Unmanned Aerial Vehicle Systems (UAVS) Support the Unit of Action

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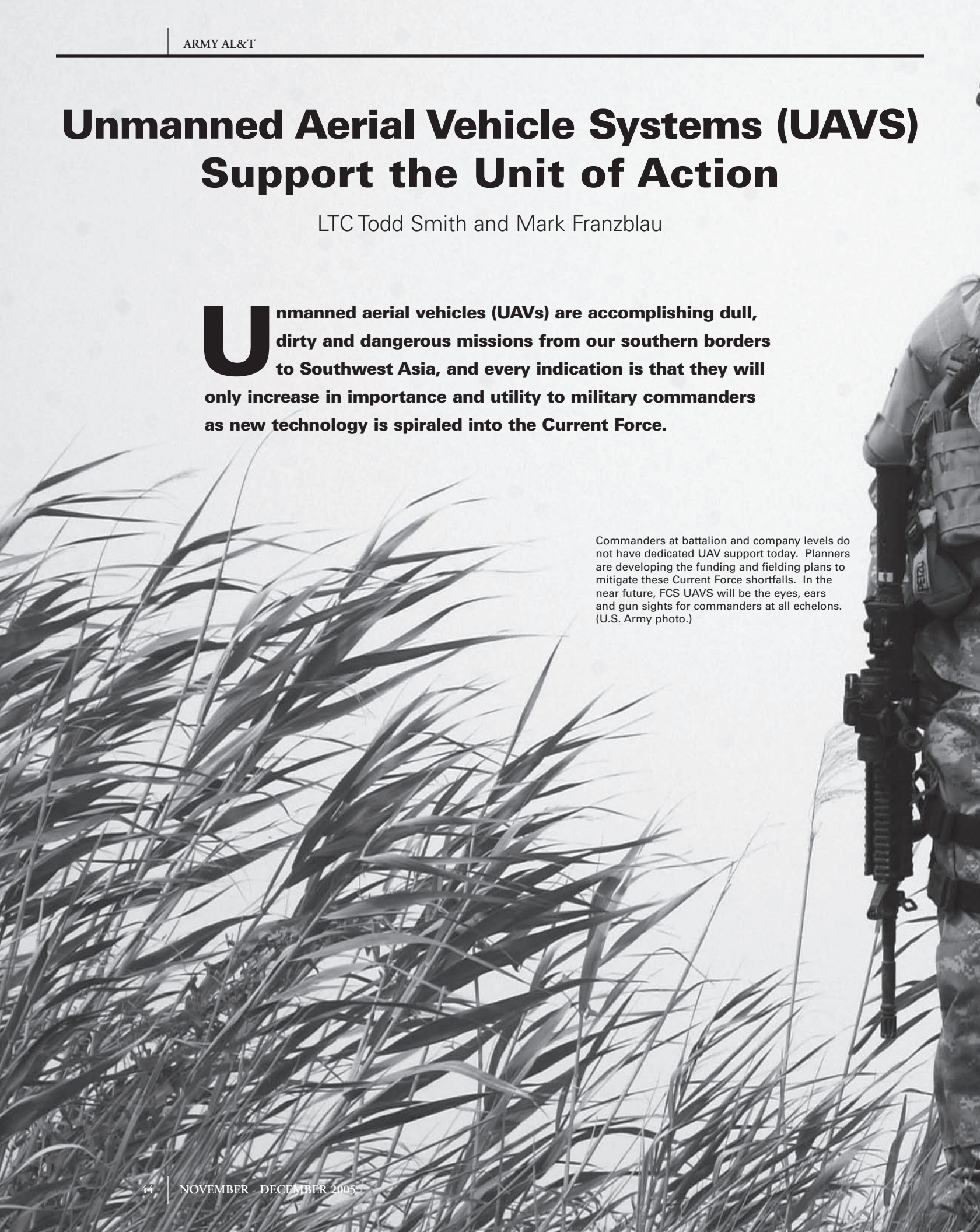
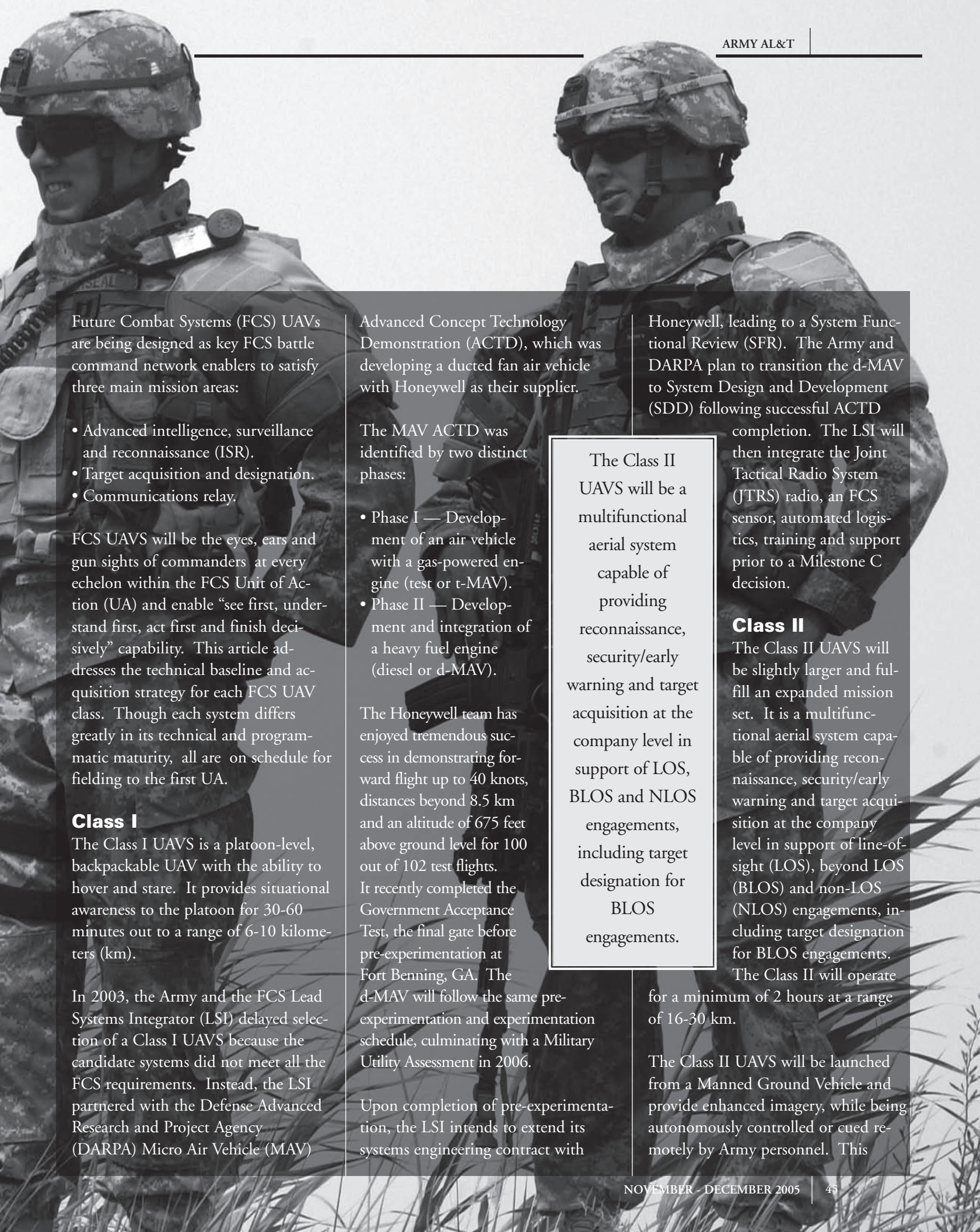
Unmanned aerial vehicles (UAVs) are accomplishing dull, dirty and dangerous missions from our southern borders to Southwest Asia, and every indication is that they will only increase in importance and utility to military commanders as new technology is spiraled into the Current Force.



