The MQ-9 Reaper has become a ‘must have’ platform among Europe’s armed forces looking for a weapon capable UAV.

David Oliver

The conflict in Ukraine has spurred many European members of NATO to reappraise and accelerate their military modernisation plans, with the acquisition of unmanned aerial vehicles (UAVs) one of their priorities.

One of the most successful operational armed long-endurance UAVs is the General Dynamics Aeronautical Systems (GA-ASI) MQ-9 Reaper, the first of which was delivered to the United States Air Force (USAF) two decades ago. With an endurance of 27 hours, a maximum operating ceiling of 50,000 feet (15,240 metres), the MQ-9 can carry an 850-pound (386-kilogram) payload that can include up to four Lockheed Martin AGM-114 Hellfire air-to-ground missiles or two 500-pound (230-kilogram) GBU-12 Paveway laser-guided bombs.

In August 2008, Italy submitted a Foreign Military Sales (FMS) request through the United States Defense Security Cooperation Agency (DSCA) for four MQ-9As, four ground stations and five years of maintenance support, valued at $330 million. Two additional aircraft were ordered in November 2009 and in November 2015, the US approved a contracted covering weapons integration onto Italy’s Reaper aircraft, which made it the first country outside the UK to weaponise the MQ-9A. The potential for increased contribution to NATO coalition operations improved operational flexibility, and enhanced survivability for Italian forces prompted the request.

On 26 August 2013, France and the US Department of Defense concluded the contract for 16 Reapers and eight ground control stations, plus training for French Air Force operators. The MQ-9A Block 1 Reaper UAVs were introduced into French Air Force service in 2019 and three were deployed to Niamey Air Base in Niger from where they conducted their first strike against jihadists in Mali on 21 December 2019.

At the beginning of 2022 France announced that it was withdrawing its Barkhane anti-jihadist operations in Mali and the MQ-9As would return to Cognac, their base in France.
The Spanish Ministry of Defence announced it would buy four MQ-9A Block 5 Reaper systems for $27 million in 2016. General Atomics partnered with Spanish Company SENER to deliver the unarmed Reapers to the Spanish Air Force by the end of 2020.

**ENTER PROTECTOR**

In July 2020 the UK Ministry of Defence signed a $882 million contract for three GA-ASI SkyGuardian UAVs, a variant of the Predator B developed to meet European airworthiness certification standard, with option on 13 additional aircraft. This option was taken up in July 2021 when the MoD announced that a $245 million contract had been signed to bring the total to 16 platforms. Designated Protector RG.1 in Royal Air Force (RAF) service, it will be armed with the UK-made Brimstone missile and Paveway IV LGBs and replace the RAF’s 10 MQ-9A Reapers.

The UK and Belgium signed a Bilateral Statement of Intent to collaborate on their MQ-9B programmes in August 2020. The US Department of State had approved the sale in March 2019 of four MQ-9B SkyGuardians to Belgium for $600 million, pending approval by US Congress.

On 17 July 2018, the Netherlands signed a $339 million FMS contract with the United States to purchase four MQ-9A Block 5 Reaper systems, plus equipment and training. Following delivery in February 2022 the Reapers will be split between Leeuwarden Air Base in the Netherlands for NATO support operations, and Hato International Airport in Curacao for cooperation with the US including counter-drug operations.

The Finnish Defense Forces (FDF) began testing and experimenting unmanned aerial systems, including the MQ-9 in the Autumn of 2021. Although no UAS has been selected to date, Finland’s pending membership of NATO may expedite a selection.

In August 2008 Germany requested the purchase five Reapers and four ground control stations, plus related support material and training through the FMS process valued at $205 million. However, Germany decided to lease the Israel Aerospace Industries (IAI) Heron I offered by IAI and Rheinmetall initially for a one
year contract, as a stop-gap measure before a long-term decision on a medium-altitude, long-endurance (MALE)-system is made.

However, six Heron 1s are still being operated by the German Air Force although none of these are armed. In 2020, plans to acquire armed IAI Heron TP UAVs failed through Germany’s long-standing impasse over the introduction of armed UAVs that meant that roles that could have been handed off to remotely operated unmanned systems had until then been met by crewed platforms. It has also meant that the armed forces have built up no experience of armed UAV operations to help inform decision-making and planning. The arming of Heron UAVs could have been seen as a first step for the Bundeswehr to lay the groundwork for the introduction of additional UAV platforms capable of operating in non-permissive environments in the coming decade.

However now following the Russian invasion of Ukraine, hesitation about arming the UAVs has been overcome. The German authorities have determined to arm the UAVs that it will lease from Israel with precision-guided missiles manufactured in Israel. Arming the UAVs will cost an estimated $162 million.

The Polish government continues to pursue a goal of permanently stationing US troops and equipment in the country and this includes USAF MQ-9s which have been flying unarmed reconnaissance missions from Poland since May 2019 from a new set of facilities at Miroslawiec Air Base to accommodate the Air National Guardsmen and contractors operating Reapers there. These new facilities for US personnel include secure processing centres, a large aircraft maintenance shelter, communications infrastructure and dormitories for the 52nd Fighter Wing personnel assigned there.

As a direct response to Russia’s invasion of Ukraine, Poland’s Armament Agency spokesperson said on 1 March 2022: “I would like to inform you that acquisition of MALE UAVs is pursued both within the framework of the ZEFIR programme as well as within the framework of urgent acquisition of the MQ-9 Reaper UAVs in relation to the situation on the eastern border of the Republic of Poland.”

Four UAV systems armed with anti-tank missiles will be purchased under a contract with the United States and according to data from the Polish MoD, deliveries are planned from 2022 to 2024. Once delivered, Poland would become the first country on NATO’s eastern flank to acquire the MQ-9 Reaper.
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We have recently seen extensive use of unmanned aerial vehicles (UAV) in the conflicts in Libya, Syria and Armenia, so when Russia invaded Ukraine in February, it was obvious that they would be a vital asset to both sides. After three months of conflict (at time of print), Ukraine has been seen to be winning the UAV war.

Russia has the overwhelming force on the ground and in the air but its command and control (C2) of joint operations have been an abject failure to date. One of the vital assets of any battlefield commander is their ability to carry out effective and sustained intelligence, surveillance, target acquisition, and reconnaissance (ISTAR) missions and the most effective and economical ways of carrying them out tactically is with the use of UAVs.

For all Russia’s contention that its military aerospace industry is equal to that of the West, it has not produced a single operational unmanned combat air vehicle (UCAV) and relies on small unarmed tactical UAVs such as the Forpost, a licence-built IAI Searcher, and the Orlan-10. Since the conflict began, Russia has reportedly been losing at least one Orlan-10 a day on average, with losses increasing which have been confirmed by pictures from the battlefields. Fewer Forposts have been claimed, but other types including an Orlan-30s, a larger and heavier version of the Orlan-10 with a 15lb (7kg) payload, have been lost, and more importantly, a Kronshtadt Orion reportedly came down in Ukraine on 7 April. This is the first Russian-built MALE UAV that had been tested in Syria and its loss in Ukraine would be very bad news for the Russians.

Although the most successfully operated Ukrainian UAV has been the Turkish Bayraktar TB2, a number of indigenous designs have been used in the conflict. These include the UJ-22 Airborne, a multi-purpose mini-UAV manufactured by SPE UKRJETI; the A1-SM Furia UAS developed by SPC Athion Avia; and the Leleka-100 manufactured by UkrSpec Systems which has been in service with the Ukrainian Armed Service since 2015. The same company builds the PD-1 UAS which was purchased by the Ukrainian Armed Forces in 2016. Featuring a modular airframe, the PD-1 has a length of 2.5m and a wingspan of 4.7m. Its maximum take-off weight and payload capacities are 100lb (45kg) and 15lb (7kg) respectively. Powered by a 100 cc two-cylinder four-stroke engine, the PD-1 can fly at speeds between 38 knots (70km/h) and 75kts (140km/h). The UAV can reach a maximum altitude of 9,800 feet (3,000m) and execute missions for up to 10 hours. The PD-1 can be converted from fixed-wing to VTOL configuration within 15 minutes.

The Punisher is a Reaper-class UCAV with a 21.5m wingspan manufactured by UA Dynamics that has been used by the Ukraine forces, with over 60 successful
flights. It has a maximum operational range of approximately 45km, and a speed of 107kts (198km/hr) at a cruising altitude of 13,100ft (4,000m). The Punisher works in tandem with the Spectre ISR UAV, which detects and identifies stationary targets for engagement by the former, with a 6lb (2.7kg) explosive payload, delivered together or on different targets.

