

The US plans to buy 12 Shadow 200 Tactical UAV (TUAV) systems for the US Army in FY2003.



Payloads

SHOW THE WAY

INTEREST IN UAVs IS AT A NEW HIGH BUT, EVEN SO, IT IS FUTURE PAYLOADS THAT WILL TURN THESE AVs INTO A NECESSITY FOR THE WARFIGHTER.

The amount of attention being paid to UAVs has been growing steadily since the 1980s, but many programmes remained in the doldrums until 1990, when Saddam Hussein invaded Kuwait.

After organising an international coalition, US and allied forces counter-attacked and within 100 days routed the Iraqi army. For the first time, UAVs played a prominent role in a major military operation and would again do so during the Kosovo crisis (1999) and the recent invasion of Afghanistan.

Still, throughout all the discussions, what has usually been overlooked is the system's payload.

ENDURING FREEDOM

The US is known to have deployed two types of UAV systems to Afghanistan: the General Atomics Aeronautical Systems Predator and Northrop Grumman's Global Hawk. Each has performed successfully, although several Predators and one Global Hawk were lost.

The Predator sent to Afghanistan was equipped with electro-optic, infra-red, and synthetic aperture radar sensors. This payload transmitted imagery in real time to its ground control station (GCS) over a distance of 500 nm from 15,000 to 25,000 ft during a 24 hour period.

Raytheon developed the payload for the RQ-4 Global Hawk. This US \$12 million payload incorporates electro-optical/infra-red (EO/IR) and synthetic aperture radar/moving target indicator (SAR/MTI) sensors. The electro-optical/infrared sensor operates in the 0.4 to 0.8 micron visible waveband and the 3.6 to 5 micron infrared band. The synthetic aperture radar and ground moving target indicator (GMTI) operates at X-band with a 600 MHz bandwidth, and 3.5 kW peak power. This payload can conduct surveillance over an area of 40,000 nm² to an altitude of 65,000 ft in 24 hours.

As the campaign in Afghanistan wore on, interest in UAVs steadily climbed, despite continued Predator losses and the crash of a Global Hawk.

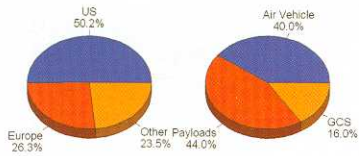
FUNDING BOOST

Between now and 2011, some \$7.5 billion will be spent on UAV procurement programmes worldwide. Of this total amount \$3.3 billion will be used to procure payloads, \$3 billion to acquire air vehicles (AVs) and \$1.2 billion for ground control equipment. By some estimates, Operation Enduring Freedom could add 10 to 30% to the overall value of this market over the next 10 years.

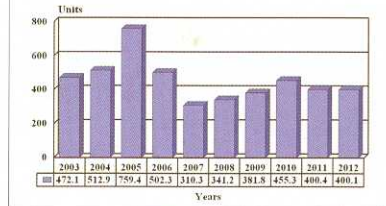
Since 11 September 2001, the United States has moved to increase its budget for UAVs by millions of dollars. Much of the additional funding provided in FY2003 will help to increase annual procurement of such UAVs as the Predator.

Worldwide UAV Spending

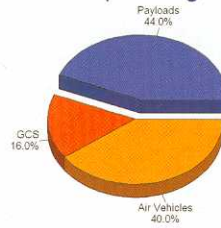
Regional Spending vs Equipment Spending



US Unmanned Vehicles R&D Funding 2003 - 2012



World UAV Spending Thru 2011



Prior to the terrorist attacks on New York and the Pentagon, Predator funding amounted to \$35.8 million for six units in FY2002 and \$23.1 million for seven units in FY2003. Now, the US will procure 16 Predators in FY2002, 22-24 AVs in FY2003 and possibly another 10 in FY2004.

In addition, the US plans to spend \$100.7 million to buy 12 Shadow 200 Tactical UAV (TUAV) systems for the US Army in FY2003 and \$129 million for three new Global Hawks. Full rate production of the Shadow 200 has been approved by the US Army and AAI expects to begin deliveries on the first nine TUAV systems in November 2003.

Frontier Systems Incorporated of Irvine, California, will receive \$23.8 million to test and evaluate the A160 Hummingbird unmanned helicopter. The A160 Hummingbird is built to fly much longer and further than conventional rotorcraft and could perform surveillance missions or extract personnel who have come under fire. The US Army and Special Operations Command are the two main military organisations interested in the vehicle.

Another \$17 million has been provided to General Atomics to complete development of the Kill Assist All Weather Targeting System (KAATS) and perform demonstrations. The KAATS brings together various General Atomics' systems including the Lynx synthetic aperture radar (SAR), multi-look SAR image processing and global positioning system algorithms, and GCS. This work will be completed by December 2005.

