Unmanned ambitions: European UAV developments

While Israel and the US retain their positions in the top tier regarding unmanned technology developments, Europe continues to drive forward its own efforts and multiple programmes are being closely observed by interested parties worldwide, Andrew White reports.

The unmanned industry continues to witness a widespread proliferation of technology across the globe, with defence and security organisations utilising systems for a variety of missions ranging from counter-insurgency and counter-terrorism through to intelligence, surveillance, target acquisition and reconnaissance (ISTAR).

However, an emphasis on utility across an ever-expanding spectrum of operations is seeing unmanned aerial vehicles (UAVs) re-roled yet further for humanitarian aid/disaster relief (HADR) missions and, in particular, monitoring the migration patterns of thousands of refugees seeking protection in Europe from North Africa and the Middle East.

MALE options

In the area of MALE technology Europe is witnessing a multitude of programmes, including the pan-European MALE 2020 project and numerous national efforts in France, Poland, and the United Kingdom.

The MALE 2020 programme, for which a declaration of intent was signed on 18 May, will encompass two years of feasibility and definition studies for a future European MALE platform. Potentially, this could be followed by a development contract allowing for delivery of a prototype in the early 2020s, defence sources suggested to IHS Jane’s.

Finmeccanica, Dassault Aviation, and Airbus Defence & Space (Airbus DS), with additional support from the European Defence Agency, are leading the effort to develop a European MALE system as a suitable alternative to US and Israeli variants such as the General Atomics Aeronautical Systems Inc (GA-ASI) Predator and Reaper aircraft and Elbit Systems’ Hermes series of airframes, both of which are currently employed by European armed forces.

Meanwhile, Thales has revealed plans to export its WK450 Watchkeeper tactical UAV following its introduction into service with the British Army. Speaking to IHS Jane’s at the Defence & Security Exhibition International (DSEI) event in London on 15 September, company sources confirmed the Watchkeeper X (WXX) variant had been offered up to both the French and Polish governments, both of which have published requirements for such a capability.
The British Army’s WK450 Watchkeeper UAS is being promoted in France and Poland for MALE requirements. (UK MoD)

The variant comprises the same Elbit Systems-derived Hermes 450 platform, with the addition of modular mission system packages dependent on the task required by commanders. These modules, according to Thales, could encompass combat operations, HADR, and internal security and maritime patrol capabilities, with individual sensor packages comprising "mobility, sensors, exploitation, and effecter" suites. Solutions can also be upgraded and scaled according to particular budgetary requirements of government agencies.

Similar to the British Army variant, the WKX is capable of carrying a dual payload, with options including the Thales I-Master radar system comprising synthetic aperture radar (SAR) and ground moving target indicator (GMTI) technology. The sensor can be used for all-weather ISTAR operations and is also capable of cueing targets to a supporting electro-optical/infrared (EO/IR) payload for positive identification. According to Thales, "I-Master provides an all-weather capability that dramatically increases Tactical UAV mission effectiveness. High-quality imaging is now possible in hostile environments, such as cloud and smoke. The ability to image at long stand-off ranges improves UAV survivability by distancing the air vehicle from potential ground fire."

Additionally, the WKX can be fitted with communications electronic support measures (CESM) as well as communications intelligence (COMINT) systems - indicative of the current appetite in the contemporary operating environment for tactical MALE UAVs. The platform is also capable of being armed with the Thales FreeFall Lightweight Multirole Missile (FFLMM).

Such a capability was recently offered up to the Polish armed forces for the 'Gryf' programme, with Thales partnering with local company WB Electronics. On 1 September the pair unveiled their offering at the MSPO defence exhibition in Kielce for the Polish requirement for an armed UAS. FFLMM strike options have been integrated with the WKX’s surveillance capability in order to provide Polish commanders with sufficient ISTAR to "fully understand and exploit" the battlespace environment, Thales told IHS Jane’s. "In a fast-changing environment the solution can dynamically re-task to an effects-based capability, allowing them to make faster, better-informed decisions during critical target engagement," the spokesperson added.

Poland is seeking an undisclosed number of airframes following the publication of a request for information in 2014.

Elsewhere, France continues to consider the WKX and Sagem Patroller UAVs for its Système de Drone Tactique (SDT) programme, which calls for the acquisition of 14 systems. France's military procurement
agency, the Direction Générale de l’Armament (DGA), began flight trials of the two competitors in June and July, with a preferred bidder expected to be announced by the end of the year.

At the Army Intelligence Forum in Saumur, France, on 6 October, Sagem promoted the multi-sensor intelligence capabilities of the Patroller system with a series of demonstration flights equipped with high-resolution EuroFlir 410 optronics and SAR/GMTI sensors.

Sagem’s Patroller UAV can carry payloads under the centreline on hardpoints on the wing. (IHS/Patrick Allen)

Patroller has been designed as a brigade- or battlegroup-level ISTAR asset that can process information generated from three video streams. According to Sagem, in GMTI mode the aircraft can automatically point the Euroflir 410 optronic sensor to provide a high-resolution image of a moving target for subsequent identification and precise position determination.

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The RAF’s Protector airframes are likely to be a derivative of the MQ-9 Reaper. (Crown Copyright)

**UCAV options**

Europe is also making significant progress in the field of UCAVs, with major programmes including the Anglo-French Future Combat Air System (FCAS) effort; the UK MoD’s Taranis programme; and the pan-European nEUROn project.