Unfortunately only a small number of the Punisher had been produced before the company had to evacuate its technical team and production facilities from Kharkiv and Kyiv.

A team of Ukrainian special forces, with UAV operators drawn from the Aerorozvidka unit, played a major role in halting the 64km Russian convoy heading to mount attack on Kyiv from the north at the beginning of the war. Its fleet of UAVs ranges from small affordable consumer drones to large octocopters built by their own engineers.

The R18 is their top model, an octocopter VTOL UAV with a range of 4km, can be in the air for about 40 minutes, and most importantly, can carry 1lb (0.5kg) of free-falling bombs. Aerorozvidka has been conducting around 300 UAV missions each day to monitor Russian troop movements and to collect data for Ukraine’s Nato-supported intelligence system, Delta that identifies high value Russian targets the coordinates of which are handed over to the Ukrainian kills squads who fly their bomb-dropping UAVs at night.

However, on 19 April AeroVironment announced its intention to donate more than 100 Quantix Recon mini UAVs to the Ukrainian MoD. With its unique hybrid design, Quantix Recon combines the VTOL advantages with the range and speed of a fixed-wing unmanned aircraft.

On the same day a Russian Gorizont Air S-100, a Russian license-built version of the Austrian Schiebel Camcopter S-100, was reportedly shot down by Ukrainian armed forces.
forces. Coincidently, the Romanian Border Police have been operating a Schiebel Camcopter S-100 for surveillance flights over the Black Sea off the coast of Romania. Based at Mangalia south of Constanta, the rotary-wing UAV has a range of 200km and an endurance of up to six hours.

On 25 April Russian sources showed a Ukrainian TB2 shot down over Kursk Oblast allegedly after a missile strike within Russia on its way back to Ukraine. Another TB2 was reportedly shot down in Belgorod Oblast by a Russian Pantsir-S1 after another raid within Russia. Two more attacks were also suspected to have been carried out by Ukrainian UAVs with reports of explosions in the regions of Voronezh and Kursk on the Russian border of Ukraine.

On 12 April Russian forces had shot down a Ukrainian Tu-141 in the Kharkiv area. These obsolete UAVs are believed to be used to draw out the positions on Russian air defence systems and another one was reportedly used to distract Russian air defences around Kherson on 28 April.

Kyiv claimed on 2 May that its drones sank two Russian patrol boats near the Black Sea’s Snake Island where Ukrainian forces rebuffed Moscow’s demands to surrender at the start of its invasion. “The Bayraktars are working,” said Valeriy Zaluzhnyi, the commander in chief of the Ukrainian Armed Forces.

On 23 May, Russian Ministry spokesman, Major General Igor Konashenkov claimed (without any verification) that since the beginning of the “special military operation”, Russian forces had destroyed 858 Ukraine drones.
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HIGH ENDURANCE. ADVANCED PAYLOADS. BEST COVERAGE.
**ADCOM**

**United 40**

- **Span:** 17.53m
- **Maximum take-off weight:** 1,000kg
- **Speed:** 108kt
- **Endurance:** 25h
- **Ceiling:** 26,000ft
- **Payload:** 100kg, Retractable EO/IR sensor
- **Powerplant:** Twin hybrid turbine-electric engines
- **Launch/recovery:** conv/conv
- **Remarks:** UAE manufactured MALE sold to Algeria.

**AERONAUTICS**

**Orbiter 4**

- **Span:** 5.4m
- **Maximum take-off weight:** 50kg
- **Range:** Line of sight up to 150km comms range
- **Speed:** 70kts
- **Endurance:** up to 24hr
- **Altitude:** 18,000ft
- **Payload capacity:** 12kg
- **Stabilised pod with day, night (cooled IR) sensors, laser designator, COMINT, ELINT, VISINT, photogrammetric mapping (HDLite), synthetic aperture radar, maritime patrol radar, LiDAR, Automatic Identification System
- **Powerplant:** Spark ignition multi-fuel engine
- **Launch/Recovery:** Catapult and compact, foldable net
- **Remarks:** Designed for shipboard and land-based applications including ISTAR, fire control electronic warfare, comms relay & ship self-defence.

**Aerostar**

- **Length:** 4.5m
- **Span:** 8.7m
- **Maximum take-off weight:** 230kg
- **Range:** 250km
- **Speed:** 110kts max
- **Endurance:** 12hrs
- **Payload capacity:** 50kg
- **Options include stabilised EO/IR sensors, laser designation, synthetic aperture radars with ground moving target indication, ELINT and COMINT systems. Customers include: Israel, General Dynamics, CIS, the Netherlands & Poland.
- **Powerplant:** Zanzottera 498i fuel injected 2-str twin, 38 hp
- **Launch/Recovery:** conv/conv
- **Remarks:** Tactical UAS with over 250,000 operational flight hours logged.

**Dominator XP**

- **Length:** 8.6m
- **Span:** 13.5m
- **Maximum take-off weight:** 1,910kg
- **Range:** LOS 300km, BLOS satcom unlimited
- **Speed:** 150kts
- **Endurance:** > 20hrs
- **Altitude:** > 18,000ft
- **Payload capacity:** 373kg
- **Options include EO/IR and hyper-spectral sensors with laser pointer and designator, maritime radar, SAR/GMTI radars, communications relays, COMINT, ELINT, MAD etc.
- **Powerplant:** 2 x 170hp Austro AE300 jet fuel piston engines
- **Launch/Recovery:** conv/conv
- **Remarks:** Operators include Mexico & Turkey. Operational in GPS-denied environments.

**AEROVIRONMENT**

**Puma 3AE**

- **Length:** 1.4m
- **Span:** 2.8m
- **Maximum take-off weight:** 6.8kg
- **Range:** 20km or 60km with long range comms antenna
- **Speed:** 25-45kts
- **Endurance:** 2.5hrs with an LE battery
- **Altitude:** 300-500ft AGL
- **Payload capacity:** > 0.85kg
- **Mantis i45 Gimbaled payload with dual 15mp EO cameras, 50xf zoom, IR camera and low light camera for night operations, and high-power illuminator
- **Powerplant:** battery electric, Launch/recovery: hand or rail/autonomous or manual deep stall landing
- **Remarks:** All-environment 3rd generation Puma mini-UAS with new propulsion system making hand launch easier, enhanced sensor suite.
<table>
<thead>
<tr>
<th><strong>UAV Listing</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Raven</strong></td>
</tr>
<tr>
<td><strong>Length:</strong> 0.91m <strong>Span:</strong> 1.37m</td>
</tr>
<tr>
<td><strong>Maximum take-off weight:</strong> 1.9kg <strong>Range:</strong> 10km comms range</td>
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<tr>
<td><strong>Speed:</strong> 17-44kts <strong>Endurance:</strong> Up to 1.5hrs.</td>
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<tr>
<td><strong>Altitude:</strong> 500ft AGL, 14,000ft MSL launch</td>
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<tr>
<td><strong>Powerplant:</strong> battery electric</td>
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<tr>
<td><strong>Payload capacity:</strong> 0.17kg. Dual forward and side-looking EO or IR camera nose with electronic pan-tilt-zoom &amp; stabilisation.</td>
</tr>
<tr>
<td><strong>Launch/recovery:</strong> hand/deep stall landing</td>
</tr>
<tr>
<td><strong>Remarks:</strong> Most are operated by the US, but foreign customers have included Australia, Estonia, Italy, Denmark, Spain and the Czech Republic.</td>
</tr>
</tbody>
</table>

| **Switchblade loitering munition** |
| **Length:** <0.6m estimate **Span:** <0.9m estimate |
| **Maximum take-off weight:** < 2.5 kg **Range:** 10 km |
| **Endurance:** 15 min |
| **Speed:** 55 to 85 kts |
| **Altitude:** < 500ft AGL, > 15,000ft MSL |
| **Payloads:** Dual front and side look EO cameras and IR nose camera. Stabilised electronic pan-tilt-zoom, Orbital ATK advanced munition warhead. |
| **Powerplant:** battery electric |
| **Launch/recovery:** tube/NA |
| **Remarks:** US Army and USMC are the primary users. Ordered by the UK. |

| **Airbus** |
| **Harfang** |
| **Length:** 9.3m **Span:** 16.6m |
| **Maximum take-off weight:** 1,250kg **Range:** 1,000km |
| **Speed:** 10kts **Endurance:** 12hr at 550nm from base |
| **Altitude:** 25,000ft |
| **Payload capacity:** 250kg. Synthetic aperture radar with 1 m resolution, Wide-Area Surveillance (WAS) & spot modes, EO/IR turret also with WAS & spot modes. NATO-STANAG-3875-compliant laser designator, panoramic pilot assistance camera. |
| **Powerplant:** 115 hp turbocharged Rotax 914 piston engine |
| **Launch/recovery:** conv/conv |
| **Remarks:** Retired French systems acquired by Royal Moroccan Air Force. |

| **KZO** |
| **Length:** 2.25m **Span:** 3.42m |
| **Maximum take-off weight:** 161kg **Range:** > 140km (on data link) |
| **Speed:** 118.8kts **Endurance:** 5.5hrs |
| **Altitude:** 11,500ft |
| **Payload capacity:** 35kg. Thermal imager system (8–12 m or 3–5 m), 3 x fixed-focus TV cameras (6 FoV), all 3-axis stabilised. Principal operator is the German Army. |
| **Powerplant:** 24kW 2-str engine |
| **Launch/recovery:** rato, cat/para |
| **Remarks:** Tactical UAS optimised for high speed reconnaissance missions. |

| **VSR700** |
| **Length:** 6.2m **Span:** 7.2m rotor diameter |
| **Maximum take-off weight:** 700kg **Speed:** 100kts |
| **Endurance:** 8hrs with full tactical payload 80nm from ship **Altitude:** 19,600ft |
| **Payload capacity:** 100kg. Naval-grade EO system, naval tactical radar, AIS, deck finder autoland system. |
| **Powerplant:** 155hp diesel and jet fuel engine |
| **Launch/recovery:** Automated VTOL |
| **Remarks:** Shipborne unmanned helicopter designed to operate alongside other shipborne naval assets. Second prototype ordered in March 2021. |
Zephyr T
Length: 6m estimate
Span: 32m
Maximum take-off weight: 140kg
Range: 18,500km estimate
Speed: approx 30kts
Endurance: > 45 days
Altitude: > 65,000ft
Payload capacity: 20kg, RADAR, LIDAR, ESM/ELINT, Broadband Comms
Powerplant: solar powered electric motors
Launch/recovery: conv/conv
Remarks: Larger variant of Zephyr with greater payload & endurance.

Arcturus
Length: 5.64m
Span: 2.87m
Maximum take-off weight: 95.25kg
Speed: 72kts
Endurance: nine to 16hrs
Altitude: 15,000ft
Payload capacity: 27.2kg inc fuel. Cloud Cap Technologies 200 and 400 Series EO/IR are standard options. 3-D mapping, SAR, LIDAR, comms relay, COMINT, SIGINT systems available.
Powerplant: 1x 190cc 4-str engine & 4 x electric motors, props for VTOL
Launch/recovery: VTOL, cat launch option
Remarks: Arcturus aircraft family are operated by US SOCOM under the Mid-Endurance Unmanned Aircraft Systems III contract. Jump 15 is smaller variant.

Baykar Makina Akinci
Length: 6.5m
Span: 20m
Maximum take-off weight: 6.000kg
Speed: 150kt
Endurance: 24 Hours
Ceiling: 40,000ft
Payload: 1,500kg including EO/IR/LD and multi-purpose AESA Radar
Powerplant: Two 750hp or 450hp turoprop engines iS internal combustion engine
Launch/recovery: automatic take-off and landing (ATOL)
Remarks: Medium-altitude, long-endurance (MALE) armed UAS sold to 15 countries and used operationally in Libya, Syria, Azerbaijan and Ukraine.

Baykar Makina Bayraktar TB2
Length: 10m
Span: 18m
Maximum take-off weight: 1,250kg
Range: 6,000km (estimate from cruise speed & endurance)
Endurance: 40hrs
Speed: 150 to 180kph cruise
Altitude: 26,000ft
Payload Capacity: 150kg
Payloads: Electro-optical sensor system under fuselage
Powerplant: Single piston engine, pusher propeller
Launch/recovery: Conventional
Remarks: MALE-class reconnaissance UAV in service with the PLA air, land, and naval services.
TYW-1

**Length:** 9.8m  
**Span:** 18m  
**Maximum take-off weight:** 1,500kg  
**Range:** 6,000km (estimate from cruise speed & endurance)  
**Endurance:** 40hrs  
**Speed:** 200kph max level speed  
**Altitude:** 24,600ft  
**Payload Capacity:** 300kg  
**Powerplant:** Single piston engine, pusher propeller  
**Launch/recovery:** Conventional  
**Remarks:** MALE-class armed UAV in development, export derivative of the BZK-005

**Boeing**

**WanderB VTOL**

**Length:** 1.79m  
**Span:** 3.1m  
**Maximum take-off weight:** 13kg  
**Communication range:** 50-80km  
**Speed:** 65kts  
**Endurance:** 2.5hours  
**Best Operational Altitude:** up to 3,281ft AGL  
**Ceiling:** 22,000ft ASL  
**Payload:** 1.35kg. Day and IR stabilised cameras, photogrammetric, multi-spectral or radiometric mapping cameras for airborne ISR or Mapping on Demand.  
**Powerplant:** Four battery driven VTOL electric motors and one electric pusher motor for level flight  
**Launch/recovery:** VTOL  
**Remarks:** Mini UAS optimised to facilitate covert, over-the-hill operations or extensive, day-and-night ISR.

**Bluebird Aero Systems**

**ThunderB**

**Length:** 1.9m  
**Span:** 4m  
**Maximum take-off weight:** 32kg  
**Communication range:** 150km  
**Speed:** 32-72kts  
**Endurance:** Up to 12hrs in cargo release configuration, up to 15hrs on station 150km from its ground control position carrying T-STAMP  
**Ceiling:** 16,000ft  
**Payload:** up to 4kg. T-STAMP triple sensor (CCD/cooled IR/laser)  
**Powerplant:** Advanced two stroke engine with electronic fuel injection  
**Launch/recovery:** auto cat/para airbag, VTOL version available  
**Remarks:** Operational in Israel and by international Defence and HLS customers. Continues mission in GPS denied environment.

**MQ-25 Stingray**

**Length:** 16m  
**Span:** 23m  
**Range:** 500nm  
**Ceiling:** 26,000ft  
**Payload:** 6,800kg of fuel  
**Powerplant:** Rolls-Royce AE 3007N tubofan  
**Launch/recovery:** conv/conv  
**Remarks:** Winner of the US Navy Carrier-Based Aerial-Refueling System (CBARS) program.

**Boeing Insitu**

**ScanEagle 3**

**Length:** 2.3-2.5m  
**Span:** 4m  
**Maximum take-off weight:** 36.3kg  
**Range:** 720nm (estimate based on cruise speed & endurance)  
**Speed:** 40-50kts cruise, 80kts max  
**Endurance:** 18hrs  
**Altitude:** 20,000ft  
**Payload capacity:** 9.1kg. Turret houses EO, EO900 (EO camera and EO telescope), MWIR, Dual Image EO and MWIR, 170W onboard power  
**Powerplant:** 1 x 2-str heavy fuel piston engine burning JP-5/JP-8  
**Launch/recovery:** cat/SkyHook vertical wire  
**Remarks:** ScanEagle 3’s design doubles the aircraft’s payload capacity and is compatible with existing ScanEagle payloads.
Blackjack

- Length: 2.5m
- Span: 4.9m
- Maximum take-off weight: 61kg
- Range: 960 nm (estimate based on endurance & cruise speed)
- Endurance: > 16hrs
- Altitude: > 20,000ft
- Payload capacity: 17 kg
- EO imager with 1.1°–25° optical field of view & 4x digital zoom, mid-wave infrared imager with 2°–25° field of view, laser rangefinder, IR marker, Communications relay and AIS also integrated.
- Powerplant: 8 HP reciprocating engine with EFI, burning JP-5, JP-8 heavy fuels
- Launch/recovery: cat/SkyHook vertical wire
- Remarks: Developed for a US Navy requirement for a small tactical unmanned aircraft system capable of operating from land and sea.

