UAV PAYLOADS 2014

Photo: USAF

SUMMARY

Unmanned Aerial Vehicles are the fastest growing segment of the military aerospace market and their sensors and payloads form the key elements of UAV systems. A wide range of UAV payloads, including EO/IR Sensors, Synthetic Aperture Radars (SAR's), SIGINT and EW Systems, C4I Systems and CBRN Sensors, worth $3 billion per year currently, is forecast to increase to $5.6 billion annually by 2020. In addition, a wide range of miniaturised munitions are being developed to arm UAVs.

Australia

Australia looks set to acquire the MQ-4C Triton to fulfil part of its AIR 7000 Phase 1B multi-mission Unmanned Aerial System project. The Australian government has announced it is issuing a letter of request to the USA for detailed cost and capability information on the maritime UAV. The MQ-4C would support the P-8 Poseidon manned MPA, which will be acquired as a direct replacement for the AP-3C.

Egypt

Egypt has agreed to purchase 10 Anka UAVs, in a deal to give Turkish Aerospace Industries (TAI) its first international sale with the ISR asset. The Anka has a maximum take-off weight of 1,500kg, including a payload of up to 250kg.

France

France has ordered 12 General Atomics Aeronautical Systems MQ-9 Reaper UAVs and associated equipment. They will be equipped with the General Atomics Lynx SAR/GMTI payload and the Raytheon DAS-1 Multi-Spectral Targeting System. Delivery is due from 2014 – 2015/16.

Germany

Germany has a requirement to replace its Heron MALE UAVs, currently operated on a rental basis. Predator is under consideration, as is a purchase of Herons.

Hungary

Hungary is building 2 prototype reconnaissance UAVs to meet an armed forces requirement. Several payload options are being developed as a part of this programme.

Israel

Payloads carried by the Heron 1 “Shoval” aircraft operated by the Israeli Air Force’s 200 Squadron are being continuously upgraded to allow the type to perform numerous missions.

Poland

Poland confirmed its intention to formally rejoin NATO’s Alliance Ground Surveillance (AGS) programme as a core nation, but with the cancellation of the AGS programme, Poland may seek a national solution to its UAV requirements. Poland is looking to acquire four systems comprising MALE, tactical, mini and micro UAVs. Polish industry has developed autopilot, communication links, optronics and other payloads for UAVs bought from Israel and the US.
The Polish Defence Ministry has set a budget of 2 billion to 3 billion zloty (US $650 million to $975 million) to cover its UAV programme.

South Korea

South Korea has requested information on a possible $1.2 billion purchase of four Northrop Grumman RQ-4 Global Hawk unmanned aerial vehicles, plus associated equipment and services.

Photo: army.mil

The new RQ-11B Raven gimbaled payload upgrade allows for greater ease of flying providing 180-degree panning of the infrared/electro-optical camera and laser illuminator

Turkey's TAI Anka UAV

Photo: TAI

Turkey

Turkish Aerospace Industries (TAI) Anka UAV is set to receive improvements to communications and other payloads as new requirements have emerged from the Turkish Undersecretariat for Defence (SSM). The Turkish Air Force is looking to add a Satellite Communications (SATCOM) payload and work is also progressing on a Synthetic Aperture Radar (SAR) by Aselsan. A new EO/IR payload is also being examined.

U.K.

The Scavenger Requirement is for a MALE UAV. Payload options have not yet been released.

U.S.A.

Northrop Grumman is integrating its STARLite ground surveillance radar on to Navmar's TigerShark unmanned air vehicle for use by the US Navy and the US Special Operations Command (SOCOM), and is also offering the payload on its own future MQ-8C unmanned helicopter.

A version of STARLite offering extended range performance and maritime surveillance modes will be offered to the US Navy for use with its MQ-8C. A number of other NATO members have expressed interest.

Raytheon Space and Air Systems (RSAS) and the Tamam Division of Israel Aerospace Industries (IAI/Tamam) have both added high-definition (HD) options to the payloads available for their electro-optic/infrared (EO/IR) sensor turrets. The AN/AAS-53 CSP is in production for the US Army's MQ-1C Gray Eagle.

Among the more sophisticated payloads under consideration for the Shadow UAV is Northrop Grumman's AN/ZPY-1 STARLite radar. The system would probably be fitted to the extended-wing Shadow due to its increased payload capacity.

