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GERMAN UAS PROGRAMMES



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German Air Force UAS Programmes

While the German Army has already been using tactical drones and mini UAVs for many years, the Luftwaffe is entering new territory for the Bundeswehr by fielding unmanned systems of the MALE (Medium Altitude Long Endurance) and HALE (High Altitude Long Endurance) classes.

UAS, with their depicted inherent qualities, can help considerably in the Air Force to improve the capability profile in almost every capability category.

By fielding UAS, the Luftwaffe is pursuing the aim of gradually gaining in capability both for ongoing operations and for challenges that lie ahead.

The Luftwaffe is first of all introducing UAS for ISR (Intelligence, Surveillance and Reconnaissance) purposes to cover the growing need for continual and near-real-time surveillance.

Operating largely away from any threat, UAS can contribute in terms of network-enabled operations toward the generation of a continuous and up-to-date, near-real-time situation picture through their great range and long loiter time in the area of operations. The reconnaissance requirements in the Bundeswehr are divided according to global reconnaissance, wide-area reconnaissance, and deep theatre reconnaissance. While the requirements relating to global reconnaissance are covered mainly by space-based systems (satellites), UAS are able, with their range and loiter time as carrier platforms for a multitude of sensors, to play a special role in terms of wide-area surveillance and reconnaissance as well as in regard to in-theatre situation reconnaissance, monitoring, and target and post-attack reconnaissance.

Wide-Area Surveillance and Reconnaissance

The Luftwaffe wishes to develop its own capabilities for airborne wide-area surveillance and reconnaissance in both the SIGINT and imagery reconnaissance field.

HALE-class UAS are suited to both tasks from the technical point of view, since only they have the necessary standoff capability to provide continuous reconnaissance, even without permission for overflight.

Various versions of the American GLOBAL HAWK RQ-4B, built by Northrop Grumman serve as flying platforms. Ranges of over 15,000km, altitudes above 18km, and a fuel endurance of over 28 hours for a payload of



EUROHAWK-
(Photo: Northrop Grumman)

1,300kg characterise the performance of the more recent GLOBALHAWK versions. The GLOBAL HAWK family already has over 30,000 flight hours to show for itself, taking into consideration the ACTD (Advanced Concept Technology Demonstrator) and the air vehicles of RQ-4A Block 10.

Despite the technical solutions being similar, the Luftwaffe is pursuing different paths in the fields of SIGINT and imagery reconnaissance.

NATO AGS / HALE IMINT

Where airborne wide-area imaging surveillance and reconnaissance are concerned, Germany has pledged its participation in the NATO Alliance Ground Surveillance (AGS) Programme. It includes the acquisition of eight GLOBAL HAWK systems in the Block 40 version along with MP-RTIP (Multi-Purpose Radar Technology Insertion Programme) radar. The initial flight of an RQ-4B Block 40 air vehicle

took place on 16 November 2009. The eight air vehicles are to be deployed in a role comparable to NATO's AWACS early-warning aircraft, by a multinational unit that is still to be established, from the Italian military airfield of SIGONELLA in Sicily. This unit will also constitute the nucleus of NATO's airborne, all-weather-capable ground reconnaissance element and hence be referred to as NATO AGS CORE. It is intended to provide cover for two reconnaissance and surveillance orbits.

The agreement (Programme MoU) forming the basis for actual contract negotiations was signed by 15 of the 28 NATO member states in September 2009.

Once operational readiness of NATO AGS CORE has been established, the Luftwaffe plans to acquire six further systems as a German contribution to cover additional orbits ensuing from NATO operational demands and as a medium-term addition to its own national sub-capabilities that include the P-3C ORION.

EURO HAWK

The Luftwaffe intends to acquire a total of five EURO HAWK air vehicles to cover the spectrum of airborne, wide-area SIGINT and reconnaissance activities undertaken by the Bundeswehr.

The actual requesting authority in this connection is the Joint Support Service / Strategic Reconnaissance Command. The project is described in the following from the viewpoint of the Luftwaffe, while the "ISIS" (Integrated SIGINT System) sub-project, which undoubtedly with all its facets is of equal importance, is left unconsidered in the context of the EURO HAWK programme. The EURO HAWK UAS is based on the GLOBAL HAWK RQ-4B Block 20, with the sensor system being developed and integrated nationally in Germany. The key element of the realisation strategy pursued by Germany for the EURO HAWK is the support provided as part of a "Direct Commercial Sale" (DCS) by a prime contractor who, throughout the life cycle of the reconnaissance system, is responsible for the planning, fielding and in-service support of the system, including expertise to integrate the national sensor system, and advancement of the system as a whole.

In 2003, the Luftwaffe identified EURO HAWK as the potential replacement for the BREGUET ATLANTIC aircraft fleet by 2010. On 3 November 2005, Northrop-Grumman and EADS founded EuroHawk GmbH 50/50 joint venture based in Immenstaad, Germany, for

the development, manufacture and sustainment of EURO HAWK.

EADS will supply the aircraft's SIGINT mission system and the ground control station while Northrop-Grumman will supply the airframe. The SIGINT payload allows detection of radar emitters (ELINT) and communications emitters (COMINT). EURO HAWK features a wingspan larger than an Airbus A320 airliner, an operational ceiling of 20,000m and a flight endurance of over 30 hours. The EURO HAWK UAV has a top speed of 555km/h.

The German government signed the EURO HAWK risk reduction contract in autumn 2006. Initial Operational Capability (IOC) and series production approval are expected by 2009. On 1 February 2007, the German MoD awarded EuroHawk GmbH a €430 million contract for the development, test and support of the EURO HAWK unmanned SIGINT system. The first demonstrator system was scheduled for delivery to the Luftwaffe in 2010. Thereafter, four EURO HAWKs would be delivered between 2011 and 2014.

Deep Theatre Reconnaissance

The fielding of a MALE system for imaging reconnaissance purposes will first of all enhance the Armed Forces' capabilities in the field of deep theatre reconnaissance (SAATEG - Deep Theatre Reconnaissance and Mapping System) to operate under almost any weather and visibility conditions and at any time of the

day or night. The aim is to complement the capabilities of the RECCE TORNADO, which has proven itself over many years and is currently deployed as part of the ISAF operation, and to help improve continuous real-time surveillance and reconnaissance, especially by means of systems with a lengthy loiter time, enhanced sensors and direct sensor data transfer.

Envisaged, besides EO or IR sensor equipment, is an additional imaging synthetic aperture radar (SAR) with moving target indication (MTI/fn). A laser pointer (LP) serves to mark objects of interest. It is possible, by means of a transmission system, to transmit full motion videos (FMV), produced by the sensors, directly to troops deployed on the ground as a means of improving the situation picture.

In Afghanistan, in March 2010, the Bundeswehr started using the HERON 1 UAV based on an operator model (cooperation project between several companies, including Rheinmetall Defence Electronics) to meet urgent requirements arising at short notice from the ongoing ISAF operation. The first of three systems is equipped with electro-optical and infrared sensors as well as a laser pointer and provides the capability to first of all transmit the data from the platform directly to a ground station. Ground troops in range of the transmitter are also able to receive sensor data directly as

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In Afghanistan, in March 2010, the Bundeswehr started using the HERON 1 UAV based on an operator model to meet urgent requirements arising at short notice from the ongoing ISAF operation. (Photo: Luftwaffe)

FMV. The second and third platforms will complement the sensor capabilities with an imaging RADAR (SAR), including MTI, and enhance the range of the platform in regard to control and data transmission via a SATCOM link. While the operator consortium has responsibility for the mission readiness of the system, the Luftwaffe deploys the system operationally with its own military UAV pilots and sensor equipment operators.

In the medium term, the Luftwaffe will continue to develop its capabilities for airborne deep theatre reconnaissance by procuring UAS for operations in the medium altitude band. This will improve the capability profile for the armed forces considerably and help significantly to protect the forces and resources deployed on operations. The lessons learned from operating HERON 1 in Afghanistan, and consideration of future reconnaissance requirements going beyond that, will have a crucial influence on the decision to select a future system. The commercially available systems that offer growth potential (derivatives of PREDATOR or HERON) and the development of a new, enhanced-performance European system (A-UAV/TALARION) will both be taken into account. A decisive aspect in this regard will be that the minimum capability provided at short

notice for Afghanistan is also sustained without any delay, even after the operator contract for HERON 1 lapses, and is also geared to foreseeable requirements and future challenges.