AVIATION INDUSTRY CORPORATION OF CHINA (AVIC)

Wing Loong I

- Length: 9.05m
- Span: 14m
- Maximum take-off weight: 1,100kg
- Range: 4,000km
- Endurance: 20 hrs
- Speed: 150kts
- Altitude: 16,000ft
- Payload capacity: 200kg on pylons, 100kg for sensors
- Remarks: MALE-class armed reconnaissance UAV in service with the armed forces of China, Egypt, Kazakhstan, Saudi Arabia, Serbia, Turkmenistan, and United Arab Emirates

Wing Loong II

- Length: 11m
- Span: 20.5m
- Maximum take-off weight: 4,200kg
- Range: 4,500nm (estimate based on 140kts cruise & endurance)
- Endurance: 32hrs
- Speed: 200kts max, 81kts min
- Altitude: 32,500ft
- Payload capacity: 480kg on external stores
- Remarks: MALE-class armed reconnaissance UAV in service with the armed forces of China, Egypt, Nigeria, Saudi Arabia, and United Arab Emirates

Yunying

- Length: 14.3m
- Span: 25m
- Maximum take-off weight: 10,000–12,000kg (estimate)
- Range: 7,000km (estimate)
- Endurance: 10hrs (estimate)
- Speed: 405kts cruise
- Altitude: 59,000ft
- Payload Capacity: 650kg (estimate)
- Powerplant: Single WP-13 turbojet engine
- Remarks: HALE-class reconnaissance UAV broadly comparable with US Global Hawk, in service with the PLAAF

Xianglong

- Length: 14.3m
- Span: 25m
- Maximum take-off weight: 10,000–12,000kg (estimate)
- Range: 7,000km (estimate)
- Endurance: 10hrs (estimate)
- Speed: 405kts cruise
- Altitude: 59,000ft
- Payload Capacity: 650kg (estimate)
- Powerplant: Single WP-13 turbojet engine
- Remarks: HALE-class reconnaissance UAV broadly comparable with US Global Hawk, in service with the PLAAF
### CHINA AEROSPACE SCIENCE AND TECHNOLOGY CORPORATION (CASC)

**Cai Hong 4**
- **Length:** 8.5m
- **Span:** 18m
- **Maximum take-off weight:** 1,330kg
- **Endurance:** 40hrs
- **Altitude:** 23,600ft
- **Payload capacity:** 345kg
- **Armaments:** AR-1, AR-1B, AR-2 air-to-surface anti-armour missiles, CS/BBE2 high-explosive bomb, and LS-6-50 small-diameter bomb, and FT-series precision bombs.
- **Powerplant:** 100hp piston engine, pusher propeller
- **Launch/recovery:** Conventional
- **Remarks:** MALE-class armed reconnaissance UAV in service with the armed forces of Algeria, Egypt, Indonesia, Nigeria, Saudi Arabia

**Cai Hong 5**
- **Length:** 11.3m
- **Span:** 21m
- **Maximum take-off weight:** 3,300kg
- **Endurance:** 40+hrs
- **Altitude:** 23,600+ft
- **Payload capacity:** 1,200 kg (200 kg internal, 1,000kg external)
- **Armaments:** AR-1, AR-1B, AR-2 air-to-surface anti-armour missiles, CS/BBE2 high-explosive bomb, and LS-6-50 small-diameter bomb, FT-series precision bombs, undisclosed 100 kg-class laser guided bombs.
- **Powerplant:** 300hp piston engine, pusher propeller
- **Launch/recovery:** Conventional
- **Remarks:** MALE-class armed reconnaissance UAV for domestic and export customers.

**Cai Hong 7**
- **Length:** 10m
- **Span:** 22m
- **Maximum take-off weight:** 13,000kg
- **Endurance:** 10+hrs
- **Altitude:** 42,650ft
- **Powerplant:** Single turbofan engine
- **Launch/recovery:** Conventional
- **Remarks:** HALE-class low-observable unmanned combat aerial vehicle in development

### DENEL DYNAMICS

**Seeker 400**
- **Length:** 5.77m
- **Span:** 10m
- **Maximum take-off weight:** 450kg
- **Endurance:** 16hrs
- **Altitude:** 18,000ft
- **Payload:** 100kg
- **Payload options:** Dual imaging EO/IR payloads with gimbal diameters of up to 530mm with day TV, thermal imaging, colour/monochrome spotter camera, night spotter camera, Laser illuminator and LRF, electronic intelligence payload.
- **Powerplant:** 1 x 85hp two-cylinder, air-cooled 4-str engine
- **Launch/recovery:** conv/conv
- **Remarks:** Seeker 400 is an evolution of the battle-proven Seeker II UAS. Operational in Algeria.

**Hermes 450**
- **Length:** 5.7m
- **Span:** 10.5m
- **Maximum take-off weight:** 550kg
- **Endurance:** 17hrs
- **Altitude:** 18,000ft
- **Payload capacity:** 180kg
- **Armaments:** EO/IR, SAR/GMTI & maritime patrol radars plus AIS, ELINT, EW, COMINT, COMJAM.
- **Powerplant:** 1 x 52 hp UAV Engines R802/902 rotary
- **Launch/recovery:** conv/conv
- **Remarks:** Multi-role, high-performance tactical UAS operational worldwide.
### UAV Listing

<table>
<thead>
<tr>
<th>Model</th>
<th>Length</th>
<th>Maximum take-off weight</th>
<th>Span</th>
<th>Range</th>
<th>Speed (max)</th>
<th>Cruise</th>
<th>Endurance</th>
<th>Altitude</th>
<th>Payload capacity</th>
<th>Options</th>
<th>Users</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hermes 900 Starliner</td>
<td>8.8m</td>
<td>1,600kg</td>
<td>17m</td>
<td>2,500km estimate</td>
<td>119kts</td>
<td>60kts</td>
<td>30-36hrs</td>
<td>30,000ft</td>
<td>350kg</td>
<td>Leonardo Gabianno T-200 maritime &amp; SAR/GMTI radar, AIS, Elbit D-CoMPASS EO/IR/Laser turret, AES 210 V – ESM/ELINT, Skyfix/Skyjam – COMINT/DF &amp; optional COMJAM system and a communications relay. Used by Israeli Air Force with exports to Brazil and other Latin American countries.</td>
<td>Users include the Israeli Air Force, with exports to Brazil and other Latin American countries.</td>
</tr>
</tbody>
</table>

**Powerplant:** 1 × 115hp Rotax 914 4-str engine
**Launch/recovery:** conv/conv
**Remarks:** Next-generation MALE UAS equipped with a variety of high-performance sensors to detect ground or maritime targets over a wide spectral range.

<table>
<thead>
<tr>
<th>Model</th>
<th>Length</th>
<th>Maximum take-off weight</th>
<th>Span</th>
<th>Range</th>
<th>Speed (max)</th>
<th>Cruise</th>
<th>Endurance</th>
<th>Altitude</th>
<th>Payload capacity</th>
<th>Options</th>
<th>Users</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hermes 900</td>
<td>8.8m</td>
<td>1,180kg</td>
<td>15m</td>
<td>2,500km estimate</td>
<td>119kts</td>
<td>60kts</td>
<td>30-36hrs</td>
<td>30,000ft</td>
<td>450kg</td>
<td>Leonardo Gabianno T-200 maritime &amp; SAR/GMTI radar, AIS, Elbit D-CoMPASS EO/IR/Laser turret, AES 210 V – ESM/ELINT, Skyfix/Skyjam – COMINT/DF &amp; optional COMJAM system and a communications relay. Used by Israeli Air Force with exports to Brazil and other Latin American countries.</td>
<td>Users include Switzerland.</td>
</tr>
</tbody>
</table>

**Powerplant:** 1 × 115hp Rotax 914 4-str engine
**Launch/recovery:** conv/conv
**Remarks:** Next-generation MALE UAS qualified for flight in and transit through civilian airspace.

---

**Under the auspices of the PRESIDENCY OF THE REPUBLIC OF TÜRKİYE**

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**ISTANBUL EXPO CENTER**

**THE MOST IMPORTANT DEFENCE & AEROSPACE EXHIBITION IN THE REGION**

THIS EXHIBITION IS ORGANIZED WITH THE AUDIT OF TÖRR (THE UNION OF CHAMBERS AND COMMODITY EXCHANGES OF TURKEY) IN ACCORDANCE WITH THE LAW NO.5174.
**Rheinmeta 11 Luna**

- **Length**: 3.0m
- **Span**: 5.3m
- **Maximum take-off weight**: 110kg
- **Endurance**: > 12hrs
- **Speed**: 48.5kts
- **Range**: > 100km data
- **Altitude**: > 16,000ft
- **Payload**: Tilted sensor platform with up to 7 colour and IR zoom video, hyperspectral, pilot colour video, SAR/GMTI, SIGINT-sensors, ESM, CBRN. Optional sensors: Data link relay for BLOS operations, encryption, GCS hand-off function, transponder.
- **Powerplant**: 1 x 10 kW, fuel-injected multi-fuel engine
- **Launch/recovery**: cat/para or net
- **Remarks**: Purchased by the German Army.

