

New Flight Plan for

A new production plan will help reorganize and reposition existing Army small unmanned aircraft systems (UAS) while also preparing for new software developments and hardware purchases. Called the capability production document, the plan takes advantage of combat lessons learned over the past eight years with a combination of the RQ-11B “Raven” and RQ-20A “Puma AE” systems, said Lt. Col. Nick Kioutas, the Army’s small UAS product manager.

“Both of our systems can be carried by a soldier out to the field and hand-launched. They don’t need any kind of infrastructure like airfields or launching apparatus,” Kioutas said.

The RQ-11B Raven, manufactured by AeroVironment, was the Army’s initial program of record for providing the lowest elements of the tactical force with dedicated aerial reconnaissance and surveillance. The system has a maximum line of sight range of 10 kilometers (km) and an endurance of approximately 90 minutes. Following initial fielding in 2006, the Raven’s data link was upgraded from analog to digital in 2009, providing it with added security and reliability. The Army has recently begun to replace the Raven’s original fixed-camera payload with a gimballed camera design. The new design is easier to fly while maintaining a view on a particular area of interest, Kioutas said.

The other small UAS in Army inventories, RQ-20A Puma, is also manufactured by AeroVironment. Describing it as “our largest small UAS,” Kioutas said it has a slightly greater range (15 km line of sight) and endurance time (up to 3.5 hours).

By Scott R. Gourley



U.S. Army/Staff Sgt. Andrew Porch

Clockwise from above: Sgt. Kyle Iverson, 2nd Brigade Combat Team, 4th Infantry Division, launches an RQ-11B ‘Raven’ unmanned aircraft system during training at Fort Carson, Colo.; Spc. Wesley Cunningham (left) and Spc. Benjamin Hundley, 25th Infantry Division, control a Tier I unmanned aerial vehicle ‘Puma’ at Schofield Barracks, Hawaii; Spc. Eric Cray, 82nd Airborne Division, assembles the wings of a Puma, used for reconnaissance by troops on the ground in Afghanistan.

Unmanned Aircraft

Capability Production Document

Until recently, the Puma was fielded to the Army only through urgent operational needs statements emerging from Iraq and Afghanistan. At the end of November 2013, the Army received approval on a new capability production document that incorporates the Puma and Raven into a new family of systems: the Rucksack Portable Unmanned Aircraft Systems.

The family of systems will include three elements: the Long Range Reconnaissance Surveillance (LRRS) system, the Medium Range Mobile (MRM) system and the Short Range Micro (SRM) system. The Army will initially use Puma as the LRRS element, with a total of 1,213 systems approved across the service. Ravens will initially be used as the MRM element, with an approved total of 3,604 systems.

“We don’t know what the Short Range Micro—the third piece of the family of systems—is going to look like,” Kioutas said, “but it’s probably going to be some sort of quadcopter or something like that. It will have a capability where a soldier can take it out and land it somewhere and continue to get video feeds. We call it ‘perch and stare’ capability.”

As a result, a family of systems will be available to soldiers, Kioutas explained. “Instead of the way it was in the past, when they had a kit of three Raven systems in a box, now a soldier will be able to go into a kit and decide what systems to pull out for a particular mission. He might decide that he needs something with a set endurance capability. On another occasion, he might decide that he needs something that’s a little smaller, since he’s going to be carrying it a greater distance and he’s not sure if he’s really going to be using it that much, but maybe if he’s going to use it, he wants to set it somewhere to take some video.”

Asked about a time frame in which



U.S. Army / Sgt. Hillary Rustine



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Lt. Col. Nick Kioutas, the Army's small unmanned aircraft systems product manager, describes the Raven's new gimballed payload camera upgrade, which makes the system easier to fly and allows 180-degree panning.

the SRM element might solidify, Kioutas said the near term is limited by funding. The program will likely start putting "unfunded requests" into the next program objective memorandum between fiscal year (FY) 2017 and FY 2021.

The bulk of current office activities is "in the sustainment mode while still trying to improve things," Kioutas said. He pointed to examples of recent improvements, such as the gimballed payload for Raven as well as the government's recent assumption of a lead systems integrator role.