Of the \$355.1 billion to be spent by the Pentagon in FY2003, approximately \$781.7 million will be allocated for unmanned systems research and development. Through FY2008, the Pentagon could spend upwards of \$2.81 billion developing unmanned systems. Of this amount, around \$1 billion will be directly or indirectly related to the development of UAV payloads.

MORE CAPABILITY

Despite the success of UAVs over Afghanistan, less than two months into Operation Enduring Freedom the US was already considering the development of improved payloads for its UAVs. An area of particular interest for the US is foliage and earth penetrating radar.

In December 2001, the Defense Advanced Research Projects Agency (DARPA) awarded a research contract to Lockheed Martin to develop a foliage-penetrating (FOPEN) synthetic aperture radar (SAR), also known as a 'tank under trees' sensor. Under the Counter Camouflage, Concealment and Deception (Counter CC&D) programme, DARPA hopes to provide the Warfighter with the ability to detect moving and stationary obscured targets in foliage, under camouflage or in shallow hide, and those utilising deception techniques.

The US has also initiated the Multi-Platform Radar Technology Insertion Program (MP-RTIP). The MP-RTIP aims to

design a common modular, scalable radar system for future integration on advanced airborne manned and unmanned surveillance platforms for the US and other NATO members.

Northrop Grumman is teamed with Raytheon on the MP-RTIP. The three-year contract for the first phase of this programme is worth \$303 million and is due to be completed in 2003. The next phase will include fabrication and testing of three MP-RTIP radars suitable for integration on airborne platforms, including the Global Hawk, a Wide Area Surveillance platform, and a NATO Transatlantic Advanced Radar (NATAR) platform.

'MP-RTIP will give the US Air Force a tremendous increase in its ability to detect, track and identify both stationary and moving ground vehicles,' said Ralph D Crosby Jr, Northrop Grumman corporate vice-president and president of Northrop Grumman Corporation's Integrated Systems Sector (ISS), in a company press release.

The United States is offering MP-RTIP technology to NATO to meet the Alliance's stated requirement for its own Airborne Ground Surveillance (AGS) system. NATAR will meet NATO's need for a multi-national system that is strategic and tactical as well as completely interoperable with similar national systems.

Signals intelligence (SIGINT) is another area that is getting more attention. Both Raytheon and TRW are offering new SIGINT payloads for possible use on the Global Hawk. Raytheon could provide a scaled-down version of the U-2 RAS-1R system and hopes to adapt this low-band unit to perform high-band SIGINT operations. However, the US Air Force is said to be more interested in TRW's SIGINT payload.

TRW is offering two new payloads based on its Joint SIGINT Avionics Family. The High Band Subsystem (HBSS) programme aims to create functional commonality and interoperability among all US airborne SIGINT reconnaissance platforms, regardless of service or aircraft platform. The low-band version of TRW's high-band hardware is called Orca.

The need to provide better homeland security and deal with relocatable targets could help to further boost US research funding levels for new UAV payloads. The Pentagon could spend more than \$600 million on this research programme through FY2007.

AROUND \$1 BILLION WILL BE RELATED TO DEVELOPMENT OF UAV PAYLOADS



Frontier Systems will receive \$23.8 million to test and evaluate the A160 Hummingbird.



ABOVE: The KAATS brings together various General Atomics' systems including the Lynx SAR, this image showing tanks.

Although the US leads all others in the amount of money being spent on UAV development, European nations are increasing their UAV budgets, although at a more moderate pace than the Pentagon.

EUROPEAN UPGRADE

European armed forces have begun to show considerably more interest in UAVs largely in response to their utility in the Kosovo crisis and other Balkan peacekeeping missions, as well as in Afghanistan. With European NATO forces focusing increasingly on such missions, modernisation of their UAV force has assumed a new priority. Still, Europe must reverse the downward trend in continental defense spending apparent since 1996.

Europe could spend \$1.7 billion procuring new UAV systems, including \$780 million for UAV payloads, over the next 10 years. Developing these systems will likely cost Europe an additional \$500-600 million, of which \$250 million could be for the payloads. Research and development programmes initiated between now and the end of the decade could add a further \$120-170 million to this spending total.

The biggest programme in Europe is the Watchkeeper, which provides the UK with a long-term solution to its UAVs needs.

Watchkeeper UAVs will include advanced sensor packages, passing data into network-centric warfare systems connecting strike weapons and mobile ground stations. The UK

MoD is looking at two types of AVs as part of the programme – a short-range TUAV to support brigades, and a medium-altitude, long-endurance (MALE) UAV to provide operational and strategic intelligence. The UK is still defining its Watchkeeper requirements, which could call for the acquisition of a family of systems. The total value of this programme, including development and production, is approximately \$778 million.

