neifu Airport

Location 34°50'1"N 109°32'38"E

Image Date 31 September 2018

Activity Test site

Notes FL-1, JY-300, and AT200 test site. Unclear whether it remains active.



Sanya Naval Air Base

Location 18°17'12"N 109°27'51"E

Image Date 20 May 2019

Activity Deployment

Notes



Shenyang Air Base

Location 41°52'15"N 123°26'19"E

Image Date 27 May 2016

Activity Test site

Notes Probably inactive as a UAV site.



Xintai Air Bas

Location 36°00'06"N 117°37'33"E

Image Date 27 May 2014

Activity Test site

Notes Probably inactive as a UAV site.



Yishuntun Air Base

Location 43°35'15"N 123°34'41"E

Image Date 27 January 2019

Activity Deployment

Notes More than three Soar Dragon UAVs are believed to be currently based here.

DJIBOUTI



Chabelly Airfield

Location 11°31'N 43°04'E

Image Date 20 June 2019

Activity Deployment (US)

Notes

ECUADOR



Manta Naval Air Station

Location 00°56'45"S 080°40'43"W

Image Date 21 January 2019

Activity Headquarters

Notes Also serves as a Searcher site.

EGYPT



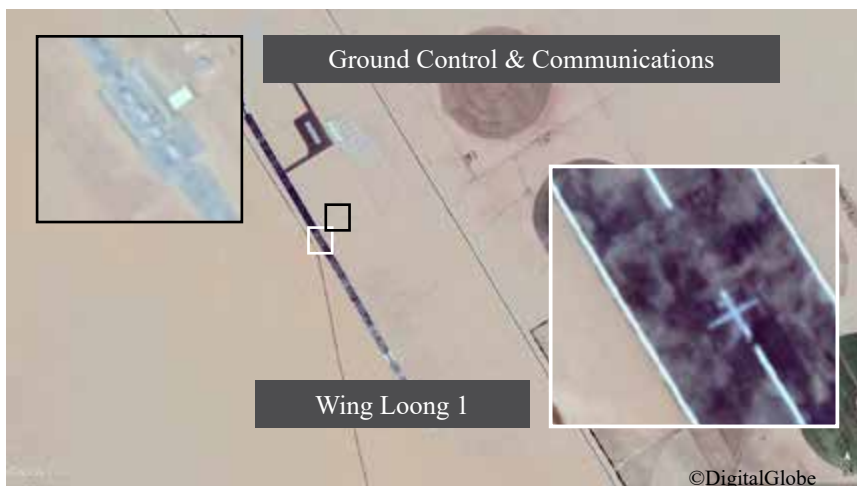
Bir Gifgafa Air Base

Location 30°24'26"N 033°9'15"E

Image Date 23 June 2019

Activity Deployment

Notes Status unclear.



Dhakla Oasis Airport

Location 25°24'40"N 029°00'10"E

Image Date 2 May 2018

Activity Deployment

Notes



Uthman Air Base

Location 29°33'18"N 025°35'20"E

Image Date 17 May 2019

Activity Deployment

Notes Status unclear.

INDIA



Awantipur Air Force Station

Location $33^{\circ}52'35''\text{N } 074^{\circ}58'32''\text{E}$

Image Date 10 August 2018

Activity Headquarters

Notes



Bagdogra Air Force Station

Location $26^{\circ}40'52''\text{N } 088^{\circ}19'43''\text{E}$

Image Date 21 February 2018

Activity Deployment

Notes



Bhatinda Air Force Station

Location $30^{\circ}16'12''\text{N } 074^{\circ}45'20''\text{E}$

Image Date 8 February 2018

Activity Deployment

Notes



Chabua Air Force Station

Location 27°27'44"N 095°07'05"E

Image Date 23 November 2018

Activity Deployment

Notes Status unclear.