Commanders at battalion and company levels do not have dedicated UAV support today. Planners are developing the funding and fielding plans to mitigate these Current Force shortfalls. In the near future, FCS UAVS will be the eyes, ears and gun sights for commanders at all echelons. (U.S. Army photo.)



Future Combat Systems (FCS) UAVs are being designed as key FCS battle command network enablers to satisfy three main mission areas:

- Advanced intelligence, surveillance and reconnaissance (ISR).
- Target acquisition and designation.
- Communications relay.

FCS UAVS will be the eyes, ears and gun sights of commanders at every echelon within the FCS Unit of Action (UA) and enable "see first, understand first, act first and finish decisively" capability. This article addresses the technical baseline and acquisition strategy for each FCS UAV class. Though each system differs greatly in its technical and programmatic maturity, all are on schedule for fielding to the first UA.

Class I

The Class I UAVS is a platoon-level, backpackable UAV with the ability to hover and stare. It provides situational awareness to the platoon for 30-60 minutes out to a range of 6-10 kilometers (km).

In 2003, the Army and the FCS Lead Systems Integrator (LSI) delayed selection of a Class I UAVS because the candidate systems did not meet all the FCS requirements. Instead, the LSI partnered with the Defense Advanced Research and Project Agency (DARPA) Micro Air Vehicle (MAV) Advanced Concept Technology Demonstration (ACTD), which was developing a ducted fan air vehicle with Honeywell as their supplier.

The MAV ACTD was identified by two distinct phases:

- Phase I — Development of an air vehicle with a gas-powered engine (test or t-MAV).
- Phase II — Development and integration of a heavy fuel engine (diesel or d-MAV).

The Honeywell team has enjoyed tremendous success in demonstrating forward flight up to 40 knots, distances beyond 8.5 km and an altitude of 675 feet above ground level for 100 out of 102 test flights. It recently completed the Government Acceptance Test, the final gate before pre-experimentation at Fort Benning, GA. The d-MAV will follow the same pre-experimentation and experimentation schedule, culminating with a Military Utility Assessment in 2006.

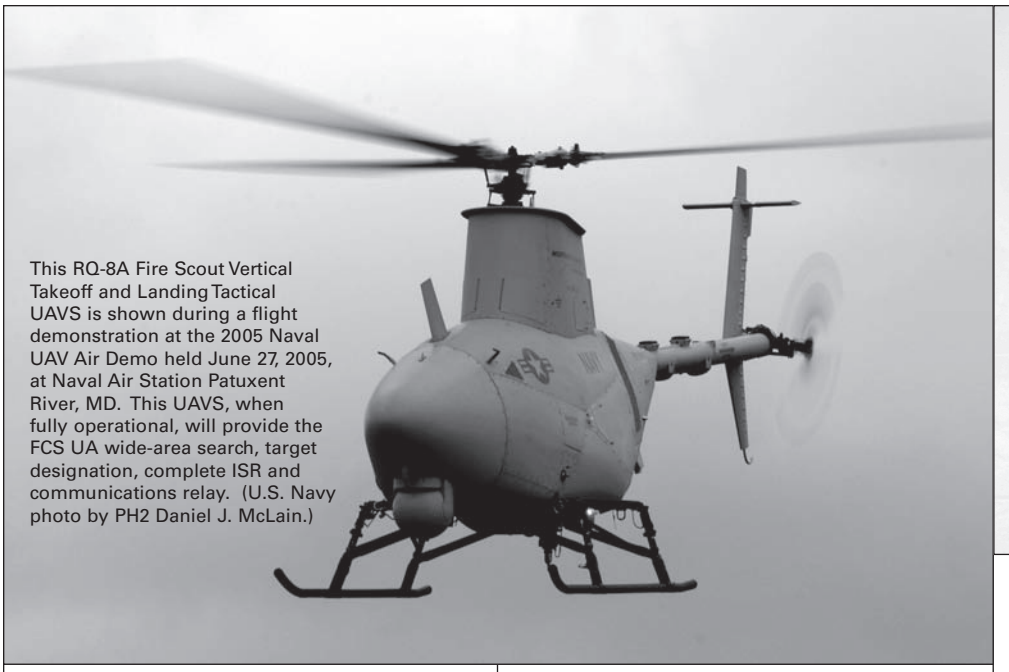
Upon completion of pre-experimentation, the LSI intends to extend its systems engineering contract with Honeywell, leading to a System Functional Review (SFR). The Army and DARPA plan to transition the d-MAV to System Design and Development (SDD) following successful ACTD completion. The LSI will then integrate the Joint Tactical Radio System (JTRS) radio, an FCS sensor, automated logistics, training and support prior to a Milestone C decision.

> The Class II UAVS will be a multifunctional aerial system capable of providing reconnaissance, security/early warning and target acquisition at the company level in support of LOS, BLOS and NLOS engagements, including target designation for BLOS engagements.