Qinetiq North America is working with three leading UAV manufacturers to test-fly its Small Multi-Spectral Imager. Qinetiq is developing payloads which are able to identify a range of targets at various altitudes up to 3,000 ft; these include simulated land mines, disturbed earth, camouflage and electrical wires. This target set typifies elements of the IED threat found in Afghanistan, Iraq and increasingly elsewhere in the world.

Northrop Grumman has released details of the critical new sensor invented for the U.S. Navy Broad Area Maritime Surveillance (BAMS) mission. The US Navy plans to buy 70 MQ-4C's, including five test aircraft, under a nearly $12 billion acquisition programme. The first MQ-4C, predicted to enter service in 2015, will scan the sea for maritime traffic using a multi-function active sensor radar developed by Northrop Grumman.

UAV Radars

A report by the Teal Group estimated that spending on UAV Radars reached US $496 million in 2013, forecasting a rise to $1.28 billion in 2022. Much of that spending will go toward the US Multi-Platform Radar Technology Insertion Programme Radars for the Global Hawk UAV, including $453 million to be spent on the programme in 2017, about half the global figure for that year.

After 2017, a good deal of projected spending will be devoted to radar work for new combat UAV programmes. But that leaves a niche market for medium-altitude, long-endurance UAV radars.

Outside the US, there is a good market for non-American developers. As medium-altitude UAVs become more widespread around the globe, the competition to sell the radars they carry is increasing. Meanwhile, demand is also increasing for a fuller range of UAV radar capabilities, specifically for maritime surveillance.

The Lynx Block 30 radar, which General Atomics has sold for manned platforms to Australia and Iraq, will be sold with the Predator XP, the export version of the Predator A for non-NATO countries. The Predator XP has already been sold to the United Arab Emirates.

Northrop Grumman's STARlite radar, which has been procured by the US Army for MQ-1C Gray Eagle UAVs, is also scheduled to get a maritime mode. Northrop is developing a STARLite High Power variant that will provide maritime sea-search capability out to 30 nautical miles. STARlite is also under consideration for the RQ-7B Shadow and the M2 next generation variant of that UAV.

Telephonics is working on a maritime AESA Radar for UAVs as well as for rotary and fixed-wing aircraft that would provide a 360-degree field of regard, but would not rely on rotating the array. The company's development effort does not immediately involve conformal arrays – the integration of arrays into the skin of airborne platforms. Conformal arrays are the ultimate goal, but those are still in the future.

Telephonics already provides its AN/ZPY-4 Radar for Northrop's MQ-8B Fire Scout unmanned helicopter.

The Northrop Grumman STARlite radar system

Selex ES has been increasing it's market share, with Israel-based Elbit Systems selecting the company's Gabbiano X-band radars for the Hermes 450 and Hermes 900 UAVs. In total, more than seven UAV types have integrated Selex surveillance radars.

Selex's Active Electronically Scanned Array (AESA) radars are seen as essential for maritime missions. Selex's AESA range includes the Picosar UAV radar – which has been sold to Saudi Arabia – and the Seaspray. Besides flying on 18 manned platforms, the AESA Seaspray has been selected for Piaggio's Hammerhead UAV, and a 7500E variant flew last year in trials on a Predator B UAV.

The Italian Air Force is considering equiping its MQ-9s with the radar to further boost its maritime surveillance potential.

The general trend in UAV radar is away from bespoke solutions. Customers are demanding flexibility and multi-mode solutions, such as using the radar for synthetic aperture radar missions one day and search and rescue the next.

Airbus Military are working on scalable, software-defined sensors, which can be easily adapted for specific missions and roles.

Aselsan (Turkey) is developing a Synthetic Aperture Radar for TAI's Anka UAV.

Thales I-Master SAR/GMTI Radar is a potential payload for the Patroller UAV.

Electronic Warfare Payloads

The U.S. Army is exploring the potential of fitting the MQ-1C Gray Eagle with an Electronic Attack Capability. Raytheon is providing 2 electronic payloads to support the programme, with the first flight and operational assessment scheduled for 2014. The system being developed is called the Networked Electronic Warfare Remotely Operated (NERO) System.

The U.S. Army is also exploring the potential to deploy an Electronic Attack Capability in smaller UAVs.

An Electronic Warfare payload could also be fitted on the next generation M2 variant of the RQ-7B Shadow.