"AeroVironment had been our one-stop shop where everything got done by them," he said. "Now we have a products IDIQ [indefinite delivery/indefinite quantity] contract with five vendors that we can get parts from. We still largely get them from AeroVironment, but we're in the process of certifying second sources. Although we've been protested, we also have a services IDIQ in the works to provide services for warehousing, an inventory control point and that kind of thing."

Kioutas credited the government's management of the effort over the past year with savings of 35 percent in sustainment costs and 20 to 40 percent in procurement costs.

Tactical Open Government Architecture

One key initiative under way in the small UAS office, Tactical Open Government Architecture (TOGA), is a set of software that is not dependent upon specific hardware. It could be provided to any vendors that would like to sell their UAS to the Army.

The introduction of TOGA will create an environment in which the Army will be able to replace small percentages of its UAS platforms each year, not unlike the way some large organizations replace and update their computers today, Kioutas said.

"Instead of retrofitting, you would get rid of your old, antiquated UAV [unmanned aerial vehicle] and buy a new one. You could do it as a commercial off-the-shelf procurement that would also be competitive—not only driving the cost down but also taking advantage of the IRAD [internal research and development] that's available, where other companies are starting to invest in the small UAS market."

Kioutas said the implementation of TOGA will also decrease the tactical workload of soldiers operating small UAS. He acknowledged the fact that current systems might



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be hand-launched, but the associated laptop, hand controller, antennas and other equipment require the full-time attention of two operators. Moreover, unless operating from a fixed-base location, additional personnel might have to be dedicated to provide security for the UAS team.

"We see that, eventually, TOGA could lead to one soldier operating it while on patrol," he said. "We call it the 'one-third cognitive load,' where one-third of his cognitive energy should be focused on the controller on his forearm or his chest while he operates the UAV, and two-thirds of the time he is looking around on patrol."

"It will also allow us to leverage the S&T [science and technology] investments by organizations like DARPA [the Defense Advanced Research Projects Agency], MIT [the Massachusetts Institute of Technology] or whoever has done work on these systems," he said. "We usually don't get the direct benefits of that S&T investment, but now if we have our own government architecture, we can provide it to them. We will manage the baseline, and they will give us what they've developed. Then we can decide whether we want to implement it or not."

Nett Warrior Integration

The small UAS office has also been working on integrating the information from its platforms with the Army's Nett Warrior program.

"We just finished an Army expeditionary warfighting experiment, working with Nett Warrior, in which we were able to send Raven full-motion video [FMV] to their end-user device," Kioutas said. "We are going to continue to build on that. When we develop our government architecture, we can create apps that could go in different places, like Nett Warrior, so that they could get the benefit of having that Raven video down to the squad level."

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While delivering Raven FMV to the tactical edge is a significant achievement in itself, program representatives are working on the next step in the process: converting information into targeting data. As part of that effort, Kioutas attended the Maneuver Center of Excellence commanding general's live-fire demonstration at Fort Benning, Ga., in March. The demo featured the RQ-11B Raven providing FMV that was used by the Maneuver and Fires Integrated Application to provide category 1 targetable coordinates down to an end-user device without a requirement for the One Station Remote Video Terminal.

Although the program office has no official plans to participate in events like Network Integration Evaluation 14.2 or this summer's Enterprise Challenge '14, Kioutas' office will continue to work closely with Fort Benning.

"Even though our requirements come out of the Aviation Center at Fort Rucker [Ala.], we really work closely with the requirements people at Fort Benning, because that's our customer," he said. "Benning and Rucker work together to develop the requirements, so we're trying to stay closely tied with them. We're also doing some work with Fort Sill [Okla.] to do the 'fires' piece of sensor-to-shooter link."

Potential Acquisitions

In terms of potential hardware acquisitions over the next few years, Kioutas acknowledged the possibility of some type of LRRS procurement.

"We don't have all the Puma systems we need, so there could potentially be an RFP [request for proposal] for that," he said, "but we're not saying that we are going to stick with Puma. Right now, we have about 1,000 Pumas, so we're about 213 short. We also have some combat losses, so we are much shorter than that. We probably have half of the requirement."

He reiterated that an LRRS acquisition would not necessarily have to be filled with Puma: "If we can get TOGA in place, that would allow us to procure anything that's competitive for that requirement."

While there may also be some sort of RFP for the SRM component, he acknowledged that funding is not in place at this point.

"Probably, what's going to happen is that we will start fielding what we have. At some point, they will start giving us money for the Short Range Micro. