

This publication is produced by Blyenburgh & Co for UVS International and is supplied free-of-charge. It has as purpose to help raise the level of global awareness relative to ongoing research & development, relevant technologies, production and sales, as well as current & future applications of unmanned vehicle systems (air, ground & naval). It has a controlled circulation of 6234 nominal addressees, consisting of UVS International members (2011), government (343), military (1142) & diplomatic corp (16) representatives, regulatory authorities (309), stakeholder associations (77) & researchers & academics (2061) in 68 countries involved with unmanned vehicles systems. As many of the defence industry and governmental recipients cannot access web sites from their office computers, this News Flash contains the entire text of the articles & press releases.

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MARK YOUR AGENDA

PARCABERPORTH

UAS Forum & Exhibition & Flight Demos

ParcAberporth, Wales, UK

June 25-26, 2008

www.parcaberporth.com

EMAV 2008

Micro UAS Conference, Competition & Exhibition
Braunschweig, Germany - July 8-10, 2008

www.emav08.org &

www.dgon.de/emav2008.htm

UVS CANADA 2008

National Conference & Exhibition
Ottawa, Ontario, Canada

November 4-7, 2008

www.uvscanada.org

UAS CHINA 2008

1st National UAS Conference
Beijing, China

September 25 & 26, 2008

www.csuav.com &

www.aviationnow.com.cn

This event will take place in new Grand Skylight Catic Hotel and is being organized by International Aviation Group of China, in partnership with UVS International.

- Proposals for presentations, along with a 250 word abstract (MS-Word file), should be emailed to UVS International before 15 July 2008.

EUROCONTROL

Innovative Research ATM Workshop & Exhibition
Eurocontrol Experimental Centre

Brétigny-sur-Orge, France - December 2-4, 2008

<http://inoworkshop.eurocontrol.fr>

UAS TAAC 2008

Technical Conference & Exhibition
Santa Ana Pueblo, NM, USA - December 9-10, 2008

Classified Session (US only) on December 11, 2008

<http://psl.nmsu.edu/uav/conference/2008/>

UVS-TECH 2009

3rd National UAS Conference
Moscow, Russia

January 27-29, 2009

www.uvs-tech.ru

This event is being organized by Expo-Ecos on behalf of the Ministry of Transport & Trade, in partnership with UVS International.

- Proposals for presentations, along with a 250 word abstract (MS-Word file), should be emailed to UVS International before 15 September 2008.

ICAUV 2009

International Conference & Exhibition
on Autonomous Unmanned Systems
Eagleton Golf Resort
Bangalore, India

April 3 & 4, 2009

www.icauv-2009.org (under construction)

The first ever Indian conference dedicated to UAS, ICAUV 2008 will take place at the Eagleton Golf Resort, which is located just outside Bangalore. This event is being organized by the Indian Ministry of Defence, DRDO, ADE, in partnership with UVS International.

- Proposals for presentations, along with a 250 word abstract (MS-Word file), should be emailed to UVS International before 15 September 2008.

BUSINESSES BUILD, PROVIDE PARTS FOR UNMANNED CRAFT

By Max Jarman
The Arizona Republic, USA
www.azcentral.com
May 18, 2008

Arizona-based companies are engaged in building unmanned aerial vehicles, or UAVs, of their own, as well as components used in planes produced by other makers.

- In Phoenix, Honeywell Aerospace has developed an 18-pound aircraft called the Micro Air Vehicle that resembles a bucket and maneuvers like a helicopter. Honeywell also makes the engines for the Predator B aircraft, now being used in Iraq and Afghanistan and on the Arizona-Mexico border. Honeywell's Micro Air Vehicle can be carried in a backpack and launched and controlled in the field. It allows users to peer into buildings and other places out of the line of sight. The so-called MAV has infrared sensors and can locate buried improvised-explosive devices, or IEDs, as well as other explosives. Honeywell's MAV passed field tests in Iraq last year, and the company expects an order shortly from the U.S. military for several hundred units. While the product was developed for the military, police departments in Houston and Miami are eyeing the product. While Honeywell declined to name the price of the units, the Miami Police Department estimates it at \$250,000.
- The Department of Homeland Security Customs and Border Protection division has four 36-foot Predators deployed on the Arizona border. «They've been very successful in detecting aliens,» said Juan Munoz-Torres, a spokesman for Customs and Border Protection's air and marine unit. The agency plans to deploy one this summer on the northern border in North Dakota and eventually plans to use them along the entire southern and northern borders along the Gulf of Mexico and the Caribbean. The \$10.5 million Predators, built by General Atomics Aerospace of San Diego, can patrol the border at speeds up to 240 knots (276 mph) and send back streaming video from up to 50,000 feet. A modified version of the aircraft, called the Reaper, is equipped with two Hellfire missiles and is deployed by the U.S. Air Force in Iraq and Afghanistan. The Predators in Iraq are controlled from Nellis Air Force Base in Nevada, while those on the Arizona border are flown from Fort Huachuca. A more lethal version of the Predator, called the Sky Warrior, carries four missiles and is being developed for the U.S. Army. The aircraft's targeting system is built by Raytheon Co. in Tucson, which also makes sensors for Northrop Grumman Corp.'s \$35 million high-altitude, long-range reconnaissance UAV called the Global Hawk. Raytheon also has developed its own experimental UAV, called the Cobra, and is working on a new plane, the KillerBee, that it hopes to sell to the U.S. Navy and Marine Corps. The missile maker operates one of a handful of U.S. test facilities for unmanned aircraft near Sierra Vista, where it is working on the KillerBee and conducting further experiments with its 9-foot Cobra.
- In Tucson, Advanced Ceramics Research has been building UAVs for six years and has three models: the Silver Fox, Mantra and Coyote. The 5-foot Silver Fox is undergoing combat trials in Iraq while the 6-foot Mantra is being pressed into service by the Scripps Research Institute in La Jolla, California, to collect data on California's air quality. The planes have been deployed in Greenland collecting data on climate change. Another aircraft, the 31-inch Coyote has an electric motor and wings that fold back so it can be launched from a tube on an airplane or helicopter. Woddy Berzins, a spokesman for Advanced Ceramics, said the company has produced about 400 planes that it has sold in the U.S. and abroad. «We're looking at both military and commercial applications for our aircraft,» Berzins said.
- In Mesa, Boeing is working on its Unmanned Little Bird. The company has modified MD530F commercial helicopter to fly without a pilot. The military is eyeing the unmanned aerial vehicle to re-supply combat troops and as a weapons platform. Boeing has been flying the Little Bird from the cockpit of a Mesa-made Apache Longbow attack helicopter. The next-generation Apaches will come with UAV guidance systems as standard equipment. The technology will allow the pilot to send out a UAV to gather intelligence and provide air support for troops on the ground and in the air.

PILOTLESS AIRCRAFT TESTED IN ARIZONA

By Max Jarman
The Arizona Republic, USA
www.azcentral.com
May 18, 2008

Arizona's airspace is being invaded by a bizarre array of aircraft that resemble flying wastebaskets, giant cigars with wings and model airplanes on steroids.

They are unmanned aerial vehicles, or UAVs, and they are becoming an increasingly important tool in warfare, border security and law enforcement. The unmanned planes are relatively inexpensive compared with conventional

aircraft and can be flown on dangerous missions without putting a pilot and crew at risk.

Arizona, because of its clear skies, open space and roster of aerospace and defense companies, is emerging as a hub for the development and production of the pilotless aircraft.

Companies come from around the globe to test their technologies at Fort Huachuca and at Raytheon Co.'s unmanned-aircraft test site near Sierra Vista, one of a handful of such facilities in the country.

And at Honeywell Aerospace in Phoenix, Advanced Ceramics Research in Tucson and the Boeing Co. in Mesa, engineers are working on versions of the unmanned airplanes and the high-tech systems that make them fly and function.

The UAVs were initially conceived as reconnaissance and information-gathering tools but in Iraq and Afghanistan, they are increasingly being outfitted with weapons and being called upon to perform an expanding list of tasks. The industry is growing at more than 10 percent per year, and sales are expected to reach \$10 billion by 2012, according to some estimates.

Much of the momentum is coming from the U.S. military. After early battlefield successes in Iraq and Afghanistan, the military has been lavishing money on UAVs.

The Department of Defense forecasts that one-third of its strike force will utilize UAVs by 2010.

Their lower cost and potential for saving lives make them a no-brainer for the military, which is spending billions of dollars a year on purchases and research.

The proposed 2009 defense budget alone provides \$2 billion to purchase unmanned aerial vehicles such as General Atomics' Predator and Northrop Grumman's Global Hawk.

A 2005 Air Force study estimated the cost of training a pilot at \$700,000 and a UAV operator at \$13,000.

Furthermore, UAVs do not require incremental pilot-related costs such as displays and instruments, ejection seats and environmental controls. The planes are smaller and lighter and more aerodynamic, which translates into lower component and fuel costs.

Honeywell's Micro Air Vehicle performs the reconnaissance work of a helicopter at a cost of about \$250,000. That compares with \$60 million for an Apache helicopter.

«There is a big push for procurement of these systems and a lot of money available,» said Lindsay Voss, an unmanned-systems industry analyst with the market-research firm Frost & Sullivan.

There also is a growing commercial market for the planes, which analysts predict will eventually haul cargo and even passengers. Already the planes are being used to study air quality in California and global warming in Greenland. Police departments in Houston and Miami also are considering adding unmanned aircraft to their forces.

«They could be used for security, pipeline inspections, monitoring forest fires and collecting data on climate change,» said Vaughn Fulton, manager of Honeywell's Micro Air Vehicle program.

Don Newman, director of unmanned systems for Raytheon Co. in Tucson, predicts cargo companies such as UPS and FedEx eventually will use unmanned aircraft.

«Think of the money they could save, if they didn't have to have pilots flying their planes,» he said.

But there is a major hurdle that must be overcome before the commercial market for unmanned aircraft can be fully developed: the Federal Aviation Administration's reluctance to allow the planes to fly in the National Airspace System regulated by the agency.

The unmanned planes now fly in restricted airspace around military bases but must obtain hard-to-get special authorization to fly in the general air space.

Honeywell and other companies are currently working with the FAA to develop rules that would allow UAVs to safely share the airspace with conventional aircraft.

«It's really a groundbreaking process,» Cuff said.

Once the FAA approved standards for using unmanned aerial vehicles in the National Airspace System, the industry is really expected to take off. That could be as soon as 2010, according to estimates.

«Everyone is waiting for the civilian market to erupt,» Voss said.

BAMS-BOOZLED?

By James R. Asker

Aviation Week & Space Technology, USA

www.aviationweek.com/awst

May 19, 2008

A major price difference in the winning proposal by Northrop Grumman and the competing bid by Lockheed Martin/General Atomics Aeronautical Systems for the Navy's Broad-Area Maritime Surveillance (BAMS) UAV program is key to the protest of the contract award. Lockheed Martin's Predator-based design was estimated to cost more than \$5 billion less than Northrop Grumman's, based on the Global Hawk. Lockheed cited cost

difference in a public statement last week, but the company has not publicly released the figure. The difference, however, in the proposals was based on how soon contractors could achieve the objective capabilities on radar coverage and range. Northrop Grumman's proposal is seen as more likely to achieve those goals sooner.

FIRST CHOICES

Ottawa to double defense spending but still faces tough funding decisions

By Graham Warwick

Aviation Week & Space Technology, USA

www.aviationweek.com/awst

May 19, 2008

Canada's plan to boost defense spending would have mixed results for aviation programs. The number of new fighters envisioned has been cut to 65, while other aircraft will be upgraded and their replacement delayed. Prime Minister Stephen Harper unveiled the government's «Canada First» defense strategy in Halifax on May 12, stating: «If you want to be taken seriously in the world, you need the capacity to act - it's that simple.» The strategy includes long-term funding based on an automatic annual increase in military spending from the current 1.5-2%, beginning in 2011-12. This would more than double the Canadian defense budget to C\$30 billion (\$29.9 billion) a year within two decades and make an additional C\$12 billion in funding available over the 20 years.

Despite the increase, Ottawa reduced its requirement for new fighters from 80 - the number of upgraded Boeing CF-18s the Canadian Forces will operate and the planning figure for its involvement in the F-35 Joint Strike Fighter program. The number has been trimmed because the new fighter will have significantly greater capability than the CF-18, Harper said. Canada is participating in development of the Lockheed Martin F-35, but the Dept. of National Defense (DND) stresses the JSF has not been formally selected as the Canadian Forces' next fighter.

Sparse on details, the Canada First defense strategy focuses on increasing readiness, modernizing equipment and expanding the forces. Most major new aircraft procurements have already been announced, including four Boeing C-17 strategic transports, 17 Lockheed Martin C-130J tactical transports and 16 Boeing CH-47 Chinook heavy-lift helicopters. The plan also provides for replacement of the Lockheed CP-140 Aurora maritime-patrol and de Havilland Canada CC-115 Buffalo search-and-rescue (SAR) fleets, but not for some time.

The Canadian Forces plans to upgrade the six Buffalos to extend their lives by five years, to 2015, to give DND more time to acquire a replacement fixed-wing SAR aircraft. The service says it's finalizing its operational requirement for the «predominantly avionics» upgrade and is hoping for a quick approval from the government.

The CP-140 is to be kept in service to 2020, but only 10 of the 18 aircraft will go through a full structural life extension and mission system upgrade. This will include new outer wings, center wing lower surfaces and horizontal stabilizers. The remaining eight partially upgraded Auroras will be retired as they run out of hours.

Bell CH-146 utility helicopters are to be upgraded by 2009 under the Interoperable Griffon Reconnaissance Escort Surveillance Systems project. This will procure up to 19 electro-optical/infrared sensor system mission kits-four in an intelligence, surveillance and reconnaissance configuration with data link, and 15 in an armed escort configuration without data link but with door-mounted gun.

In another interim move, the DND has issued a request for proposals for Project Noctua to lease an unmanned air vehicle system to replace the Sagem Sperwer tactical UAVs operating in Afghanistan. The RFP calls for 12-hr. endurance. Contract award is scheduled for early July, with initial operational capability required within 180 days.

PERSISTENT PRESENCE

Trial 'proves' design concept of next-gen U.K. loitering weapon system

By Douglas Barrie

Aviation Week & Space Technology, USA

www.aviationweek.com/awst

May 19, 2008

Easing the path for the U.K.'s fully funded phase of the program, MBDA has test flown a prototype of the Fire Shadow loitering munition.

MBDA is heading Team Loitering Munition (Team LM) in addressing the Defense Ministry's potential requirement for a persistent presence weapon as part of its Indirect Fire Precision Attack (IFPA) program. The Loitering Munition initiative is intended as a pillar of the Defense Ministry's overall structure for future guided weapons development, enshrined in government and industry's Team Complex Weapons (Team CW) strategic partnering project.

When the intent to create Team CW was unveiled in 2006 by then-Procurement Minister Paul Drayson, he also

announced that the Loiter Munition contract would be awarded single-source if the assessment phase was successfully completed. Team LM includes all of the core Team CW participants.

Other members of Team LM include: Blue Bear Systems Research, Cranfield Aerospace, Cranfield University, Lockheed Martin UK Insys, Marshalls, Meggit, Qinetiq, Roxel, Selex, Thales UK, Ultra Electronics and Vega. The Defense Ministry is interested in the ability to field a land-mobile system that can launch multiple air vehicles to provide a persistent strike capability as part of the IFPA effort.

The Fire Shadow concept has been under development for 18 months, with the bulk of funding provided by industry. The first flight was conducted on Apr. 30 using the Aberporth range, and was intended to prove several elements of the design.

The prototype loitering munition air-frame differed from the proposed production standard design in that it was rail-launched with wings deployed. The production standard design would be slant-launched from a storage canister, with wings opening from a rear fuselage-mounted mechanism.

The test was intended to validate the boost/sustain engine configuration, establish that the endurance model of the airframe was accurate, and that the design was also capable of the required maneuverability in the final phase of the engagement. The design uses a rear-mounted engine and pusher propeller. A number of comparatively low-cost seeker options - including imaging infrared and dual-mode configurations - are being considered.

Following a successful launch, the booster motor separated, the air vehicle transitioned to stable flight and the sustain motor took over. The airframe was required to marry a high lift-over-drag approach with considerable terminal maneuverability, which posed some design challenges.

The intended endurance of the production standard Fire Shadow is in excess of 10 hr., and the test is believed to have confirmed that this is attainable, although the flight trial was not intended to physically prove this. Instead performance data, including fuel consumption, were gathered to validate the computer model used in the development of the Fire Shadow. The system is intended to have an operating range of more than 150 km. (94 mi.) with submetric accuracy. The Fire Shadow will utilize man-in-the-loop operations to cater to rules-of-engagement constraints.

Simulating the terminal phase of the engagement, the Fire Shadow also carried out a maneuver representative of an attack on a target, with the airframe proving capable of sustaining the required level of g-force.

A first flight of the Fire Shadow had originally been targeted for the end of 2007; however, a mix of technical and range clearance issues resulted in this highly ambitious date being moved back. Poor weather toward the end of April also affected the eventual first flight date of the prototype.

Approval for the assessment phase is anticipated in the second half of the year, covering a 36-month period. Following completion of this stage, the program would then go forward to the Main Gate point of the ministry's procurement process. If it passes muster, this would result in up to a further three-year combined development and manufacturing phase leading to the system being introduced into service in 2014-15.

While the initial IFPA assessment phase, concluded in 2005, determined that a loitering munition would prove valuable, there are some within the guided-weapons community who have yet to be fully convinced of its utility and cost-effectiveness.

The introduction of a loitering system will also require additional management of the airspace in the area of operations to deconflict flight paths with tactical unmanned aerial vehicles and manned helicopters.

RETHINKING SOCIAL NETWORKING

One industry insider sees little hope and even less «community» in the mega social sites.

By Kenneth Corbin

Internet News, USA

www.internetnews.com

May 20, 2008

When the phrase «social networking» comes up, most people will reflexively think of Facebook and MySpace. They're the biggest, and they certainly get the most hype. But, if anything, those are social networks in name only, according to Chris Anderson, editor-in-chief of *Wired* magazine.

In a keynote address here at the MediaBistro Circus media conference, Anderson argued that social networking is really about identifying with a community that is built around a specific topic, a «*raison d'être*». «'Community' is one of these words that we toss around all the time,» Anderson said. «The problem with the social networking destinations like Facebook and MySpace is that they're not about anything - they're about Facebook and MySpace.» Instead, smaller sites with a narrow focus are the more fertile grounds for successful social networking, Anderson argued.

He was referring to the Internet's «long tail,» a term he coined in 2004 referring to the innumerable niche sites across the Web whose visitors tend to have a strong interest in a particular field of content.

Any site can include social networking features such as profile pages, blogs and the ability to upload and share photos or videos. But those features aren't enough to build a community, Anderson argued.

The successful social networking model will be built around a defined field of content, the more specific the better, Anderson said. He pointed to Ning, the new venture of Netscape founder Marc Andreessen, which helps people build a social network around niche topics.

So far, Ning has helped created more than 255,000 social networks on topics ranging from Mercedes Benz ownership to amateur unmanned aerial vehicles, a network that Anderson created around his favorite geek hobby. Sites like these are made for social networking, Anderson argued, because they already have a band of dedicated faithful with a common interest. The mega social networks, by contrast, are social in so far as they impel people to seek out strangers to amass giant networks in what Anderson called the «friending arms race.»

«We need to take social networking out of Facebook and out of MySpace and bring it into our sites,» Anderson said. Those environments, he said, would be about «content first, and social networking second.»

Any vision of social networking these days is bound to encounter the question of monetization. Despite the tens of millions of people who have created profiles on MySpace and Facebook, those sites are still struggling to turn a profit. The short answer to the monetization question is, of course, advertising. But as News Corp. CEO Rupert Murdoch quipped on his company's most recent earnings call, selling ads on social networks is hard.

As Anderson explained it, the problem is targeting. Because the membership of those sites is so varied, targeting ads effectively and in a way that respects users' privacy has so far been an unsolvable problem.

Whereas the typical CPM (cost per thousand impressions) for an ad on Facebook or MySpace might be around 20 cents to 30 cents, Anderson said that his own Ning-based DIY Drones site enjoys CPMs of around \$7 through Google AdSense.

The reason? A smaller community formed around a specific interest means a more qualified audience. A typical MySpace ad might represent a comparatively generic product such as classmates.com or a real estate service. But ads on Anderson's do-it-yourself drones site are selling things like accelerometers built on open source hardware. Definitely not for mass appeal.

Of course, the monetization paradox is that «the highest value is in the smallest sites.» Niche sites will have more qualified audiences, so they will be able to sell more targeted ads at higher CPMs - just fewer of them.

That paradox doesn't have an easy answer, but Anderson is adamant that the future of social networks lies in the granular sites built around a distinct purpose. While he was not ready to eulogize MySpace and Facebook, Anderson was sharply critical of their purpose, and seemed highly skeptical about their staying power.

«They're generic social networks,» he said. «That is why they have been so difficult to monetize, and why they will see so much competition from niche social networks.»

PRESS RELEASE

NGC Showcases UAV Capabilities Northrop Grumman, USA May 21, 2008

Northrop Grumman Corporation (NYSE:NOC) will display a wide range of its key capabilities and programmes at the Berlin International Aerospace Exhibition, including unmanned aerial vehicles, aerial tanker refueling and aircraft navigation systems. The air show will take place at the southern section of Berlin-Schönefeld Airport from 27 May to 1 June. More than 1,000 exhibitors from some 40 countries will participate in the show, which will also commemorate the 60th anniversary of the Berlin Airlift.

«We are strongly positioned to grow our business in Germany and across Europe where we have considerable capabilities to offer,» said John Brooks, president of Northrop Grumman International Inc. and vice-president of international business development for Northrop Grumman's Integrated Systems sector. «We look forward to serving the needs of our customers by building on the success of our industry partnerships to leverage our core capabilities and provide tailored solutions.»

PRESS RELEASE

iRobot Receives Orders Totaling \$22 M iRobot Corp, USA May 22, 2008

Bedford, Mass., USA - iRobot Corp. today announced it received orders under two separate contracts from the U.S. Army Program Executive Office for Simulation, Training, and Instrumentation (PEO STRI), that manages

ADVERTISEMENT



these contracts on behalf of the Robotic Systems Joint Project Office at Warren, Mich. and Huntsville, Ala. PEO STRI placed a \$16 million order, the third under the xBot contract, to put more than 200 robots and spare parts into the hands of infantry by October 31, 2008. Orders to date now total \$27 million under this \$286 million Indefinite-Delivery/Indefinite-Quantity (IDIQ) contract.

iRobot also received a delivery order totaling \$6.3 million under the PEO STRI contract for a combination of iRobot(r) PackBot(r) 510 with EOD kit robots, the iRobot PackBot with ICx Fido Explosives Detection Kits, as well as spare parts and equipment. Total orders under this \$64 million IDIQ contract equal \$52 million, and iRobot expects to complete delivery by the end of September 30, 2008.

«Each day, the military is using our robots to perform missions that leverage the benefits of robots in theater,» said Joe Dyer, president of iRobot Government and Industrial Robots. «Continued investment by the U.S. Army further validates these advantages, especially the ability to complete critical missions at safe standoff distances.»

BOEING FLIES A160T HUMMINGBIRD UNMANNED ROTORCRAFT FOR 18 HOURS

Space War, USA

www.spacewar.com

May 22, 2008

Boeing successfully flew its A160T Hummingbird unmanned rotorcraft for 18.7 hours May 14-15, claiming an unofficial world endurance record for unmanned aerial vehicles (UAVs) weighing between 1,102 and 5,511 pounds (500 to 2,500 kilograms).

«We didn't set out to establish a world record, but it was a great accomplishment,» said Jim Martin, Boeing Advanced Systems A160T program manager.

«This 18-hour endurance flight is the culmination of thousands of hours of systems, ground and flight testing. The aircraft performed flawlessly, flying unrefueled longer than any other current unmanned rotorcraft. Our customers are excited about this important flight, the needs the A160T fills and the many options it gives warfighters.»

During the flight at the U.S. Army's Yuma Proving Ground in southwestern Arizona, the turbine-powered aircraft

carried a 300-pound internal payload at altitudes up to 15,000 feet, landing with better than 90 minutes of fuel in reserve. The flight began May 14 at 8:55 p.m. (Pacific time) and ended May 15 at 3:36 p.m.

Boeing has submitted an application to the National Aeronautic Association, the U.S. sanctioning body for the Fédération Aéronautique Internationale (FAI), to officially claim the world record. FAI establishes rules for the control and certification of world aeronautical and astronautical records.

«With its ability to operate autonomously for extremely long durations while carrying heavy payloads, the A160T is perfectly designed for a variety of military missions,» said Grady Eakin, Boeing Advanced Systems director of Business Development.

«The A160T's large internal bays can accommodate multiple sensor payloads, allowing it to simultaneously perform persistent intelligence, reconnaissance, surveillance and target acquisition, communications relay, direct attack and other missions all in the same sortie. An externally mounted payload module can deliver heavy supplies or recover high-value assets with great precision.»

The aircraft used in the 18-hour test was one of the A160Ts Boeing Advanced Systems is building for customers including the U.S. Defense Advanced Research Projects Agency (DARPA), the U.S. Army Aviation Applied Technology Directorate and U.S. Naval Air Systems Command. The same aircraft achieved another flight milestone May 9 by successfully completing hover-out-of-ground-effect (HOGE) demonstrations at altitudes of 15,000 and 20,000 feet.

«The HOGE was an important flight because it showcased a highly desirable capability that other unmanned rotorcraft can't deliver,» said Martin.

«Being able to hover at high altitudes puts the A160T above certain mountainous areas and out of range of some ground defenses, while maintaining persistent intelligence, reconnaissance, surveillance and target acquisition, and performing other missions for troops on the ground. The 15,000-foot HOGE met the DARPA goal. We exceeded that goal with the 20,000-foot test point.»

The HOGE demonstration flight lasted 2.9 hours, including hovering for more than seven minutes. The HOGE and 18-hour endurance flights completed all planned Phase I flight test demonstrations for DARPA.

Since 2007, the A160T has reached a speed of 142 knots, recorded an eight-hour flight carrying more than 1,000 pounds of payload and recorded a 12-hour flight carrying more than 500 pounds, all using a fraction of its maximum fuel capacity.

The Hummingbird features a unique optimum-speed-rotor technology that significantly improves overall performance efficiency by adjusting the rotor's speed at different altitudes, gross weights and cruise speeds.

The autonomous unmanned aircraft, measuring 35 feet long with a 36-foot rotor diameter, eventually will fly more than 140 knots with a ceiling of 20,000 to 30,000 feet (high hover capability up to 15,000 feet) for more than 20 hours.

NORTHROP GRUMMAN SHOWCASES UAV CAPABILITIES AT BERLIN ILA AIR SHOW 2008
Space War, USA
www.spacewar.com
May 22, 2008

Northrop Grumman will display a wide range of its key capabilities and programmes at the Berlin International Aerospace Exhibition, including unmanned aerial vehicles, aerial tanker refueling and aircraft navigation systems. The air show will take place at the southern section of Berlin-Schönefeld Airport from 27 May to 1 June. More than 1,000 exhibitors from some 40 countries will participate in the show, which will also commemorate the 60th anniversary of the Berlin Airlift.

«We are strongly positioned to grow our business in Germany and across Europe where we have considerable capabilities to offer,» said John Brooks, president of Northrop Grumman International Inc. and vice-president of international business development for Northrop Grumman's Integrated Systems sector.