Chitradurga Aeronautical Test Range

Location 14°23'17"N 076°34'16"E

Image Date 30 March 2019

Activity Test site

Notes



Indian Naval Station Garuda

Location 9.941°N 76.275°E

Image Date 24 August 2018

Activity Headquarters

Notes



Jaisalmer Air Force Station

Location 26°52'49"N 070°51'18"E

Image Date 1 March 2019

Activity Deployment

Notes



Kumbhirgram Air Force Station

Location 24°54'47"N 092°58'43"E

Image Date 9 February 2019

Activity Deployment

Notes



Leh Air Force Station

Status 34°08'09"N 077°32'47"E

Image Date 28 August 2018

Activity Deployment

Notes

IRAN



Choghadak Airfield

Location 09°58'44"N 050°59'32"E

Image Date 4 June 2019

Activity Deployment

Notes



Hamadan Air Base

Location 35°12'42"N 48°39'12"E

Image Date 19 December 2018

Activity Deployment

Notes



Jask Airport

Location 25°39'13"N 057°47'57"E

Image Date 3 June 2019

Activity Deployment

Notes



Kashan Airport

Location 33°53'43"N 051°34'37"E

Image Date 26 September 2018

Activity Test site

Notes



Konarak Airfield

Location 25°19'55"N 060°21'23"E

Image Date 26 December 2018

Activity Deployment

Notes



Marjan Airstrip

Location 34°15'06"N 45°49'57"E

Image Date 19 June 2017

Activity Deployment

Notes Status unclear.



Qeshm Airfield

Location 26°42'32"N 055°57'35"E

Image Date 12 June 2018

Activity Deployment

Notes UAV site since 2012.

JAPAN



Misawa Air Base

Location 40°42'19"N 141°22'19"E

Image Date 13 September 2018

Activity Deployment (US)

Notes Probably inactive as a UAV site. RQ-4 operations were moved to Yokota Air Base in 2019.

JORDAN



Muwaffaq Salti Air Base

Location 31°49'55"N 036°47'28E

Image Date 31 August 2018

Activity Deployment (US)

Notes

KAZAKHSTAN



Taraz Airport

Location 42°51'13"N 071°18'13"E

Image Date 20 June 2019

Activity Headquarters

Notes

KUWAIT



Ali Al Salem Air Base	
Location	29°20'48"N 47°31'14"E
Image Date	14 April 2018
Activity	Deployment (US, UK, Italy)
Notes	

LIBYA



Ben Guerir Air Base	
Location	32°7'50"N 7°54'39"W
Image Date	9 February 2016
Activity	
Notes	Status unclear.

NIGER



Air Base 101 (Niamey)

Location 13°28'54"N 002°10'13"E

Image Date 23 June 2019

Activity Deployment (US, France)

Notes



Air Base 201 (Agadez)

Location 16°57'06"N 008°00'57"E

Image Date 3 April 2019

Activity Deployment (US)

Notes MQ-9 Reaper operations planned to start in late 2019.

PAKISTAN



M.M. Alam Air Base

Location 32°33'47"N 071°34'15"E

Image Date 18 February 2018

Activity Test site

Notes Status unclear.



Murid Air Base

Location 32°54'36"N 072°46'26"E

Image Date 22 March 2019

Activity Deployment

Notes

RUSSIA



Akhtubinsk Air Base

Location 48°18'4"N 046°12'15"E

Image Date 30 May 2019

Activity Test site

Notes



Chkalovsk Air Base

Location 54°46'0"N 020°23'48"E

Image Date 30 March 2019

Activity Deployment

Notes



Petropavlovsk-Kamchatsky Airport

Location 53°10'3"N 158°27'12"E

Image Date 29 June 2019

Activity Deployment

Notes



Salka Airport (Nizhny Tagil)

Location 57°59'18"N 060°14'6"E

Image Date 7 May 2019

Activity Test site, Training

Notes



Severomorsk-2 Air Base

Location 69°0'54"N 033°17'30"E

Image Date 11 October 2018

Activity Headquarters

Notes



Stupino Airfield

Location 54°53'18"N 038°9'6"E

Image Date 22 September 2018

Activity Training

Notes

SAUDI ARABIA



Jizan Airport

Location 16°54'04"N 042°35'09"E

Image Date 13 June 2019

Activity Deployment (UAE)

Notes Most likely operated by the UAE. Emirati-operated Predator XP and Saudi CH-4 UAVs have also been spotted at Jizan in historical imagery.