Further payload options for the British Army Watchkeeper UAV include Electronic Warfare.

The RAF's Watchkeeper may have a future in EW

Photo: wikimedia.org

Communications Payloads

In 2013, Sagem conducted successful initial integration and trials of a Communications Intelligence (COMINT) payload on its Patroller MALE UAV. The COMINT payload is believed to be the Thales TRC 6200 Wideband Direction Finder. A SATCOM payload may also be integrated on to the Patroller.

A podded Forward Airborne Secure Transmissions and Communications (FASTCOM) system is being developed for the RQ-7B Shadow.

For its Anka Medium Altitude UAV, the Turkish Air Force is looking to add a Satellite Communications (SATCOM) payload. A Communications Relay Capability is also required to support Turkish Land Forces.

Further payload options for the British Army Watchkeeper UAV include Communications Intelligence.

Thermal Imaging Payloads

The U.S. Army would like to see Thermal Imaging incorporated into the payload of the RQ-7B Shadow.

Electro-Optic Payloads

The Wide Focal Plane Array Camera (WFPC- known as Wolfpack) is under consideration by the USMC as a replacement for the POP 300D payload. A second increment of the Gorgon Stare Wide Area Sensor is being developed by the Sierra Nevada Corporation. Gorgon Stare is deployed on the MQ-9 Reaper.

The Small Multi-Spectral Imager (Small MSI) Sensor features blue, green red and near infra-red (IR) spectral imaging capabilities and is being developed by QinetiQ North America, principally for IED detection.

Weapon Systems

The USMC is looking to acquire sub-11kg guided bombs for UAV applications.

Lockheed Martin's Shadow Hawk small precision guided weapon has been tested from the RQ-7B Shadow.

Weapon System integration on to the Patroller UAV is being considered by Sagem, with MBDA's Brimstone a possible solution.

Integrated Systems

A New Multi-Intelligence (Multi-INT) Capability that shrinks Sensor Payloads for large UAVs for use on smaller UAVs is being developed by BAE Systems. The System includes a Small All-Weather radar that combines 2 Synthetic Aperture Radar (SAR) images, which is paired with a SIGINT System to detect and locate Radio Frequency Emitters.

UAV OPERATORS

COUNTRY	UAV TYPE	OPERATING SQUADRON/UNITS (WHERE KNOWN)
ANGOLA	AEROSTAR	
ARGENTINA	YARARA	
AZERBAIJAN	HERON	
AUSTRALIA	HERON (3) RAVEN SKYLARK 1	
BELGIUM	B-HUNTER (12)	80 SQUADRON
BRAZIL (FED POLICE)	HERON (15) HERMES 450 - MORE ON ORDER	
CANADA	HERON (3) SPERWER SKYLARK 1 SKYLARK II SCAN EAGLE	
CHILE	HERMES 900	
CHINA	VULTURE (1)	Note: many indigenous designs operated and under development

COUNTRY	UAV TYPE	OPERATING SQUADRON/UNITS (WHERE KNOWN)
COLOMBIA	HERMES 450 HERMES 900	
CROATIA	HERMES 450 SKYLARK 1	
CYPRUS	HERMES 450	
CZECH REPUBLIC	RAVEN	
DENMARK	RAVEN-B SPERWER AEROVIRONMENT UAVS ON ORDER	
ECUADOR	HERON (2) SEARCHER II	NAVY
FINLAND		
FRANCE	HERON TP (HARFANG) MQ-9A REAPER (12) ON ORDER - DELIVERY 2014-2015/16 SPERWER II (30) SKYLARK 1	EC1/330 - COGNAC EC1/33 - COGNAC
GEORGIA	HERMES 450	
GERMANY	HERON (3) - ON LEASE UNTIL OCT. 2014 CAMCOPTER (NAVY) K20 LUNA ALADIN	AKG-51 - SCHLESWIG-JAGEL
HUNGARY	SKYLARK 1	
INDIA - AIR FORCE	HERON (50) SEARCHER II (100+)	