«We look forward to serving the needs of our customers by building on the success of our industry partnerships to leverage our core capabilities and provide tailored solutions.»

The Northrop Grumman exhibit pavilion will feature the company's industry-leading capability in unmanned aerial vehicles including Euro Hawk, Fire Scout, the recently-awarded Broad Area Maritime Surveillance and the Global Hawk-based solution for the NATO Alliance Ground Surveillance (AGS) requirement.

In 2007, the German Ministry of Defence awarded a contract to Euro Hawk GmbH, a joint-venture company formed by Northrop Grumman and EADS, for the development, test and support of the Euro Hawk(r) unmanned signals intelligence (SIGINT) surveillance and reconnaissance system. With a wing span larger than a commercial airliner's, the Euro Hawk(r) UAS will serve as the German Air Force's high altitude, long endurance SIGINT system.

NATO has also chosen Global Hawk to meet its AGS requirement. Demonstrating its commitment to trans-

Atlantic cooperation, Northrop Grumman leads an industry team representing 19 participating nations to develop and produce an Alliance-owned and operated ground surveillance capability.

Also on display will be the KC-45A aerial refuelling tanker. Earlier this year, the U.S. Air Force selected a Northrop Grumman-led team to provide the new tanker, which will be based on the highly successful Airbus A330 commercial airframe. The KC-45A will be built by a world-class industrial team that includes EADS North America as the primary sub-contractor.

The MQ-8B Fire Scout vertical take-off and landing unmanned aerial vehicle will also be featured. The Navy recently announced that it intends to conduct the Fire Scout Operational Evaluation aboard a FFG-7, Oliver Hazard Perry class ship. This will provide the fleet with unmanned aerial system support as soon as possible. Northrop Grumman's German and Italian subsidiaries will also be represented at the air show. LITEF will display its navigation systems for land vehicles, sensors for weapon stabilisation, inertial guidance systems for missiles and attitude heading reference system / navigation systems for fixed and rotary wing aircraft.

Northrop Grumman Italia will display a full range of its state-of-the-art fibre-optic navigation systems including the LISA-200, the Navex family of attitude heading reference systems and LN-251 / LN-270 high accuracy inertial navigation systems.

These systems are in service on aircraft platforms in the U.S., Europe and Asia and are fitted to the Eurofighter Typhoon, the Tornado and BAE Systems Hawk.

EYE IN THE SKY: NEW FLYING LASER WILL STOP HEAT-SEEKING MISSILES

By Allison Barrie

Fox News

www.foxnews.com

May 22, 2008

For just a few thousand dollars terrorists in Somalia bought a heat-seeking missile and took down a commercial airliner as it was taking off. Now the U.S. government wants to put an eye in the sky to keep watch over our airports and make sure that never happens again.

Enter Project Chloe, an innovative program commissioned by the Department of Homeland Security. DHS plans to fly an unmanned aerial vehicle (UAV) at 65,000 feet that will zap the missiles with a laser and put them out of commission.

Chloe, named after the «24» character who serves as Jack Bauer's eyes and ears, uses a mounted laser to blind the missile's infrared eye, deflecting it and saving planes from certain harm.

Shoulder-launched missiles, also called MANPADS (man-portable air-defense systems), pose «a significant threat to aviation,» according to Jay Cohen, under secretary for science and technology at DHS.

The missiles are easy to fire, weigh just 35 pounds and are usually under five feet long. In the world of military arms, they're fairly cheap, costing between \$5,000 and \$10,000.

Terrorists had been threatening to target commercial planes with the heat-seekers since 2002, and they finally succeeded with the Somalia attack on March 24 of last year when they brought down a plane full of humanitarian cargo, killing 11.

Commercial planes are vulnerable to infrared tracking, as their engines and power sources offer easy targets. But Project Chloe's UAV's can do some heat-seeking of their own.

Here's how it works:

If a terrorist launches a missile, the UAV's sensors immediately detect the missile's thermal scar. In just seconds, it fires its laser to jam the missile's guidance system.

A terrorist need be within only 10 miles of a runway to bring down a plane as it lands or takes off, and MANPADS can strike planes at altitudes up to 15,000 feet within a 2-3 mile range.

But Project Chloe could surmount that threat, offering 360-degree protection over a vast area. «... One of these devices flying above 60,000 feet would cover all of the commercial airports in the L.A. County area,» Cohen said. Not only can Chloe protect planes - its sensors could help defend against other security threats, from illegal border crossings to strikes against critical infrastructure near the airports.

Fitted with a high-magnification camera, a Chloe UAV could immediately zoom in to provide real-time visuals and investigate threats nearby without having to wait to send up helicopters for a look.

Homeland Security had previously commissioned a project to mount another version of the detect-and-deflect technology on individual planes, but airlines have balked at the cost - over \$1 million a pop.

Airlines are hoping for a solution that won't compel them to foot the bill or operate the machines, and Homeland Security's flying laser may just be the ticket.

There may be one catch, however: deflecting those missiles can save hundreds of lives, but there's no telling where they'll hit the ground.

AUSTRALIA TESTS SPY PLANES TO PROTECT BORDERS

AFP

<http://asia.news.yahoo.com>

May 23, 2008

Sydney (AFP) - Unmanned spy aircraft are being tested for Australian border patrols against threats at sea, including boatloads of illegal immigrants, the government said Friday.

The Border Protection Command has launched a six-week trial of the planes from a base at Weipa in the far northeast to assess the technology for use in civil maritime surveillance, Home Affairs Minister Bob Debus said. «UAVs (unmanned aerial vehicles) are quiet, virtually undetectable and can maintain extended surveillance of a target area or vessel for many hours at a time,» Debus said in a statement.

The aircraft had flown successfully over the Gulf of Carpentaria, the Torres Strait between Australia and Papua New Guinea and the Great Barrier Reef during the trials.

«All are areas of interest to Border Protection Command in preventing illegal foreign fishing, keeping a watch for quarantine and border threats and detecting prohibited activities in protected marine areas,» he said.

Surveillance against illegal immigrants trying to reach Australian shores by boat would be part of the spy planes' duties if they are put into full-time service, a spokesman for Debus told AFP.

«This trial will assess the suitability of UAVs to boost surveillance of critical offshore maritime areas, including the vital Torres Strait border region and the environmentally sensitive Great Barrier Reef,» Debus said.

The Border Protection Command will prepare a report for the government at the end of the trial in June.

The aircraft under test is a Heron operated by Israel Aerospace Industries. It has a wingspan of 16.6 metres (54 feet), is 8.5m long and has a range of more than 1,800 kilometres.

DEMAND GROWS FOR REMOTE-CONTROLLED DRONES ON FRONT LINES

CNN, USA

<http://edition.cnn.com>

May 23, 2008

The demands of wars in Iraq and Afghanistan are behind a new push by the Pentagon to increase the ranks of one of its most tireless fighting machines: remote-controlled attack aircraft called Unmanned Aerial Vehicles, or UAVs. The U.S. military in recent months has doubled its squadrons of the small, quiet and deadly drones, which are operated by pilots in the United States.

Gen. David Petraeus, the top U.S. commander in Iraq, praised the work of the Predator UAVs flying over Baghdad. «I think there's some path-breaking work ongoing here,» Petraeus said.

Yet Defense Secretary Robert Gates said last month that it's «been like pulling teeth» to get more UAVs into the air over Iraq and Afghanistan. He established a task force to speed up the process.

«Unmanned systems cost much less and offer greater loiter times than their manned counterparts, making them ideal for many of today's tasks,» Gates told Air War College graduates last month. Watch drones blast unsuspecting targets »

CNN has obtained previously classified video of the Air Force's newest heavily armed unmanned warplane with the grim moniker «The Reaper,» which is essentially a Predator on steroids. The newly declassified video shows a 500-pound bomb slamming into a suspected Taliban bunker in southern Afghanistan this year. Another video clip shows a 500-pound bomb, aimed and fired by a pilot at Creech Air Force Base in the Nevada desert, striking two insurgents in Afghanistan as they try to escape on a motorcycle.

«It flies higher. It flies faster. It carries more of a weapons load,» said Lt. Gen. Norman Seip, commander of the 12th Air Force at Davis-Monthan Air Force Base, Arizona. «They're flying long, they are flying hard and they are making a big impact.»

The CIA began using unmanned drones with cameras in the early 1990s, when Gates was the CIA director.

«After 27 years of experience as an intelligence professional, I had seen many agents place themselves in harm's way to collect information in some of the world's most dangerous and inaccessible environments,» Gates said in his Air War College address. He welcomed the UAVs as a «far less risky and far more versatile means of gathering data.»

The addition of Hellfire missiles to the original «Predator» spy drone just after September 11, 2001, gave it the ability to live up to its name.

Gates said the Pentagon now has 5,000 UAVs in service - 25 times the number before the September 11 attacks. The Air Force recently announced that it can now keep 24 UAVs in the air at all times, putting it two years ahead of its goal.

«But in my view, we can do - and we should do - more to meet the needs of men and women fighting in the current conflicts while their outcome may still be in doubt,» Gates said.

Gates said he was concerned the military was «not moving aggressively» to get more UAVs to the battlefield. «I've been wrestling for months to get more intelligence, surveillance and reconnaissance assets into the theater,» he said. «Because people were stuck in old ways of doing business, it's been like pulling teeth.»

The task force, created last month, includes representatives from all four branches of the military. It has a short deadline, he said. The biggest challenge may be finding and training men and women to pilot the growing fleet of UAVs. «All this may require rethinking long-standing service assumptions and priorities about which missions require certified pilots and which do not,» Gates said.

Critics argue that any aircraft carrying weapons should only be flown by certified pilots. The Air Force has reduced manpower demands by letting pilots in the United States operate the planes through satellite links supported by ground crews closer to the battlefield. The Air Force has reassigned pilots from other aircraft, and the Air National Guard has also accelerated its Predator commitment in five states, the Air Force said. It will establish a second Predator training squadron and a Predator weapons instructor course in early 2009, the Air Force said.

MANHOLE ALERT ... PREDATOR ON DISPLAY ... MORE

By Lisa Hoffman

Fox News

www.foxnews.com

May 23, 2008

Washington, USA - Apparently, according to the Department of Homeland Security, one of the nation's major terrorism vulnerabilities lies under our feet: manholes. Though heavy to lift, manhole covers generally aren't locked or otherwise hardened against those who might want to attack us from below. Anyone could open most of them by using a simple lever. The absence of alarms or surveillance devices also means that bad guys could wreak havoc undetected beneath our cities, sabotaging utilities and telecommunications lines, or worse.

Homeland Security's National Infrastructure Protection Center is now encouraging the development and eventual installation of locking devices on many of the estimated 250,000 manhole covers that dot U.S. streets and sidewalks - an enormously expensive task.

Everyone knows that radio signals are lost underground. But researchers at the National Institute of Standards and Technology recently confirmed that underground tunnels can have a frequency «sweet spot» that lets signals travel several times farther than other channels. The exact «sweet spot» depends on the width of the tunnel.

The studies are part of a larger post-9/11 effort to document what radio frequencies work best in different types of buildings and structures with the aim of giving emergency responders and perhaps other users the best quality of transmissions.

At the Smithsonian's National Air and Space Museum, historic aircraft of the past draw more tourists than almost any other attraction in Washington. Now visitors can see several of the first generation of revolutionary drones that will be pivotal warplanes in the future. Six of the so-called «unmanned aerial vehicles,» or UAVs, are now on view. Included is an MQ-1L Predator A - a surveillance robot operated by airmen on the ground thousands of miles away - that can fly around the clock, providing unprecedented reconnaissance as well as missile fire.

The Predator at the museum is one of the first three to fly over Afghanistan after the 9/11 attacks and was the first Predator to launch a missile in combat. Before it was retired, it flew 196 combat sorties and racked up more than 2,700 flight hours.

Speaking of retiring, the announcement of Rep. Vito Fossella, R-N.Y., that he will not seek re-election - after his recent drunk-driving arrest and his acknowledgment that he fathered a child out of wedlock - brings to 26 the number of House Republicans who are either retiring or seeking other office.

That compares to only seven House Democrats who are vacating their seats.

UN CONCLUDES RUSSIA SHOT DOWN GEORGIAN SPY PLANE

Space War, USA

www.spacewar.com

May 26, 2008

The UN concluded in a report Monday that a Russian fighter jet shot down an unmanned Georgian spy plane last month, prompting the EU to call on Moscow and Tbilisi to «explain themselves.»

The report, posted on the UN website, said evidence gathered by UN monitors «leads to the conclusion that the aircraft belonged to the Russian air force» and that the downing was «fundamentally inconsistent» with ceasefire

accords.

Russia's defence ministry rejected the findings, with spokesman Alexander Drobyshevsky telling AFP: «We deny this report. Our planes did not violate anyone's airspace and therefore could not have fired a shot.»

The incident is one of the most serious in the volatile region since the end of a military conflict in 1993 between Georgian troops and Moscow-backed separatist rebels in the Georgian breakaway province of Abkhazia.

The European Union's Slovenian presidency said the UN report was «balanced» because it criticised Russia as well as Georgia for deploying the spy plane in the area in violation of a ceasefire agreement.

«It's a balanced report,» Slovenian Foreign Minister Dimitrij Rupel told reporters in Brussels after chairing a meeting of his EU counterparts.

«We think that those who have been found responsible should explain themselves,» Rupel said.

Georgian President Mikheil Saakashvili said the report vindicated Tbilisi's claims that the Russian military has been violating its sovereignty.

«Georgia today is in a very difficult situation because foreign armed forces have entered its territory,» he said in televised remarks.

«The UN has released a report in which Russia is directly accused of aggression against Georgia.... For the first time, the UN has directly, unequivocally pointed the finger at Russia.»

Russia, which backs the Abkhaz rebels in the lush Black Sea province, has denied violating Georgian airspace and says that Abkhaz forces shot down the Georgian drone on April 20 - a claim supported by Abkhaz officials. But the report, obtained by AFP ahead of its release by the UN, stated that a MiG-29 or Su-27 warplane was used in the incident and that the aircraft then «turned back north heading... into Russian airspace.»

The text was highly critical of the drone shooting, saying it violated a ceasefire agreement between Georgian forces and Abkhaz rebels - and called into question the separation of Russian peacekeepers from the conflict.

The UN mission «considers that enforcement action by third parties - in this case the Russian Federation - is fundamentally inconsistent with the Moscow agreement and, aside from possible considerations under international law, undercuts the ceasefire and separation of forces regime,» the report said.

The report also indicated that the incident may have posed a threat to civilian aircraft.

«The interception took place very close to, or even inside, an international airway at a time (when) civilian aircraft were flying,» it said.

Analysts said the report could give a major boost to Georgian efforts to replace Russian peacekeepers in Abkhazia, whom Tbilisi accuses of siding with the rebels, with an international force.

«This is going to have a huge impact,» said Tornike Sharashenidze, a Tbilisi-based analyst.

«Now Georgia has a report from a neutral body on the Russian militarisation of Abkhazia. Georgia will be able to count on much stronger support, not only from America, but from Europe,» he said.

The text said its conclusions were based on analysis of witness statements, radar records and video taken by the Georgian drone that filmed itself under attack at close range by a warplane.

The drone footage had not been doctored in any way, the UN report said.

Tense relations between Russia and Georgia, whose pro-Western leadership is pushing for entry into NATO, have flared up repeatedly over the last month in Abkhazia.

Georgian officials warned that the two countries had come close to war and Russia announced it was sending reinforcements to a Russian troop contingent deployed in Abkhazia as peacekeepers.

But Russian President Dmitry Medvedev appeared to strike a more conciliatory tone on Monday in a message to Saakashvili congratulating him on Georgia's independence day.

Medvedev said he hoped for «constructive» cooperation with Georgia, promoting «good neighbourly relations» and «fostering stability and security in the Caucasus,» the Kremlin said in a statement.

'IT'S ALWAYS BETTER TO TALK THAN TO SHOOT'

By Jay Bookman

The Atlanta Journal-Constitution, USA

www.ajc.com

May 26, 2008

It might be hard to tell, but beneath the name-calling and posturing, John McCain and Barack Obama are actually debating two critically important questions confronting the American people:

First, under what conditions should we turn to force to resolve our differences with other nations?

Second, how willing should we be to turn to negotiations to resolve differences as a way of avoiding war?

Both candidates have a history on such issues: McCain, for example, was an early advocate of war with Iraq; Obama was an early opponent. In fact, it's telling that most of the neoconservatives who helped drive us to war with Iraq backed McCain in the 2000 GOP primaries against George W. Bush, believing McCain to be more

aggressive about the use of force.

In general, the difference between the candidates can be described in a single sentence: Both men are willing to go to war to protect America; McCain is more willing to go to war to protect American interests.

That may seem at first a subtle distinction, but it is not. Protecting America, and protecting American interests, are two very different thresholds for going to war. Defending America and her allies is always a cause worth fighting for - we should never balk at that duty, and we never will.

The invasion of Afghanistan, for example, was a clear use of force to protect America, because that country's territory had been used to launch a devastating attack on our soil. Both McCain and Obama backed that decision. However, sending our fellow Americans off to fight and die to advance American interests is a very different thing. Our interests, while important, don't directly affect our security. They seek less tangible goals such as economic benefit, strategic advantage and the removal of leaders who frustrate our goals. And in general, most Americans are leery of asking their countrymen to die in pursuit of national interests rather than national security.

But as we've seen, there are ways around that reluctance. If you want public support for a war intended to advance national interests, you get it by deceiving the American people into believing that it is instead a war to defend America herself.

The invasion of Iraq was sold just that way, as a war to protect America against mushroom clouds that might rise over U.S. cities and unmanned aerial vehicles from Iraq that might spread smallpox or anthrax over the American landscape. Saddam Hussein was cast as the new Hitler, and anybody who dared question the need to remove him by force was condemned as a dangerous appeaser.

It's a little late, but the American people now understand how they were fooled, which is why only 33 percent of us still believe invading Iraq was the right thing to do.

However, similar issues are now being raised by the debate over how to deal with Iran and Syria and extremist groups such as Hamas. President Bush and McCain both dismiss the possibility of negotiation with those parties, with President Bush suggesting to the Israeli Knesset that those who advocate negotiation sought «the false comfort of appeasement» like that which led to the rise of Hitler.

That talk is nonsense, and Bush knows it. While he came into office refusing to talk to North Korea, he's now sending personal letters to Kim Jongil, North Korea's dictator. In Iraq, we initially refused to negotiate with Sunni groups that were launching attacks against U.S. forces; now, through negotiations, we have turned them into at least temporary allies. Even in Israel, 64 percent of adults in a recent poll said they back negotiations with Hamas, and a few days after Bush's speech, Israeli Prime Minister Olmert announced he had begun direct negotiations with Syria, explaining that «it is always better to talk than to shoot.»

In the world that Bush and McCain occupy, that makes the Israelis appeasers. For the rest of us, it sounds like plain common sense.

U.N. BLAMES RUSSIA FOR DOWNED DRONE

By C. J. CHIVERS

New York Times, USA

www.nytimes.com

May 27, 2008

Moscow, Russia - A United Nations investigation has concluded that a remotely piloted Georgian reconnaissance aircraft that was destroyed last month was struck by an air-to-air missile fired from a Russian fighter jet.

The report suggested that Russia's actions called into question its role as a credible peacekeeper in Georgia's territorial disputes, and it presented the Kremlin with a diplomatic embarrassment over its policy in the southern Caucasus and its previous statements about its military activities there.

Moreover, the report detailed a degree of military recklessness not previously reported, noting that the fighter jet's «interception took place very close to, or even inside an international airway,» while civilian aircraft were flying.

Russia's military again denied a role in the episode. It has previously claimed that all of its military pilots were off duty the day the drone was downed, and even said that an American F/A-18 had shot it down.

But it offered no specific evidence to rebut the finely nuanced account and analysis of the flight paths of the drone and the intercepting aircraft, which were prepared by a fact-finding team of military aviation experts and released Monday.

Georgia's foreign minister seized on the report as verification that Russia was not neutral, and said the findings would be used to try to remove Russian troops from any peacekeeping role on Georgian soil.

The reconnaissance drone operated by Georgia, an Israeli-made Hermes 450, was shot down on April 20, but not before transmitting a highly unusual video recording of its own destruction in the sky over Abkhazia, a separatist region in western Georgia that receives Russian support.

The recording shows a twin-tailed fighter jet bank into view, approach the drone and release a missile that rushes

toward the lens, leaving a dense trail of white smoke. The video ends in a blur as the missile nears the lens and explodes.

As part of its earlier denials, Russia had declared the Georgian video a fake. The investigators concluded otherwise. By examining the available evidence and interviewing eyewitnesses and participants, and by correlating the radar records, the drone's video and maps of the ground, the fact-finding team «concluded that the video was authentic.» The team also concluded that the attacking plane was either a Russian MIG-29 or Su-27, and that it had fired an AA-11 Archer heat-seeking missile, which was detonated near the drone by its internal proximity fuse.

The report suggested that the fighter pilot had flown within range of the drone's cameras in order to avoid using longer-range weapons because of the fighter's proximity to an airway used by civilian aviation.

Russia has served as a regional peacekeeper since Georgian and Abkhaz forces entered an uneasy cease-fire in the 1990s, after Abkhazia achieved de facto independence in a brief war. The Russian military has at least 2,500 soldiers in Abkhazia under a mandate approved by the Commonwealth of Independent States.

The United Nations report said the attack was «fundamentally inconsistent» with Russia's role as a peacekeeper and «undercuts the cease-fire and separation of forces regime.» It also raised «possible considerations under international law» without specifying them.

The report criticized the Georgian government, too, saying that the use of drones over Abkhazia violated the separation of forces agreement and that «this kind of military intelligence-gathering is bound to be interpreted by the Abkhaz side as a precursor to a military operation, particularly in a period of tense relations between the two sides.»

It noted as well that the United Nations had notified Georgia on April 7 that the drones violated the cease-fire agreement.

Officials in Abkhazia had claimed that the Abkhaz military had downed the drone with one of its L-39 jets, a dated aircraft with a single tail fin. The L-39 is typically used for training and bears little resemblance to the jet on the video.

The report made clear that the United Nations did not accept the Abkhaz answer, and noted that Abkhazia had refused to cooperate with investigators.

Sergei M. Shamba, Abkhazia's foreign minister, said he disagreed with the conclusion that Russia had downed the drone. «It does not have any significance to us,» he said of the report, speaking by telephone. «Let them think whatever they want.»

But he welcomed the criticism of Georgia's use of reconnaissance drones. «We know from this report that Georgia violated the agreements and that the United Nations more than once appealed to Georgia to stop these flights,» he said.

Eka Tkeshelashvili, Georgia's foreign minister, said the United Nations report had established a point that Georgia had long tried to make: that Russia is not a neutral party in the dispute between Georgia and Abkhazia, and should not continue to be allowed to play a peacekeeping role.

«The need for changing the peacekeeping format is clear,» she said by telephone. «Russia has established itself as a participant in the conflict.»

The report was released as opposition groups marched Monday in Georgia's capital, Tbilisi, to protest results showing that the party of President Mikheil Saakashvili had won major victories in last week's parliamentary elections, The Associated Press reported. Opposition supporters contend that the elections were rigged.

AAI SHADOW UAS REACHES 300000 FLIGHT HOURS

Space War, USA

www.spacewar.com

May 27, 2008

AAI Corporation, an operating unit of Textron Systems, a Textron Inc has reported that its Shadow UAS have achieved 300,000 cumulative flight hours in service with the U.S. Army and Marine Corps. In fact, 91 percent of these flight hours were amassed in support of Operation Iraqi Freedom and Operation Enduring Freedom.

«It is gratifying to see how mature our Shadow UAS technology has become in the hands of America's soldiers and Marines,» says AAI's Vice President of Unmanned Aircraft Systems Steve Reid.

«The frequency with which we're achieving these milestones is a testament to the robustness of the system, as well as the excellent partnership we have with our customers to ensure our technology is meeting the mark.»

In fact, this milestone was reached only 10 months after the systems reached 200,000 total flight hours, and 22 months after the first 100,000 flight hours were accumulated.

This milestone comes on the heels of receipt by AAI of significant orders for two additional systems from the U.S. Army, five additional systems from the Marine Corps and a training system for the National Guard - all contracted through the U.S. Army Unmanned Aircraft Systems Program Executive Office for Aviation.

To date, a total of 96 Shadow systems have been ordered for use by the Army, Marines and National Guard and 65 have been delivered to these customers.

«America's military services are focused on creating jointness and interoperability, and we're proud to be part of this vital mission with our Shadow UAS program,» says AAI Senior Vice President and General Manager Ellen Lord.

«We enable these efficiencies for the Army, National Guard and Marine Corps not only through design, production and delivery of our combat-proven Shadow system technologies, but through state-of-the-art training capabilities and performance based logistics services.»

PROBLEMS DELAY AUSTRALIAN UAV

By Julian Kerr

Jane's Defence Weekly, UK

www.jdw.janes.com

May 28, 2008

Development problems have delayed the initial operating capability (IOC) of the Australian Army's I-View unmanned aerial vehicles (UAVs) by two years, *Jane's* has learned.

An AUD145 million (USD138 million) contract with Boeing Australia teamed with Israel Aircraft Industries (IAI) was signed in December 2006 for eight I-View MK250s and through-life support. Australia is the launch customer for the UAV, which was chosen to provide airborne surveillance, reconnaissance and target acquisition to support Australian Defence Force (ADF) land operations at brigade level. A Department of Defence (DoD) spokesperson told *Jane's* on 20 May that I-View IOC was originally scheduled for the end of 2009 but that this has now been scheduled for the end of 2011.

«Despite problems with contractor understanding of the Australian army's operation and deployment requirements ... these requirements are now understood, with Boeing and the Defence Materiel Organisation actively working on a commercial resolution,» the spokesperson said.

Some of the Australian requirements «were not inherent to the I-View UAV family», the spokesperson added, and this had contributed to the delay. Boeing Australia was expected to complete a revised work and delivery schedule by the end of June. The DoD will not be disclosing whether damages have been claimed. Boeing Australia President David Withers said in a statement: «Programmes employing cutting-edge technologies can present unique challenges, as has our project involving tactical UAVs. However, as we have assured our valued customer, we remain committed and fully prepared to deliver this important capability.» Well-informed sources blamed much of the delay on «scope creep», including unnecessarily complex flight control software. The sources also referred to integration issues with the UAVs' payloads, which range from synthetic aperture radars to a variety of electro-optical and infrared sensors.

The I-Views are to be operated by the newly formed 20th Surveillance and Target Acquisition Regiment, which has yet to receive the necessary supplementary personnel, the spokesperson said.

USAF SEEKS MORE AGILE AERIAL COMBAT DRONE

By Caitlin Harrington

Jane's Defence Weekly, UK

www.jdw.janes.com

May 28, 2008

The US Air Force (USAF) is looking for contractors interested in building a new armed drone that is faster, more manoeuvrable and better equipped to overcome jamming than the current generation of hunter-killer unmanned aircraft.

USAF officials announced in a 19 May notice that they will release a request for information (RfI) at the end of May for the Next Generation Unmanned Aerial System (NG UAS): a successor to the MQ-1 Predator and MQ-9 Reaper.

USAF officials want the NG UAS, which will fly at high subsonic speeds and support as much as twice the payload as the Reaper, to reach initial operational capability by 2015.