King Khalid Air Base

Location 18°18'25"N 042°48'33"E

Image Date 13 June 2019

Activity Deployment

Notes

SOUTH KOREA



G 222, Yangju

Location 37°49'49" N 126°59'24" E

Image Date 24 February 2019

Activity Headquarters

Notes



G 404, Yangju

Location 38°05'15" N 127°59'13" E

Image Date 14 February 2019

Activity Headquarters

Notes



Goehung Flight Performance Test Site

Location 34°36'40"N 127°12'24"E

Image Date 17 October 2018

Activity Test site

Notes



U.S. MQ-1C Gray Eagle

Kunsan Air Base

Location 35°54'13"N 126°36'57"E

Image Date 26 March 2019

Activity Headquarters, Deployment (US)

Notes

SYRIA



Deir ez-Zour Airport

Location 35°17'07"N 040°10'33"E

Image Date 12 March 2018

Activity Deployment (RU)

Notes



Hama Military Airport

Location 35°07'12"N 036°43'13"E

Image Date 10 October 2016

Activity Deployment (IR)

Notes Site of intermittent Iranian UAV activity. Probably no longer active as a UAV base.



Khmeimim Air Base

Location 35°24'42"N 035°56'42"E

Image Date 26 September 2018

Activity Deployment (RU)

Notes

TAJIKISTAN



Qurghonteppa International Airport

Location 37°51'44"N 068°51'46"E

Image Date 25 March 2019

Activity Deployment (RU)

Notes

TUNISIA



Bizerte-Sidi Ahmed Air Base

Location 37°14'36"N 009°47'11"E

Image Date 13 July 2019

Activity Deployment (US)

Notes

TURKEY



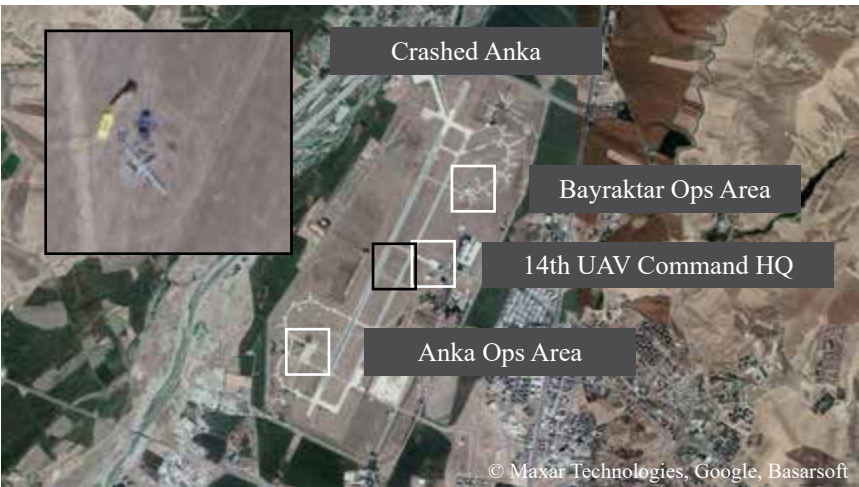
Akıncı Air Base

Location 40°04'44"N 32°33'53"E

Image Date 9 June 2019

Activity Test site

Notes TAI Anka and Aksungur site



Batman Air Base

Location 37°55'57"N 41°07'22"E

Image Date 4 August 2018

Activity Headquarters

Notes



Historical Imagery: Batman Air Base

31 December 2017



Çanakkale Airport

Status $40^{\circ}08'15''\text{N } 026^{\circ}25'36''\text{E}$

Image Date 1 July 2019

Activity Headquarters, Deployment

Notes



Dalaman Naval Air Base

Location $36^{\circ}42'45''\text{N } 028^{\circ}47'29''\text{E}$

Image Date 22 June 2019

Activity Deployment

Notes Navy Anka and Bayraktar-TB2 site.