Outlook

While the focus of current UAS procurement projects is on augmenting intelligence collection and reconnaissance capabilities, it will be necessary in the long term to also take account of prospective changes in other capability categories when fielding UAS in future.

UAS as sensor carrier platforms first of all help to establish a situation picture. Sensor images and videos can be transmitted and evaluated in almost real time using the data processing capacities available, thereby shortening the time span until a target is engaged. Deploying weapons directly from the reconnaissance platform (UCAV) can lead to crucial time savings, especially when engaging time-urgent targets.

Although HALE and MALE UAVs, when deployed in low-threat scenarios, can guarantee a continuous response capability and lethality in almost real time due to their long loiter time and combination of sensors and weapons (as weaponised UAVs), their surviv-

ability in high-threat scenarios seems to be extremely limited. It is then that suitably optimised Unmanned Combat Aerial Systems (UCAS) can make a decisive contribution toward effective engagement, because they are more survivable and lethal, with their sensors and weapons combined in a comparably more agile and multi-spectrally signature-reduced platform, and have a higher degree of autonomy.

The Luftwaffe is currently carrying out studies to analyse the possibilities of deploying such systems as a means of qualitatively and quantitatively maintaining, or at all being able to cover, together with the EUROFIGHTER, the capability spectrum ensuing from international obligations and from the Bundeswehr Concept for the time after the TORNADO weapon system has been completely phased out.

Given the high degree of complexity of such systems, it is necessary for the Luftwaffe as well as industry to proceed gradually in technologically manageable steps.

In the long term, depending on technological progress, it is imaginable that UAVs will be used as communication relay stations (e.g. stratosphere platforms), for aerial refuelling tasks, for tactical or even strategic materiel and supply transport, for intelligence gathering operations, for early warning functions, and for target identification (slew-to-cue) in countering ballistic missiles.

Despite all the promising possibilities that UAVs offer, however, they will not completely supersede or replace manned systems in the foreseeable future but primarily complement them in those applications where they are operationally better-suited because of their inherent qualities or, if they yield the same operational benefit, where they are the more cost-effective means for the mission in question.



EURO HAWK Unmanned Aircraft Shows Stamina with 30-Hour Flight

EURO HAWK successfully proved its long endurance capability with a 30.3-hour flight over Edwards Air Force Base, CA. Built by Northrop Grumman Corporation and EADS Deutschland GmbH, operating through Cassidian, the defence and security division of EADS, the high-flying UAS took off 1 December at 16:47h PST and landed 2 December at approximately 10:59 PST.

"Soaring up to 60,000 feet, the EURO HAWK performed beautifully and has logged nearly 100 total flight hours since its maiden flight approximately five months ago," said Duke Dufresne, Sector Vice President and General Manager of the Strike and Surveillance Systems Division for Northrop Grumman's Aerospace Systems sector. "This flight not only demonstrated

the aircraft's endurance capability, but it also enabled the team to collect crucial communications data points."

The EURO HAWK is the first international configuration of the RQ-4 GLOBAL HAWK high-altitude, long-endurance UAS. It also demonstrates the remarkable team spirit uniting Northrop Grumman and EADS Deutschland GmbH/Cassidian.

"This milestone is a significant step towards completion of the ferry flight to Germany next year," said Nicolas Chamussy, Senior Vice President of UAS for Cassidian. "The aircraft will undergo additional flight testing in Germany before being delivered to the German Air Force by the end of 2011 to replace the fleet of manned Breguet Atlantic aircraft which went out of service this year."

Based on the Block 20 configuration, the EURO HAWK will be equipped with a signals intelligence mission system developed by Cassidian, providing standoff capability to detect electronic and communications emitters.

"We are very excited to soon have EURO HAWK flying over German skies and providing airborne wide-area surveillance and reconnaissance," said Neset Tuekenmez, CEO of the EuroHawk GmbH. "This trans-Atlantic cooperation has been a long time coming since the effort began in August 2000 and the contract awarded in 2007."

Delivery of four subsequent systems is anticipated between 2015 and 2016 following successful testing and introduction in German operational service.