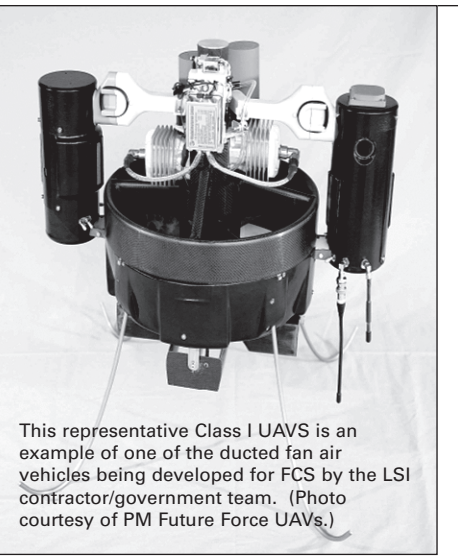
Class II

The Class II UAVS will be slightly larger and fulfill an expanded mission set. It is a multifunctional aerial system capable of providing reconnaissance, security/early warning and target acquisition at the company level in support of line-of-sight (LOS), beyond LOS (BLOS) and non-LOS (NLOS) engagements, including target designation for BLOS engagements. The Class II will operate for a minimum of 2 hours at a range of 16-30 km.

The Class II UAVS will be launched from a Manned Ground Vehicle and provide enhanced imagery, while being autonomously controlled or cued remotely by Army personnel. This



This RQ-8A Fire Scout Vertical Takeoff and Landing Tactical UAVS is shown during a flight demonstration at the 2005 Naval UAV Air Demo held June 27, 2005, at Naval Air Station Patuxent River, MD. This UAVS, when fully operational, will provide the FCS UA wide-area search, target designation, complete ISR and communications relay. (U.S. Navy photo by PH2 Daniel J. McLain.)



This representative Class I UAVS is an example of one of the ducted fan air vehicles being developed for FCS by the LSI contractor/government team. (Photo courtesy of PM Future Force UAVs.)

capability greatly reduces the operational and tactical risks associated with small unit operations in all environments — especially complex ones.

Class II UAVS development will be carried out in three phases, with the FCS LSI and DARPA developing different technologies in tandem until a final candidate system is selected. DARPA initiated the Organic Air Vehicle II program, strictly focused on ducted fan technology, while the LSI will evaluate an alternative nonducted fan approach.

The first phase will include requirements assessment and risk-reduction trade studies on initial UAV concepts before a down-select in mid-2006 to one candidate Class II LSI system. Selected LSI and DARPA candidates will then be evaluated for their suitability to meet FCS requirements during a 24-month concept maturation phase, which will culminate in a flight assessment of developmental prototypes. A down-select will then occur for the final SDD phase when the LSI, Army and DARPA will select the best-value solutions for each UAV class. The first integrated Class II systems will be delivered for FCS system-of-systems testing with fielding to the first UA.

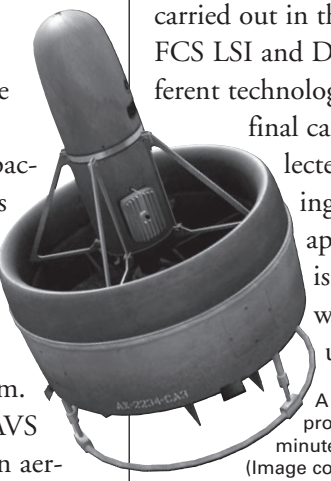
The Class IV UAVS is the largest and most developed of the four UAV classes. It will have a minimum endurance of 6 hours at 75 km, a maximum altitude of 20,000 feet, a maximum speed of 112 knots and carry a payload ranging from 130-600 pounds.

Class III

The Class III UAVS will have greater endurance and a larger payload-carrying capacity than the Class II systems, with a minimum endurance of 6 hours at a range in excess of 30 km. The Class III UAVS is a multifunction aerial system capable of providing reconnaissance, security/early warning, target acquisition and designation for precision fires throughout the battalion area of influence. It will remotely overwatch and report changes in key terrain, avenues of approach and danger areas in open and rolling, restrictive and urban areas, and will be capable of taking off and landing in unimproved areas.