An enhanced hunter-killer unmanned system, the NG UAS would focus on two main missions: intelligence, surveillance and reconnaissance (ISR) as well as strike missions in «low- and some medium-threat environments». The USAF said the NG UAS would be able to conduct limited suppression of enemy air defence (SEAD) missions, meaning the hunter-killer would potentially be among the first aircraft to fly into contested enemy air space. The NG-UAS would also be able to conduct «limited interdiction missions», and close air support missions.

The notice said the NG UAS would also be able to provide support for joint maritime operations and combat search-and-rescue missions, as well as identifying and neutralising threats such as improvised explosive devices, mortars and rocket sites.

The USAF's Reaper is already heavily involved in ISR and strike missions.

However, in theory at least, the NG UAS would be in a position to do those missions more reliably because it would have an anti-jamming capability as well as the ability to perform at «high subsonic dash speed» and with greater manoeuvrability.

These features could allow the NG UAS to overcome enemy attempts to jam or spoof targeting information and they would also allow the NG UAS to potentially outmanoeuvre kinetic threats.

The NG UAS will increase «assuredness of information for [time-sensitive targets]/'weapons of mass destruction' and other high-value targets», the USAF notice said. The unmanned system will also have «enhanced survivability in increased threat environments including jamming and chemical and biological».

A variety of United States defence contractors are likely to express an interest in helping to develop the NG UAS.

PRESS RELEASE

QinetiQ North America Awarded \$400 M for Talon Robots and Spares

QinetiQ, USA

May 28, 2008

QinetiQ today announced that QinetiQ North America's Technology Solutions Group has been awarded a new \$400 million IDIQ (indefinite delivery, indefinite quantity) contract for additional TALON robots and replacement parts for service with the US military in Iraq and Afghanistan.

The contract award was made by the Robotic Systems Joint Program Office (RSJPO) administered by the Naval Air Warfare Training Systems Division (NAVAIR). It is a follow-on to the \$150 million IDIQ awarded in the spring of 2007 that has now been fully funded.

Over 2,000 TALON robots are now deployed around the world, with a significant number located in Iraq and Afghanistan. They are used primarily to assist military personnel with the extremely dangerous job of detecting and disabling roadside bombs - the Improvised Explosive Devices (IEDs) planted by hostile forces to attack troops. TALON robots have been used in more than 80,000 counter-IED missions to date.

«This contract is further evidence of the growing acceptance and willingness on the part of the military to use TALON robots to keep US soldiers and marines as safe as possible,» said Dr William Ribich, president of QinetiQ North America's Technology Solutions Group. «We are proud that TALON is deployed with all branches of the US military for counter-IED missions because of its ruggedness and ease of use.»

SINGAPORE DTA 2008 FOCUSED ON UNMANNED VEHICLES

By Wendell Minnick

Defense News, USA

www.defensenews.com

May 29, 2008

Singapore is considering buying unmanned underwater vehicles (UUVs), Navy Chief Rear Adm. Chew Men Leong said in the keynote speech at the Defense Technology Asia (DTA) 2008 show, held here May 22-23.

The show featured conferences on unmanned vehicles, naval surface, submarine and anti-sub warfare, organizer Samuel Mathews said. Most of the exhibitors were Europe-based, with exhibits from Ital's Selex Sistemi Integrati, France's ECA, Singapore Technologies Electronics - Training & Simulation Systems, France's Eurotorp, Germany's Germanischer Lloyd, France's Sagem Défense Sécurité, Germany's MTU Friedrichshafen, Italy's Whitehead Alenia Sistemi Subacquei, U.S. company L-3 Communications Ocean Systems and French shipbuilder DCNS. Marc Heller of U.S. company Lockheed Martin described the littoral uses of his company's remote multimission vehicle (RMMV), a semi-submersible diesel-powered vehicle with a data link to the mother ship and an endurance of 24 to 72 hours.

Its above-water sensors can perform coastal and harbor surveillance; electronic warfare; intelligence, surveillance and reconnaissance (ISR); and chemical, biological, radiological, nuclear and high-yield explosive detection.

Below-water sensor missions include mine warfare, side-scans, synthetic aperture sonar, low-frequency broadband, active and passive anti-submarine warfare, hauling supplies for special operations troops, and environment assessment.

The U.S. Navy has three RMMVs, with five more on order. One has completed a deployment aboard the destroyer

Bainbridge. An anti-submarine warfare version is being planned.

Patrick Vincent of Thales Naval Division and Claudio Ceccarini, head of marketing for Eurotorp, presented papers on the role of unmanned surface vehicles for anti-submarine warfare. Ceccarini talked about unmanned surface vehicles' use in ISR, force protection, mine warfare, precision engagements, anti-terrorism, anti-submarine warfare and anti-surface warfare. He said they could detect submarines at a safe distance from the mother ship, then fire lightweight torpedoes at them.

Lanfranco Benedetti, of the Italian Ship Model Basin, talked about swarms of 2-meter unmanned surface vehicles equipped with inertial navigation systems, Global Positioning System, gyros and accelerometers. He said a low-power wireless network was under development.

ST Electronics promoted its Integrated Mission Debriefing Station, saying it «records and [plays back] all the simulators and instrumental platforms and can be reviewed in 3-D form rather than the traditional 2-D format.» Other features include stealth view, adaptive head-up display, event analysis and display control.

During DTA, Singapore Telecommunications (SingTel) announced the company won the Seatrade Asia Award for Technical Innovation for the first 1.5m C-Band stabilized satellite antenna for sea vessels.

«This breakthrough caters to the increasing demand for 'always-on' broadband solutions such as e-mail, Internet access, e-Surveillance, GSM coverage and Voice-over-IP calls,» said Titus Yong, SingTel's vice president of Satellite.

PRESS RELEASE

AeroVironment to continue Nano Air Vehicle development

AeroVironment , USA

www.avinc.com

May 29, 2008

Unmanned aerial vehicles represent one emerging technology that has delivered as promised over the last decade, achieving critical relevance in battlefields situations where they can perform both reconnaissance and combat roles without putting humans in the the line of fire. In addition to the rapid growth and development that has occurred in relation to larger, weapons capable craft, smaller systems have also proved their worth, and the latest announcement from AeroVironment (AV) is further evidence that this sector will continue to flourish. The company which has already established unmanned micro air vehicle (MAV) programs - including the Raven and Wasp III - has now received funding to continue development of an even smaller scale platform dubbed the Nano Air Vehicle (NAV).

The USD\$636,000 Phase II contract awarded by the Defense Advanced Research Projects Agency (DARPA) will see a flying prototype of a 10 gram, three-inch flapping-wing air vehicle system demonstrated in six months. It follows the Phase I, \$1.7 million program in which AV completed a preliminary design review for the Nano Air Vehicle (NAV) program.

Following a successful demonstration, DARPA has the option to extend the program for an additional 18 months which could increase the Phase II contract value.

The NAV program envisages a new class of air vehicles capable of indoor and outdoor operations, employing biological mimicry at an extremely small scale and providing new military reconnaissance capabilities in urban environments.

The tiny NAV will also be able to carry a payload of up to 2 grams.

AV's hand-launched unmanned aerial systems have been used extensively by U.S. armed forces use for missions such as base security, route reconnaissance, mission planning, battle damage assessment and force protection. Ravens were flown for approximately 150,000 combat hours in 2007. AV has delivered over 9,000 small unmanned aircraft to date, including Raven, Wasp and Puma.

PRESS RELEASE

UAV Systems by Rheinmetall Make Key Contribution Towards Information Networking Rheinmetall

AG, Germany

May 29, 2008

The missions of the international armed forces in the world of the 21st century are far removed from the scenarios of the Cold War. Instead of the clashing of large armoured units, asymmetric threats have gained in significance. To counter this threat potential, which is often so difficult to define, the gathering of information and, above all, the provision of information in realtime without any time lag is of decisive significance. For this reason, UAV systems, comprising the aerial vehicles and the ground equipment, must be accorded an ever greater role.

Systems such as the aerial target localization vehicle KZO or the OPALE system by the company Rheinmetall Defence play an important role in the gapless networking of all units participating in the mission, and assure the generation of a common recognized picture.

Besides the benefits offered by a high-performance aerial vehicle, the use of a multifunction ground control station yields a decisive advantage. The ground control station (GCS, or in German: Bodenk Kontrollstation BKS) of Rheinmetall Defence has a system architecture which permits interfacing to various airborne systems. Its principal functions include:

- Mission management (flight path planning, sensor management, communications planning, retasking)
- Flight control
- Sensor data evaluation and conditioning
- Data processing and fusion
- Distribution of information to C4I systems

As the core of the entire reconnaissance system, the GCS controls the course of the mission. Superimposed digital maps on the monitors ensure that the crew is informed about the flight path of the drone at all times. The received videos and images are all geo-referenced, so that coordinates can be extracted directly from the video or image. In the ground control station, the payload of the air vehicle is also controlled online (panning of the camera, changing the field of view, tracker function etc.).

The information gained from the sensors of the air vehicle is transmitted in realtime via a jamming-resistant data link directly to the ground control station, where it is evaluated with computer support. The common operational picture generated in this way is passed on to the individual soldiers through the command system. For example, the «infantryman of the future» can then call up the reconnaissance result of the UAV system in scaled form on his portable computer, to gain an almost lag-free overview of the situation. The standards applied permit interoperability with other systems used by the allied forces.

The modular concept of the ground control station does not, however, permit the forwarding of information within the own service arm. The capability of exchanging information in a «joint and combined» mode was demonstrated impressively during the NATO exercise «Bold Avenger», where the Rheinmetall ground control station received air task orders and then deposited the reconnaissance results directly into the Coalition Shared Database. This verified that a UAV system of the German Army can indeed be integrated into the composite reconnaissance system of the NATO air forces.

COUNTDOWN TO UK MILITARY LAUNCH

By Jonathan Amos
BBC News, UK

<http://news.bbc.co.uk>

May 29, 2008

A significant milestone in the UK's biggest space project is reached on Friday with the launch of the third and final Skynet 5 satellite.

The military communications platform will be lofted by an Ariane rocket from Europe's equatorial spaceport at Kourou in French Guiana.

It will provide British forces with the secure, high-bandwidth capability they now need to run their operations.

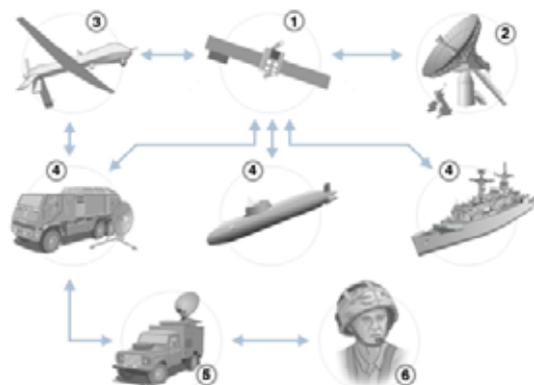
A successful launch will complete the in-orbit part of the £3.6bn project.

Additional work has included upgrades to ground stations and the installation of new antennas and terminals on military ships, planes and land vehicles.

Taken together, the three Skynet spacecraft - known as 5A, 5B and 5C - will provide coverage from the Americas to Asia. The satellites match the sophistication of the very latest civilian platforms used to pass TV, phone and internet traffic - but also are «hardened» for military use and will resist attempts to «jam» them, for example.

«These satellites have technology that allows them to pinpoint communications on to particular regions of the world with absolute precision, and without interference,» explained Malcolm Peto from Paradigm Secure Communications,

SKYNET COMMUNICATIONS



1. Skynet 5 overhauls satellite communications for UK forces
2. The largely autonomous satellites talk to two UK ground stations
3. Skynet 5 supports high-bandwidth applications, such as UAV video
4. Antennas and terminals are upgraded to make best use of Skynet
5. New battlefield networks, such as Cormorant, feed into the system
6. System gives commanders access to more information, faster

the company set up to run Skynet.

«You know the areas where British forces operate, and you can imagine the type of interference attempted. We can avoid that very simply, very clinically,» he said. The new Skynet constellation will allow the Army, Navy and Royal Air Force to pass much more data, faster between command centres. The bandwidth capacity of Skynet 5 is two-and-a-half times that of the old satellite constellation, Skynet 4.

The new system will allow British forces to make use of next-generation weapons systems, such as the recently introduced Reaper drones.

These unmanned aerial vehicles (UAV) are deployed over Afghanistan but are remotely piloted by RAF personnel in the US.

This is made possible only by Skynet's ability to handle the drones' real-time video feeds.

Other battlefield applications would include surgeons, unsure how best to treat badly injured soldiers, being able to send scan information back to the UK for a second assessment; and then using video conferencing to discuss cases.

Skynet 5 is the largest PFI (Private Finance Initiative) so far delivered to the UK's Ministry of Defence (MoD). Under the PFI, the British military buys guaranteed capacity off its commercial supplier (Paradigm), which is free then to sell any spare capacity to friendly governments.

These third-party sales earn money for Paradigm and the MoD in what is a «shared gain» arrangement. The launch of the Skynet 5C satellite should provide substantial extra revenue potential.

When the PFI deal was originally set up, the MoD was only going to get the use of two satellites; but the high cost of spacecraft insurance in the early 2000s prompted project chiefs to put that money into building an extra platform instead.

«In effect we've self-insured,» said Mr Peto. «We've used the money we would have spent on insurance to build a third satellite.

«When we launch [Skynet 5C], we will have three very capable satellites to provide communications, not only for British forces but for our third-party market which makes this whole project viable.»

Paradigm hopes the money it earns over the course of its contract (which runs to 2020) will be sufficient for it to reinvest in further spacecraft with enhanced payloads.

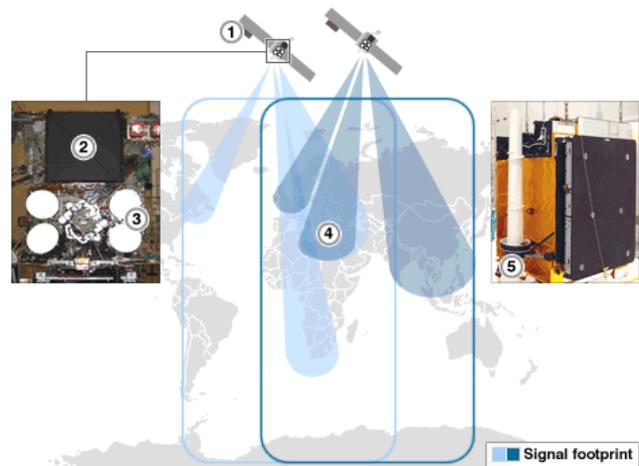
If this is achievable, Mr Peto says, it will provide UK forces with better equipment, much faster than traditional procurement routes.

As is normal for Ariane flights, Skynet 5C will ride into space with a co-passenger - on this occasion, a Turkish TV satellite.

«We'll be first out; the separation of 5C from the rocket occurs about 30 minutes after launch,» explained the Skynet project manager, Patrick Wood, from manufacturer EADS Astrium.

«We'll pick it up via a ground station we're using in South Africa. The first thing we'll do is send a command that should be sent straight back to us, telling us the receive electronics are working. We can then send a sequence of commands to start waking up the satellite's systems.»

It will take about a week to move 5C to its initial operational position 36,000km over the Atlantic Ocean, at 17.8 degrees West. Friday's launch window in Kourou opens at 2152 GMT.



1. Improved technologies, including a solar 'sail', lengthen the platforms' operational lives to at least 15 years
2. The satellites are 'hardened' against interference. A special receive antenna can resist attempts at jamming
3. Each spacecraft has four steerable antennas that can concentrate bandwidth onto particular regions
4. The system gives near-global coverage, providing 2.5 times the capacity afforded by the previous system
5. Each spacecraft is a 3x4x4.5m box and weighs just under 5 tonnes; the solar wings once unfurled measure 34m tip to tip

PRESIDENT BUSH DELIVERS COMMENCEMENT ADDRESS AT UNITED STATES AIR FORCE ACADEMY
White House News Releases, USA

www.whitehouse.gov

May 29, 2008

Air Force Academy, Colorado Springs, Colorado, USA

The President: Thank you. Mr. Secretary, thank you for the kind introduction. General Moseley, General Regni; Mr. Congressman, thank you. Academy staff and faculty, distinguished guests, and proud family members. I am

so pleased to stand before the future leaders of the United States Air Force.

I have something I'd like to say to the Cadet Wing: Class of 2008! Yes, that's good. I was a little worried you we're going to yell: «Give him the Bird!»

You're the 50th graduating class in the history of the Air Force Academy. Each of you has worked hard to reach this moment. You survived «Beast», «Terazzo Sailing» «fatty bags» at Mitch's. You earned your «prop and wings» at Pinnacle and today you will receive your degree and commission as Air Force officers. Your teachers are proud of you, your parents are proud of you - and so is your Commander-in-Chief. Job well done.

The Superintendent informs me that some of you are still on restriction. It might be because you were caught running from the «Lightning Van.» Or it might be because of Jimmy Chad's apple. Whatever the reason you got your Form-10, help has arrived. In keeping with longstanding tradition, I hereby absolve all cadets who are on restriction for minor conduct offenses. As for your grades, well, some things are even beyond the powers of the President.

In becoming officers of the United States Air Force, you have chosen a vocation that is both hazardous and rewarding. As a former F-102 pilot, I know the exhilaration of flight. As the son of an aviator who was shot down in combat, I know its perils. Whether you serve in the skies above or on the ground below, each of you has stepped forward to defend your country. You've chosen to face danger in foreign lands so your fellow citizens do not have to face danger in our own land. And I want to thank you for making this courageous choice. And all of America is grateful to the Class of 2008.

When you put on your Second Lieutenant bars in a few moments, you will become part of a great history - a history that is still only beginning to unfold. By any standard, air power is still a relatively new phenomena. Men have been fighting on land and at sea for thousands of years - yet there are still Americans among us who were born before man ever flew. In the lifetime of one generation, our nation has seen aviation progress from that first tentative liftoff at Kitty Hawk to an age of supersonic flight and space exploration.

And as flight has progressed it changed the face of war. In the 20th century, air power helped make possible freedom's victory in great ideological struggles with fascism and communism. In those struggles, our nation faced evil men with territorial ambitions and totalitarian aims, who murdered the innocent to achieve their political objectives. Through a combination of military strength and national resolve, and faith in the power of freedom, we defeated these adversaries - and secured the peace for millions across the world.

And now, in the 21st century, our nation is once again contending with an ideology that seeks to sow anger and hatred and despair - the ideology of Islamic extremism. In today's struggle, we are once again facing evil men who despise freedom, and despise America, and aim to subject millions to their violent rule. And once again, our nation is called to defeat these adversaries - and secure the peace for millions across the world. And once again, our enemies will be no match for the men and women of the United States Air Force.

You know, what's remarkable about this class is that each of you knows the stakes in the war on terror. You applied to this Academy after seeing the attacks of September the 11th, 2001. You came to this Academy knowing that the responsibility of our military is to protect the American people. And you now leave this Academy to take your place in this great struggle. Today, I've come to talk to you about the battle you're about to join, the lessons we can learn from the conflicts of the past, and what they can teach us about the challenges we face in the war on terror that will dominate your military careers.

The first lesson is this: In both the 20th century and today, defeating hateful ideologies requires all elements of national power, including the use of military power. The military power that you will wield in your military careers is much more precise and effective than in past generations. When the United States entered World War II, the age of long-range bombing was just beginning. There were no computer guidance, no GPS targeting, or laser-guided munitions. The allied bombing raids against Germany and Japan resulted in horrific civilian casualties and widespread destruction. It took nearly four years before the regimes in Berlin and Tokyo finally capitulated - with difficult battles from the deserts of North Africa to the forests of France, to the islands of the Pacific.

Today, revolutionary advances in technology are transforming warfare. During Operation Iraqi Freedom, for example, we employed military capabilities so precise that coalition air crews could take out a tank hiding under a bridge without damaging the bridge. With this military technology, we can now target a regime without targeting an entire nation. We've removed two cruel regimes in weeks instead of years. In Afghanistan, coalition forces and their Afghan allies drove the Taliban from power in less than two months. In Iraq, with the help of the United States Air Force, our troops raced across 350 miles of enemy territory to liberate Baghdad in less than one month - one of the fastest armored advances in military history.

These facts create both opportunities and challenges. One opportunity is that, if we have to fight our enemies, we can now do so with greater precision and greater humanity. In the age of advanced weapons, we can better strike - we can better target strikes against regimes and individual terrorists. Sadly, there will be civilian casualties in war. But with these advances, we can work toward this noble goal: defeating the enemies of freedom while sparing the lives of many more innocent people - which creates another opportunity, and that is, by making war

more precise, we can make war less likely.

For hostile dictators, it is a powerful deterrent to know that America is willing and able to target their regimes directly. When rulers know we can strike their regime while sparing their populations, they realize they cannot hide behind the innocent - and that means they are less likely to start conflicts in the first place.

Our unmatched military power also creates challenges. Because no adversary can confront and defeat our military directly, the enemies of the 21st century will increasingly turn to the use of asymmetric warfare. We've seen this in Afghanistan and Iraq. In those countries, our adversaries did not lay down their arms after the regime had been removed. Instead, they blended into the civilian population and - with the help of stateless terrorist networks - continued the fight through suicide bombings and attacks on innocent people. In the 21st century, this nation must be prepared to fight this new kind of warfare.

To meet this new challenge, we need to continue to develop technologies that put unprecedented speed and precision and power in your hands. And that's what we're doing. Since 2002, the number of unmanned aerial vehicles in our arsenal has increased nearly 40-fold to more than 5,000 - and we're increasing them even more. We've transformed the Special Operations Command and more than doubled its budget. We're improving our intelligence and surveillance and reconnaissance capabilities. We're transforming our ground forces for the wars of the 21st century - making them faster and more agile and more lethal.

And you'll see the impact of these changes in your own Air Force careers. Instead of serving at 10,000 feet, some of you will serve on the ground as battlefield airmen - deploying behind enemy lines and using laser technology to fix targets for aviators circling above. Instead of sitting in jet fighter cockpits, some of you will sit before computer consoles at bases here in the United States, where you'll guide Predator UAVs half a world away and use them to strike terrorist hideouts. These and other changes will increase your ability to prevail in asymmetric warfare. They will make you more effective in the defense of freedom.

Another challenge of asymmetric warfare is that it requires patience. Our new enemies know they can't defeat us militarily. So their strategy is to cause us to lose our nerve and retreat before the job is done. They take advantage of the information age and the 24-hour news cycles, creating images of chaos and suffering for the cameras, in the hope that these images will horrify the American people and undermine resolve and morale here at home. This means that to win the first war of the 21st century, we need to prevail not just in the battle of arms, but also in the battle of wills. And we need to recognize that the only way America can lose the war on terror is if we defeat ourselves. The second lesson is this: In both the 20th century and today, defeating hateful ideologies requires using our national resources to strengthen free institutions in countries that are fighting extremists. We must help these nations govern their territorial - territory effectively so they can deny safe haven to our common enemies. And in Afghanistan and Iraq, where we removed regimes that threatened our people, we have a special obligation to help these nations build free and just societies that are strong partners in the fight against these extremists and terrorists.

We've assumed this obligation before. After World War II, we helped Germany and Japan build free societies and strong economies. These efforts took time and patience, and as a result, Germany and Japan grew in freedom and prosperity. Germany and Japan, once mortal enemies, are now allies of the United States. And people across the world have reaped the benefits from that alliance. Today, we must do the same in Afghanistan and Iraq. By helping these young democracies grow in freedom and prosperity, we'll lay the foundation of peace for generations to come.

We face a number of challenges in undertaking this vital work. One challenge is that in the past, in Germany and Japan, the work of rebuilding took place in relative quiet. Today, we're helping emerging democracies rebuild under fire from terrorist networks and state sponsors of terror. This is a difficult and unprecedented task - and we're learning as we go. For example, in Iraq we learned from hard experience that newly liberated people cannot make political and economic progress unless they first have some measure of security. In 2006, Iraqis did not have this security, and we all watched as their capital descended into sectarian violence.

So this year we changed our strategy. Instead of retreating, instead of pulling back and hoping for the best, I made the decision to send in 30,000 additional troops with a new mission: Protect the American people - Iraqi people from terrorists and insurgents and illegal militias. Together, U.S. and Iraqi forces launched new offensives across the country to clear the enemy out of its strongholds. And as this military surge brought security to neighborhoods that were once in the grip of terror, it was followed by a civilian surge - with Provincial Reconstruction Teams deploying to work with Iraqis to ensure military progress was quickly followed by real improvements in daily life.

Today we're seeing the fruits of the new strategy. Violence in Iraq is down to the lowest point since March of 2004. Civilian deaths are down. Sectarian killings are down. And as security has improved, the economy has improved as well. Political reconciliation is taking place at the grassroots and national level. The surge is working. Our men and women in Iraq are performing with skill and valor - and they have earned the respect of the people of the United States of America.

This experience will help shape your careers as officers in the United States Air Force. During your time in uniform, some of you will have to help young democracies build free institutions amid chaos and confusion. You'll have to work with civilians on the battlefield in ways generations never imagined. To support your efforts, to help you make young democracies transition from tyranny to freedom, one thing is for certain: The United States Congress better make sure you have all the resources you need to do your job.

Another challenge in this new and unprecedented era is defining success. In the past, that was relatively easy to do. There were public surrenders, a signing ceremony on the deck of a battleship, victory parades in American cities. Today, when the war continues after the regime has fallen, the definition of success is more complicated. So in Iraq and Afghanistan, we set a clear definition of success: Success will come when al Qaida has no safe haven in those countries and the people can protect themselves from terror. Success will come when Iraq and Afghanistan are economically viable. Success will come when Iraq and Afghanistan are democracies that govern themselves effectively and respond to the will of their people. Success will come when Iraq and Afghanistan are strong and capable allies on the war on terror. Men and women of the Air Force: These successes will come - and when they do, our nation will have achieved victory, and the American people will be more secure.

The third lesson is this: For all the advanced military capabilities at our disposal, the most powerful weapon in our arsenal is the power of freedom. We can see this story in the 20th century. In 1941, when Nazi bombers pounded London and Imperial Japan attacked Pearl Harbor, the future of freedom appeared bleak. There were only about a dozen democracies in the world - it seemed that tyranny, not liberty, was on the march. And even after Japan and Germany were defeated in World War II, freedom's victory was far from clear. In Europe, the advance of Nazi tyranny was replaced by the advance of Soviet tyranny. In Asia, the world saw the Japanese Empire recede and communism claim most of its former territory - from China to Korea, to Vietnam.

Imagine if a President had stood before the first graduating class of this Academy five decades ago, and told the Cadet Wing that by the end of the 20th century, the Soviet Union would be no more, communism would stand discredited, and the vast majority of the world's nations would be democracies. The Cadets probably would have said he had done one too many Chariot Races.

Many throughout history have underestimated the power of freedom to overcome tyranny and transform whole societies. Yet in the end, despite challenges and setbacks, freedom ultimately prevails, because the desire for liberty is written by our Creator in every human heart. We see that desire in the citizens of Georgia and Ukraine who stood up for their right to free and fair elections. We see that desire in the people of Lebanon who took to the streets to demand their independence. We see that desire in the Afghans who emerged from the tyranny of the Taliban to choose a new president and a new parliament. We see that desire in the jubilant Iraqis who held up ink-stained fingers, and celebrated their freedom. And in these scenes, we see an unmistakable truth: Whenever men and women are given a real choice, they choose to live in freedom.

