

Under a \$1.6 million program with the Army's Aviation Applied Technology Directorate, Boeing will test the use of weapons such as Hellfire, the advanced precision-kill weapon system missiles, and the GAU-19A gun aboard the unmanned Little Bird, a modified MD 530F helicopter.

The topic of armed UAVs, meanwhile, is gaining attention at the Defense Department, where policy officials are debating the implications of deploying these systems.

"Weapons introduction onto unmanned air vehicle systems must be carefully considered and conducted under a controlled and thoughtful process," said Dyke Weatherington, deputy of the UAV

Planning Task Force at the office of the secretary of defense. "Appropriate study and test is necessary to assure the safety and reliability of the system," he wrote in response to questions from National Defense. "That said, it is likely that we will see the services continue to qualify an increasing variety of weapon-UAV combinations to meet mission requirements."

UAV programs, additionally, need to continue to address a variety of technical challenges, such as aerial refueling, Weatherington noted. "Another equally challenging technical area is the development of a robust see-and-avoid system for UAVs that will prevent mid air collisions or near misses with other UAVs or manned platforms." **ND**

Gulf Nation Poised to Lead Region In Production of Unmanned Aircraft

Abu Dhabi, United Arab Emirates—Amid heightened security risks in the Persian Gulf region, this nation's military is pushing aggressively to develop its own surveillance and reconnaissance assets.

Crown Prince General Sheikh Mohammed Bin Zayed Al-Nahyan, who serves as deputy supreme commander of the armed forces, recently launched an unmanned aerial vehicles program, not only to modernize the country's surveillance and reconnaissance capabilities, but also to enable the UAE to design, manufacture and integrate unmanned systems locally.

"UAVs are an integral part of any efficient combat force," Maj. Gen. Khalid Al-Bu Ainnain, commander of the UAE air force and air defense, told National Defense. "It is not a choice anymore."

In the case of the UAE, a small but wealthy country wedged between Saudi Arabia and Oman, "it is important to have early warning, surveillance, data gathering and targeting," Al-Bu Ainnain said in an interview during a military show in Abu Dhabi. "The UAVs are extremely important for homeland security."

The UAE uses unmanned aircraft and other collection systems, in conjunction with satellite imagery to conduct persistent monitoring of smuggling, border intrusions, other illegal activities, troop movements and military installations, officials said.

While the UAE sees unmanned aircraft as a huge benefit for intelligence, surveillance and reconnaissance, and targeting, it currently is not considering equipping the platforms with weapons, a trend that has taken off in the U.S. military. "Weaponizing the UAVs is not a goal for us," said Al-Bu Ainnain.

"The UAV is not meant to be armed," because whatever effect a small weapon mounted on a UAV would achieve, it still can't stop any possible ensuing military action, noted Al-Bu Ainnain. "It does not change the war," he said. UAVs also become extremely vulnerable, because they have to fly low to shoot the weapon, he asserted.

UAE has had extensive experience with unmanned systems, he said. The air force, for example, has been using the South African Seeker system, which was developed by Denel, for more than 14 years, and has "an excellent experience," said Al-Bu Ainnain.

"UAVs have become a mandatory development technology," he stressed. Therefore, in 2004, the UAE military established a UAV research and technology center under the guidance of the air force. The center, located in UAE's capital Abu Dhabi, promotes international cooperation in the development of systems—thus leading to better interoperability with allies—and the development of an indigenous team of experts through technology transfer, said officials. The center is the first of its kind in the Gulf region, officials asserted.



The S-100 vertical take off and landing UAV is under development in conjunction with the United Arab Emirates' UAV research and development center. (Schiebel photo)

While the research and development currently is done in conjunction with international companies, the aim eventually is to train local people to develop the technology, said an air force pilot who works at the center, who asked not to be identified.

The center tests new flight control technologies, avionics systems, including guidance, navigation, sensors, control communications and operator interface components. "This is set to position the UAE as a regional center for the aerospace industry and will enforce our local defense capabilities," Col. Staff Pilot Mahash Al Hameli, the head of the project, said in a statement.

The UAE military signed a memorandum of understanding with a local business called Gulf Aircraft Maintenance Company, better known as GAMCO, to use some of the company's know-how and its facilities in support of research and development projects.

The center takes the requirements that emerge within the armed forces and develops systems based on those needs, explained the air force pilot. "We are trying to use commercial-

off-the-shelf technology and put it together [at the center], and work with other countries for the technology transfer," he told National Defense. The main goal to be achieved by this technology "is the protection of the country and humanitarian missions," such as emergency relief, regional security and peacekeeping, he added. "There is a lot of need for this technology."