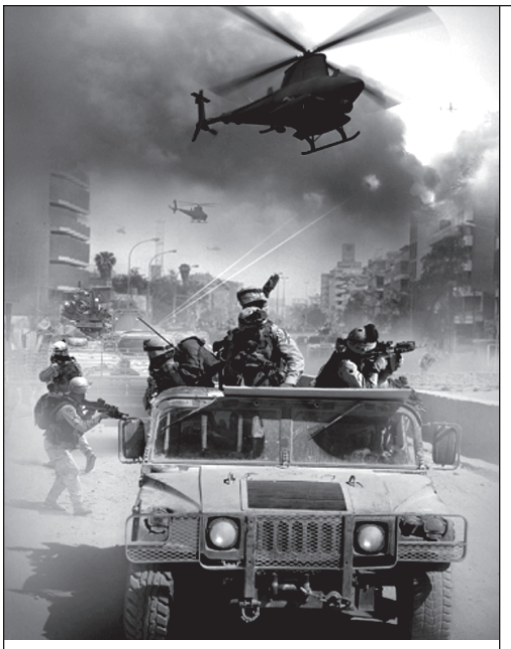
The Class III UAVS will provide information from operating altitudes and standoff ranges in day, night and adverse weather. It will also be capable of communications relay; mine detection; chemical, biological, radiological and nuclear detection; and meteorological survey for the NLOS battalion.

Class III UAVS development will be carried out in three phases, with the FCS LSI and DARPA developing different technologies in tandem until a final candidate system is selected. DARPA is investing in a rotorcraft UAV approach, while the LSI is examining two fixed-wing solutions and an unmanned autogyro.



A Class I UAV will be capable of providing limited SA for 30-60 minutes out to a range of 6-10 km. (Image courtesy of PM Future Force UAVs.)

Similar to the Class II first phase requirements assessment and risk-reduction trade studies, a down-select in mid-2006 from three down to one



FCS UAV capabilities will provide networked sensor data to each modular force echelon, enabling operations in complex urban environments and greatly reducing risks to Soldiers on the ground. (Image courtesy of PM Future Force UAVs.)

LSI system will take place. The selected LSI and DARPA candidates will then be evaluated for their suitability to meet FCS requirements during a 24-month concept maturation phase, which will culminate in flight assessments of developmental prototypes. During the final SDD phase, the LSI, Army and DARPA will select the best-value solutions for each UAV class. Although planned for fielding with the first UA in 2014, the Class III is a candidate for delivery in an earlier technology spin out (SO).

Class IV

The Class IV UAVS is the largest and most developed of the four UAV classes. The LSI awarded Northrop Grumman Corp. (NGC) a system development contract through a best-of-industry competition in September 2003 to become the Class IV One Team Partner.

The MQ-8B Fire Scout provides ISR, wide-area search, target designation, communications relay and manned/unmanned teaming for the UA. It will have a minimum endurance of 6 hours at 75 km, a maximum altitude of 20,000 feet, a maximum speed of 112 knots and carry a payload ranging from 130-600 pounds.

The Army and Navy are jointly developing the airframe to decrease development costs and maximize commonality between the Army and Navy versions. The Navy will equip its version with communications and sensors appropriate for shipboard environments, and the Army will equip the Class IV UAVS with the JTRS, the Integrated Computer System and sensors more appropriate for land warfare.

The Navy and NGC have already conducted more than 100 successful test flights, including a demonstration at the Association of Unmanned Vehicle Systems International Conference in June 2005 and a weapons demonstration in July 2005. The Navy will field Fire Scout 2 years prior to the Army.

The Army will equip the Class IV UAVS with the JTRS, the Integrated Computer System and sensors more appropriate for land warfare.

The Class IV System will have its SFR in December 2005 and Preliminary Design Review in June 2006. First flight in the Class IV configuration, including the FCS embedded systems and payloads, will occur in 2008 with fielding as early as 2010.

FCS UAVs reside within the UA and are complemented by manned aviation and UAVs supporting the unit of employment. The Armed Reconnaissance Helicopter, Apache Block III and Extended Range/Multipurpose UAV will share sensor data and provide network support through the use of common software and hardware applications.

The Army is also developing a transition that accommodates the development of FCS UAVs. Commanders at battalion and company levels do not have dedicated UAV or aviation support today, and planners are developing the funding and fielding plans to provide these capabilities.

At the same time, an Army/LSI team is reviewing the feasibility of providing FCS UAV capabilities in FCS SO2 to the Current Force. This would provide networked sensor data to each modular force echelon, which would enable operations in complex urban, jungle and mountainous terrain.

UAVs will contribute immeasurably to the UA, adding robustness to the network, enabling air-to-air and air-to-ground teaming, and penetrating the enemy's decision cycle regardless of weather without risking the lives of our Soldiers.

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