The enemies of freedom understand this - and that is why they're fighting desperately to deny this choice to men and women across the Middle East. But we understand some things, too: We understand that freedom helps replace the conditions of hopelessness that extremists exploit to recruit terrorists and suicide bombers. We understand that free societies are peaceful societies, and that people who live in liberty and hope do not turn to ideologies of hatred and fear. And that is why, for the security of America and the peace for the world, the great mission of your generation is to lead the cause of freedom.

This is the last time I'll address a military Academy commencement as the President. Over the past eight years, from Annapolis to West Point, to New London, to Colorado Springs, I have looked out at the best young men and women our nation has to offer - and I have stood in awe. And I stand in awe again today. Each of you is a volunteer who stepped forward to accept the burdens of war, knowing all the dangers you would face upon graduation. You willingly risk your lives and futures so that our country can have a future of freedom and peace. Our enemies say that America is weak and decadent, and does not have the stomach for the long fight. Our enemies have never set foot on the campus of the United States Air Force Academy.

A nation that produces citizens of virtue and character and courage like you can overcome any challenge and defeat any adversary. So I'll leave this campus today filled with the confidence in the course of our struggle and the fate of our country, because I've got confidence in each of you.

We see the strength and spirit of this class in a Cadet named Erik Mirandette. In 2003, Erik felt a tug at his heart from the Almighty to take time off from the Academy and do humanitarian work in Morocco. After nearly two years there, Erik, and his brother Alex and two childhood friends, decided to ride across the African continent on dirt bikes. The last stop in their journey was Cairo - where a suicide bomber attacked them by exploding a bucket filled with nails. The blast killed Erik's brother, injured his two friends, and left Erik bleeding on the street. Doctors did not think he'd ever walk again. He never gave up his dream of coming back to this Academy. And 14 months ago, after surviving the blast, Erik returned to this campus. Today he begins his career as a proud officer in the greatest Air Force known to man.

He still has got dozens of nails in his body. But he has a fierce determination in his heart - to protect his country,

defeat the forces of terror. Erik puts it this way: «I'll live the rest of my life scarred inside and outside. But I've got a sense of calling. I want to prevent attacks on other good people.»

Each of you gathered here this morning has answered that same call. I want to thank you for stepping forward to serve. The security of our citizens and the peace of the world will soon be in your hands - the best of hands. Be officers of character and integrity. Keep your wings level and true. Never falter; do not fail. And always know that America stands behind you.

Thank you. May God bless, and congratulations to the Class of 2008.

MINIATURE ROBOT LEAPS 27 TIMES ITS BODY SIZE

Gizmag, USA

www.gizmag.com

May 30, 2008

Creating robots that can replicate the locomotion and maneuvering skills of insects is an increasingly attractive project for scientists - it lends itself to simple prototyping, and has obvious applications for surveillance, exploration, search and rescue assistance, and sensor deployment. While the EU-funded SPARK initiative is attempting to replicate the cognitive processes of bugs, researchers at the Laboratory of Intelligent Systems at EPFL have developed a jumping robot inspired by the grasshopper.

The 5cm model uses a 0.6-gram pager motor and a cam to charge two torsion springs, which trigger a jump from the robot's 1.3mm carbon rod feet. The 7-gram robot can jump 1.4 meters, more than 27 times its body size, and ten times the distance of any existing jumping robot. The robot incorporates an infrared receiver and a 10mAh Lithium Polymer battery, which the researchers hope can be reduced in size to further decrease the weight of the model. The motor recharges the mechanism for one jump cycle in 3.5 seconds, using 95mA. The 10mAh provided by the LiPo battery theoretically allows for 6.3 minutes of continuous recharging or approximately 108 jumps. «This biomimetic form of jumping is unique because it allows micro-robots to travel over many types of rough terrain where no other walking or wheeled robot could go,» explains EPFL Professor Dario Floreano. «These tiny jumping robots could be fitted with solar cells to recharge between jumps and deployed in swarms for extended exploration of remote areas on Earth or on other planets.»

The four bar linkage leg system enables researchers to adjust the jumping force, take off angle, and force profile during the acceleration phase. The amount of energy that will be stored in the springs can be adjusted by changing the spring setting between 106mJ and 154mJ in steps of 6mJ.

The reason a jumping mechanism is so valuable in small robots is because the smaller a body is, the more difficult terrain becomes to navigate - a principle known as the «Size Grain Hypothesis». Jumping is a power-efficient way for a robot to overcome large obstacles and traverse wide areas of land in a short amount of time. With future models, the researchers hope to include a set of folding wings, so the robot can glide back to Earth from the apex of its jump.

PRESS RELEASE

Netherlands Ministry of Defence Selects AeroVironment's Raven Small UAS

AeroVironment, USA

May 30, 2008

Monrovia, California, USA - AeroVironment, Inc. today announced that The Netherlands Ministry of Defence, acting through its Defence Materiel Organization (DMO), has awarded AV a contract for RQ-11B (Raven) small unmanned aircraft systems. The order includes new aircraft systems as well as training, logistics support, and airworthiness certification. Each Raven system typically consists of three aircraft, a ground control station, a remote video terminal, system spares, and related services. The total award value is \$7.7 million and is fully funded.

«We performed a thorough competitive selection process and the Raven came out as a clear winner,» said Frans Klein, Head Section Unmanned Aircrafts for The Netherlands Defence Materiel Organization.

«Decisive elements in the selection were hand-launchability, reliability, ease of use, robustness, and proven, in-theatre operational performance.»

«The selection of Raven by The Netherlands Ministry of Defence demonstrates confidence in its proven reliability



and ability to support operational needs wherever required,» said Ilker «Ike» Bayraktar, AV vice president of international initiatives. «This contract award is another example of AV's continued progress in introducing this joint capability to allied military forces.»

AV's Raven is a 4.2-pound, backpackable, hand-launched sensor platform that provides day and night, real-time video imagery for «over the hill» and «around the corner» reconnaissance, surveillance and target acquisition in support of tactical units. U.S. armed forces use Ravens extensively for missions such as base security, route reconnaissance, mission planning and force protection. In addition to Raven, AV's small UAS include Puma and Wasp, which are also hand-launched and controlled by AV's hand-held ground control station. AV's UAS logistics operation supports systems deployed worldwide to ensure a consistently high level of operational readiness. AV has delivered more than 9,000 small unmanned aircraft to date. Other international purchasers of Raven include Italy, Denmark, Australia and Spain.

WAR WITHOUT SOLDIERS

By Andy Greenberg

Forbes, USA

www.forbes.com

May 31, 2008

The future of the U.S. military looks a bit like a child's toy glider.

Known as the Switchblade, the high-tech mini-plane built by Monrovia, California-based contractor AeroVironment can be packed in a tube that weighs less than four pounds. Pull it out and its wings, about a foot long, snap into place. Throw it, and its motor engages, setting it to fly a pre-programmed route or a path guided by remote control.

Like AeroVironment's older gadgets, the Switchblade can stream video feeds from color or infrared cameras to its operator, making it a deft spy plane. But this aerial robot has another trick: It can become a guided missile with an explosive payload - used for, say, attacking an enemy sniper.

AeroVironment's remote-control attack plane may be small, but it represents a big shift taking place in the U.S. military: Today's defense robotics are more focused on killing and less dependent on humans than ever before. A report issued last March by the Defense Advanced Resources Projects Agency laid out a road map for the next 25 years for the Pentagon's war bots, including goals like removing soldiers from a third of the Army's operational ground vehicles by 2015. For air vehicles, those goals are even more ambitious: One-third of the military's air-based strike force will be unmanned by 2010, according to the DARPA report. «The age of the unmanned military is upon us,» says Loren Thompson, a defense analyst with the Lexington Institute.

The Air Force is well on its way to fulfilling DARPA's goals. In 2008, Reapers and Predators, the Air Force's two primary remote-controlled vehicles, will spend almost 120,000 hours in the air on reconnaissance and intelligence missions, up from just over 80,000 hours last year and less than 5,000 in 2001.

Those unmanned aircraft, each armed with Hellfire missiles and laser-guided bombs, are attacking more targets than ever before, while their pilots sit in the safer venue of Creech Air Force Base in Las Vegas. In 2007, Predators and Reapers launched 128 missiles and bombs - about twice as many as in 2005. In the first four months of 2008, unmanned drones were on track to beat that record, having already launched 47 missiles and bombs.

Despite several reports of civilian deaths in unmanned air strikes by the Air Force, as well as the Central Intelligence Agency, Air Force officials insist that the robotic strikes go through the same «kill-chain» - the procedure of checking and double-checking targets with human observers - as manned air strikes. «We track the target, we watch it and we make sure we know exactly what we're taking out,» says Air Force spokesman Ed Gulick. «It doesn't matter whether the aircraft is manned or unmanned - the decision is the same.»

Some military observers are posing a different controversial question: Why do so many unmanned drones end up in pieces on the ground? More than a third of the 182 Predators deployed by the Air Force have crashed in combat or other operations, according to Air Force statistics.

The Lexington Institute's Loren Thompson says those mishaps usually result from a simple break in the line-of-sight connection between a plane and the satellite that controls it - often when one of the aircraft's own wings maneuvers into the path of the signal. «We have repeated problems with [unmanned aerial vehicles] that cut through their own uplink to the pilot, and the consequences aren't pretty,» he says. «The moment you break that tether, a UAV becomes a flying chunk of metal.»

General Atomics, the manufacturer of the Predator and the Reaper, argues that its later models have more backup systems to prevent those momentary losses of control. In fact, only one of the U.S.' 19 Reapers - the next generation of drone to follow the Predator - have crashed. The Air Force's Major Jonathan Songer points out that many of the Predator mishaps occurred early in the program, when the unmanned drones were still prototypes.

But Sanger also blames what he calls «human factors.» Unmanned vehicle pilots fly longer hours than manned vehicle pilots, often leading to fatigue, and they're forced to deal with complex controls without the normal sensory feedback of being in a cockpit. «Pilots no longer have the audible noise or that seat-of-the-pants feeling,» Sanger says. «That can decrease their ability to sense how well the engine is running.»

The Army's solution? Even more automation. It's deploying another General Atomics plane known as the Sky Warrior, which takes a greater degree of the plane's control out of the hands of humans. The Sky Warrior's automatic takeoff and landing system can put a plane on a runway «plus or minus one foot,» says one Department of Defense official who asked not to be named.

He argues the Army's approach, leaving the majority of the piloting to the plane's automatic systems, avoids accidents and saves resources that the Air Force wastes training human pilots. «We don't use a stick and rudder. You just look at a screen and click, and it does what you tell it to,» the official says. «Why pay for a pilot to go to college and flight school when you can use an 18- or 19-year-old guy from basic training?»

On the ground, that degree of automation hasn't yet become practical. In November, DARPA put street-level robots to the test in its Urban Challenge, a race of 12 autonomous cars through simulated city streets populated by obstacle cars. Though several cars performed nearly flawlessly, only half of the entrants finished the event. TerraMax, a 12-ton Oshkosh military truck fitted with laser sensors and global positioning equipment, nearly plowed into a concrete pillar and was disqualified early in the race.

But in the air, where obstacles are far fewer, fully robotic vehicles are already a reality. Northrop Grumman, for instance, signed a deal last year with the Navy to begin supplying it with an autonomous helicopter known as the Fire Scout. Though some versions of the helicopter may eventually be equipped with an array of missiles, the Fire Scout is for now planned as a reconnaissance vehicle - a role where entire missions, including taking off and landing on aircraft carriers, can be accomplished with just a few keystrokes.

«If you can open a laptop and move a mouse,» says Northrop Grumman spokesperson George Guerra, «then you can pilot this vehicle.»

AIRPOWER AND RANGE

By Bill Sweetman

DTI, USA

June 2008

Two stories in this issue highlight an important fact about airpower, one that might illuminate the contentious debate about the relevance of military aviation in current and future conflicts.

The U.S. Air Force, for the first time in almost 30 years, is spending real money on a new bomber: subsonic, survivable, with a bigger ordnance load than a formation of fighters (see p. 16). In other news, the classic Predator unmanned aerial vehicle (UAV) seems to be giving way, in many missions, to its bigger sibling, the Predator I3 or Reaper.

The connection between the two is range and reach. Why is USAF looking at a new bomber? Fighters can go deep into hostile airspace, but quickly run out of fuel, weapons and pilot endurance. The bomber's assets are its «deep magazine» and varied weapon load, and its long range makes it effective even if bases near the target are closed.

The original Predator UAV was a revolutionary weapon due to its combination of full-motion video (FMV) sensors, precision navigation and satellite communications. With a Predator overhead, a commander anywhere knows more about where the hostiles are than they do, down to the location of individuals, and he sees them move when they move. FMV doesn't just mean a picture and a location; it shows actions and history and lets the analyst infer intent.

But the Predator is a little plastic air-plane with a snowmobile engine glued to its tail. Its flight envelope looks like the Westland Wapiti biplane that the RAF used in Afghanistan in the 1920s. The Predator «does 120 kt. on a good day going downhill,» one operator says. It takes a long time to get where it's needed and it hates bad weather. When you run that little Rotax 24/7, it's going to give up the ghost sooner or later.

The Predator B is a different animal. General Atomics-Aeronautical Systems Inc. boss Tom Cassidy flies between San Diego and the company's Grey Butte, Calif., test site in a Raytheon King Air. The Predator B is about that big, and cruises at more than 240 kt. indicated (faster than 240 kt. ground speed) at 50,000 ft.

But that is what airplanes do. They move quickly from place to place in a straight line. Speaking in April at the rollout of the Gripen Demo in Linkoping, Sweden, I made the point that a jet fighter can influence events anywhere within 600 mi. inside an hour, regard-less of terrain. The best-equipped ship or army division can't do that.

Slow airplanes give up that advan-tage. Cassidy makes the point that the cost of ownership of the Predator B is less than that of the Predator A. One can guess several reasons why: It does not crash as much; its engine runs longer between maintenance actions; its sensors can see farther and its view is less obstructed by terrain; and it covers more ground within a given time.

And if the Predator B is covering more ground, so is its crew. Since at least 2003, the demand for Predator FMV has exceeded supply. One can snipe about people commuting from Las Vegas tract homes to air-conditioned trailers at Creech AFB, Nev., but fatigue is fatigue-people have performance limits, units need to refresh and train, and these deployments have no limits. What does four years of combat-virtual or not-do to a 19-year-old? We're about to find out, whether we want to or not.

Which raises the question of whether the Army's plan to proliferate Sky Warrior UAVs into every division makes sense. It's going to take more people that the Army hasn't got - the service uses civilian pilots today - and they will have to be trained, housed in-theater and moved when the division moves. If the idea is that the aircraft will be so automated that they have operators, not pilots, we humbly suggest that the Army hasn't talked to anyone in charge of air traffic. So far, those authorities have been twitchy enough even about vehicles using fully-trained pilots behind the keyboard. And, as the rest of the world decides that higher and faster is the way to go, the Army still wants to chug into action with Sky Warriors at 120 kt.

FEELING THE SQUEEZE
Budgetary pressures may scale back FCS development
 By Paul McLeary
 DTI, USA
 June 2008

When it comes to the controversial \$160-billion Future Combat Systems (FCS) program, something big always seems to be on the horizon. Spearheaded by lead systems integrator Boeing and partner Science Applications International Corp., FCS seeks to connect the U.S. Armys fighting force on one network through an interlocked system of ground sensors, manned and unmanned vehicles, unmanned aerial vehicles, radio systems and non-line-of-sight cannon systems.

Program managers say there have been recent successes in testing Phase 1 spinout technologies, some of which are coming closer to being fielded by the 2011 time frame. Equally good news for the program came from the Senate Armed Services Committee in May when it approved the Army's Q9'büüuu Fiscal-Year 2009 FCS funding request.

But when discussing FCS, good news is usually offset by complications - in this case both immediate and long-range. The immediate issue to be resolved comes from House Appropriations defense subcommittee Chairman John Murtha (D-Pa.), who is offering to attach a one-time \$20-billion bonus to the Defense Dept. budget if the Army invests it in rolling out the most viable elements of FCS in the next five years and scrapping the rest of the program.

Murtha's proposal is tied to a long-term problem: the up-coming budgetary squeeze inherent in the expensive process of refitting military's fighting force, which has spent the past five-plus years wearing down equipment at a rapid pace. In a recent report, the Government Accountability Office estimated the repair bill at 8120 billion over 10 years. In deliberations in May, the House suggested cutting \$200 million from the Fiscal 2009 FCS budget to start paying for these «reset» programs.

Adding yet another wrinkle to the budgetary process, the Army has, according to reports, asked Congress for permission to raid the coffers of other Army programs to transfer \$78 million into FCS, while allowing FCS managers to transfer \$174.5 million between FCS programs to make up for some of the \$789 million in cuts Congress made in the past three defense budgets.

Of the Murtha plan at least, FCS Public Information Officer Paul Mehney says «the Army is looking at things in the program for acceleration. The Class 1 UAVs are one example of that, and once the Army discussions continue, we'll present Chairman Murtha the plan that he requested.»

This political maneuvering comes at a time when the unattended ground sensors (UGS) for the program - manufactured by Textron Defense Systems - performed successfully at the U.S. Air Force 's annual JEFX demonstration in Nevada in April. Charlie Williams, FCS Spin Out 1 program manager for Boeing, says that the tests are «a small step, but a step that brings the network into being for the conventional force. They are the first crucial step that embeds the network more clearly into the current force.» Importantly, the tests show that all components of FCS can work together, he adds.

Williams says that all the pressure the program has received from the press and Congress ignores to some extent the complexity of the program, the work it entails and the speed with which parts of it have worked their way through development.

«We're pressing-there are a lot of things we're doing simultaneously» he notes. «We're readdressing the way development: work is done. It's not a traditional approach.»

Work continues on the Phase 1 spinout-scheduled for 2011-which includes installing network integration hardware kits, or «B-kits» on Abrams, Bradley and Humvee platforms. The B-kits, developed by BAE Systems, General Dynamics Land Systems and AM General, include the Joint Tactical Radio System (JTRS), Ground Mobile Radio and Integrated Computer System, all running the System of Systems Common Operation

Environment software. Phase 1 also includes the Non-Line-of-Sight (NLOS) Launch System and tactical and urban UGS.

UGS and NLOS are going through accelerated testing this summer. UGS will be used for surveillance or perimeter security, and can detect, classify and track multiple vehicles, personnel and aircraft while relaying data to the B-kit-enabled systems (see story, p. 56).

There are eight Manned Ground Vehicle (MGV) prototypes, each with a common chassis, of which the NLOS is the first to be tested. Of these, five are being produced this year, with three more to be delivered at the beginning of Fiscal 2009. The delivery of the prototypes will allow the Army to begin testing out the functionality of the NLOS cannon and common chassis. «That's important because the seven Manned Ground Vehicles go to prototype in 2011,» Mehney says.

If the testing goes as program managers expect, the Army will have soldiers driving NLOS launch systems at Yuma Proving Ground, Ariz., in the fourth quarter, and crewing NLOS for firing evaluations during the first quarter of 2009. By the third quarter, plans call for the NLOS to be fielded with the Army Experimental Task Force (AETF) at Ft. Bliss, Texas, for soldier training and evaluation. By 2010 there should be 18 cannons ready for fielding to the test artillery battalion there.

«We will have these gun systems ready for the prototype stage in 2011,» Mehney says. «We're on track to prototype the remaining seven Manned Ground Vehicles in 2011.» The gun technology - 120-mm. XM 360 cannons and NLOS mortars - has so far performed to specifications. «There have been no significant issues with the guns, so they'll be ready by 2011.»

The chassis prototypes for the MGV and NLOS systems have flat hulls, but in a nod to the devastation that roadside bombs cause in Iraq and Afghanistan, the Army is evaluating a V-shaped hull. The MGVs are also being designed so armor can be added or removed as necessary. The infantry carrier, which will transport a crew of two plus a nine-man squad, has a target weight of 30 tons and will feature a 30-mm. Mark 44 gun, with a 120-200-round/rate of fire.

Bowing to pressure from Army brass and politicians, FCS managers are adding programs to their accelerated testing schedule this year. While they're not part of Spin-out 1, they are being fast-tracked for development. Small UGVs from iRobot Corp. and Class 1 Block 0 UAVs from Honeywell Defense and Space Electronic Systems are being evaluated by the AETF at Ft. Bliss as part of this effort. Twenty-five small UGV prototypes had been delivered by the end of May.

Mehney says that based on feedback from the field, there is a need for some of the capabilities that the Class 1 Block 0 UAV will provide, such as «hover and stare.» This uses adjustable gimballed sensors that let soldiers keep the vehicle in stationary hover, and incorporates early versions of JTRS. The small UGV, meanwhile, has better sensors and is lighter and more durable than the Packbots used in Iraq and Afghanistan.

«Army leadership asked AETF to look at those to see if they will be useful in the field,» Mehney says, «and to evaluate that technology for potential procurement within the next couple of years. We owe Army leadership an answer in September on that.»

So yet again, there's another milestone for FCS watchers to circle on their calendars-unless Rep. Murtha gets his way and the program is sped up and then assigned to the dustbin of history.

SCORPION RISING

French army program upgrades warfighting capabilities

By Joris Janssen

DTI, USA

June 2008

The French defense procurement agency DGA plans to award the first contracts early next year in France's Scorpion land forces transformation program. The €10-billion (\$16-billion) program will overhaul the army's battle capabilities through acquisition of next-generation C⁴I (command, control, communications, computers, intelligence) systems, missiles, armored vehicles and drones, and by upgrading legacy systems. Scorpion is scheduled for implementation between 2009 and 2025.

The initiative is the French equivalent of the U.S. Army's Future Combat Systems (FCS) program and the U.K.'s Future Rapid Effects Systems (FRES) program. Plans call for equipping eight, combined-arms brigades, each numbering 5,000-6,000 troops, with integral artillery and aviation support.

The procurement strategy the French select will draw on «lessons learned from FCS and FRES,» says Col. Jerome Perrin, the DGA's program executive director for armored vehicles. Defense and aerospace contractors from the U.S. may play a key role in the program. U.S. companies are among the firms that responded to a request for information (RFI) from the DGA last year. Others include French-based contractors EADS, MBDA, Nexter, Sagem and Thales. Perrin says that major European players outside France like BAE Systems,

Rheinmetall and Saab did not respond to the RFI, a disappointing turn of events, though they attended Scorpion's industry day. Those that did respond, however, «are already talking to each other» about forming teams for the initial request for proposals expected late this year. Scorpion is taking a comprehensive approach to planning, procuring and implementing the next generation of land force capabilities for operational, technical and economic reasons.

«Operationally, it is necessary to achieve much greater integration than is possible today, so we can do combined-arms operations well below the brigade level, including aviation and artillery support,» Perrin says. «But the introduction of many communication and information systems means there will be major interoperability issues that can be mastered only if we adopt an all-encompassing approach for development and procurement.»

A wide-ranging program like Scorpion is also expected to reduce costs by creating an efficient procurement strategy. Scorpion will cover numerous programs: new long-, medium- and short-range tactical missiles; advanced information and communication systems; a mid-life update (MLU) for Leclerc main battle tanks; acquisition of 2,600 armored personnel carriers to replace the VAB vehicle family; and procurement of 300 next-generation armored reconnaissance vehicles (EBRC) to replace the AMX-10RC and Panhard ERC-90.

Medium- and short-range missiles are being developed under the Anglo-French Multi-Role Combat Missile (MRCM) program that replaced the trilateral European Modular Missile program after Sweden's withdrawal late last year. The MRCM program will, beginning in 2015, deliver a family of open-architecture guided weapons. These will be primarily based on common technologies and subsystems, which provide non-line-of-sight, precision surface-attack capability from various platforms against a range of targets, MBDA officials say.

Scorpion will benefit from a number of ongoing R&D programs. The BOA integrated air-land battle technology demonstrator (under development by a consortium of Thales, Nexter and Sagem), for example, will be a «major risk-mitigating factor,» Perrin says.

Other efforts include the development by Bertin Technologies of the HoverEye short-range, lightweight (9-lb.) vertical takeoff and landing drone for close combat intelligence and surveillance missions in urban environments. This recently completed five-year project resulted in five prototypes that fly autonomously with obstacle-avoidance capability and hover in 19 mph. winds, says Daniel Trouchet, senior engineer at Bertin, which is based in Montigny-le-Bretonneux, France. But a decision to order HoverEye has not yet been made, he notes. Army aviation assets, particularly the Eurocopter Tiger attack helicopter and NH Industries' NH90 transport rotorcraft, will be integrated down to the battle group level, he adds.

DGA-funded studies are looking into land robots, with French company ECA developing three modular, semi-autonomous platforms for urban warfare.

«For Scorpion and its many individual projects, we will try to avoid redundancies between systems,» Perrin says. «We will endeavor, for example, not to end up with two non-line-of-sight, precision-engagement systems. We will likely pick either the upgraded Leclerc tank or the new EBRC vehicle.»

Meanwhile, a range of new equipment is entering service, often following protracted development programs. Examples include the Tiger helicopter; N1190 tactical transport helicopter; Felin soldier-modernization kit from Sagem Defense Security; C⁴I systems from EADS, Sagem and Thales; and the PVP light armored vehicle from Panhard General Defense. Three mechanized infantry battalions will be equipped with Nexter Systems' new VBCI 8X8 armored infantry vehicle by April 2011. Nexter, working with Renault Trucks Defense, received contracts from the French military for 1,72 VBCIs. A contract for another 118 vehicles is expected by the end of the year.

The first command post variant, known as VPC, was ready for testing in April. The second VPC, along with the leading infantry combat vehicle variants, or VCIs, were recently in the final checkout room at Nexter's main vehicle assembly plant in Roanne.

French army operational trials with the new VBCI production version are taking place in Noyon, north of Paris, through July. VBCI training started in May in Canjuers, outside Nice, with a «Train the Trainers» course that runs through September. The first frontline VBCI battalion will be the 35th infantry regiment in Belfort. The unit is scheduled to be in Canjuers for training from October to May 2009, and to conduct operational trials between November and June next year. The second VBCI unit is the 92nd infantry regiment in Clermont-Ferrand, which will train in Canjuers from September 2009 to April 2010. The third VBCI unit is the 152nd infantry regiment in Colmar, which will train with the vehicle between September 2010 and April 2011. The infantry-training center in Montpellier will also receive vehicles, in June 2009.

VBCI driver and crew simulators are to be installed in Canjuers and Montpellier, and crew simulators will be placed with frontline battalions in Belfort, Clermont-Ferrand and Colmar. Nexter expects to build 700 VBCIs for the army (550 VCI models and 150 VPC versions) under a framework contract signed in 2000, with deliveries stretching out through 2014. Although the last of 355 Leclerc main battle tanks was delivered by Nexter in October 2007, the DGA is already planning a significant MLU, aimed at improving their effectiveness and survivability in urban warfare. Late last year Nexter received a first contract to bring the army's entire Leclerc fleet up to the latest standard, says Perrin. This involves installing Nexter's Icon battlefield management system in every tank,

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as well as making each capable of firing the latest munitions, including a high-explosive round that is in development. The tanks now fire only standard 120-mm. armor-piercing, kinetic energy penetrators and shaped-charge explosive rounds.

DGA is considering other munitions, including the Polynège non-line-of-sight, precision guided missile type round pro-posed by Nexter Munitions. The laser-guided weapon has an effective range of 2.5-8 km. (1.5-5 mi.) and muzzle velocity of 700 meters/sec. when fired by the tank's 120-mm. gun at a 17-deg. elevation. The fir-ing of two demonstrators is planned this year, says Thierry Bredy, strategy director for Nexter Munitions.

More MLU improvements are slated in a few years, the plans for which are being developed, Perrin says. «The first objective of the MLU is to replace the vehicle electronics infrastructure, as the Leclerc's current data bus is reaching the point where it is maxing out in capacity,» he says. «We need much greater capacity to exchange and share an increasingly large volume of information.»

The DGA also wants to add a number of functions to better suit the Leclerc for urban operations. These may include:

- Improving wireless connectivity and integration between the tank and dismounted troops working with Felin equipment;
- Installing a new electro-optical sensor suite that improves situational awareness with 360-deg. panoramic vision;
- Adding a remote weapon station (RWS) on top of the turret. France has just ordered the Kongsberg Protector RWS to equip VAB wheeled armored vehicles, and may put this on the Leclerc tank as well;
- Providing an active protection system to improve survivability against short range anti-tank weapons.

According to Perrin, the MLU package development contract will be awarded in 2010, with series production deliveries expected to start in 2015. How many Leclerc tanks will be upgraded depends on the findings of the upcoming defense white paper. Nexter executives say the number could be as low as 250.

Earlier this year, Nexter delivered the first series-produced, truck-mounted, 155-nlm./52-cal. Caesar howitzer system for the French army. The company plans to build 40 this year, including six for Thailand. A total of 163 of the self-propelled howitzers have been ordered by three countries: 77 by France; six by Thailand, and 80 by an undisclosed Middle Eastern country, says Evelyne Montet, Nexter's artillery systems business manager. The Middle Eastern country is widely reported to be Saudi Arabia, which is expected to assemble Caesar howitzers locally for

delivery in 2009, 2010 and 2011. The Saudi Arabian howitzers will be integrated on Unimog high-mobility trucks from Mercedes-Benz. These were selected because of Unimog's broad logistics-support network in the kingdom. In that sense the howitzers will be different from the French and Thai systems, which use 6 X 6 military trucks from Renault Trucks Defense as carrier platforms. This vehicle can deploy more than 600 km. without refueling and travel at over 80 kph. on roads. The Caesar howitzers for France will be delivered by 2010, says Montet. (Five pre-production systems have been in service since 2003.) The first production howitzer will be deployed with a frontline artillery battery as early as this summer. The six guns for Thailand will be produced and shipped by the end of the year, Bredy says, and delivered to the army in early 2009. Fire support electronics (the Atlas fire-support information system for the French army) and a Sigma 30 ring-laser gyro inertial navigation unit from Sagem are part of the system, Montet says. Caesar has a combat weight of less than 18 metric tons and is air-transportable in a C-130 in a single load, Nexter says. The ordnance is designed for a firing rate of six rounds per minute. The howitzer engages targets 4.5-42 km. away using base-bleed ERFB ammunition, and more than 50 km. away with rocket-assisted munitions, the manufacturer claims. Eighteen rounds are carried on board and loaded semi-automatically. The howitzer can be brought into action within a minute after coming to a stop, and be on the move 40 sec. after firing, says Nexter. A crew of 4-5 can operate the weapon.

GRAD ROCKETS GET LYNX UPGRADE
DTI, USA
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Israel is upgrading rocket battalions of an undisclosed former Soviet republic, as part of a large-scale arms transfer, sources tell *DTI*. One system has been delivered. The battalions are equipped with Russian Grad rockets on mobile launchers. Upgrades are based on Israel Military Industries' Lynx, an autonomous, modular artillery system that fires rockets and tactical missiles from one platform. The system deploys LAR-160 rockets with (MI's Trajectory Correction System. This enhances the accuracy of free-flight artillery rockets by adjusting trajectory during flight. The upgrades will also improve target-acquisition systems. Battalions will receive an autonomous targeting capability provided by an Orbiter mini-drone from Aeronautics Defense Systems (ADS). At Eurosatory (June 16-20 in Paris), ADS will show Orbiter in a configuration designed for range and endurance. During a recent demonstration in Israel, Or-biter located targets 50 km. (31 mi.) away. It relayed target video and coordinates to an artillery unit, and rockets were aimed and fired. The drone monitored impact and transmitted aiming-correction data for a second volley.

HIGH-ENDURANCE FLIGHT WITH A HEAVY PAYLOAD
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The U.S. Army Space and Missile Defense Command and Special Operations Command are sponsoring programs aimed at demonstrating technology for a UAV that flies for several days at 65,000 ft., with a 400-500-lb. sensor payload. The teams are AeroVironment and Aurora Flight Sciences, which is working with Boeing. Both use liquid hydrogen (LH2) fuel. AeroVironment's entry is Global Observer GO-1, a 170-ft.-wingspan vehicle with four electrically driven propellers. It generates power with a fuel cell or engine (turbine or piston) linked to a generator. AeroVironment doesn't specify which is on GO-1.

Aurora's Orion HALL (High Altitude Long Loiter) will fly in 2010, says John Langford, president and CEO. Aurora is responsible for the airframe, which has a 130-ft. wingspan based on sail-plane technology. Boeing is developing the powerplant, a modified Ford Focus car engine with multistage tur-bocharging and intercooling system, using LH2 as a heat sink. Langford says a production aircraft will probably have two engines for reliability and use an integral LH2 tank-Orion has a spherical tank in the fuselage. Design challenges include thermo-dynamics - cooling and intercooling at high altitude are difficult - and the variation in power between takeoff, climb and cruise.

ISRAEL ADDS COMBAT UGV
DTI, USA
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Israel Defense Forces is procuring Guardium autonomous unmanned ground vehicles (UGV) for border patrol missions. The IDF has received the first test vehicles, equipped with command-and-control systems. They will be used for

field-testing and development of tactics prior to integration with patrol units. The IDF uses several versions of tele-operated and robotic vehicles, and plans to deploy a large UGV on the Gaza border this summer (*DTI* April, p. 8). Guardium, however, is the first autonomous vehicle designed for combat operations with ground forces. The vehicle is supplied by Gnius, a joint venture established by Israel Aerospace Industries and Elbit Systems. It is a third-generation UGV, incorporating the experience and systems engineering of both companies in unmanned vehicles. The UGV is based on the all-terrain Tomcar platform. Its modular design can be adapted to other vehicles. While Guardium's size is sufficient for current mission plans, the IDF wants larger platforms for heavy payloads. A commercial version is being tested for airport security.

HYPER READY

Russia's scramjet engine reaches the testing stage

By Maxim Pyadushkin

DTI, USA

www.aviationweek.com/dti

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Russian scientists continue to work on the development of a supersonic combustion ramjet (scramjet) engine that is lighter and simpler in design than gas turbines and will achieve hypersonic speed (over Mach 4). The Central Institute of Aviation Motors (CLAM) in Moscow plans to start bench tests of a hypersonic vehicle in 2009, and begin flight trials in 2011-12.

At the Engines 2008 exhibition in Moscow in April, CLAM displayed a mockup of its GLL-AP-02 hypersonic vehicle that was unveiled last year at Russia's MAKS air show. Vyacheslav Semenov, deputy chief of CIAM's aerospace propulsion department, says the 3-meter-long (9.8-ft.) vehicle with takeoff weight of 600 kg. (1,320 lb.) will have a scramjet engine with projected thrust of 300 kg. During the flight test, the GLL-AP-02 will accelerate to Mach 4 on an aircraft or other booster. The scramjet then will take the vehicle to Mach 6 for about 30 sec., at an altitude of 20-30 km. (65,000-98,000 ft.). The GLL-AP-02 vehicle is not CIAM's first scramjet platform. The research program began in the late 1970s. The first hypersonic flight-test vehicle CLAM developed was Kholod, or «cold,» which made its maiden flight in 1991 at Sary Shagan test range in Kazakhstan.

Kholod had an experimental E-57 axisymmetric scramjet engine that generated 160 kg. or thrust. It was mounted in place of a warhead on a 5B28 surface-to-air missile that served as a booster. The missile was launched from an S-200V (SA-5) air defense system. Kholod made seven test flights, the last five with the scramjet in operation. During the final flight, in 1999, the engine ran for 77 sec., reaching Mach 6.5. But according to Semenov, Kholod was still propelled by the missile during the entire flight. The GLL-AP-02 vehicle should fly independently with its scramjet.

Semenov says the Russian scramjet will have a cooling system, unlike NASA's X-34A hypersonic prototype that flew in 2004. The scramjet will be cooled by liquid hydrogen fuel that circulates through channels in the engine's walls before being injected into the ramjet.

Designers report a major difficulty involves adjusting the shock waves to control airflow inside the engine. The wedge-shaped air intake slows incoming air to Mach 3. The airflow then mixes with hydrogen and is burned for thrust. If the shock wave moves off the edge of the air intake, the engine loses thrust.

Another obstacle is heating. At Mach 6 the nose of the vehicle is expected to reach 1,650K (1,377C). CLAM is considering several options for heat-resistant materials: ceramics, tantalum, molybdenum or metal alloys.

Semenov says CLAM has received enough financing during the past two years for scramjet development. It's no secret, though, that the Kholod flight test became possible partly as a result of foreign funding. Some flights are being financed by NASA and by Onera, France's national aerospace research center, which will use the test data for its own programs. CLAM is also under contract to the Russian government for much of its scramjet work. The engine developed by CLAM has no application so far. Semenov says it can be used on missiles and aircraft. If the scramjet powers aircraft, it can be combined with a gas generator that will increase flight speed until the scramjet takes over.

OVERWORKED

User demand creates need for larger UAVs

By Bill Sweetman with David Eshel

DTI, USA

www.aviationweek.com/dti

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Driven by demand for surveillance and realization that crew training is the limiting factor in Predator operations, the U.S. Air Force and export customers are shifting attention to the more productive, turbine-powered Predator B/Reaper unmanned aerial vehicle from the Predator A.

General Atomics-ASI is ramping up Predator B production to three a month from two. USAF requests nine MQ-9As in the Fiscal 2009 budget, following 12 in 2007, plus another eight aircraft under the Global War on Terror supplemental budget for 2008.

The Royal Air Force was the first Predator B export customer, signing up in 2006 and putting the aircraft in service in Afghanistan in October, in a joint task force alongside USAF Reapers and Army Sky Warrior Block 0 UAVs.

GA-ASI President Tom Cassidy says Italy has ordered the Predator B, and will take delivery of four this year. Germany is evaluating the Predator B, and seeks an initial operational capability in 2010. Spain is also looking at the Predator B, and Canada has put a request for proposals out for a leased UAV in this class.

Why the interest in the big (10,000-lb.) UAV? Cassidy ticks off advantages over the classic Predator: equal endurance, higher altitude, shorter time to station, 3,000-lb. weapon load and improved sensors. «And the cost of ownership is as good, if not better than the Predator A.»

Cassidy declines to detail that calculation, but points out that the turbine engine on the B requires less maintenance and the higher-flying model covers more territory.

The key to ownership economy may, in fact, lie in a calculation of cost relative to maintaining area surveillance. If the job takes fewer aircraft and crews, economics and force structure may favor a bigger platform.

Two facts became clear in recent months: the commander's appetite for full motion video coverage of an area of operations is almost unlimited, and maintenance of that coverage takes resources. USAF has surged operations, increasing Predator and Reaper orbits to 24 in May from 19 late last year. But to do this the service has frozen Predator assignments, keeping pilots on the UAV longer than expected, and reassigning pilots from other duties.

Col. Chris Chambliss, commander of USAF's 432nd Wing, notes that one Predator combat air patrol takes four aircraft, 80 people-50 in-theater-and two ground-control stations. Last year, the 432nd trained 240 pilots and sensor operators; this year, it will train 320. The basic course for rated pilots takes 90 days, but does not include takeoff and landing; pilots assigned to launch and recovery need another 21 days of training.

Sensor operators, mostly enlisted crew fresh from basic training, take a six-month imagery analysis class and three months of training on the sensor package. Chambliss says the primary stress factor on sensor operators, who are based in the U.S., is the «Ground-hog Day» effect of carrying out the same mission, day after day. The psychological factors are unique, says an RAF officer. «You go to war. You see death and destruction, and sometimes you create it. Then you go home.»

Not only are users calling for more video-surveillance orbits, but other missions are being added. The Reaper is the platform for the Wide Area Airborne Surveillance program, which uses a battery of sensors to cover areas much larger than today's cameras, but at a lower refresh rate. «It can increase the effectiveness of combat air patrols by over 1,200% initially, and eventually increase effectiveness to over 3,000% from where we are today with the Predator,» USAF says. Northrop Grumman was awarded a contract in April to develop compact versions of the Airborne Signals Intelligence Payload: ASIP-1C for Predator A, expected to complete flight tests in May 2009 and be fielded in 2010, and ASIP-2C for the MQ-9.

Cassidy believes USAF will deemphasize the Predator A in favor of the Reaper, leaving the Army to concentrate on the smaller vehicles. The Army has ambitious plans for the MQ-1C Sky Warrior, a modernized, heavier, reengineered aircraft that has little in common with USAF's Predator except general configuration. A GA-ASI presentation at a conference in London last November noted that since Sky Warrior is a divisional asset, the Army's goal is to acquire one system - with 12 air vehicles - for each of 45 divisions.

Sky Warrior development and deployment is proceeding in stages. The Army's I-Gnat Extended Range aircraft, similar to Predator but lacking a satcoms link, have been renamed Sky Warrior Alphas. They operate in combat alongside Sky Warrior Block 0 aircraft, which have the larger payload and Thielert diesel engine of the definitive Sky Warrior, but use the existing GA-ASI ground-control station and data link. They are flown in action by GA-ASI pilots who perform takeoffs and landings, but with Army crew «on board» for operational segments. It is not known whether civilian crews have flown armed Predators.

The first example of the definitive Block 1 Sky Warrior is flying. It uses the same OneSystem ground station from AAI Corp. as the Shadow UAV. Unlike previous GA-ASI products, it is a «fly-by-mouse» system with automatic takeoff and landing. Judging from USAF experience, the Army's plan to deploy the systems with each division will depend on its ability to exploit that automation and abbreviate training.

The only aircraft in the same class as the Predator B/Reaper is Israel Aerospace Industries' Heron TP, also dubbed Heron 2 and known to the Israel Air Force (IAF) as Eitan. In addition to intelligence, surveillance and reconnaissance, Eitan executes a variety of operational missions, including inflight refueling and strategic missile defense.

The IAF is evaluating options to provide inflight refueling for long-endurance systems such as Heron and Heron 2, utilizing manned or unmanned platforms. «Refueling provides a persistent presence in the air, which significantly

increases our ability to respond rapidly to evolving threats,» Brig. Gen. Yohanan Loker told the conference last November. «The operational advantage of aerial refueling for long-range missions is obvious.» Israel aspires to a long-endurance armed UAV for its ambitious boost-phase intercept of tactical ballistic mis-siles. The original concept, shelved by funding limitations, would have carried 2-3 interceptor missiles derived from Rafael's Python air-to-air missile. Analysts regard Eitan, with its advanced avionics, size and endurance, as a candidate. Industry sources have said that Eitan could be a multipurpose UCAV carrying out reconnaissance and attack mis-sions, including locating and destroying mobile ballistic missile launchers. IAF videos show unspecified UAVs launching direct, precise attacks, with the sensor operator looking through the seeker of what is probably a fiber-optic-guided Spike missile. With maximum take-off weight of 4,650 kg. (10,250 lb.), the 14-meter-long (46-ft.) Eitan carries over 1,000 kg. of sensors.

GEORGIAN UAV LOSSES
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Abkhazian forces claim to have shot down four Elbit Herpes 450 unmanned aerial vehicles (UAVs) during March, April and May - one each in the first two months and then two more in early May. The second shootdown was carried out by an aircraft, believed to be a Russian M1G-29, but the two latest were victims of a 9M36 Buk (SA-11 'Gadfly'), according to Abkhazian Foreign Minister Sergey Shamba.

GLOBAL HAWK SCOOPS BAMS PRIZE
By Martin Streetly
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The US Navy (USN) has awarded Northrop Grumman Integrated Systems a USD1.16 billion system design and development (SDD) contract for its Broad Area Maritime Surveillance (BAMS) unmanned aerial system (UAS) following a protracted decision-making process.

Northrop Grumman's bid was selected over the Mariner UAV offered by Lockheed Martin and General Atomics, and Boeing's Gulfstream G550 business jet option. Lockheed Martin launched an appeal against the decision in early May.

BAMS will provide persistent intelligence, surveillance and reconnaissance (ISR) data collection and dissemination for the fleet, in support of the Maritime Patrol and Reconnaissance Force (MPRF).

Under the terms of the 89-month deal, a Northrop Grumman-led team will design, fabricate and deliver two BAMS Air Vehicles (AVs) with associated mission payloads and a communications suite. A forward operating base mission control system, integration laboratory and a main operating base mission control system will also be supplied.

Integrated Systems is acting as prime contractor and AV supplier, heading up a development team that includes Northrop Grumman's business unit at Norwalk, Connecticut, which is responsible for the radar.

Aurora Flight Sciences is providing the AV's tail assembly and other composite structures. L-3 Communications is responsible for communications integration and Raytheon will support the mission control system segment and provide the AV's electro-optic/ infrared (EO/IR) sensor. Of the other members of the development team, Rolls-Royce will provide the aircraft engine, Sierra Nevada Corporation the AV's electronic support (ES) system and Vought Aircraft Industries the AV's wings.

The BAMS RQ-4N is based on an RO-4 Block 20 airframe optimized for the wide surveillance role and the maritime environment.

Features include anti-birdstrike provision, a deicing system and a dedicated mission suite that includes a 35 GHz ICX Radar Systems AI-130 OASys obstacle awareness system. Also included is an Automatic Identification System (AIS) capability, a communications package that includes a twin common datalink installation and X- and Ku-band (8-12.5/12.5-

18 GHz) Link 16 and Single Channel Ground to Air Radio System (SINCGARS) connectivity.

Northrop Grumman has supplied its X-band Multi-Function Active Sensor (MFAS) active electronically scanned array (AESA) surveillance radar, the Sierra Nevada Corporation its Merlin electronic support measure (ESM) fit and Raytheon an EO/IR sensor package.

The AV's EO/IR sensor turret is installed under its nose and, while not confirmed, is understood likely to be based on Raytheon's Common Sensor Payload (CSP) technology that already equips the USN's MH-60R/

S helicopter. For its part, the MFAS radar's AESA is mounted in a belly radome and the sensor is described as being able to conduct multiple scans, identify surface targets and hand-off information (via a distributed transmission capability while continuing to search) with the aircraft in any position relative to its target and/or data recipient.

The RQ-4N's communications package is designed to provide the vehicle with air traffic control voice, line-of-site (LOS) Common Data Link, LOS Ultra High Frequency (UHF - 300 MHz to 3 GHz) and Inmarsat/UHF/wide-band datalink satellite communications functionalities.

The Merlin ESM application is understood to be part of Sierra Nevada's modular family of such equipment; it is described as being able to intercept and identify electronic traffic and has been trialled aboard one or both of the RQ-4 Block 10 Global Hawk Maritime Demonstration AVs operated by the USN's VX-20 test squadron.

RQ-4N design specifications include a gross take-off weight of 14,628 kg, internal and external payloads of up to 1,360 kg and 1,089 kg respectively, a maximum altitude in excess of 60,000 ft, a ferry range of 22,780 km, a loiter speed of 635 km/h, an on-station endurance (at 3,704 km) of 24 hours and a maximum endurance of 36 hours.

In the run-up to the described SDD contract award, Northrop Grumman undertook the 'head start' (HS) initiative subjecting its BAMS concept to a risk assessment programme that focused on proposed subsystems, sensor effectiveness and a demonstration of USN ForceNet compliant communications.

The HS effort was designed to demonstrate the claimed low-risk, cost-effective nature of the submission and its ability to deliver an operational capability that was ahead of threshold requirements. Specific system elements demonstrated included the MFAS radar, end-to-end communications functionality, the proposed mission management system (covering onboard network, bandwidth and sensor control) and the proposed mission control system.

The programme is scheduled for completion by the end of September 2014.

PAKISTAN COMPLETES CAMCOPTER TRIALS FROM TYPE 21 FRIGATE

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The Pakistan Navy has successfully completed a series of flight trials of the Schiebel Camcopter S-100 unmanned aerial vehicle (UAV) from the flight deck of one of its Type 21 frigates, writes Fay Brigden.

According to a statement from Schiebel the three flights took place off the coast of Karachi in mid-March 2008. Operations took place in moderate sea conditions and winds of up to 15 kt, with the vessel travelling at speeds of between 10 and 13 kt during the takeoff and recovery cycles.

Vertical takeoff was undertaken autonomously, while landings were performed both manually and autonomously. Once off the deck the carbon fibre-built Camcopter used GPS to navigate between waypoints at a distance of 50 ft above and 100 ft behind the ship, until it was in clear airspace.

The UAV travelled out to a maximum distance of 22 n miles during the flight tests and completed a range of reconnaissance tasks, including relaying target detection results back to its host ship.

One four-hour mission involved taking off during daylight and then returning during the hours of darkness, which enabled the operators to test the UAV's day/night-capable electro-optic/infrared gimbal. The UAV can carry 25 kg in payload for up to six hours.

The Pakistani trials follow another series of tests aboard an Indian Navy offshore patrol vessel, believed to be the Sukanya-class patrol vessel, INS Sujata, which were carried out at the end of 2007.

UK's WK450 UAV MAKES FIRST FLIGHT

By Martin Streetly

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The UAV Tactical Systems (U-TacS) WK450 unmanned aerial vehicle (UAV) made its maiden flight out of Megido, Israel, in April 2008.

A Thales UK/Elbit Systems joint venture, the WK450 is based on Elbit's Hermes 450B air vehicle and forms part of the British Army's Watchkeeper unmanned aircraft system (UAS) - scheduled to enter service during 2010.

When compared with Elbit's baseline Hermes 450, the WK450 features a 32 cm increase in fuselage width and switches from a pylon- to a shoulder-mounted wing configuration. Other air-frame features include a

partially retractable nosewheel, composite elements manufactured by the UK-based Lola automotive group and an arrestor hook to minimise the vehicle's landing run.

In terms of mission capability, the WK450 is equipped with a dual payload comprising the Thales Ku-band (12.5-18 GHz) I-Master ground moving target indicator/ synthetic aperture radar (GMTI/ SAR) and Elbit Systems Electro-Optics (Elop's) Digital Compact Multi-Purpose Advanced Stabilised System (DCoMPASS) electro-optical (EO) sensor package.

I-Master takes the form of a 30 kg plug-and-play line replaceable unit that is interchangeable with a standard EO turret. Performance parameters include ranges of between 15 km (spot SAR mode) and 20 km (GMTI and strip SAR modes); elevation and azimuth coverage of -55 to +10 degrees and 360 degrees respectively; a GMTI scanning speed of three to 12 de-grees/second; submetric resolution in its SAR modes and the ability to provide surveillance of an area of 2,000 km²/hour.

The 15-inch DCoMPASS is described by Elop as the first EO payload system providing full digital architecture. The baseline CoMPASS EO sensor is designed for both day and night observation and incorporates a charge-coupled device TV camera, a 3-5 pm band forward-looking infrared camera, a laser-aiming sensor, an eyesafe laser rangefinder or a diode pumped laser designator and a laser target illuminator.

CoMPASS features ED and IR imaging, plus laser designation. Weighing in at less than 38 kg with a laser designator installed, base-line CoMPASS can image targets at ranges of between 100 m and 20 km. For data transfer, the WK450 is equipped with a datalink and for flight control, the platform features fully automatic take-off, flight and landing, with no direct operator involvement in air vehicle control.

The WK450 is supported by advanced ground elements (including a containerised ground control station) that incorporate exploitation, dissemination and training tools, can control multiple UAV assets and feature a NATO STANAG-compliant shared image reference library.

A theatre entry Watch keeper' application can be transported as two C-130J loads and the air vehicle is further noted as being able to operate from semi-prepared strips. It features in excess of 16 hours' endurance and incorporates an inherent growth capability. While not confirmed, Jane's believes that this could include new generation sensors such as foliage-penetrating radar or a multi-spectral imager.

US MULLS UAV MERGER

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The US Army and US Air Force are considering merging the army's Sky Warrior and the air force's Predator unmanned aerial vehicle (UAV) programmes to effectively build both aircraft around a common airframe, engine and avionics package based on the MQ-1C Sky Warrior. «What we are putting forward is a collaborative programme built around a common airframe;» said Tim Owings, the US Army's deputy project manager for unmanned aircraft systems.

USAF SELECTS NORTHROP GRUMMAN'S ASIP VISION FOR PREDATOR UAV

By Martin Streetly

Jane's International Defence Review, UK

www.idr.janes.com

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The US Air Force (USAF) has awarded Northrop Grumman a USD54.9 million contract for development and flight-testing of an Airborne Signals Intelligence Payload (ASIP) configuration for installation aboard the MQ-1 Predator unmanned aerial vehicle (UAV).

Designated ASIP-1C, the effort is scheduled to see the completion of factory testing by the end of December 2008, flight testing of the equipment aboard an MQ-1 in the following May and operational fielding of the capability during 2010. Alongside development of ASIP-1C, the contract also covers preliminary design work on an expanded ASIP-2C variant for use on the MQ-9 Reaper UAV.

ASIP has a modular and scalable open architecture capable of detecting, identifying and locating radars and other types of electronic and modern communications signals. It is described as being the USAF's next-generation SIGnals INTelligence (SIGINT) sensor.

ASIP tasking, processing, exploitation and dissemination is integrated into the Distributed Common Ground System (DCGS) multi-source intelligence handling and distribution architecture's Deployable Ground Intercept Facility.

Aside from the already noted ASIP-1 C/2C COMmunications INTelligence (COMINT) configurations, ASIP packages have also been developed for the U-2S reconnaissance aircraft and the RQ-4 Block 30 UAV. Within the Global Hawk ASIP configuration, the High Band System Production Configuration Unit (HBS PCU) is said to act as a key sub-

system and can detect, locate, identify and analyse radar and other specialised signals from altitudes up to 60,000 ft. The HBS PCU is modular, scalable and incorporates Mercury Computer Systems RACE++(R) series multi-computers based on VME cards.

ASIP technology also forms the basis of the enhanced situational awareness (ESA) capability aboard the US Army's RC-12N1 'Guardrail' SIGINT aircraft. Here, the capability centres on a two-chassis ASIP derivative and is described as including signals classification and recognition (SCAR) software, and a network-centric sustainable architecture.

As such, it provides a capability against commercial targets and is able to map the modern signals environment. 'Guardrail' ESA also includes associated ground-based sensor control and signals exploitation software tools. ASIP began engineering checkout aboard the U-2S during late 2006/early 2007 and system performance trials the following May. Up to five ASIP packages are expected to become operational aboard the U-2S during 2008.

CIVIL-MILITARY CONNECTION BOOSTS UUV DEVELOPMENT

In a reversal of traditional patterns of underwater technology transfer, navies are now making increasing use of unmanned underwater vehicles, sonar systems and oceanographic sensors originally developed in the civilian sector

By Cliff Funnell

Jane's Navy International, UK

www.jni.janes.com

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The migration over the past 10 years of unmanned underwater vehicles (UUVs) such as REMUS, HUGIN, Bluefin and Gavia into the specialised fields of mine countermeasures (MCM) warfare, rapid environmental assessments and intelligence, surveillance and reconnaissance provides evidence that technologies initially developed for the commercial sector are now making increasing headway in the defence arena.

Each of these remotely controlled or autonomous submersibles originally won its spurs in either the offshore oil and gas industry or in civil oceanography and science (some of them in both), thus reversing the traditional 'military to civil' direction of technology transfer in the underwater sphere.