An artist’s rendering of a potential Anglo-French FCAS. (BAE Systems)

The French and UK governments continue to press ahead with an FCAS feasibility study to identify potential to jointly develop a UCAV for deployment in 2030 and beyond. The study was launched at the
Farnborough Airshow in July 2014 and includes contributions from Dassault Aviation, BAE Systems, Thales, Selex ES, Snecma, and Rolls-Royce. A decision regarding selection of an airframe and accompanying engine is expected by the end of 2015.

Meanwhile, the UK MoD's indigenous Taranis UCAV programme is understood to be under consideration for a third set of evaluation trials in 2016 following the successful completion of flight and systems tests at the Woomera Test Range in Australia over the past two years. Stealth technology was also evaluated during testing. Industry sources claim that prime contractor BAE Systems is discussing options with the MoD. It is believed that Taranis could also form part of the FCAS effort.

The Taranis successfully undertook a number of flights as part of its 2013 test schedule. (BAE Systems)

Another programme that could feed into FCAS is the European nEUROn UCAV initiative. The USD440 million programme aims to develop a UCAV capability in the 2020s and involves prime contractor Dassault Aviation (France), Saab (Sweden), Hellenic Aerospace Industry (Greece), Thales (France), RUAG Aerospace (Switzerland), Airbus DS (Spain), and Alenia Aermacchi (Italy).

nEUROn completed its second phase of testing, designed to assess the air vehicle's combat capability, radar-cross section, and infrared signatures, in Sardinia, Italy, in August. The Italian testing follows the completion of flight tests in contested airspace in France during February against opposing aircraft, including French Air Force Mirage and Rafale jets complete with active electronically scanned-array radar technology.
Italy completed the second stage of the nEUROn UCAV demonstrator’s trials programme in late August. (Alenia Aermacchi)

HALE

In the area of HALE systems Europe continues to make progress. However, the future of Germany's Euro Hawk signals intelligence (SIGINT) programme, which was unceremoniously cancelled in 2013 following an investment injection of more than EUR500 million, remains uncertain. A similar amount of investment will have to be injected in order to resurrect the programme, according to official parliamentary information published in October. The programme was originally cancelled due to airspace integration issues and expense.

Between 2014 and 2015 the German MoD signed agreements with the US Navy to consider integration of Euro Hawk's surveillance technology on board the Northrop Grumman Corporation's Triton HALE UAS, as well as other manned aircraft, including the Bombardier Global 5000 jet. However, such a move and acquisition of three Triton UASs by the German MoD would cost more than EUR600 million, according to officials.

Speaking to *IHS Jane’s* a spokesperson for Airbus DS said there had been no progress with the Euro Hawk programme, adding, "We are all waiting for a decision from the German government and unfortunately have nothing new to add."

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The solar-powered Zephyr 7 holds the world record for continuous flight. (Airbus DS)

**Rotary-wing UASs**

In the RWUAS domain, the Italian, Polish, and UK MoDs continue to press ahead with developments regarding utility in maritime environments.

The 'Italian Blade' programme, run by the Italian Army Aviation and AgustaWestland, aims to identify market opportunities for RWUASs in the land, maritime, and littoral sectors. Trials have been carried out with an AgustaWestland (PZL-Swidnik) unmanned/optionally piloted SW-4 'Solo' airframe and the smaller HERO RWUAS platform.

Meanwhile, on 15 September AgustaWestland announced that it has completed capability concept demonstration (CCD) trials with the SW-4 Solo helicopter for the UK MoD. The CCD programme was launched in 2013 under a GBP2.3 million (USD3.5 billion) contract awarded by the MoD to AgustaWestland to conduct research into RWUAS technology. It was designed to help inform the RN regarding the future development of its Tactical Maritime Unmanned Air System (TMUAS) requirement. TMUAS aims to operate in concert with a variety of manned helicopters, including AW159 and AW101 platforms, as well as unmanned surface vessels and unmanned underwater vehicles.
The AgustaWestland SW-4 RWUAS conducting Phase II (including a series of pseudo deck landings, pictured) of the UK MoD’s CCD programme. (AgustaWestland)
During the CCD tests at Llanbedr Airfield in Wales the SW-4 Solo completed 26 flights in 27 hours of operation, including 22 automated simulated deck landings, across three phases. Scenarios revolved around persistent wide area surveillance operations, communications relay, mine countermeasure and hydrography, littoral reconnaissance, counter-piracy, counter-smuggling, and counter-fast inshore attack craft missions.

AgustaWestland noted that the RWUAS CCD also included a capability study to look at a range of differently sized RWUASs "that could deliver persistent maritime capability".

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Counter-UAS systems

Meanwhile, Europe is proving itself to be the trailblazing continent in terms of counter-UAS technology in response to the increasing threat of UAVs and airborne improvised explosive devices (ABIEDs) operated by terrorist organisations and organised criminal gangs.

In May a consortium of UK-based companies comprising Blighter Surveillance Systems, Chess Dynamics and Enterprise Control Systems unveiled its Anti-UAV Defence System (AUDS): a system designed to disrupt and neutralise UAVs within a 180-degree field of view using AESA radar, EO cameras and directional RF systems.
This was followed in September by the launch of Finmeccanica’s Falcon Shield solution. Speaking at DSEI in London, company officials said they had spoken to a number of international governments interested in purchasing the system for security and law enforcement utility.

Falcon Shield has been designed to “find, fix, track, identify, and defeat” UAVs around critical national infrastructure such as airports. Recent incidents witnessed at Heathrow Airport in the United Kingdom; the White House in Washington, DC; and the US Open tennis event at Flushing Meadows in New York have seen UAVs accessing out-of-bounds security areas.
IHS Jane’s Defence Industry and Markets Intelligence Centre

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