---

**Aladin**

- **Length**: 1.57m
- **Span**: 1.46m
- **Maximum take-off weight**: < 4kg
- **Endurance**: > 1hr
- **Speed**: 21.5-38kts
- **Range**: 25km with comms link, 50km off line
- **Altitude**: 98ft AGL minimum, 30-90ft typical, 14,700ft density alt max
- **Payload**: Daylight: 4 x colour CCD video cameras: 1 pilot view, 2 x downward looking, 1 downward looking on left side used in circling mode, plus high-res forward looking zoom camera, 2 x daylight video cameras. Night: 1 x IR video, 1 x colour video CCD camera
- **Powerplant**: battery & electric motor driving tractor propeller
- **Launch/recovery**: hand or cat/auto
- **Remarks**: High performance mini UAV in operational service with several NATO countries.

---

**Eleron-3SV (T-28 air vehicle)**

- **Length**: 1.57m
- **Span**: 1.46m
- **Maximum take-off weight**: < 4kg
- **Endurance**: > 1hr
- **Speed**: 21.5-38kts
- **Altitude**: 98ft AGL minimum, 30-90ft typical, 14,700ft density alt max
- **Payload**: Daylight: 4 x colour CCD video cameras: 1 pilot view, 2 x downward looking, 1 downward looking on left side used in circling mode, plus high-res forward looking zoom camera, 2 x daylight video cameras. Night: 1 x IR video, 1 x colour video CCD camera
- **Powerplant**: battery & electric motor driving tractor propeller
- **Launch/recovery**: hand or cat/auto
- **Remarks**: High performance mini UAV in operational service with several NATO countries.

---

**Eleron-10SV (T-10 air vehicle)**

- **Length**: 8.7m
- **Span**: 2.2m
- **Maximum take-off weight**: 12kg
- **Endurance**: 2hrs 30min
- **Speed**: 30-70kts
- **Altitude**: > 16,000ft
- **Payload**: 3-axis stabilised turret with a 10x optical magnification-enabled video camera and digital photo camera with minimum 10.2mpix resolution. Option 2: Stabilised turret with 10x thermal imaging and video camera. Digital camera with minimum 10.2Mp resolution.
- **Powerplant**: battery & electric motor driving pusher propeller
- **Launch/recovery**: cat/para
- **Remarks**: Larger member of Eleron range. Used by Russian Ground Forces for local ISR.

---

**Black Hornet PRS/VRS**

- **Length**: 12cm
- **Rotor diameter**: 12cm
- **Maximum take-off weight**: < 33g
- **Endurance**: 25min
- **Speed**: 12kts
- **Altitude**: > rooftop
- **Payload**: Day: 2 x EO cameras, 1 video, 1 high-res snapshot. Night: fused thermal and EO.
- **Powerplant**: battery & electric motor driving two-blade main and tail rotors
- **Launch/recovery**: VTOL
- **Remarks**: Personal/vehicle reconnaissance system. Vehicle launch unit mounts externally and fully integrates within vehicle.
### General Atomics Aeronautical Systems

**Reaper Block 5**
- **Length**: 11m
- **Span**: 20m
- **Maximum take-off weight**: 4,763kg
- **Range**: LOS/global
- **Endurance**: 27hrs
- **Speed**: 240kts max
- **Altitude**: 50,000ft MSL
- **Payload Capacity**: 1,701kg (386kg internal, 1,361kg external, not simultaneous)
- **Payloads**: MTS-B EO/IR, Lynx multi-mode radar, maritime radar, SIGINT/ESM system, Automatic Identification System (AIS), comms relay, dual ARC-210 UHF/VHF radios, other customer specific payloads.
- **Weapons**: Hellfire missiles, GBU-12, GBU-38, GBU-49 smart bombs
- **Powerplant**: Honeywell TPE331-10 turboprop 3-blade propeller
- **Launch/recovery**: conv/conv
- **Remarks**: Operated by: USAF, US Homeland Security, Australia, France, Italy, Netherlands, Spain, UK to be replaced by Protector RG Mk1. Ordered by India.

### Gray Eagle Extended Range
- **Length**: 9m
- **Span**: 17m
- **Maximum take-off weight**: 1,905kg
- **Range**: LOS/global (comms)
- **Endurance**: 42hrs
- **Speed**: 167kts
- **Altitude**: 29,000ft
- **Payload Capacity**: 261kg internal, 227kg external. EO/IR, SAR/GMTI radar, communications relay.
- **Powerplant**: HFE-180 HP heavy-fuel engine
- **Launch/recovery**: conv/conv
- **Remarks**: Open, modular architecture supports integration of three payloads simultaneously, with capacity for growth.

### SkyGuardian
- **Length**: 11.7m
- **Span**: 24m
- **Maximum take-off weight**: 5,670kg
- **Range**: LOS/global
- **Endurance**: 40hrs
- **Speed**: 210kts
- **Altitude**: 40,000+ ft
- **Payload Capacity**: 363kg internal, 1814kg external. Raytheon MTS-B EO/IR, GA-ASI Lynx multi-mode radar, VHF/UHF certified radios
- **Powerplant**: Honeywell TPE331-10 turboprop driving pusher propeller
- **Launch/recovery**: conv/conv
- **Remarks**: Selected by UK as Protector RG Mk1, and Belgium.

### Ababil-3
- **Length**: 3.5m
- **Span**: 5m
- **Maximum take-off weight**: 83kg
- **Speed**: 108kt
- **Endurance**: 4h
- **Ceiling**: 16,500ft
- **Payload**: 40kg
- **Powerplant**: 25hp WAE-342 twin-cylinder piston engine
- **Launch/recovery**: conv/conv
- **Remarks**: Iranian tactical UAV.

### Shahed-129
- **Length**: 8m
- **Span**: 16m
- **Speed**: 8kt
- **Endurance**: 24h
- **Ceiling**: 24,000ft
- **Payload**: 400kg including Oghab-6 EO/IR sensor
- **Powerplant**: Rotax 914 Twin piston engine.
- **Launch/recovery**: conv/conv
- **Remarks**: Iranian armed MALE. The naval version is called Simorgh.
INdRa

Length: 3.4m
Maximum take-off weight: 200kg
Endurance: 4-6hrs
Speed: 100kts
Altitude: 11,811ft
Payload: 30kg
Gyro-Stabilised MMP EO/thermal camera, Automatic Identification System (AIS)
Powerplant: Heavy fuel engine burning JP5
Launch/recovery: VTOL
Remarks: Maritime unmanned helicopter designed to support surveillance and law enforcement tasks from a ship or a ground base.

Fotros

Length: 14m
Maximum take-off weight: 5,670kg
Endurance: > 30hrs
Speed: 220 kts
Altitude: > 35,000ft
Payload: 2,700kg, EO/IR/LRF/LD, synthetic aperture and maritime patrol radar, ELINT/COMINT, ESM and additional capabilities of payloads.
Powerplant: 1,200hp Pratt & Whitney Canada PT6 Turboprop driving pusher propeller
Launch/recovery: conv/conv, automatic takeoff and landing system (ATOL)
Remarks: Turbine-powered MALE UAV with large internal volume for a variety of payloads, certified to STANAG 4671 and compatible with NATO standards.

Searcher Mk III

Length: 5.85m
Span: 8.55m
Maximum take-off weight: 450kg
Range: 350km
Endurance: 20hrs
Speed: 110kts max, 60-80 kts loiter
Altitude: 21,000ft service ceiling
Payload: 120kg, EO/IR or SAR/GMTI or SIGINT, aerial data relay
Powerplant: Jabiru 4-str “silent” piston engine
Launch/recovery: conv/conv
Remarks: Offers multiple operational configurations, operates in extreme weather, fully redundant avionics.

Pelican

Length: 8.5m
Maximum take-off weight: 1.350kg
Endurance: 45hrs
Speed: 140kts max, 60-80kts loiter
Payload capacity: 470kg
Payloads: New configuration include long-range EO systems and radars plus a wide range of additional payloads: ELINT/COMINT/ESM, communication relay, special etc
Powerplant: 1x 135 HP Rotax 915ls B Certified electronic-controlled fuel injection engine
Launch/recovery: conventional runway automatic take-off and landing system
Remarks: Updated version of Heron enabling new configurations with long-range observation sensors and radars.

Heron TP

Length: 14m
Maximum take-off weight: 5,670kg
Endurance: > 30hrs
Speed: 220 kts
Altitude: > 35,000ft
Payload: 2,700kg, EO/IR/LRF/LD, synthetic aperture and maritime patrol radar, ELINT/COMINT, ESM and additional capabilities of payloads.
Powerplant: 1,200hp Pratt & Whitney Canada PT6 Turboprop driving pusher propeller
Launch/recovery: conv/conv, automatic takeoff and landing system (ATOL)
Remarks: Turbine-powered MALE UAV with large internal volume for a variety of payloads, certified to STANAG 4671 and compatible with NATO standards.