However, this about-turn is not confined to vehicles as it also extends to sonar systems and oceanographic sensors. Further-more, the potential, but not yet burgeoning, market for 'homeland security' is also relying to a great extent on commercial systems, probably because the budgets are still small and the customer is primarily from the civil sector (commercial ports and harbours) rather than the military.

In the early days of the offshore oil and gas industry the operators relied heavily on systems and expertise transferred from under-water warfare, including diving systems, manned submersibles and sonar. However, the hostile waters of the North Sea and the challenges of cost-effectively and safely exploiting the hydrocarbon resources within provided the opportunity for intensive operation of these technologies and a spur for innovation and development of new unmanned vehicles or robotics, and acoustic systems.

Consequently, in many of these areas, entrepreneurs, mostly with a naval diving background, set up small companies to exploit the demand for cost-effective systems and instruments in a very competitive marketplace, and also an exacting one on account of the huge financial risks of operating these unproven technologies. The offshore industry is notoriously risk-averse and, therefore, it is very difficult for companies to introduce new technologies, due to the downside costs if the equipment fails. For example, rates for a deepwater semi-submersible drilling unit are around USD450,000-500,000 per day, and for a diving support vessel USD260,000; even worse, the loss of production from a medium-sized North Sea oil field development at current oil prices would be USD 10-12 million.

Although the imposition of commercial off-the-shelf (COTS) procurement on the military to reduce costs went a long way to encourage the introduction of many of these systems, that is not the whole story as it relies on the availability of technology that is well proven in equivalent environments, which is not always possible.

Technology Drivers

«In the very early days [1960s and 1970s] of the offshore oil and gas industry, [UK] Royal Navy [RN] deep diving expertise provided a well-needed foundation to work in the North Sea. But it was only a very few years before the commercial world was into 24- and 36-man saturation diving systems on semi-submersibles, leaving naval divers and research operations way behind,» explains Richard Marsh, managing director of Aberdeen-based Tritech International.

«Technology advances fastest when the human race is under threat, [in other words] war. In peacetime the

only real motivator is profit and that's what's driven us all in the offshore business. In peacetime military spending is seriously curtailed because of the eternal conflict between politicians and the armed forces. Technical progress, therefore, is painfully slow.»

Marsh has had 30 years experience in the subsea industry, leading the charge in the early days from manned diving systems to remotely operated vehicles (ROVs). Prior to entering the underwater domain, however, he was part of the Concorde airliner design team at British Aerospace (now BAE Systems) and therefore no stranger to the management and machinations of large government contracts.

Tritech International is a past winner of the Queen's Award for Innovation and Queen's Award for Export Achievement. The company's SeaKing sonar, which is an industry standard mechanical scanning, obstacle-avoidance sonar for work-class ROVs, is a very good example of the civil-to-military procurement process. It was modified slightly for the Atlas Elektronik SeaFox MCM vehicle and has now sold in the thousands.

Another aspect of technology transfer into the defence sectors is that of small companies, especially in the United States, which spun out of universities and oceanographic institutes and developed their own niche areas. It is interesting to observe, however, that once they begin to demonstrate their value there is a pattern of them being acquired by larger defence companies.

A good example is the REMUS 100 vehicle, which is now manufactured by Hydroid but was originally developed at Woods Hole Oceanographic Institution (WHOI) in the early 1990s. It was funded primarily by the US National Oceanic and Atmospheric Administration (NOAA) under its National Undersea Research Program to support the scientific concepts of the Autonomous Ocean Sampling Network. However, the US Office of Naval Research (ONR) also provided early financial support, with vehicles developed for military applications being ordered by 2001.

The more recent, and deeper diving, REMUS 600 has followed the same path. It was developed at WHOI in 2003 for ocean-ographic science applications, but during 2007 was sold to both to the RN and the Royal Australian Navy. Hydroid had been established in 2001 to manufacture, support and further develop the REMUS autonomous vehicle line, through an exclusive licence with WHOI, but in December 2007 it was announced that Hydroid was being purchased by Kongsberg Maritime, a wholly owned subsidiary of Norway's Kongsberg Gruppen, for around USD80 million.

Battlespace Preparation

The Bluefin-21 vehicles, which are now an integral part of the Battlespace Preparation Autonomous Underwater Vehicle mission module for the US Navy's (USN's) nascent Littoral Combat Ship programme, were evolved from the Odyssey range of UUVs developed at the Massachusetts Institute of Technology, and first underwent field trials off the coast of New England in 1992 and off Antarctica in early 1993. The Odyssey vehicles were also supported by NOAA as well as the National Science Foundation, and ONR supported the development of a second-generation vehicle.

This technology, or rather product, transfer is supported by the funding environment in the US, where the Small Business Innovation Research (SBIR) programme and ONR funding has helped small companies, and university and oceanographic institution spin-offs, develop technologies that have dual-use applications. The Department of Defense SBIR programme provides over a billion dollars each year for early-stage research and development (R&D) projects that serve a defence need and have commercial applications. This provides up to USD850,000 in early-stage R&D funding directly to small technology companies (or to individual entrepreneurs who form a company). What is more, the companies retain the intellectual property rights to technologies they develop under these programmes.

Companies that have been Jited over the years include Benthos and RD instruments, both now owned by Teledyne Technologies; Bluefin Robotics, owned by Battelle; Foster Miller, now owned by QinetiQ; Perry Technologies, now part of Lockheed Martin; Sonatech, owned by Channel Technologies; and Nekton Research.

European Constraints

In Europe, however, R&D funding is not only far more restricted but the levels are much lower, with 50 per cent of the project cost being the norm. Consequently, many of the smaller companies have developed products with internal finance and focused on shorter-term market horizons.

The primary driver in the European underwater sector has been the offshore oil and gas industry, with civil and scientific oceanography playing a lesser role. The continent's defence markets are not as welcoming to smaller companies as in the US, where the SBIR mechanism supports speculative and longer-term R&D. Despite the lack of appropriate funding routes in Europe, the identified trend has still been strong. For example, Gavia is another UUV developed and initially demonstrated in the ocean science sector, and initially sold to universities and institutes in Canada, Iceland and the US. In October 2003 the USN agreed to purchase

the vehicle for testing for MCM missions, with the Space and Naval Warfare Systems Center in San Diego, which is currently evaluating autonomous underwater vehicle (AUV) systems for near-term fleet deployment, initiating the procurement.

In January 2007, the Icelandic company Hafmynd announced the sale of two Gavia underwater vehicles to two undisclosed military buyers. It is believed that Australia's Defence Science and Technology Organisation has acquired one of the units, with the other going to a European navy. The vehicles were reported to have been intended for delivery in March and August 2007 respectively.

Probably the best example of the civil-to-military trend is the HUGIN project, which commenced in 1995 as a collaborative effort between the Norwegian Defence Research Establishment, the Norwegian oil company Statoil, Norwegian Underwater Intervention and Kongsberg Simrad. The prototype vehicle, HUGIN I, was used to survey the route of a commercial pipeline in October and November 1997. However, since then the vehicle has become the de facto standard for deepwater seabed survey in the oil and gas industry, with 3,000 m and 4,500 m maximum depth vehicles in operation.

As a consequence of the extensive experience and knowledge developed for the off-shore industry, the HUGIN was further developed for MCM operations and is now operated by the Royal Norwegian Navy as a key element of its HUGIN Mine Reconnaissance System.

Rapid Response

Not all companies have received significant government funding but have grown instead on the back of a good product range. Saab Seaeye, now a wholly owned subsidiary of Saab Underwater Systems, was formed in 1986 by a husband and wife team to specialise in the manufacture of electrically powered ROVs for the offshore oil and gas industry. One product that has generated much interest is the Seaeye Falcon, which is now operated by the naval forces of Finland, Italy, New Zealand, Russia, the UK and the US. Saab Seaeye has also worked closely with the Russian Federation Navy to develop the Seaeye Panther Plus into a machine capable of operating in support of distressed submarines. Moscow purchased the vehicles in 2006 as part of a rapid response, air transportable submarine rescue system, with a further system ordered for delivery in August 2007.

Perry Slingsby Systems is one of the world's leading suppliers of underwater vehicles, building over 400 manned and unmanned systems, including submarine rescue vehicles. Starting life as Slingsby Engineering, the company helped pioneer the development of manned submersibles for the offshore oil industry in the 1970s before expanding into submarine rescue. The LR5, manufactured in 1978, remains in service with the RN and Perry Slingsby is now involved in the development of the new NATO Submarine Rescue System.

However, it is not only underwater vehicle manufacturers that are making the leap from civil to defence sales. Marine Electronics, employing just over 10 people, was established in Guernsey in 1983 to design and manufacture sonar and acoustic products for the offshore oil and gas industry, and in recent years the company's offerings have begun to be integrated with military systems.

The Dolphin Model 6201 Obstacle Avoidance Sonar, for example, is now a fit on a new Lockheed Martin UUV and has been sold to the US Naval Surface Warfare Center in Panama City. Furthermore, Marine Electronics has now introduced a series of systems for the homeland security market, including the See-Sentry 3D Intruder Detection Sonar.

A company that is making a major effort to utilise its offshore oil and gas pedigree in the defence sectors is Sonardyne International. Established in 1971 as a family firm, it is now an international group of companies, although still relatively small compared to established defence concerns.

Sonardyne has always specialised in the use of acoustics for underwater navigation, positioning, data communication and control. However it has now developed a diver detection system for port and harbour security applications. The Sentinel sonar head has now been selected by US Naval Sea Systems Command for its Integrated Swimmer Defense System.

The UK-based company has also secured a contract to test and integrate the intruder detection system as part of the USN's expeditionary warfare requirement, having successfully completed a four-day series of intensive trials at the US Naval Underwater Warfare Center in Newport, Rhode Island, in October 2007.

Sentinel is a third-generation sonar system that can operate as a standalone portable system or as a system allowing multiple heads to be networked together to provide wide-area domain awareness.

With effect from 1 April 2008, Sonardyne has acquired Wavefront Systems, an underwater technologies design company founded in 2004 by a team of defence sonar engineering professionals.

Oceanographic and marine environmental sensors and systems are also being adapted for military applications. Chelsea Technologies Group was spun out of Imperial College, London, in the 1960s and is now a small company developing and manufacturing systems and sensors for the maritime science sector, including the towed SeaSoar undulating oceanographic recorder (UOR); optical sensors; current, temperature and depth (CTD) probes;

and multi-parameter sensor systems.

As a result of that experience and expertise, Chelsea Technologies has developed the Tactical Environmental Data Acquisition System (TEDAS), an oceanographic system designed to full military specifications and based on the technically advanced Sonar 2115, the successor to the Sonar 2081 fitted in the RN's four Vanguard-class ballistic missile submarines.

TEDAS measures CTD and detects changes in water/mass types associated with ocean fronts, eddies and stratification; all factors in sonar performance.

Sonar 2115, meanwhile, is being integrated into the RN's new Astute-class nuclear powered attack submarines and is being assessed by several other navies. Together with the SeaSoar UOR vehicles operated by the hydrographic survey ships HMS *Echo* and HMS *Enterprise*, these systems provide key environmental data for UK maritime operations.

Customer base

Another UK company that has benefited from the increased willingness of the military to explore COTS technology solutions is Valeport. Established in Dartmouth in 1969, it began with a small product range based around the 'Braystoke' impeller flow metres. Today the Valeport catalogue covers many aspects of environmental, river, estuarine, coastal, hydrographic and oceanographic instrumentation. The company has a worldwide customer base that includes a number of leading academic, research and commercial organisations.

It is only in the last few years, however, that the military business has become significant, as Valeport's CTD and sound velocity technology has been highlighted as a requirement for new build vessels.

The technologies serve several purposes. Water density measurement from CTD sensors allows both accurate depth measurement and precise buoyancy control, while sound velocity data is used to calibrate sonar systems. Both technologies are also being used for halocline and thermo-cline detection, which can cause serious issues for sonar performance.

While the end goal of these measurements in a military application is obviously very different to a commercial application, the performance criteria are often very similar, and in some cases more stringent for non-military use. To give a simple example, Valeport sensors 'are designed to withstand the rigours of 6,000 m deep ocean dives as standard for commercial use, and down to 11,000 m in some cases - way beyond any current military requirement. According to Matt Quartley, Valeport's managing director, this is the major factor that has driven the increase in COTS equipment supply to the military.

«There is no denying that the offshore environment is a harsh one, and in *order* to be a commercial success any given product that targets this market must have been developed, tested, redesigned, improved and proven to be exceptionally durable and reliable,» he says.

This mindset of 'reliable quality, first and foremost' is the hallmark of the most successful equipment suppliers to the offshore market, and in many cases this has been honed over the past 30 to 40 years, since the offshore era that is recognisable today emerged in the early 1970s.

Military customers are now recognising that these commercial products, although developed for reasons of profit rather than defence, have actually been designed to meet similar demands to their own, and it has therefore become a comparatively small leap for them to accept COTS equipment.

HEAVY-FUEL UAVs OPERATIONAL
Jane's Navy International, UK
www.jni.janes.com
June 2008

US Navy Boeing/Insitu ScanEagle unmanned aerial vehicles powered by a heavy-fuel engine (HFE) have flown operationally for the first time, Insitu announced on 22 April. The HFE-equipped ScanEagles have flown more than 350 h, including flying missions that lasted longer than 12 hours in both land and maritime scenarios over Iraq.

JV KITS OUT FIRE SCOUT RADAR
Jane's Navy International, UK
www.jni.janes.com
June 2008

GE Fame Intelligent Platforms - a joint venture (UV) of United States-based General Electric and Fanuc Ltd of Japan - is to provide a set of low-weight ruggedised components for Telephonics Corporation's RDR-1700B

multimode radar system. The JV will provide high-performance processors and other hardware for the 1 kW X-band maritime surveillance and imaging radar, which earlier this year was selected by Northrop Grumman for its MQ-8B Fire Scout unmanned aerial vehicle programme.

RAVEN UAVs WINNING GOLD IN AFGHANISTAN'S «COMMANDO OLYMPICS»

Defense Industry Daily, USA

www.defenseindustrydaily.com

June 2, 2008

(Originally posted on November 2, 2005)

Back on Feb 24, 2005, DID covered the success the RQ-11 Raven mini-UAV was enjoying in Iraq. In November 2005, StrategyPage reported that the RQ-11 Raven was also turning heads in what it calls «the commando Olympics» of Afghanistan: *«In addition to all the cooperation, there's also a lot comparing notes. One thing everyone has noted is the large number of useful gadgets American Special Forces troops have. The most envied item is the American Raven UAV.»*

Or at least, mini-UAVS like the Raven. This Spotlight article looks at Special Forces related mini-UAV buys from a number of countries, spurred by requests from troops in theater. Now the Netherlands has added itself to the list of Raven customers...

RQ-11: Drawing Ravens

The Raven is a 4.2-pound, backpackable, hand-launched sensor platform that provides day and night, real-time video imagery for «over the hill» and «around the corner» reconnaissance, surveillance and target acquisition. Each Raven system typically consists of 3 aircraft, a ground control station, system spares, and related services. As a measure of its success, The 3,000th RQ-11A Raven vehicle rolled off the production line back in March 2006. U.S. armed forces use Ravens extensively for missions such as base security, route reconnaissance, mission planning and force protection. According to the U.S. Army, Ravens were flown for approximately 150,000 combat hours in 2007.

The same reasons behind the Raven's Iraqi success also apply in CENTCOM's first theater of war:

- Useful at the battalion level, but so simple to operate that one of the best pilots in the Iraqi theater was a cook.
- Ideal for quick peeks to see what's on the other side of obstructed terrain - like a city block in Iraq, or Afghanistan's hills and mountains.
- Switch-in IR cameras that some called better than an AH-64 Apache attack helicopter's (presumably the one in TADS/PVNS, not the updated Arrowhead).
- Small and unobtrusive (wingspan just over 4 feet, weight just over 4 pounds), with low noise signature relative to larger UAVs.
- So small, in fact, that it can easily be carried by Special Forces scouts and squads.
- No letters to write if the aircraft goes down.

While some Ravens have been shot down, StrategyPage says the most common cause of loss is losing the communications link or a software/hardware failure on the aircraft. It also reports that troops in Afghanistan have taken to putting a translated label on each Raven, noting that a reward will be given to anyone who returns them to the Americans. Several lost Ravens have actually been recovered this way.

The Commando Olympics: Other Teams are Competing

Both American UAVs and American UAV doctrine are attracting interest from other Western Special Forces - and other branches of the US military. Nevertheless, American UAVs aren't the only winners. Elbit's Skylark, for instance, has emerged as a strong alternative...

Australia

Australia chose Elbit's Skylark as its mini-UAV, to complement Israel Aerospace Industries' larger I-View 250 and some Boeing ScanEagles used at battalion and brigade levels.

The Skylark system include 3 Air Vehicles, a Ground Control Station and the day and night payloads. The system can be carried in two back packs and operated in mission by two soldiers, but additional launch options are available - including by air from various manned or unmanned platforms, or ground launch by rail. The UAV is controlled through full, downsized or man-portable tactical miniature ground-control stations which draw from the Hermes UAV family heritage, and offers real time continuous video and telemetry data transmission via a new Spectralink-developed data link.

Britain

The British SAS purchased a larger hand-launched UAV called BUSTER (backpack unmanned surveillance targeting and enhanced reconnaissance) in 2005, which is bigger than the RQ-11 Raven but has greater endurance, altitude, and range. While StrategyPage claims that the BUSTER is a derivative of the Raven's AeroVironment FQM-151 Pointer predecessor, DID's research reveals a very different vehicle with a biplane-like double wing, made by a different company who seems to have the applicable British contract. The British are also incorporating Desert Hawk mini-UAVs, and a Sept 27/06 release from the MoD confirmed that they're using RQ-11 Ravens in Iraq via a partnership with the US Army.

Canada

Back in 2005, Canadian Forces director of operational requirements for unmanned aerial vehicles, Maj. Keith Laughton, stated that they will be buying portable UAVs that are similar to the Raven, and that they will be deployed in Afghanistan by August 2006. «It has been identified as an operational requirement for Op Archer Roto 2 in August.» At the time, no specific UAV had been chosen to fulfill this role, though Canada has evaluated the Advanced Ceramics Research Silver Fox mini-UAV (see a more visual report via the CASR think_tank). Canada joined Australia in choosing Elbit's Skylark. The UAV was first ordered on a temporary basis, as part of the \$200 million set of emergency purchases for Operation Archer in November 2005. It was picked more formally as Canada's future mini-UAV in October 2006, following a competition that reportedly included IAI's I-View 50 with its unique parafoil landing system, and Boeing's larger ScanEagle UAV. Thales Canada will act as the prime contractor.

Denmark

On Sept 11/07, AeroVironment announced that the Danish Army Operational Command had examined competing offerings, then placed a \$2.4 million order to supply with 12 RQ-11B Raven-B small Unmanned Aircraft Systems (UAS). The RQ-11B is slightly larger than the original Raven; a Raven-B system typically consists of three aircraft, a hand-held ground control station, a remote viewing terminal, systems spares, and related services, which in this case include logistics support and training services.

True to form, this is a «commando olympics» purchase: «*Three of the Raven-B systems are planned for delivery to the Jaegerkorpset (Army Special Forces), with the remainder destined for troop testing by deployed units at the Danish Army's Artillery Training Center.*»

France

On March 24/08, Elbit Systems Ltd. announces that it has won «a tender involving 10 of the leading UAV manufacturers worldwide,» and will supply Skylark I UAV systems to France's Special Forces. This contract marks Elbit Systems' first UAV contract with France.

Netherlands

In April 2006, the Dutch bought 10 Aladin UAVs and 5 ground stations for their Uruzgan mission in Afghanistan; Dutch troops received a crash course from the German army, who have used the system in Northern Afghanistan. See DID coverage. The very small size of this order strongly suggests special forces deployment.

On May 30/08, AeroVironment, Inc. announced that The Netherlands Defence Materiel Organisation (DMO), had awarded a \$7 million contract for RQ-11B Raven systems as well as training, logistics support, and airworthiness certification. The release quotes Frans Klein, Head Section Unmanned Aircrafts for The Netherlands Defense Materiel Organisation: «We performed a thorough competitive selection process and the Raven came out as a clear winner.... Decisive elements in the selection were hand-launchability, reliability, ease of use, robustness, and proven, in-theatre operational performance.»

Poland

July 27/07: Following an initial sale of Orbiter mini UAVs to the Polish Special Forces in 2006, «the customer's high satisfaction with the Orbiter's operational performance in Afghanistan over the past year has led to a sharp increase in Aeronautics' activities in Poland (now a member of NATO), and to the decision by the Polish Ministry

of Defense to equip its other land forces with a large number of similar systems.»

The worldwide tender for the \$3 million contract reportedly included 11 other companies, of which 6 made it to the final stage of the tender. Aeronautics Defense Systems Ltd. will be the sole supplier of 6 Orbiter systems, each of which includes 3 mini air vehicles, day and night camera payloads, portable Ground Control Stations and data links for command and video transmission. Orbiter has a fully automatic flight control system that includes automatic launch and recovery. Aeronautics release.

Spain

On Jan 14/07, El Pais reported that The Spanish Ministry of Defence has given the go-ahead to an urgent purchase of 9 RQ-11B Raven mini-UAV systems (27 UAVs) to strengthen the protection of Spain's 742 soldiers deployed in Afghanistan and 1,100 in Lebanon. The contract amounts to EUR 3.1 million and has been awarded to the Spanish firm Aerlyper as an urgent acquisition «negociado sin publicidad.»

To date, El Pais reports that the RQ-11's manufacturer AeroVironment have sold more than 3,000 units. Thanks to DID reader Pedro Lucio for the pointer and translation assistance. This purchase is separate from, but linked to, Spain's purchase of IAI/UTE Searcher MkII-J tactical UAVs. The Searcher UAVs will be used for for battalion-level reconnaissance in depth, as opposed to the Raven's much shorter range and duration that gives it only squad/company-level utility. Unfortunately, the scheduled September 2007 delivery from the Spanish UTE consortium did not materialize until late December 2007, and the system will not be operational for several months. The Ravens, which are being produced in quantity, may well prove to be an immediately available front-line stopgap.

USAF

The Air Force Association's Oct 15/07 Daily Report says that: «The [USAF's] 380th Expeditionary Security Forces Squadron in Southwest Asia has a new asset: the 35-inch-long unmanned aerial vehicle called the Raven B. MSgt. Ruby Zarzyczny reports that airmen, who are using the 4.2-pound UAV, with a wing span of 65 inches, for reconnaissance, surveillance, force protection, battle damage assessment, and convoy security missions, adopted the small UAV from the Army. Previously the airmen used the slightly larger Desert Hawk, but «its capabilities far exceed the previous air frame,» said 1st Lt. Daryl Crosby, with the 380th ESFS. For one thing, operators can launch Raven B from moving vehicles, roof tops, or any open area, and it can go to war in a backpack. It takes both still photos and live video.»

US SOCOM

Feb 6/08: AeroVironment, Inc. in Simi Valley, CA received a \$45.9 million firm-fixed-price and cost-plus-fixed-fee contract for the SOCOM Raven Systems (newer RQ-11B) and initial spares packages. Work will be performed in Simi Valley, CA and is expected to be complete by Jan 31/09. One bid was solicited on Jan. 30, 2008, and 1 bid was received by the U.S. Army Aviation & Missile Command in Huntsville, AL (W58RGZ-05-C-0338).

According to AeroVironment's Feb 7/08 release, the option was submitted under the existing U.S. Army joint small UAS program of record for the RQ-11, which provides systems for the US Army and Marine Corps. The contract also allows for contract additions from US Special Operations Command and other U.S. military services.

PRESS RELEASE

Bental's MicroBAT Debuts on Oto Melara's Ibis a VTOL UAV Bental Industries, Israel June 2, 2008

Bental Industries, Ltd., Israel's defense industry's leading motion systems supplier and its preferred source for specialized military and commercial applications, announces the addition of VTOL (Vertical Take-Off and Landing) - an unmanned helicopter - to the operational air and land platforms on which MicroBAT has successfully been integrated.

The successful integration of MicroBAT 275, Bental's smallest and most compact, stabilized payload system for mini and micro UAVs, was carried out on Oto Melara's and Celin Avio's Ibis unmanned helicopter. Oto Melara and Celin Avio have teamed to design and produce the VTOL Ibis, and will present it with MicroBAT installed at the Oto Melara Eurosatory booth in Paris next month.

Intended for integration on a variety of air, land, and sea platforms, MicroBAT is an operational system integrated

on different types of air and land UAVs as well as on a variety of other platforms. Claimed the world's smallest and most compact stabilized payload system for mini and micro UAVs, the MicroBAT 275 meets the complex and evolving challenges of surveillance, reconnaissance, and observation missions. The MicroBAT family includes models for various platform sizes, and it is ideal for use in a wide range of small UAV applications which now include VTOL.

Discussing MicroBAT's recent integration, Michael Arnon, Bental's VP Marketing & Sales says, «With MicroBAT's growing integration success on different air and land platforms, this new application on Oto Melara's and Celin Avio's Ibis is another example of our system's inherent flexibility and of its ability to fit every type of existing and emerging UAV platform.»

PRESS RELEASE

Rheinmetall and IAI Cooperate in Wide-Area Reconnaissance Rheinmetall AG, Germany June 2, 2008

Rheinmetall Defence and Israel Aerospace Industries (IAI) have announced their new cooperation agreement on the marketing of the Heron TP UAV reconnaissance system for long-range operations in the Bundeswehr programme SAATEG («imaging surveillance system for the depth of the deployment theatre») during the Berlin Air Show ILA 2008. This programme has the task of contributing towards a comprehensive situational awareness within the scope of networked command & control, both over land and on the high seas or at the coasts.

At present, the German armed forces do not yet have a MALE (Medium Altitude Long Endurance) drone system that can be deployed for missions abroad in all the corresponding environmental conditions worldwide and on a 24/7 basis. The key requirements for the new system are capabilities for widearea realtime surveillance and situation reconnaissance, target acquisition and battle damage assessment - including object and target tracking - as well as competence for precise identification.

The German need must be met in the near-term, i.e. the initial operating capability (IOC) is already planned for 2010.

For this programme, Rheinmetall Defence and IAI are offering the long-range UAV system «Heron TP» - an advancement of the proven Heron system. Heritage of more than 400,000 UAV flight hours and 30 years of operational experience by 35 customers were implemented in the design and the development of the Heron TP. The Heron TP incorporates the latest technologies to meet today's operational needs of ISTAR forces.

Designed as a Multi-payload, Multi-mission platform to answer the requirements of the Israeli Air Force, the HERON TP presents a versatile robust, «all weather «capable MALE UAV system which complies with the SAATEG requirements of the German Armed Forces.

Developed in the framework of an Israeli Ministry Of Defence (IMOD) program several UAV's were already manufactured and tested and it is ready now for serial production.

The Heron TP system meets the requirements specified by the Bundeswehr without any restrictions and, in addition, offers a number of major advantages. In the sensor area, it is equipped with the latest technology and offers a high degree of mission flexibility and considerable growth potential - especially with regard to payload. As a result, the system will make a significant contribution to the safety of the German soldiers in the operational area.

Rheinmetall Defence will be responsible for the complete ground infrastructure, ground control unit, interface to existing command & control infrastructures («Germanization» of the system) and the entire logistics area.