Four teams are competing for the Watchkeeper contract: Northrop Grumman, BAE Systems, Lockheed Martin, and Thales. Competitors are offering high-performance and flexible payloads which include EO/IR and synthetic aperture radar (SAR), with moving target indicator (MTI) overlay, target tracking, laser target designation and data relay capability.

A final winner is to be selected in 2004. Initial operational capability could be achieved as early as 2005. The Watchkeeper system could be fully operational by 2007.

Meanwhile, Germany and France are interested in acquiring new, more capable UAVs. Germany wants to replace its aging fleet of Breguet Atlantic manned patrol aircraft with a UAV. One option is the Global Hawk.

Northrop Grumman and EADS have joined forces to offer EuroHawk, a version of Global Hawk equipped with a European electronic intelligence (ELINT) payload. Besides Germany, Northrop Grumman and EADS are hoping to generate interest in this system from other European NATO members such as France and the UK.

Although specific figures are unavailable for Europe, Northrop Grumman believes it will be able to sell 250-300 Global Hawks worldwide through 2020.

France has announced plans to develop two new UAVs: the MultiCapeurs MultiMissions (MCMM) for the army and the MALE for the air force. These projects could be worth €1.5 billion.

The MCMM will be used to gather battlefield information, designate targets and jam communications. Some 80 UAVs will be procured as part of this programme. The first 40 will be purchased under the FY2003-2008 defence budget. Deliveries may commence in 2008. The total cost of this programme is placed at €450 million including maintenance.

France could procure between 12 and 24 UAVs under the MALE programme. The MALE would perform intelligence gathering, target designation and in-theatre communications duties. Deliveries of UAVs could start in 2009. Total programme cost, including 24 UAVs and 15 years of support and maintenance, could reach €1.1 billion.

France and the Netherlands are co-operating on the MALE programme.

Energised by successes in Afghanistan, the US military and its allies are moving to expand UAV fleets. Rapid advances in technology have brought an array of sensors, vehicles and weapons that can be operated by remote control or are totally autonomous.

RISING EXPECTATIONS

US Defense Secretary, Donald Rumsfeld, and the armed services' leadership have long recognised the 'transformational' capabilities inherent in UAVs. The accomplishments of the US Air Force Predator and Global Hawk in Afghanistan demonstrate these systems' abilities and point the way to the future.

UAVs could provide future armies with the means of performing dirty, dull and dangerous missions without risking the life of a human pilot. Every day, new applications for UAVs are being developed. The US Congress has gone so far as to announce its desire to see one-third of the US military's aircraft inventory made up of unmanned vehicles by 2010.

Still, for these programmes to succeed, sufficient funding and determination will have to be provided to see them through any technological problems that surface during development. These elements may now exist, but only time will tell if they are present in adequate amounts.

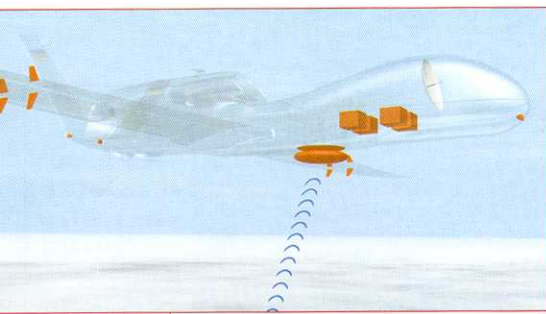
A key question concerning the future of UAVs is whether the current enthusiasm for these systems will last. A similar boost in interest occurred during the Vietnam War, after the Israeli Bekaa Valley victories, in the aftermath of Desert Storm, and following operations in Bosnia-Herzegovina and Kosovo.

Unfortunately, this interest seems to fade as quickly as it appears. Although enthusiasm for UAVs did increase after each operation, it did not reach the levels that some individuals were predicting in the conflict's immediate aftermath.

It remains to be seen how the ongoing war against global terrorism will affect the future of UAVs. A likely outcome is a sharp increase in the level of interest for the short term, followed by a significant decline. This decline will likely take place when budget realities set in and UAV programmes come into conflict with funding for more traditional weapon systems. Despite all the hype about UAVs, one spectacular failure could set these programmes back to square one. ●

Editor's note

Larry Dickerson is a senior defense analyst at Forecast International/DMS Inc based in Newtown, CT, USA.



Northrop Grumman and EADS have joined forces to offer EuroHawk, equipped with an electronic intelligence (ELINT) payload.