Heron Mk2

Length: 8.5m
Maximum take-off weight: 1.350kg
Endurance: 45hrs
Speed: 140kts max, 60-80kts loiter
Payload capacity: 470kg
Payloads: New configuration include long-range EO systems and radars plus a wide range of additional payloads: ELINT/COMINT/ESM, communication relay, special etc
Powerplant: 1x 135 HP Rotax 915ls B Certified electronic-controlled fuel injection engine
Launch/recovery: conventional runway automatic take-off and landing system
Remarks: Updated version of Heron enabling new configurations with long-range observation sensors and radars.

IRaN aVIaTIoN INdUSTRIES oRGaNISaTIoN

Length: 9m
Span: 21m
Maximum take-off weight: 1,000kg
Speed: 117kt
Endurance: 30h
Ceiling: 45,000ft
Payload: 200kg EO/IR sensor
Launch/recovery: conv/conv
Remarks: The largest Iranian armed MALE UAV.
Yasir

- Length: 1.19m
- Span: 3.05m
- Maximum take-off weight: 26.5kg
- Speed: 65kts
- Endurance: 8h
- Ceiling: 15,000ft
- Payload: 10kg EO/IR sensor
- Powerplant: Two-bladed propeller piston engine
- Launch/recovery: cat/sky-net
- Remarks: Iranian copy of the Insitu Scan Eagle.

Orion-E

- Span: 16m
- Maximum take-off weight: 1,000kg
- Speed: 65kts
- Endurance: 24h
- Ceiling: 24,600ft
- Payload: 200kg including an optoelectronic station with two thermal imagers, a wide-angle TV camera and a laser rangefinder/target designator
- Launch/recovery: conv/conv
- Remarks: First Russian armed MALE UAV, undertook combat evaluation in Syria.

AW159

- Length: 3.7m
- Span: 7.2m
- Maximum take-off weight: 200g
- Range: > 200km
- Endurance: 8-14hrs
- Speed: 17kts
- Altitude: > 16,400ft
- Payload: 70kg. EO/IR turret with laser designator, SAR/GMTI radar, multi-mode surveillance radar, AIS, ESM/COMINT, comms relay, hyperspectral imager.
- Powerplant: 65hp gasoline engine
- Launch/recovery: conv/conv
- Remarks: Medium altitude, medium endurance tactical UAV intended for surveillance missions.

Falco Xplorer

- Length: 9m
- Span: 18.5m
- Maximum take-off weight: 1300kg
- Range: comms range unlimited (satcom)
- Endurance: > 24hrs
- Altitude: > 30,000ft service ceiling
- Payload: Gabbiano T80UL multimode synthetic aperture radar mapping, ground moving target indication. EO turret up to 20-in diameter, visual/IR/laser rangefinder, laser marker and optional laser designator. ELINT or COMINT suite, AIS
- Launch/recovery: conv/conv
- Remarks: Large UAV to be offered as both an integrated platform and as a fully-managed information-superiority service to military and civil customers, designed for civil certification First flight 15 January 2020.
**LOCKHEED MARTIN**

Desert Hawk III

- **Span**: 1.5m
- **Maximum take-off weight**: 3.72kg
- **Range**: 
- **Endurance**: 1.5hrs
- **Speed**: 50kts
- **Altitude**: 11,000ft
- **Payload**: 0.9kg. Includes 360-degree colour EO and IR video camera systems, plus other interchangeable, snap-on “Plug and Playloads”
- **Powerplant**: battery & electric motor driving tractor propeller
- **Launch/recovery**: hand/conv skid
- **Remarks**: Small UAS that provides day and night support to small unit ISTAR and related operations.

**Stalker XE**

- **Span**: 3.66m
- **Maximum take-off weight**: 10.9kg
- **Range**: 370 km (aircraft), 93km comms
- **Endurance**: > 8hrs
- **Speed**: 30.4kts cruise, 30kts dash
- **Altitude**: 12,000ft max launch alt
- **Payload capacity**: 2.5kg, EO/IR with cursor-on-target, integrated tracker with scene lock moving target tracking, auto-track and follow navigation
- **Powerplant**: solid oxide propane fuel cell & electric motor driving tractor propeller
- **Launch/recovery**: cat/conv glide, VTOL option
- **Remarks**: VTOL capability provided by four electric motors driving vertical propellers mounted in pairs mid-span

**RQ-170 Sentinel**

- **Length**: 4.5m
- **Span**: 19.99m
- **Maximum take-off weight**: 3,850kg
- **Speed**: 108kts
- **Endurance**: 25h
- **Ceiling**: 15,000ft
- **Payload**: 100kg including an EO/IR sensor and possibly an AESA radar
- **Powerplant**: Garrett TFE731 turbofan engine
- **Launch/recovery**: conv/conv
- **Remarks**: Classified stealthy HALE UAV