The companies Rheinmetall Defence and IAI have already been cooperating successfully for some time now in other areas, e.g. the Bundeswehr programme WABEP («weapon system for standoff-capable engagement of single and pin point targets») and for the conversion of Boeing 747 passenger planes to cargo aircraft. This strong alliance offers further opportunities for the advancement of a joint technology basis, amongst other things, in the field of unmanned flight systems and Airborne Systems.

GENERAL ATOMICS STARTS PREDATOR C UAV DEVELOPMENT

By Gareth Jennings
Jane's Defence Weekly, UK
www.jdw.janes.com
June 4, 2008

General Atomics Aeronautical Systems Inc (GA-ASI) has begun development of the Predator C unmanned aerial vehicle (UAV), but it has not divulged any aircraft details or a development schedule.

Chris Ames, director of Business Development Aircraft Systems Group, told *Jane's* on the opening day of International Aerospace Exhibition 2008 in Berlin on 27 May that the company is currently developing the successor to the battle-proven MQ-1B Predator and MQ-9 Predator B aircraft.

Ames said that the Predator C programme was very much in its early days and, as such, he was unable to provide any definitive statements as to its planned capability, other than to say that it will «fly higher, faster and stealthier» than the aircraft currently in service with the US Air Force (USAF), UK Royal Air Force and Italian Air Force.

In addition to the three current Predator operators, Ames said that GA-ASI expects to hear the result of its German Air Force bid sometime later in 2008. The German Air Force has a short-term need to purchase an off-the-shelf medium-altitude long-endurance (MALE) system to complement its Panavia Tornado IDS reconnaissance aircraft currently deployed in Afghanistan, as well as its medium- to long-term requirement to field a high-altitude long-endurance UAV.

Ames said he feels that the Predator would be an ideal choice for the German Air Force MALE requirement as it is already in service with coalition forces in Afghanistan, affording it «assured interoperability» with its NATO partners. In addition, the MQ-9's payload of more than 3,000 lb (1,360 kg) adds a degree of flexibility and longevity to the Predator B in its capability to integrate new sensors, which, according to Ames, is not found with other comparable systems.

A General Atomics spokesperson told *Jane's* that the company is currently completing four Predators and two Predator Bs per month for all customers, «with this schedule ramping up as demand requires». He added: «These new orders will simply fall into the queue with current orders we are fulfilling for the USAF.»

In addition to Germany, GAASI sees Australia as a potential customer for the Predator. In 2006 the company demonstrated the aircraft's capabilities by flying from Adelaide on the south coast of Australia to RAAF Learmouth on the northwest coast of the country for the purpose of simulating the defence of Australia's northwest maritime approach.

During this demonstration, the Predator 'sank' a Royal Australian Navy patrol boat that was playing the part of a hostile intruder. The captain of the vessel actually got to see the 'destruction' of his own craft in real time via a video download provided by a Remotely Operated Video Enhanced Receiver (ROVER) terminal. Ames said that this level of situational awareness is one that «any commander would give his eye-tooth for».

GETTING THE MESSAGE ACROSS ABOUT GEORGIA

The West needs to react in a constructive way to the 26 May UN report on Russia's attack on a Georgian unmanned aerial vehicle, argues David J Smith

Jane's Defence Weekly, UK

www.jdw.janes.com

June 4, 2008

On 20 April a Russian fighter aircraft destroyed a Georgian unmanned aerial vehicle (UAV), according to a report from the UN on 26 May. The UAV had been conducting unarmed surveillance above the breakaway Georgian territory of Abkhazia.

Heightening tension, the shutdown closely followed outgoing Russian President Vladimir Putin's 16 April decree extending the Russian economic, legal and administrative space to Abkhazia. The West cannot overlook this sort of Russian bullying because there is more at stake than a Georgian UAV and a Black Sea province. Russia maintains that Abkhaz separatist forces downed the UAV and - on cue - Abkhaz forces claim seven such shoot-downs. However, the UN concluded that the attack came from either an Su-27 'Flanker' or a MiG-29 'Fulcrum' fighter - aircraft that the Abkhaz forces do not possess. After the shutdown, the fighter turned north and flew into the Russian Krasnodar region. «Absent compelling evidence to the contrary,» the UN report says, «the aircraft belonged to the Russian Air Force.»

Discussion is «pointless», said Russian Military Air Forces spokesman Alexander Drobishevsky. Perhaps it is pointless because the Georgian Hermes 450 UAV transmitted graphic video of the moments before its demise at 0554:31 GMT.

The tape shows what the UN report calls «the distinctive twin-fin configuration» of an Su-27 or MiG-29. The fighter fired a missile with «a curved head similar to the AA-11 'Archer'» air-to-air missile.

UN experts carefully checked the authenticity of the video. Eyewitnesses and radar records - also carefully scrutinised for authenticity - corroborate what the video shows. «The UN report on the 20 April incident has been published and that confirms what we knew,» said Swedish Foreign Minister Carl Bildt.

Russia's 20 April high-altitude hijinks were bizarre, but the incident was not its first attack on Georgia.

On the night of 11 March 2007 Russian Mi-24 'Hind' helicopters flew through the Caucasus mountain passes that lead from Russia to Georgia to attack Upper Abkhazia: the only part of Abkhazia controlled by Georgia.

As the helicopters loitered above the valley, the villages of Chkhalt'a and Ajara came under ground-to-ground rocket fire from separatist-controlled territory. The attack culminated with a helicopter launch of either an AT -6 Shturm or an AT -9 Ataka anti-tank guided missile against the government building in Chkhalt'a.

Then, on 6 August 2007, a Russian Su-24 'Fencer' fighter aircraft penetrated Georgian airspace three times above the town of Stepansminda. On the third foray it travelled southwest - tracked by three civilian and military radars - to Tselubani, where it fired a Kh-58U anti-radar missile, apparently aimed at a nearby radar recently upgraded to NATO standards.

The missile fell, undetonated, into a field metres away from houses in the village. The aircraft turned northeast, crossing back into Russia. Of course, Russia denied involvement in either attack, suggesting the Georgians had attacked themselves with weapons they do not possess.

Incongruously, after both attacks Russian Special Envoy for CIS Countries Valery Kenyaikin made clear that Georgia deserved the punishments. Moscow flexes its muscle, plausibly denying any involvement. Georgia gets the message.

Western countries see the muscle too, but it is so strange that they can plausibly deny having seen anything, their sense of fairness demanding more proof.

Now they have it. «For the first time,» said Georgian President Mikheil Saakashvili, «the UN has directly, unequivocally, pointed the finger at Russia.» Although feigning recognition of Abkhazia as part of Georgia, Moscow backs an autocratic separatist regime based on ethnic hatred there. Meanwhile, Putin's 16 April decree turned creeping annexation of the territory into sweeping annexation, bolstered by an additional 700 troops pretending to be peacekeepers, despite their heavy weaponry.

An agitprop campaign provides political cover, accusing Georgia of preparing an invasion - fantastically, through Upper Abkhazia, a narrow defile where Georgia maintains only a 500-strong police force. (Moreover, there have been no Georgian troop movements around Zugdidi, along the main road leading to Abkhazia.)

The UAV shutdown was an unobvious reminder of Russia's intentions of staging a late-1940s-style land grab.

Western leaders must turn their condemnations of Putin's 16 April gambit into a constructive reaction to the 26 May UN report and focus on Moscow's bullying. This is right for Georgia and it will help to build Europe whole and free, with respect for the territorial integrity of every country, free trade, energy security, validity of contracts and human rights.

The election of Dmitry Medvedev as Russia's new president may be an opportunity, but we cannot know unless the West poses him some tough challenges. Among them should be the establishment of an international police force to replace the Russian peacekeepers in Abkhazia and to forge a new diplomatic format that can realistically resolve this conflict.

INDUSTRY RESISTS EDA UMBRELLA FOR UAV PROGRAMMES

By Brooks Tigner

Jane's Defence Weekly, UK

www.jdw.janes.com

June 4, 2008

Industry remains resistant to continuing efforts by the European Defence Agency (EDA) to persuade Europe's defence ministries to bring their cross-border unmanned aerial vehicle (UAV) programmes within its fold.

«The idea of an FDA 'chapeau' on a UAV joint project is not a bad one since EDA is sponsoring the same kind of [multination] effort in other domains, but doing the same with UAVs is premature. The timing is important and teaming conditions are not ready for that,» a European defence industry executive told *Jane's* during the ILA 2008 Berlin Air Show. «The EDA shouldn't rush into something if industry's not ready for it.»

EDA Chief Executive Alexander Weiss was present at ILA on 28 May, where he met with defence officials.

The defence agency has been exploring with its constituent 26 ministries of defence - all EU countries except Denmark - for the last two years how to forge a European approach to developing the military UAVs the EU needs for expeditionary missions. It has hosted numerous UAV expert meetings at its headquarters in Brussels with ministerial and industry personnel and has paid for several small feasibility studies to pinpoint critical UAV technologies for future development.

So far, however, nothing concrete has materialised. «Everybody's looking at UAVs and Europe has a lot of players and would be players, but you have to start with the largest countries and work outwards from there,» said the defence executive.

«It boils down to the hard fact that it is Europe's biggest countries that will spend their [military] budget on UAVs and they and their industries have to work out the basic arrangement for a programme. Only when there is a firm meeting of the minds of the bigger EU countries that have the money to support the programme can you start thinking about a wider European or EDA initiative,» the executive said.

ROBOT WARS

Scott R Gourley and Tony Skinner report on the technological development of unmanned ground vehicles and their deployment in an expanding number of missions, which could have profound implications for future military operations

Jane's Defence Weekly, UK

www.jdw.janes.com

June 4, 2008

While the 21st century has witnessed the introduction of a broad range of tactical defence technologies, few areas have seen the embrace modern war-fighters have given to unmanned ground vehicles (UGVs). Across the globe, UGVs are being employed on a daily basis and, perhaps most significantly, in an expanding number of military applications.

From Talon to MARCbots to xBots to new Future Combat Systems (FCS) platforms, the US military provides multiple examples of this proliferation of platforms and applications.

A case in point can be seen in the Talon family of robots, manufactured by the Foster-Miller subsidiary of QinetiQ North America's Technology Solutions Group. With more than 80 different payloads developed or adapted and mounted on the Talon robot platform, the company delivered 1,000 UGV platforms to the US military between 2001 and 2007.

However, that number has doubled over the last 13 months, according to Bob Quinn, vice president of Unmanned Ground Systems at Foster-Miller.

«It's been all to support the US military surge in the last year, with heavy emphasis on counter-IED [improvised explosive device] operations, where the Talon robots are just overwhelmingly being used,» Quinn said.

On 28 May QinetiQ announced the award of a new USD400 million indefinite-delivery, indefinite-quantity (IDIQ) contract for additional Talon robots and replacement parts for fielding with the US military in Iraq and Afghanistan. Noting that the early UGV applications had focused on explosive ordnance disposal (EOD) and route clearance, Quinn said: «What we are seeing is the 'pull' from the US military to go beyond these two combat support operations to combat operations: in terms of a small reconnaissance robot and a generally small weaponised robot to be able to go in and out of buildings for armed reconnaissance.»

Reflecting on these expanding applications, Quinn said that the Talon family had expanded from a single robot platform of approximately 115 lb (52 kg) - mission profile dependent - to encompass both a small tactical reconnaissance capability, called Dragon Runner, as well as a larger remotely operated weapons platform, called the Modular Advanced Armed Robotic System (MAARS).

Describing what he dubbed «the beauty of an armed reconnaissance», Quinn explained: «A Dragon Runner will provide a small, tough little robot that weighs 15 lb and can be thrown up into second- and third-storey windows and break through glass. It doesn't quit. It's a tough little beast. And if you do find people inside buildings, transmitting the reconnaissance information before you storm the building can be very helpful.»

In tactical contrast, he said that the company's weaponised MAARS design, currently equipped with an M240B machine gun. «is more for going down the street».

MAARS is a successor to the company's SWORDS (Special Weapons Observation Reconnaissance Directaction System) UGVs, and three systems were deployed in Iraq during 2007.

«SWORDS was safety-approved but MAARS resolved perceived deficiencies - or implemented necessary improvements to what the military found with SWORDS, particularly with relation to situational awareness to prevent friendly fire,» Quinn explained.

«What SWORDS did not have was an ability to know where the weapon was pointing in relation to the operator or friendly forces,» he continued. «That wasn't one of the requirements the military had with SWORDS, but after it was safety certified the initial user said, 'Yeah, this is great but we really want to know where that weapon is pointing.' So MAARS does all that.»

He added: «It also gives the operator the ability to escalate force from non-lethal to less-lethal to lethal; which is how our troops are trained.»

Quinn also highlighted the importance of a rugged design in any tactical UGVs.

«In this asymmetric fight the combat operations folks want to send a little robot down an alley or into a building - 'What's there before I risk my life going through a building?' - So these things have to be tough, rugged, and reliable. Fortunately, our Talons have [acquired] a tremendous reputation for being tough, rugged,» he said.

As a way to quantify that reputation, he noted that the platforms undergo battle damage and repair at in-theatre repair facilities run by the company's two primary customers. One of these facilities reports that the Talons can be repaired, on average, after being blown up 13 times. The other facility reports that it can repair the robots an average

of 16 times.

«So we have shipped not just 1,000 robots in 13 months, but also in those 13 months we have shipped over 100,000 replacement parts,» he said. «Those parts are for after the robot has been blown up. Insurgents were attacking the robots in order to try to take them off the battlefield. So they were being replenished, repaired and put back into the fight in less than four hours when they arrived at these robot repair facilities.»

Looking toward the future, Quinn predicts imminent announcements surrounding both Dragon Runner and MAARS. «We had the Dragon Runner at the Marine Corps Warfighting Lab and Fort Benning [US Army Infantry Center and School] already, to get user evaluation,» he said, noting that those two user evaluations will support the near-term «re-introduction of a 'new and improved' Dragon Runner» for tactical reconnaissance applications.

Adding that the first MAARS platform was recently shipped for government acceptance testing, Quinn said: «The MAARS is also scheduled for formal government testing at Fort Benning and at the Marine Corps Warfighting Lab this summer and in the [autumn]. There are multiple experiments at the McKenna MOUT [military operations in urban terrain] site [at Fort Benning] and at the [Marine Corps Warfighting Lab] Quantico MOUT site for [conducting] further concepts of -operation and TTP [tactics, techniques and procedures] development while the safety confirmation is [proceeding] simultaneously.»

Summarising «the real essence» of recent UGV activities, he reiterated that the company had observed «user pull» moving from a counter-IED and combat support tool to actual combat operations.

«What we *have seen* is this demand from our troops. Now that they have had five years of robots in counter-IED; [they are demanding] armed reconnaissance, where [they] can escalate force from non-lethal to less-lethal to lethal.» Exponent's MARCbot (Multifunction Agile Remote-Controlled Robot) series of UGVs provides another example. Developed for the US Army's Rapid Equipping Force to meet a critical theatre operational need, the first Exponent robots were sent to Afghanistan in 2002 and the first improved MARCbot I for IED sweeps were initially sent to Iraq in May 2004. A series of spiral improvements made in direct response to soldier feedback obtained from IED sweep missions, resulted in the current MARCbot IV configuration.

Another UGV that has seen significant quantity deployment as well as recent upgrade activities is the iRobot PackBot. According to Joseph W Dyer, president of iRobot's Government & Industrial Robots Division, the company has delivered more than 1,500 PackBot UGVs to date.

«It has served proudly and well,» Dyer explained. «It has saved lives and that's a big deal for us. iRobot is a commercial company with investors just like every other company in America but when you can see such a direct link between your work and supporting US forces, particularly saving lives and limbs, it really is special to us and we are proud of those 1,500 deliveries.

«We have made some significant improvements to PackBot of late,» Dyer continued. «For example, we now have 300-4(X) 'game controllers' delivered to the army. And they have made a very big and positive difference for us because we're taking advantage of those 'thousands of hours of training' that today's teenagers get before they find their way to the army. It's very intuitive. It has shortened the training time. It has made the operation of the robots much more intuitive and that's a giant step forward.»

Significant Improvements

Another recent improvement involves the power system for the new PackBot '510' variant. «We have [moved] away from our very complex, very expensive proprietary battery and have now modified the design so that it can operate with the SINCGARS /Single Channel Ground and Airborne Radio System] battery that's used for thousands of army radios and other [items of] army equipment. So that's a big logistics plus for the army,» Dyer said.

Developed late last year, the new battery pack is now in production.

«That's a giant step forward,» he added. «It means that not only are thousands of batteries available, it means that the ancillary equipment necessary to support them is readily available. And it represents a real cost savings as well.»

The new battery design is initially being delivered with the first increment of 'xBot' UGV platforms.

Under a contract 're-award' announced in mid-December 2007, iRobot characterised xBot as marking «a turning point in the way the army uses robots in combat, which until now have been deployed in limited numbers only to explosive ordnance device specialists. With this award, the army broadens the deployment of robots in larger scale to general infantry forces for a variety of critical missions in addition to EOD».

The initial phase of the IDIQ contract from the US Army Program Executive Office for Simulation, Training and Instrumentation (PEO STRI), on behalf of the Robotic Systems Joint Project Office at Redstone Arsenal, Alabama, called for the immediate delivery of 101 xBots «for urgent deployment». Under the terms of the full contract, the army could order up to 3,000 military robots, spare parts, training and repair services over the next five years.

«We have delivered over 100 of the xBots on the initial contract,» Dyer said, adding: «We are standing by for a second order that we are advised is inbound, and we are looking for-ward to providing that robot.»

On 22 May iRobot Corporation announced receipt of additional UGV orders under two separate contracts from PEO STRI.

The first involved a USD16 million order under the xBot IDIQ contract to put more than 200 robots and spare parts into the hands of infantry by 31 October 2008.

In addition, iRobot also reported receipt of «a delivery order totalling USD6.3 million under the PEO STRI contract for a combination of iRobot PackBot 510 with EOD kit robots, the iRobot PackBot with ICx Fido Explosives Detection Kits, as well as spare parts and equip-ment. Total orders under this USD64 million IDIQ contract equal USD52 million, and iRobot expects to complete delivery by the end of 30 September 2008».

«That [xBot] robot is a bit of a bridge,» Dyer explained. «It serves for route clearance and finds its way not to EOD troops but to the army. It represents a positive step in getting robots out to a broader customer base. And then, in trail after that, is the [FCS] SUGV [Small Unmanned Ground Vehicle], which is being accelerated from a 2013 kind of date to what we are doing right now, which is providing robots ... for evaluation [by the US Army Evaluation Task Force - AETF] with the infantry troops this summer, and looking for an early production decision late this calendar year.»

Developing Technology

Along with xBot fieldings and potential acceleration of SUGV to FCS, Dyer highlighted other iRobot developmental programmes.

«One other one that we think is going to be equally exciting is our `Warrior' robot, which is a 250 lb-class machine that is a very strong,» he said. «It's not manportable now. If you break the battery packs off it is two-manportable. But it's a very strong, very capable robot, capable of lift-ing over 150 lb. It has over 11 ft (3 m) of reach. It is in development right now. We are working with TARDEC [Tank-Automotive Research, Development and Engineering Center] to further that robot and one of the prototypes will be going to the `Cobra Gold' exercise in Thailand later this month.

«So ... if you take PackBot, that's a 60 lb robot, depending on how it's kitted out, you're seeing us move in the direction of the SUGV, where the design driver was to take weight out of it, to make it much more producible, much more reliable, a better sensor suite, and for it to be able to communicate on the network. So that's the `going smaller' piece. And then the `Warrior' represents adding more strength, even more mobility, and having a platform that, in the case of Warrior, we think will serve in missions that extend from logistics to casualty extraction to the potential for a weaponised platform - and many roles where you need significantly more strength.»

Pointing to the fact that the SINCGARS battery design is also «retrofitable» to already fielded systems, he noted that the company is also focusing on what Dyer dubbed «radio agnostic» designs.

«We've built the capability now that says, if you have any radio you want that fits the weight and cube requirements and has an Ethernet interface, we're happy to plug it in and deliver it to you. So this designing with lifecycle cost and designing for value in service is very much part of our thesis here at iRobot and very much the way we approach design,» he said.

As Dyer noted, a significant amount of critical planning regarding the future employment of UGVs is currently being undertaken at Fort Bliss, Texas, by the AETF, designated 5th Brigade 1st Armor Division.

According to Lieutenant Colonel Ed House, a battalion commander within 5th Brigade 1st Armor, the SUGV tactics, techniques and procedures currently being refined within the AETF focus on real world offensive and defensive operations.

«It happens in Iraq, multiple times, every day, where a platoon is moving down the road and they find what they believe is an

IED,» Col House said. «And right now all we can do is secure the area and call EOD - whether it is Iraqi Army or US Army - to come verify, confirm or deny whether it is an IED. But while we are doing that we are upsetting the local population because they are no longer allowed freedom of movement in their own neighbourhoods - for their own safety.»

Col House continued: «So now, if the platoon leader says, `I think I have an IED,' he goes up and confirms it or denies it with an SUGV and then we continue to move on. That's what this capability will provide - capabilities in both offensive operations and force protection/stability operations.»

In another reflection of the anticipated growth of UGV involvement on the future battlefield, BAE Systems in the UK recently showed how information can be passed between UGVs and unmanned aerial vehicles (UAVs) as well as how control of the vehicles can be passed between different command systems - albeit on a synthetic level.

In an announcement on 23 April, the company said the demonstration, part of BAE Systems' Capability

Augmentation Programme, took place at the Apex integration facility in New Malden, UK.

Based around a convoy route planning scenario, the synthetic demonstration allowed researchers to examine the «technological challenges of managing multiple unmanned air and ground vehicles in a manned environment».

«In this kind of operation, it's critical that the payload - in this case, vital surveillance and reconnaissance information - and that the tasking of an unmanned asset is transferred quickly and effectively between commanders on the battlefield,» Andy Wright, BAE Systems Capability Augmentation Manager said.

The company plans to hold a live demonstration in July with a Bowler Wildcat off-road vehicle (a Land Rover 4 x 4 modified by the Bowler custom-build specialist vehicle company) equipped with robotic and network communications technology.

A company spokesman said this would be followed later in 2008 by a live vehicle demonstration at BAE Systems' West Sale test facility in Australia, incorporating the Wildcat, Supacat UGV and Kingfisher UAV.

Mixed Autonomous Force

BAE Systems aims to have developed and demonstrated mixed forces of autonomous vehicles - UAVs with UGVs, and UGVs with unmanned underwater vehicles (UUVs) - in multiple domains by the end of the decade. Developed over six months in 2006-07, the Wildcat 4 x 4 is equipped with fully auto-matic control of all drive functions allowing it to «drive and think for itself», according to the company.

The vehicle has the ability to follow planned routes at speeds of up to 40 mph, sensing and avoiding obstacles in its path. The company has employed a multi-level approach to the vehicle's autonomous operation - four levels of autonomy range from the top level 'planner', which holds mission information, down to the 'driver', which controls the vehicle.

Building on the effort to develop the Wildcat, BAE Systems Australia recently demonstrated the integration of autonomous technologies onto a Supacat vehicle. The Supacat UGV, which employs vehicle management and ground mission technologies developed for the Kingfisher UAV, successfully navigated the company's West Sale facility in February.

Meanwhile, the UK Ministry of Defence (MoD) is looking to emulate the efforts of the US Defense Advanced Research Projects Agency (DARPA) with a 'Grand Challenge' to develop highly autonomous aerial and ground vehicles.

The latest DARPA event was dubbed the 'Urban Challenge' and was held on 3 November 2007 at the former George Air Force Base in Victorville, California. The event required teams to build an autonomous vehicle capable of driving in traffic and performing complex manoeuvres such as merging, passing, parking and negotiating intersections.

In the UK 11 teams have been chosen by the MoD for a challenge that will culminate in August 2008 with a live demonstration at Copehill Down, a village built for urban warfare training.

The vehicles will be tested on their ability to detect and identify a range of threats encountered by UK troops on operations - such as snipers, roadside IEDs and armed insurgents - and relay this information back to the operators.

Among the teams offering UGVs as either all or part of their solution are: Steller, offering Saturn (an integrated UAV and UGV system); Mira offering a land-based platform carrying optical sensors with a tethered aerial camera; and Silicon Valley offering a combination of fixed, ground and air platforms with optical, laser rangefinder and acoustic sensors.

The UK MoD has also seen the advantage of employing UGV systems for EOD missions.

In 2007 the MoD selected Northrop Grumman subsidiary Remotec UK as prime contractor for Phase II of its GBP65 million (USD127.3 million) EOD programme. The contract will see delivery of an 80-strong fleet of UGV systems specifically designed for EOD duties.

Known as Cutlass, the six-wheeled remote-controlled systems will replace the British Army's existing 'Wheelbarrow' UGVs - also developed by Northrop Grumman - which have been in operational use in Northern Ireland since the 1970s.

In Germany Robowatch Technologies and micro UAV manufacturer microdrones GmbH entered into an agreement in 2007 to develop technologies to link ground and aerial surveillance and reconnaissance systems. Robowatch has previously supplied UGVs for reconnaissance, chemical, biological, radio-active and nuclear (CBRN) hazard detection, as well as the defusing and transportation of explosive devices.

Also in 2007 Turkish company Aselsan completed a concept demonstrator of its first UGV, called Izci.

According to Aselsan, the modular design of Izci makes it suitable for a wide range of missions, including asymmetric warfare, border surveillance, homeland security, logistics, perimeter patrol of high-value installations, observation and reconnaissance. It is based on a 4 x 4 commercial all-terrain chassis that features drive-by-wire and can be operated by remote control or with a person on board.

The Israel Defence Force (IDF), meanwhile, has moved to deploy UGVs for border patrol missions around the Gaza Strip.

The Guardian UGV, developed by G-nius, a joint venture between Elbit Systems and Israel Aerospace Industries, has been delivered for intruder detection missions. The Guardian is based on the Tomcat utility vehicle, can accommodate payloads of up to 300 kg and is equipped with fully autonomous driving and navigation systems. The UGV can also link into a digital army network, enabling communications and data transfer between other assets, including UAVs. Despite being developed for IDF requirements, G-nius is planning to market the Guardian worldwide.

The IDF is also looking to field Elbit's VIPeR (Versatile, Intelligent, Portable Robot) UGV, which was developed within the framework of the Portable UGV programme. Announcing the addition of the VIPeR to its UGV family in October 2007, Elbit Systems said the UGV was configurable for multiple types of missions by add-on sensors, modules and payloads, tailored to specific tasks.

U.S. UNMANNED SYSTEMS MARKET DEMAND INCREASING IN NEAR TERM

Military & Aerospace Electronics, USA

<http://mae.pennnet.com>

June 4, 2008

Palo Alto, California, USA - In support of the global war on terror, the U.S. Department of Defense (DoD) has bolstered the strength of its unmanned systems fleet, which includes unmanned aerial systems (UAS), unmanned ground systems (UGS), and unmanned maritime systems (UMS).

The increasing demand for remotely operated systems from the DoD has created a multibillion dollar defense industry, wherein small firms and large defense contractors compete for market share, say analysts at Frost & Sullivan. «U.S. Unmanned Systems Markets» finds that the market earned revenues of more than \$2.9 billion in 2007 and estimates it to reach \$3.5 billion in 2016.

«Unmanned systems have proven to be ideal solutions for long endurance intelligence, surveillance, and reconnaissance (ISR) missions, target acquisition, and in some cases, strike operations,» says Frost & Sullivan industry analyst Lindsay Voss. «This is accelerating the procurement as well as the research and development efforts of the U.S. DoD.»