The center is shifting much of its weight towards the development of rotary, vertical take off and landing UAVs. UAE is collaborating with two foreign companies to develop these aircraft. One program is the "Al Sber," which is the S-100 UAV, built by the Austrian company Schiebel. The S-100 is based on the company's version of the Camcopter. The Camcopter 6.0 UAV is an advanced, medium-range, medium-endurance VTOL UAV.

The S-100 can carry a 55-pound payload for up to six hours. The maximum payload it can carry can reach 121 pounds. The platform has a dash speed of 120 knots and a cruise speed of 50 knots for best endurance. The S-100 is capable of fully autonomous takeoff, waypoint navigation and landing, according to company specifications. In terms of the video and data link, the S-100 can send up to two simultaneous feeds of fully digital, compressed video. The UAV is 122 inches long, 41 inches high and has a width of 49 inches. Its main rotor diameter goes to 133.9 inches.

The development of the S-100 will be completed by the end of this month. Full production is scheduled by the end of the year, said the pilot.

The second program—the Apid 55—a smaller multi-purpose UAV, is being developed in conjunction with CybAero, a Swedish company. A fully autonomous VTOL UAV, the Apid 55 can be equipped with different sensors and can transmit video and data in real-time to the ground control station. On board, it has a three-hour video recorder and a video-support tool, both developed by the Norwegian company SiMiCon.

The Apid can be used for surveillance, reconnaissance, target identification and designation, as well as environmental monitoring. It has automatic vertical take off and landing and can endure missions of up to six hours depending on the payload weight. It can travel at 90 kilometers per hour at a maximum altitude of 3,000 meters above sea level. This development also is nearing completion, said the pilot.

The UAV research and development center also is working with GAMCO to develop the GRS 100 Falcon 1 UAV as an anti-submarine-warfare platform carrying a miniature magnetic anomaly detection system in a pod beneath the air wing. A Canadian company, CAE, is developing the detection system. CAE has built several versions of the MAD system for actual aircraft. MAD can identify magnetic variations or anomalies caused by a submarine. The system usually is installed in the tail area of an aircraft that is used for maritime patrol and surveillance. The expectation is that the Falcon 1 will be finished in less than a year, said the pilot.

Meanwhile, the center is experimenting with micro-UAVs, as well as hand-held systems, to support ground troops, said Al-Bu Ainnain.

Together with a South Korean company, UCONSYSTEM, the UAV center is working on an integrated ground station that will be capable to control the activity of the Schiebel S-100, the Apid 55 and other systems under development, explained the pilot. The ground control station can enable mission planning and in-flight real-time hazard analysis. The station also has a digital map and is able to process images in real-time, as well as display and edit them. GCS offers the flight data analysis and database, and controls the sensors and payload. Apart from developing the ground station,

UCONSYSTEM signed a memorandum of understanding with the center to advise on all matters related to UAVs.

Because UAE armed forces have an aggressive technology-insertion program, all systems have to be built to be flexible in order to be upgraded and improved constantly, said officials.

Unmanned technology developments, however, are not confined solely to the armed forces. Outside the military research center, the Abu-Dhabi-based ADCOM Group has been developing unmanned systems for use as targets for 13 years. For example, the company's SAT-400 medium-speed target system is in operation in Canada and the UAE military, said Mohammed Khalifa Al Ghalfi, ADCOM's managing director. Negotiations for the system are going on in Qatar, Oman, Libya, Indonesia and Malasia, he said.

While the SAT-400 is exemplary of the company's standard target products, ADCOM has just developed the double-delta wing Yabhon-M UAV. The Yabhon has a range of 6000 km and can fly 30 continuous hours. It can carry a 25-kilogram payload and 190 kilograms of fuel, said Al Ghalfi. "It has a fully advanced flight control unit, a laser terrain avoidance system and a fly by wire unit," he said. The UAV also has a portable ground control station.

Since it flies up to 30,000 feet for 30 hours, the Yabhon is well-suited for long-range strategic surveillance and reconnaissance, he said. ADCOM designs and produces most of its technology in-house, including an integrated flight control system, the terrain avoidance system and control station that can also substitute as a simulator. While the company does not have any contracts for the Yabhon, it has seen interest from several countries and is expecting to see first orders coming soon, Al Ghalfi said. ND

—Roxana Tiron

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