**NORTHROP GRUMMAN**

MQ-8C Fire Scout

- **Length**: 12.6m
- **Span**: 10.7m dia
- **Maximum take-off weight**: 2,722 kg
- **Range**: 278km radius from ship, 2,556km) estimate based on endurance & cruise speed
- **Speed**: 155kts max, 115kts cruise
- **Altitude**: 15,000ft
- **Payload capacity**: 318kg
- **Payloads**: EO/IR/LRF, comm relay, AIS, maritime radar (future), COBRA mine detector (future). Multiple payloads and configuration available
- **Powerplant**: Rolls-Royce 250-C47E turboshaft engine driving main and tail rotors
- **Launch/recovery**: automatic VTOL
- **Remarks**: US Navy declared the MQ-8C mission capable and ready to deploy aboard Littoral Combat Ships in 2021
<table>
<thead>
<tr>
<th>UAV Name</th>
<th>Length</th>
<th>Span</th>
<th>Maximum take-off weight</th>
<th>Range</th>
<th>Endurance</th>
<th>Speed</th>
<th>Altitude</th>
<th>Payload capacity</th>
<th>Payloads</th>
<th>Powerplant</th>
<th>Launch/recovery</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Global Hawk</td>
<td>14.5m</td>
<td>39.8m</td>
<td>14,628kg</td>
<td>22,780km (ferry)</td>
<td>&gt; 34hrs</td>
<td>310 kts</td>
<td>60,000ft</td>
<td>1,360kg</td>
<td>All-weather synthetic aperture, radar/moving target indicator, high-resolution electro-optical (EO) digital camera, and a third-generation infrared (IR) sensor working through common signal processor</td>
<td>Rolls-Royce AE3007 turbofan generating up to 3,856 kg thrust</td>
<td>conventional</td>
<td>HALE UAV in service with USAF since 2001. Gathers near-real-time, high-resolution imagery of large areas of land. 24/7. EQ-4B version carries the Battlefield Airborne Communications Node (BACN) payload.</td>
</tr>
<tr>
<td>Triton</td>
<td>14.5m</td>
<td>39.9m</td>
<td>14,630kg</td>
<td>15,186km (ferry)</td>
<td>30hrs</td>
<td>320 kts</td>
<td>56,500ft</td>
<td>1,452kg max internal, 1,089kg external</td>
<td>Multi-Function Active Sensor Active Electronically Steered Array (MFAS AESA) radar, MTS-B multi-spectral targeting system</td>
<td>Rolls-Royce AE3007 turbofan generating up to 8,500 lbs thrust</td>
<td>conventional</td>
<td>Developed under the US Navy’s Broad Area Maritime Surveillance programme, Triton’s role is to provide ISR over vast ocean and coastal regions, conduct search and rescue missions, and to complement the P-8 Poseidon MP A.</td>
</tr>
<tr>
<td>Yarara</td>
<td>2.465m</td>
<td>3.98m</td>
<td>35kg</td>
<td>&gt; 50 km LOS link range</td>
<td>6hrs</td>
<td>90kts max</td>
<td>9,843ft</td>
<td>5.5kg</td>
<td>IAI MicroPOP EO/IR turret</td>
<td>1 x 8hp Cubewano Sonic 35 multi-fuel rotary engine driving 3-blade pusher propeller mounted above the wing.</td>
<td>conventional, unprepared runway</td>
<td>Operated by the Argentinian Air Force, system comprises three UAVs, GCS and support equipment in three boxes weighting less than 250kg.</td>
</tr>
<tr>
<td>Mohajer-4B</td>
<td>3.75m</td>
<td></td>
<td>242kg</td>
<td></td>
<td>6h</td>
<td>110kts</td>
<td>15,000ft</td>
<td>250kg</td>
<td>Safran Euroflir 410 EO/IR turret plus COMINT, SIGINT, radar and other sensors.</td>
<td>1 x 115hp Rotax 914F 4-cyl turbocharged liquid cooled engine</td>
<td>cat/para</td>
<td>Iranian tactical UAV.</td>
</tr>
<tr>
<td>Patroller</td>
<td>8.5m</td>
<td>18m</td>
<td>200 m LOS</td>
<td></td>
<td>20hr</td>
<td>110kts max</td>
<td>20,000ft</td>
<td>250kg</td>
<td>Safran Euroflir 410 EO/IR turret plus COMINT, SIGINT, radar and other sensors.</td>
<td>1 x 115hp Rotax 914F 4-cyl turbocharged liquid cooled engine</td>
<td>conv/conv</td>
<td>The French Army has 14 on order, was due to receive the first 5 at the end of 2019, 14 in 2020 and two more in 2024. No deliveries yet reported.</td>
</tr>
<tr>
<td>Model</td>
<td>Description</td>
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</tbody>
</table>
| S-70 Okhotnik-B | Length: 14m  
Span: 20m  
Maximum take-off weight: 20,000kg  
Speed: 432kt  
Range: 5,000km  
Payload: 2,000kg weapons carried in internal weapons bay  
Powerplant: Saturn AL-31F turbofan  
Launch/recovery: conv/conv  
Remarks: Russian advanced strike UAV. |
| Orlan-10 | Length: 1.8m  
Span: 3.1m  
Maximum take-off weight: 18.7kg  
Speed: 92kt  
Endurance: 4h  
Ceiling: 16,404ft  
Payload: 6kg  
Powerplant: Piston engine  
Launch/recovery: cat/para  
Remarks: Developed for ISR, protection & monitoring missions in military and civil applications. Currently deployed by the French Army and Navy, overseas land & naval forces, SOF, police & gendarmerie. |
| Tracker 120 | Length: 1.54m  
Maximum take-off weight: 8.7kg  
Speed: 17 to 25 m/sec  
Altitude: 985ft cruise, 8,200ft max  
Payload capacity: 1.1kg  
Payloads: T120 gyrostabilised EO/IR turret  
Powerplant: battery & 2 x electric motors driving twin tractor propellers  
Launch/recovery: hand/belly landing  
Remarks: Designed for ISR, coastal surveillance, convoy protection, monitoring of sensitive areas |
| Camcopter S-100 | Length: 3.1m  
Span: 3.4m rotor diameter  
Maximum take-off weight: 200kg  
Range: 50,100 or 200km data link range  
Endurance: >6hrs with 34kg payload, >10hrs with external fuel  
Speed: 120kts dash, 55kts estimate endurance  
Altitude: 18,000ft  
Payload capacity: 50kg  
Payloads: EO/IR gimbals standard, with wide area search sensors, Synthetic Aperture Radar (SAR), Light Detection and Ranging (LIDAR) scanners, Signal Intelligence (SIGINT) & Communication Intelligence (COMINT), communications relays, loudspeakers, transponders, dropping containers and under-slung loads as options.  
Powerplant: 50hp rotary engine  
Launch/recovery: VTOL  
Remarks: Delivered to 35 customers worldwide. |
| Aliaca | Length: 1.85m  
Maximum take-off weight: 12kg  
Speed: 52kts  
Altitude: 9,843ft  
Payload capacity: 1.1kg  
Payload: T120 gyrostabilised EO/IR turret  
Powerplant: battery & 1 electric motor driving a single tractor propeller  
Launch/recovery: cat/belly  
Remarks: Designed for ISR, protection & monitoring missions in military and civil applications. Currently deployed by the French Army and Navy, overseas land & naval forces, SOF, police & gendarmerie. |
### DFV 2000 ER

- **Length:** 2.27m
- **Span:** 3.3m
- **Maximum take-off weight:** 22.5kg
- **Speed:** 65kts
- **Altitude:** 32,300ft
- **Payload capacity:** 2kg
- **Powerplant:** 1 x fuel-injected 2-str engine
- **Launch/recovery:** cat/conv
- **Remarks:** Designed for military and civilian intelligence, surveillance and inspection missions

### AR3 Net Ray

- **Length:** 1.7m
- **Span:** 3.5m
- **Maximum take-off weight:** 23kg
- **Speed:** 65kt
- **Endurance:** 16h
- **Payload:** 4kg including EO/IR sensor
- **Remarks:** An optional VTOL capability with dual side-looking SAR called GAMASAR is available.

### Shadow V2

- **Length:** 2.1m
- **Span:** 3.6m
- **Maximum take-off weight:** 47kg
- **Endurance:** 10hrs with multi-INT payload
- **Speed:** 65kts
- **Altitude:** 10,500ft density altitude with multi-INT payload
- **Payload capacity:** 6.8kg
- **Powerplant:** Lycoming EL-005 two-stroke Heavy Fuel Engine plus 4 electric vertical rotors
- **Launch/recovery:** VTOL
- **Remarks:** Runway independent development of Aerosonde

### Aerosonde Hybrid Quadrotor (HQ)

- **Length:** 3.66m
- **Span:** 26.2m
- **Maximum take-off weight:** 212kg
- **Endurance:** 9hrs
- **Speed:** 62-65kts / Max 98kts dependent on mission profile
- **Altitude:** 18,000ft ceiling, 10,000ft max take-off elevation
- **Payload capacity:** 43kg
- **Payloads:** EO/IR, communications relay, optional laser designation, etc.
- **Powerplant:** UA V Engines model 741 rotary engine
- **Launch/recovery:** cat/conv, arrested
- **Remarks:** Operators of this and earlier versions include the US Army, US Marine Corps, the Australian Army, the Italian Army, and the Swedish Army

### Tactical (Watchkeeper)

- **Length:** approx 5.7m
- **Maximum take-off weight:** 550kg
- **Endurance:** 16hrs
- **Altitude:** 16,000ft
- **Payloads:** Elbit Compass turret with visual, Infra-Red (IR) laser rangefinder and designator, Thales I-Master SAR/GMTI radar, radio relay, COMINT. Principal operator is the British Army.
- **Powerplant:** Powerplant: 1 x 52hp UAV Engines R802/902 rotary engine
- **Launch/recovery:** conv/conv
- **Remarks:** Based on Elbit Hermes 450, Watchkeeper is British Army tactical UAV system, latest version offered for export by Thales is Watchkeeper X

### THALES

- **Length:** approx 5.7m
- **Span:** 10.5m
- **Maximum take-off weight:** 200kg
- **Endurance:** 16hrs
- **Speed:** 95kts
- **Altitude:** 15,000ft
- **Payload capacity:** 350kg
- **Powerplants:** 2 x 52hp UAV Engine R802/902 rotary engine
- **Launch/recovery:** conv/conv
- **Remarks:** Based on Elbit Hermes 450, Watchkeeper is British Army tactical UAV system, latest version offered for export by Thales is Watchkeeper X
<table>
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<tr>
<th><strong>Spy’Ranger</strong></th>
<th><strong>UAV FACTORY</strong></th>
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<th><strong>UWCA</strong></th>
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<tr>
<td>Length: 1.76m (estimate)</td>
<td><strong>Penguin C</strong></td>
<td>Length: 4.031m</td>
<td><strong>Forpost</strong></td>
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<tr>
<td>Span: 3.9m</td>
<td></td>
<td>Rotor diameter: 4.6m</td>
<td></td>
</tr>
<tr>
<td>Maximum take-off weight: 14kg</td>
<td></td>
<td>Speed: 81kts</td>
<td>Length: 5.85m</td>
</tr>
<tr>
<td>Endurance: 3hrs</td>
<td></td>
<td>Altitude: 12,000ft</td>
<td>Span: 8.55m</td>
</tr>
<tr>
<td>Speed: 49kts</td>
<td></td>
<td>payloads: Optional payloads: advanced EO/IR turrets, Sentient Vision</td>
<td>Maximum take-off weight: 450kg</td>
</tr>
<tr>
<td>Altitude: 14,764ft (t/o)</td>
<td></td>
<td>Vidar, SAR/GMTI radar, hyper-spectral and multi-spectral cameras,</td>
<td>Speed: 80kt</td>
</tr>
<tr>
<td>Payload: 1.2kg</td>
<td></td>
<td>comms relay systems</td>
<td>Endurance: 8h</td>
</tr>
<tr>
<td>Powerplant: battery &amp; DC brushless electric motor</td>
<td></td>
<td>Powerplant: Limbach L550 piston engine</td>
<td>Ceiling: 23,000ft</td>
</tr>
<tr>
<td>Launch/recovery: cat/belly</td>
<td></td>
<td>Launch/recovery: conv/conv</td>
<td>Payload: 120kg</td>
</tr>
<tr>
<td>Remarks: French Army acquired a fleet of 210 Spy’Rangers for reconnaissance and observation missions</td>
<td></td>
<td>Remarks: Russian license-built IAI Searcher III tactical UAV.</td>
<td></td>
</tr>
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</table>