Despite the DoD's high deployment over the last five years, growth of unmanned systems in the mid to long term is expected to be slow. Specifically, growth will likely plateau as technology matures and future growth will be dependent on a long-term plan to develop interoperable and unified systems.

Changes in the political sphere and a lack of new unmanned system programs represent potential roadblocks to continued progress. These factors will curtail market growth between 2010 and 2016 and will affect companies that have depended heavily on the DoD the most.

«Companies that had once tried to breakthrough this market have now focused their efforts on electro-optical and infrared (EO/IR) sensors, miniaturized synthetic aperture radar (SAR), collision avoidance systems, tactical data links, and ground control stations,» notes Voss.

The DoD has not initiated new ventures that could provide opportunities to revitalize the sector in the future. Budget cuts and decision-making delays will also impact the market's future prospects.

«In the unmanned systems market, the focus tends to be on the platform itself, and several companies have been successful in selling their platforms to the DoD,» observes Voss. «However, for companies to continue thriving in the market, it will be crucial to explore new methods to optimize system capabilities, including the enhancement of communication systems and payloads.»

Going forward, emphasis will be on interoperability, innovation, and the reduction of operational and support costs. Promising areas include sensors, imagers, electro-optical cameras, radar guidance or navigation, communications, and ground control stations.

GATES CALLS FOR MORE UAVS, FRESH THINKING

By Michael Hoffman

C4ISR, USA

www.c4isrjournal.com

June 9, 2008

U.S. Defense Secretary Robert Gates continues to criticize military leaders for what he says is too slow a response to his order to deliver more UAVs and other surveillance systems to Iraq and Afghanistan.

«I've been wrestling for months to get more intelligence, surveillance and reconnaissance assets into the theater.

Because people were stuck in old ways of doing business, it's been like pulling teeth,» Gates said in a speech at the Air University at Maxwell Air Force Base, Ala.

Gates has established a servicewide ISR task force to find «innovative and bold» solutions to the shortage. Headed by Brad Berkson, acting principal assistant deputy undersecretary of defense for logistics and materiel readiness, the group was tasked to cut through bureaucratic tie-ups. «My concern is that our services are still not moving aggressively in wartime to provide resources needed now on the battlefield,» Gates said.

A few days later, Gates said Berkson would «look worldwide at all the ISR resources we have. And it's not just ... UAVs. I'm asking him to look at all of the ISR capabilities, piloted aircraft as well as UAVs and so on, and see what we have in the other commands here in the United States and so on.»

He likened the urgency of the task force's work to that of a group he created last year to push for faster production and deployment of Mine Resistant Ambush Protected armored vehicles that are credited with saving lives of troops facing attacks by roadside bombs in Iraq. The new task force will be made up of representatives of the Joint Staff, the military services, the comptroller and the undersecretary of defense for intelligence.

While Gates did not mention the Air Force's Predator UAVs by name, or blame for the Air Force for not getting more of those craft into the field, the secretary chose an audience of Air Force officers for the speech. Earlier this year, he called upon the Air Force to boost the number of MQ-1 Predator orbits to 24 by June. The Air Force reports it is on track to meet that number - a 25 percent increase from last year.

With the Air Force struggling to retrain pilots quickly enough to fly even more Predators, Congress has raised the possibility of the Air Force allowing other officers to pilot Predators. However, Air Force Chief of Staff Gen. T. Michael Moseley shot down that idea, saying he would require all Predator pilots to have first flown other aircraft as long as the UAVs carried munitions.

«All this may require rethinking long-standing service assumptions and priorities about which missions require certified pilots and which do not,» Gates said. «For those missions that still require manned missions, we need to think hard about whether we have the right platforms. Whether, for example, low cost, low-tech alternatives exist to do basic reconnaissance and close air support in an environment where we have total command of the skies - aircraft that our partners can also afford and use,» he added.

Gates urged the officers in his audience to dedicate themselves to thinking creatively.

PRESS RELEASE

Northrop Grumman Showcases UAV Capabilities At Berlin ILA Air Show 2008 Northrop Grumman, USA May 21, 2008

Northrop Grumman Corporation will display a wide range of its key capabilities and programmes at the Berlin International Aerospace Exhibition, including unmanned aerial vehicles, aerial tanker refueling and aircraft navigation systems. The air show will take place at the southern section of Berlin-Schonefeld Airport from 27 May to 1 June. More than 1,000 exhibitors from some 40 countries will participate in the show, which will also commemorate the 60th anniversary of the Berlin Airlift.

«We are strongly positioned to grow our business in Germany and across Europe where we have considerable capabilities to offer,» said John Brooks, president of Northrop Grumman International Inc. and vice-president of international business development for Northrop Grumman's Integrated Systems sector. «We look forward to serving the needs of our customers by building on the success of our industry partnerships to leverage our core capabilities and provide tailored solutions.»

The Northrop Grumman exhibit pavilion will feature the company's industry-leading capability in unmanned aerial vehicles including Euro Hawk, Fire Scout, the recently-awarded Broad Area Maritime Surveillance and the Global Hawk-based solution for the NATO Alliance Ground Surveillance (AGS) requirement.

In 2007, the German Ministry of Defence awarded a contract to Euro Hawk GmbH, a joint-venture company formed by Northrop Grumman and EADS, for the development, test and support of the Euro Hawk(r) unmanned signals intelligence (SIGINT) surveillance and reconnaissance system. With a wing span larger than a commercial airliner's, the Euro Hawk(r) UAS will serve as the German Air Force's high altitude, long endurance SIGINT system.

NATO has also chosen Global Hawk to meet its AGS requirement. Demonstrating its commitment to trans-Atlantic cooperation, Northrop Grumman leads an industry team representing 19 participating nations to develop and produce an Alliance-owned and operated ground surveillance capability.

Also on display will be the KC-45A aerial refuelling tanker. Earlier this year, the U.S. Air Force selected a Northrop Grumman-led team to provide the new tanker, which will be based on the highly-successful Airbus A330 commercial airframe. The KC-45A will be built by a world-class industrial team that includes EADS North America

as the primary sub-contractor.

The MQ-8B Fire Scout vertical take-off and landing unmanned aerial vehicle will also be featured. The Navy recently announced that it intends to conduct the Fire Scout Operational Evaluation aboard a FFG-7, Oliver Hazard Perry class ship. This will provide the fleet with unmanned aerial system support as soon as possible. Northrop Grumman's German and Italian subsidiaries will also be represented at the air show. LITEF will display its navigation systems for land vehicles, sensors for weapon stabilisation, inertial guidance systems for missiles and attitude heading reference system / navigation systems for fixed and rotary wing aircraft. Northrop Grumman Italia will display a full range of its state-of-the-art fibre-optic navigation systems including the LISA-200, the Navex family of attitude heading reference systems and LN-251 / LN-270 high accuracy inertial navigation systems. These systems are in service on aircraft platforms in the U.S., Europe and Asia and are fitted to the Eurofighter Typhoon, the Tornado and BAE Systems Hawk.

Northrop Grumman, headquartered in Los Angeles, has offices in Europe in: Freiburg and Hamburg, Germany; Pomezia, Italy; Paris, France; Brussels, Belgium; Oslo, Norway; and at locations across the United Kingdom. Northrop Grumman Corporation is a global defence and technology company whose 120,000 employees provide innovative systems, products, and solutions in information and services, electronics, aerospace and shipbuilding to government and commercial customers worldwide.

PRESS RELEASE

**Boeing Flies A160T Hummingbird Unmanned Rotorcraft for 18 Hours: Company claims world record for UAV endurance in specific weight class
Boeing Integrated Defense Systems, USA
May 21, 2008**

The Boeing Company successfully flew its A160T Hummingbird unmanned rotorcraft for 18.7 hours May 14-15, claiming an unofficial world endurance record for unmanned aerial vehicles (UAVs) weighing between 1,102 and 5,511 pounds (500 to 2,500 kilograms). «We didn't set out to establish a world record, but it was a great accomplishment,» said Jim Martin, Boeing Advanced Systems A160T program manager. «This 18-hour endurance flight is the culmination of thousands of hours of systems, ground and flight testing. The aircraft performed flawlessly, flying unrefueled longer than any other current unmanned rotorcraft. Our customers are excited about this important flight, the needs the A160T fills and the many options it gives warfighters.» During the flight at the U.S. Army's Yuma Proving Ground in southwestern Arizona, the turbine-powered aircraft carried a 300-pound internal payload at altitudes up to 15,000 feet, landing with better than 90 minutes of fuel in reserve. The flight began May 14 at 8:55 p.m. (Pacific time) and ended May 15 at 3:36 p.m.



Boeing has submitted an application to the National Aeronautic Association, the U.S. sanctioning body for the Fédération Aéronautique Internationale (FAI), to officially claim the world record. FAI establishes rules for the control and certification of world aeronautical and astronautical records.

«With its ability to operate autonomously for extremely long durations while carrying heavy payloads, the A160T is perfectly designed for a variety of military missions,» said Grady Eakin, Boeing Advanced Systems director of Business Development. «The A160T's large internal bays can accommodate multiple sensor payloads, allowing it to simultaneously perform persistent intelligence, reconnaissance, surveillance and target acquisition, communications relay, direct attack and other missions all in the same sortie. An externally mounted payload module can deliver heavy supplies or recover high-value assets with great precision.»

The aircraft used in the 18-hour test was one of the A160Ts Boeing Advanced Systems is building for customers including the U.S. Defense Advanced Research Projects Agency (DARPA), the U.S. Army Aviation Applied Technology Directorate and U.S. Naval Air Systems Command. The same aircraft achieved another flight milestone May 9 by successfully completing hover-out-of-ground-effect (HOGE) demonstrations at altitudes of 15,000 and 20,000 feet.

«The HOGE was an important flight because it showcased a highly desirable capability that other unmanned rotorcraft can't deliver,» said Martin. «Being able to hover at high altitudes puts the A160T above certain mountainous

areas and out of range of some ground defenses, while maintaining persistent intelligence, reconnaissance, surveillance and target acquisition, and performing other missions for troops on the ground. The 15,000-foot HOGE met the DARPA goal. We exceeded that goal with the 20,000-foot test point.»

The HOGE demonstration flight lasted 2.9 hours, including hovering for more than seven minutes. The HOGE and 18-hour endurance flights completed all planned Phase I flight test demonstrations for DARPA. Since 2007, the A160T has reached a speed of 142 knots, recorded an eight-hour flight carrying more than 1,000 pounds of payload and recorded a 12-hour flight carrying more than 500 pounds, all using a fraction of its maximum fuel capacity.

The Hummingbird features a unique optimum-speed-rotor technology that significantly improves overall performance efficiency by adjusting the rotor's speed at different altitudes, gross weights and cruise speeds. The autonomous unmanned aircraft, measuring 35 feet long with a 36-foot rotor diameter, eventually will fly more than 140 knots with a ceiling of 20,000 to 30,000 feet (high hover capability up to 15,000 feet) for more than 20 hours.

PRESS RELEASE

DARPA Awards AeroVironment Phase II Contract for Nano Air Vehicle Development About AeroVironment, Inc. (AV), USA May 27, 2008

Monrovia, California, USA - AeroVironment, Inc. today announced it has been awarded a Phase II contract by the Defense Advanced Research Projects Agency (DARPA) to design and build a flying prototype for the Nano Air Vehicle (NAV) program. AV completed a preliminary design review at the end of its Phase I, \$1.7 million program. Phase II, which was initiated in March, is a new six-month, \$636,000 development program that will culminate with the demonstration of a rudimentary, three-inch flapping-wing air vehicle system. Following a successful demonstration, DARPA has the option to extend the program for an additional 18 months which could increase the Phase II contract value.

The NAV program was initiated by DARPA to develop a new class of air vehicles capable of indoor and outdoor operations. Employing biological mimicry at an extremely small scale this unconventional aircraft is designed to provide new military reconnaissance capabilities in urban environments. AV's NAV is designed to weigh no more than 10 grams and have the ability to carry a payload of up to 2 grams. AV's NAV team also developed the Black Widow and Wasp MAVs for DARPA.

«Our Raven and Wasp III UAS began as early development programs similar to the NAV program, and now help protect the lives and enhance the operational effectiveness of warfighters and first responders,» said John Grabowsky, AV executive vice president and general manager of unmanned aircraft systems. «The NAV program represents the early development of a revolutionary new class of UAS that could eventually provide valuable new capabilities to our customers,» Grabowsky added.

U.S. armed forces use AV's hand-launched UAS extensively for missions such as base security, route reconnaissance, mission planning, battle damage assessment and force protection. The United States Army reported that its Ravens were flown for approximately 150,000 combat hours in 2007. AV has delivered over 9,000 small unmanned aircraft to date, including Raven, Wasp and Puma.

PRESS RELEASE

Dassault Aviation, Thales and Indra submit a joint MALE UAV offer in Franco-Spanish cooperation to the French and Spanish Ministries of Defence Dassault Aviation, France May 28, 2008

Dassault Aviation, Thales and Indra have signed an industrial agreement covering Unmanned Aerial Vehicle Medium-Altitude Long-Endurance (MALE UAV) activities. On 22 May 2008 the companies submitted an offer to the French and Spanish Ministries of Defence for a UAV MALE system to be developed within the framework of Franco-Spanish cooperation. This pragmatic and competitive offer would match the operational needs of both countries, and allow the supply to both Armed Forces of long endurance UAVs for theatre surveillance within a very short timeframe. The first system could be operational as early as the end of 2012. The proposed solution, managed at a European level by Dassault Aviation, Thales and Indra, entirely fulfills the requirements of both countries by taking into account the current budget constraints while addressing operational needs with a comprehensive high performance mission system, integrating leading technologies. The solution is based on the HERON TP UAV developed by the Israeli company Israel Aerospace Industries. It is a new generation multi-

mission platform, whose design benefits from 30 years of Israeli experience in the domain of UAVs. This joint offer capitalises on strong industrial capabilities acquired in Europe and also covers the technical and managerial skills needed to succeed in such a partnership - aerospace, mission systems, systems architecture and complex systems management. The solution is based on extensive expertise, long lasting cooperation, and is backed by a strong and solid industrial team.

PRESS RELEASE

**GA-ASI's Frank Dace honored by AIAA: Company EVP Receives Lifetime Achievement Award in Aerospace Engineering
General Atomics Aeronautical Systems
San Diego, California, USA
May 23, 2008**

General Atomics Aeronautical Systems, Inc. (GAASI), a leading manufacturer of unmanned aircraft systems (UAS) and tactical reconnaissance radars, today announced that Frank Pace, executive vice president of the company's Aircraft Systems Group, has been honored by the American Institute of Aeronautics and Astronautics (AIAA) with a local lifetime achievement award in aerospace engineering. The San Diego Section is dedicated to promoting awareness, activism and access throughout the aerospace community. Mr. Pace was recognized at the San Diego Section's 2008 Annual Awards Banquet held yesterday for a lifelong career in aerospace engineering highlighted by his successful full life-cycle management of many unmanned aircraft systems that have revolutionized the field of UAS and their use in combat. The award is presented to candidates who have made a significant contribution to aerospace engineering over a lifelong career.

«Mr. Pace's significant contributions over his distinguished 27-year aerospace engineering career have transformed the global UAS industry,» said Thomas J. Cassidy, Jr., president, Aircraft Systems Group, General Atomics Aeronautical Systems, Inc. «His innovative engineering programs have dramatically improved UAS capabilities, accelerated global UAS procurement, and established the standard against which all other UAS are judged. His impressive efforts have contributed to GA-ASI's recognition as the world's premier supplier of unmanned aircraft systems, and we are very proud to have him on our team.»

Frank Pace has been a leader in unmanned flight for over 27 years and in unmanned aircraft for 22 years. An aerospace engineering «pioneer and pacesetter,» his engineering prowess, vision, and innovation have been pivotal to GA-ASI's development and production of more than 275 proven and reliable UAS that have logged over 450,000 flight hours, with over 80% of that time spent in combat. His engineering achievements have produced a series of proven UAS that have been critical to U.S. and coalition forces during combat operations in the Balkans Conflict, Operation Enduring Freedom, and Operation Iraqi Freedom.

HONEYWELL TO ACQUIRE INTELLIGENT AUTOMATION

**By Max Jarman
The Arizona Republic, USA
www.azcentral.com
June 3, 2008**

Honeywell's Phoenix-based aerospace division has agreed to acquire a San Diego provider of onboard diagnostic systems for military and commercial helicopters.

Terms of the acquisition of Intelligent Automation Corp. were not disclosed, but the deal fits with Honeywell's plans to expand its defense and space business and is subject to regulatory review.

Intelligent Automation Corp.'s health and usage monitoring systems are now deployed on more than 500 aircraft and scheduled to be installed on another 1,000, including Apache, Blackhawk, Chinook and Little Bird military helicopters. The company also provides systems for fixed-wing aircraft, unmanned aerial vehicles and ground vehicles.

In April, an Intelligent Automation Corp. system detected tail-rotor faults in five Apache helicopters.

«IAC technologies solve complex problems with easy-to-understand systems that increase aircraft mission readiness, reduce operating costs and improve public and crew safety,» said Ed Wheeler, president of Honeywell Defense and Space, a division of Honeywell Aerospace.

Facilitating Access To Global UVS Information

The electronic **UVS News Flash** is produced by Blyenburgh & Co for UVS International and is supplied **free-of-charge** by email. The UVS News Flash has as purpose to help raise the level of global awareness relative to ongoing research & development, relevant technologies, production and sales, as well as current & future applications of unmanned vehicle systems (UVS) (air, ground & naval), by making existing published information available to a wider readership.

SOURCE MATERIAL

The following **UVS International media partners**:

- Aerospace & Defence Network, The Netherlands
- Armada International, Switzerland
- Avionics Magazine, USA
- Canadian Defence Review, Canada
- Defence News, USA
- Frontline, Canada
- Jane's Defence Weekly, UK
- Jane's Navy International, UK
- Strategie & Technik, Germany
- TTU, France
- Asia Pacific Defence Reporter, Australia
- Armed Forces Journal, USA
- C4ISR Journal, USA
- Defence Management Journal, UK
- Fantassins, France
- Flight Tech Online, USA
- Jane's International Defence Review, UK
- Military Technology, Germany
- Training & Simulation Journal, USA

have authorised UVS International to include the relevant articles that they publish in the weekly UVS News Flash. The aforementioned media partners are sincerely thanked for their cooperation.

In addition, the UVS News Flash contains press releases submitted by industry (UVS International members, as well as non-members) and regulatory and government authorities (military & civil). Multiple articles are also searched for on the web. In all cases the source of the information, the name of the author (if applicable) and the date of publication, as well as the publication's web site, are indicated.

For security reasons, many of the recipients of the UVS News Flash cannot access web sites from their office computers. Therefore, the UVS News Flash does not rely on supplying links to various web sites where information can be found, but proposes the entire text of the relevant articles & press releases.

LANGUAGE All articles in the UVS News Flash are in English.

CIRCULATION

The UVS News Flash is distributed every two weeks by email to a qualified readership of more than **6 000 persons** in **68 countries** directly involved with unmanned vehicle systems. Many of these recipients forward the News Flash on to others within their organizations, which substantially increases the News Flash circulation. All UVS News Flashes are posted on www.uvs-info.com

GETTING ON THE RECIPIENTS LIST

Registration on www.uvs-international.org or www.uvs-info.com by qualifying entities automatically assures being inserted on the email listing used to send out the publication.

QUALIFIED READERSHIP

The qualified recipients of the UVS News Flash consist of: UVS International members, government, military, diplomatic and international organization representatives, regulatory authorities, researchers, academia, as well as partner organizations and associations.

SUBMISSION OF PRESS RELEASES & ARTICLES

All recipients of the UVS News Flash are encouraged to supply UVS International by email with their press releases & announcements. All recipients are also encouraged to forward the UVS News Flash to their contacts & relations. Publications (printed & electronic press) interested to have their relevant articles included in the UVS News Flash are requested to contact UVS International (info@uvs-international.org).

ADVERTISING RATES

The advertising rates have been kept extremely reasonable in order to make advertising in this medium also possible for small and medium sized companies. The UVS News Flash is without doubt the most cost effective way possible for an advertiser to regularly get his message out to the targeted international unmanned vehicle systems community.

2008 UVS NEWS FLASH ADVERTISING RATES

<u>Positions:</u>	Rates in Euro excl. VAT	Cost per insert in Euro excl. VAT	Applied Discount
2nd & following pages only (cover page is not available for advertising)			
Full page advertisement in	- 4 consecutive issues	1 000	250
	- 8 consecutive issues	1 800	225 -10%
	- 12 consecutive issues	2 544	212 -15%
	- 24 consecutive issues	4 800	200 -20%
	- 48 consecutive issues	8 976	187 -25%
Half page advertisement in	- 4 consecutive issues	548	137
	- 8 consecutive issues	984	123 -10%
	- 12 consecutive issues	1 404	117 -15%
	- 24 consecutive issues	2 640	110 -20%
	- 48 consecutive issues	4 944	103 -25%

Note: Orders for less than 4 consecutive insertions will not be accepted.
19,6% VAT will be due by companies established in France.

Euro 1 = US\$ 1,50 (for indicational purposes only; the exchange rate may vary from day-to-day)

Agency Commissions	Indicated advertising rates do not include any commissions for agencies. If an agency commission is required, such commission should be added to the indicated prices.
Invoice Currency	All invoices will be issued & must be paid in Euro .
Advertisement Booking	In order to be valid, advertisement bookings must be made by completing and signing the News Flash Advertisement Booking Form. The completed form is to be transmitted by post or fax to Blyenburgh & Co. Bookings will be legally binding after written booking confirmation by means of an official invoice sent by the Publisher.
Payment Deadline	A booked advertisement will only be published after receipt of payment.
Publication Dates	The UVS International News Flash is published & emailed out Saturday or Sunday every two weeks.
Copy deadline	The advertisement copy is to be received by Blyenburgh & Co on the Tuesday preceeding the Saturday on which the News Flash in which the advertisement is to be placed will be published.

ADVERTISEMENT COPY INSTRUCTIONS

- The advertisements can be submitted in JPEG, Photoshop, Illustrator or PDF format. Please note that we operate in a PC environment.
- The advertisements should have the following sizes:
 - Full page advertisements : 238 x 164 mm (height x width);
 - Half page advertisements : 119 x 164 mm (height & width).
- The advertisement file should have the lowest possible resolution acceptable for screen reading & printing; 72 dpi is suggested.
- Advertising copy files are to be sent to Blyenburgh & Co by email at rc@uvs-info.com & pvb@uvs-info.com.
- The advertising copy for each insertion may be different.
- For further questions relating to the supply of your advertising artwork, please contact Blyenburgh & Co.

ADVERTISING CONTACT

Russ Curry

Tel.: 33-1-47.43.01.98 - Cell: 33-6-07.16.72.02 - rc@uav-info.com

ADVERTISING IN THE 2008 UVS NEWS FLASH - TERMS & CONDITIONS

In these Terms & Conditions «the Publisher» means Blyenburgh & Co; «the Advertiser» means the advertiser or its agent, whichever is the principal; and «Advertisement» means the advertising space booked by the Advertiser.

- 01** The receipt of the signed advertisement booking form by the Publisher constitutes a binding contract.
- 02** Unless otherwise stated, fees payable to the Publisher for Advertisements are stated exclusive of VAT (which shall be payable in addition). VAT will only be charged to Advertisers established in France.
- 03** Unless otherwise expressly agreed in writing, all invoices will be issued in Euro and will be payable in accordance with the payment instructions indicated on the invoice.
- 04** All cheques must be in Euro and be made payable in France to the Publisher and sent to the Publisher at the address appearing on the invoice.
- 05** The Advertiser shall submit to the Publisher suitable Advertisement copy by the due date notified by the Publisher. If such copy has not been received by such date, the Publishers may refuse the Advertisement and may reproduce material already held from the Advertiser, or may print the name and address of the Advertiser in place of the Advertisement, and the Publisher shall not be responsible for any mistake, error, or omission in such copy.
- 06** The Advertiser shall supply to the Publisher all necessary artwork to reproduce the Advertisement. Supplementary processing costs incurred by the Publisher will be charged to the Advertiser where artwork is not supplied in the specified form. The Publisher may stipulate special charges and conditions for special Advertiser requirements.
- 07** Cancellations can be accepted only if received in writing not later than 7 days prior to the publication date. Cancellations received after this date are subject to a 50% adjustment fee.
- 08** Special positions are given only if agreed to in writing by the Publisher. An additional charge may be levied.
- 09** All production work handled by the Publisher, including reproduction from complete artwork, will be charged at cost to the Advertiser.
- 10** The Publisher reserves the right to refuse or cancel any Advertisement without any reason or notice, (returning any money paid).
- 11** Advertising copy that may be mistaken for non-advertising material (Advertorials) must be clearly marked «Advertisement».
- 12** The Publisher reserves the right to alter or postpone the publication date.
- 13** The Publisher cannot take any responsibility for the accuracy of copy given verbally to the Publisher. Publisher is not responsible for any misspellings or other errors in advertisements.
- 14** Advertisers' material or the material supplied by their agents is held by the Publisher at the owner's risk. The Publisher will retain such material for up to 12 months and reserves the right to destroy them thereafter if their return is not requested in writing by the Advertiser within six (6) months of the date of the publication of the Advertisement.
- 15** The Advertiser indemnifies the Publisher in respect of any loss, expense, cost or damage incurred or suffered by the Publisher as a result of any claim made against the Publisher arising from the Advertisement. The Publisher will consult with the Advertiser as to the way in which any such complaints are to be handled.
- 16** The Publisher is not responsible for any loss howsoever occasioned, as a result of delay or failure to publish this publication.
- 17** The Advertiser hereby warrants to the Publisher that its Advertisements are in no way whatsoever a violation of any existing copyright and that they contain nothing illegal, defamatory, objectionable, indecent or libellous, and hereby indemnifies the Publisher against any loss, injury or damage which may be occasioned to the Publisher in consequence of any breach of this warranty arising from the placing of its Advertisement in the Publisher's publication.
- 18** The Advertiser must notify the Publisher in writing of any complaints it has or receives regarding the Advertisement within twenty eight (28) days of the relevant publication date.
- 19** Each invoice rendered by the Publisher to the Advertiser or its agency shall be paid within 30 days of the date of the invoice. Should any invoice remain unpaid after the expiry of 30 days, then the Publisher reserves the right to charge interest on the outstanding invoice at the rate of 1,5% per month or part of the month from the date when the invoice shall have been due for payment, until payment is actually received by the Publisher.
- 20** Notwithstanding aforementioned §19, if notification of receipt of payment of an advertisement booked has not been received by the Publisher from his bank 3 days prior to the publication date, the relevant advertisement will not be published.
- 21** The Advertiser will receive an electronic copy by email of the publication in which the advertisement appears on the publication date of the publication.
- 22** Should the Advertiser or its agency fail to supply Advertisement material of an acceptable standard or instructions by the specified copy deadline, then the Publisher reserves the right to charge the full cost of the Advertisement booked.
- 23** The Publisher may charge to the Advertisers' or its agency's account the cost of enforcing any of its rights against the customer for non-payment of outstanding debts in accordance with the Publisher's terms, including any expenses incurred by reason of the customer's breach of these conditions. Should the Publisher refer an outstanding account to either a debt collection agency or solicitors for collection, then any possible future business to be transacted with that customer will be entirely at the discretion of the Publisher.
- 24** These terms and conditions contain all the terms of the order and no other terms will be incorporated into the order. The order is in respect of the Advertisement only, and is not dependent on any other terms.
- 25** Orders are bound by the Laws of France and subject to the jurisdiction of the French courts.