COUNTRY	UAV TYPE	OPERATING SQUADRON/UNITS (WHERE KNOWN)
INDIA - NAVY	HERON	
INDONESIA IRAN	SEARCHER SARIR/H-110 FOTROS SHAHED 129 YASIR	
IRELAND	ORBITER	
ISRAEL	HERON 450 AEROSTAR HERMES 900 SKYLARK 1	200 SQUADRON
ITALY	PREDATOR (6) REAPER (6+2) RAVEN-B	28 GRUPO 32 STORMO
JORDAN	CAMCOPTER FALCO	
LEBANON	RAVEN	
MACEDONIA	SKYLARK 1	
MEXICO	HERMES 450 (4?) HERON (3) - FED POLICE HERMES 900 (2) - FED POLICE SKYLARK 1 ORBITER	
NATO	FALCO (20) SHADOW 200 (12)	
NETHERLANDS	RAVEN SPERWER SKYLARK 1 AEROSTAR ALADIN	
NORWAY	ALADIN	

COUNTRY	UAV TYPE	OPERATING SQUADRON/UNITS (WHERE KNOWN)
PAKISTAN	FALCO SHAHPAR BURRAQ LUNA X-2000	ARMY AIR FORCE
PHILIPPINES	HUNTER	
POLAND	ORBITER (12) HERON (2 ON LOAN) SKYLARK 1 AEROSTAR FLYEYE (MINI UAV) SCAN EAGLE	ARMY
ROMANIA	SHADOW 600	
RUSSIA SAUDI ARABIA	SEARCHER I-VIEW BIRD EYE 400 FALCO	
SERBIA	ORBITER	
SINGAPORE	HERON HERMES 450 SEARCHER AEROSTAR	
SOUTH AFRICA	VULTURE SEEKER II	
SOUTH KOREA	GLOBAL HAWK ON ORDER (4) SEARCHER SKYLARK II	
SPAIN	RAVEN SIVA (3) SEARCHER	
SRI LANKA	SEARCHER BLUE HORIZON	
SWEDEN	SPERWER SHADOW 200 (2 SYSTEMS) PUMA/WASP (12)	ARMY - OPTION ON FURTHER 18

COUNTRY	UAV TYPE	OPERATING SQUADRON/UNITS (WHERE KNOWN)
THAILAND	SEARCHER II AEROSTAR	
TURKEY	HERON (10) PREDATOR (6) SHADOW 600 GNAT 750 (6) I-GNAT ER (16) SEARCHER II AEROSTAR BAYRAKTAR (200+) ANKA (10) KARAYEL	
TURKMENISTAN	FALCO	
UAE	CAMCOPTER (80 + 20 OPTION) PREDATOR XP	
UK	WATCHKEEPER (54 ON ORDER) HERMES 450 (10 ON LOAN) REAPER (5+5) T-HAWK (18 IN AFGHANISTAN) RAVEN-B SCAN EAGLE DESERT HAWK III (239 IN AFGHANISTAN) BLACK HORNET MICRO (64 IN AFGHANISTAN)	39 SQUADRON NAVY
USA - ARMY	MQ-1C GRAY EAGLE (131+) RQ-11 RAVEN (1,272 - FY12) I-GNAT ER RQ-16 MAV RQ-5B HUNTER RQ-7B SHADOW RQ-20 PUMA WASP (22,000 REQUIREMENT)	
USA - NAVY	MQ-4C BAMS (62) - IOC 2016 HERON (2) MQ-8B FIRE SCOUT (168) MQ-8C FIRE SCOUT (30) RQ-16 T-HAWK (372) SCAN EAGLE RQ-21A BLACKJACK	

COUNTRY	UAV TYPE	OPERATING SQUADRON/UNITS (WHERE KNOWN)
USA - AIR FORCE	RQ-4A/B GLOBAL HAWK (66) - 20 ACTIVE MQ-1B PREDATOR (130-268 DELIVERED) RQ-11B RAVEN (108) WASP (442) SCAN EAGLE RQ-170 SENTINEL MQ-9B REAPER (319)	12TH RS, 13TH RS, 348TH RS 11TH, 15TH, 18TH, 6TH RS 432ND WING, 30TH RS 17TH RS, 29TH ATKS, 16TH TRS, 174TH AW, 119TH WING, 147TH RW, 163RD WING, 3RD SOS, 15TH EXPEDITIONARY RS
USA - SOCOM	CAMCOPTER VIKING 400 (6) PUMA	
USA - USMC	RQ-11B RAVEN RQ-7B SHADOW K-MAX WASP III SCAN EAGLE	} VMU 1-4 }

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