| **Length:** 2.3m | **Maximum take-off weight:** 22.5kg | **Span:** 3.3m | **Speed:** 62kt |
| **Endurance:** 20h | | **Ceiling:** 16,400ft | **Endurance:** 7 hours |
| **Payload:** 10kg including Single sensor gyro-stabilized gimbal with Epsilon 135 EO sensor | | **Powerplant:** 28hp EFI piston engine | **Range:** 500km |
| **Powerplant:** 28hp EFI piston engine | | **Launch/recovery:** cat/para | **Launch/recovery:** VTOL PD-2 |
| Remarks: US/Latvia manufactured long-endurance mini-UAV ordered by the Latvian National Armed Forces. | | Remarks: Can be converted to the VTOL PD-2 in 15 minutes. | |

| **Span:** 4m | **Maximum take-off weight:** 40kg |
| **Speed:** 72km/hr | | **Endurance:** 5 hours with 20kg payload at ISA |
| **Range:** 500km | | **Altitude:** 12,000ft |
| **Ceiling:** 3,000m | | **Powerplant:** 1x 54hp Hirth heavy fuel engine running on Jet A1, JP5 & JP8 |
| **Payload:** 10kg including USG-212 EO/IR gimbal or USG-211 EO gimbal. | | **Launch/recovery:** VTOL |
| **Powerplant:** 61cc 2-cylinder 4-stroke engine with 100 W electric generator system | Remarks: Maritime unmanned helicopter with open interface to battlefield management and C4ISR systems, STANAG 4586 compliance for ease of integration into ships. Bidding for the Polish Navy programme. |

| **Length:** 4.031m | **Rotor diameter:** 4.6m |
| **Maximum take-off weight:** 235kg | | **Endurance:** > 5 hr with 20kg payload at ISA |
| **Speed:** 81kts | | **Altitude:** 12,000ft |
| **Payloads:** Optional payloads: advanced EO/IR turrets, Sentient Vision Vidar, SAR/GMTI radar, hyper-spectral and multi-spectral cameras, comms relay systems | | **Launch/recovery:** VTOL |
| **Powerplant:** 1x 54hp Hirth heavy fuel engine running on Jet A1, JP5 & JP8 | Remarks: Maritime unmanned helicopter with open interface to battlefield management and C4ISR systems, STANAG 4586 compliance for ease of integration into ships. Bidding for the Polish Navy programme. |
**VESTEL DEFENSE INDUSTRY**

**Karayel**
- **Length:** 2.8m
- **Span:** 3.3m
- **Maximum take-off weight:** 26 kg
- **Range:** 50km
- **Altitude:** 14,763ft
- **Powerplant:** Piston engine, pusher propeller
- **Launch/recovery:** Conventional
- **Remarks:** Mini-class reconnaissance UAV in service with the Vietnamese armed forces.

**VIETTEL**

**VT-Patrol**
- **Length:** 6.5m
- **Span:** 13m
- **Maximum take-off weight:** 630kg
- **Speed:** 80kt
- **Endurance:** 20h
- **Ceiling:** 12,000ft
- **Payload:** 70kg including EO/IR sensor
- **Powerplant:** 97hp piston engine.
- **Launch/recovery:** Conventional
- **Remarks:** Turkish armed MALE UAV designed and produced according to STANAG-4671. Is being built under license in Saudi Arabia.

**ZHONG TIAN GUIDE CONTROL TECHNOLOGY COMPANY**

**Fei Long-1**
- **Length:** 2.2m estimate
- **Span:** 20m estimate
- **Maximum take-off weight:** 3.200kg
- **Speed:** 125kt
- **Endurance:** 25h
- **Ceiling:** 26,245ft
- **Payload:** 70kg including EO/IR sensor
- **Powerplant:** Rear-mounted heavy fuel engine.
- **Launch/recovery:** Conv/conv
- **Remarks:** Chinese MALE designed to operate in China’s high altitude regions for border patrol and SAR missions.

**INDIA: DEFENCE RESEARCH AND DEVELOPMENT ORGANISATION (DRDO)**

**Rustom-2**
- **Length:** 9.5m
- **Span:** 20m
- **Maximum take-off weight:** 1,800kg
- **Speed:** 135kt cruise
- **Endurance:** 24hrs (estimate)
- **Altitude:** 35,000ft
- **Payload Capacity:** 350kg
- **Powerplant:** Two 100hp Saturn 36T turboprop engines, tractor propellers
- **Launch/recovery:** Conventional
- **Remarks:** MALE-class reconnaissance UAV being developed for the Indian armed forces.

**SOUTH KOREA: KOREAN AIR AEROSPACE DIVISION (KAL-ASD)**

**KUS-7/RQ-102**
- **Length:** 3.7m
- **Span:** 4.5m
- **Maximum take-off weight:** 150kg
- **Range:** N/A
- **Endurance:** 3hrs
- **Speed:** N/A
- **Altitude:** N/A
- **Payload Capacity:** N/A
- **Powerplant:** 35hp rotary engine, pusher propeller
- **Launch/recovery:** Conventional
- **Remarks:** Tactical-class reconnaissance UAV in service with the Republic of Korea Army.
**TaIWaN: NaTIoNaL cHUNG-ShaN INSTITUTE oF ScIENcE aNd TEcHNoLoGy (NcSIST)**

**KUS-FS/Mid-Altitude UAV (MUAV)**

- **Length:** 13m
- **Span:** 25m
- **Maximum take-off weight:** N/A
- **Endurance:** 24+ hrs
- **Altitude:** 42,650ft
- **Payload Capacity:** 150kg
- **Powerplant:** 1,200hp turboprop engine, pusher propeller
- **Launch/recovery:** Conventional
- **Remarks:** MALE-class reconnaissance UAV in development for the Republic of Korea Army Ground Operations Command

**KUS-FS/Mid-Altitude UAV (MUA V)**

- **Length:** 5.3m
- **Span:** 8.7m
- **Maximum take-off weight:** 450kg
- **Endurance:** 10hrs
- **Speed:** 97kts max level speed, 60kt cruise
- **Altitude:** 15,000ft
- **Payload Capacity:** 51kg
- **Powerplant:** Single piston engine, pusher propeller
- **Launch/recovery:** Conventional
- **Remarks:** Tactical-class reconnaissance UAV in service with the Republic of China Army and Navy

**Teng Yun (Cloud Rider)**

- **Length:** 8m
- **Span:** 18m
- **Range:** 1,000km+
- **Endurance:** 24hrs
- **Altitude:** 25,000ft
- **Powerplant:** Single turboprop engine, pusher propeller
- **Launch/recovery:** Conventional
- **Remarks:** MALE-class reconnaissance UAV in development for the Republic of China Air Force.

**THaILaNd: RV cOnNEx**

**RTAF U-1**

- **Length:** 6.2m
- **Span:** 15m
- **Range:** 100-150km
- **Endurance:** 6hrs
- **Altitude:** 10,000ft
- **Payload Capacity:** 30kg
- **Powerplant:** 25hp piston engine, pusher propeller
- **Launch/recovery:** Conventional
- **Remarks:** Tactical-class reconnaissance UAV in service with the Royal Thai Air Force, derived from Sky Scout UAV.

**ZaLa aERo GRoUP**

**ZALA 421-16E5G HD**

- **Length:** 1.85m
- **Span:** 4.64m
- **Maximum take-off weight:** 29.9kg
- **Endurance:** 12+ hr
- **Altitude:** 200-5000 m
- **Payloads:** Interchangeable ZALA payloads
  - Gyro-stabilized EO/IR HD sensors: Full HD video with 60-x optical zoom, 42Mp photo, HD thermal imager with 8x zoom, LiDAR, gas detector, dosimeter, relay module
  - Powerplant: Hybrid (buffer storage battery and combustion engine)
- **Launch:** Pneumatic catapult
- **Recovery:** Parachute, airbag
- **Remarks:** ZALA 421-16E5G is a serial hybrid powerplant that provides a guaranteed flight time of more than 12 hours.
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