Gaziantep Airport

Location $37^{\circ}32'44''\text{N } 044^{\circ}15'19''\text{E}$

Image Date 3 June 2019

Activity Deployment

Notes



Hakkari Yüksekova Airport

Location 37°32'44"N 044°15'19"E

Image Date 30 October 2018

Activity Deployment

Notes



Incirlik Air Base

Location 37°00'07"N 035°25'33"E

Image Date 30 October 2018

Activity Deployment (US, TR)

Notes



Kesan Airport

Location 40°47'10"N 026°36'22"E

Image Date 13 June 2019

Activity Test site

Notes



Şırnak Airport

Location 37°21'50"N 042°03'36"E

Image Date 13 October 2018

Activity Deployment

Notes



Van Ferit Melen Airport

Location 38°28'06"N 043°19'56"E

Image Date 15 July 2019

Activity Deployment

Notes

USA



Andersen Air Force Base

Location 13°34'34"N 144°55'28"E

Image Date 3 January 2018

Activity Deployment

Notes



Beale Air Force Base

Location 39°08'10"N 121°26'11"W

Image Date 18 May 2018

Activity Headquarters

Notes



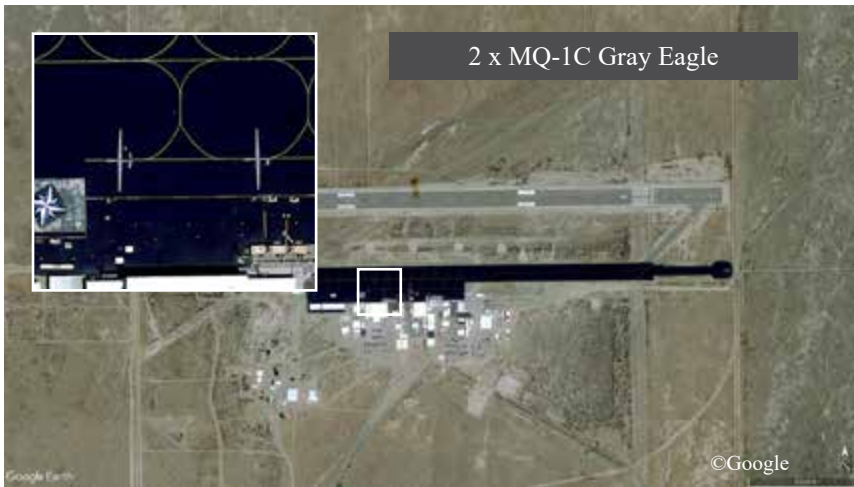
Creech Air Force Base

Location 36°35'22"N 115°40'47"W

Image Date 17 June 2018

Activity Headquarters

Notes



El Mirage Airport

Location 34°37'24"N 117°35'59"W

Image Date 14 June 2017

Activity Test site

Notes



Gray Butte Airfield

Location 34°33'59"N 117°40'13"W

Image Date 14 June 2017

Activity Test site

Notes



Mackall Army Airfield

Location 35°02'11"N 079°29'51"W

Image Date 31 September 2018

Activity Headquarters

Notes



Naval Air Weapons Station China Lake

Location 35°41'08"N 117°41'31"W

Image Date 14 July 2019

Activity Test site

Notes



Naval Base Ventura County Point Mugu

Location 34°07'13"N 119°07'16"W

Image Date 19 November 2018

Activity Headquarters

Notes



Sabre Army Airfield, Fort Campbell

Location 36°34'05"N 087°28'51"W

Image Date 2 April 2019

Activity Headquarters

Notes

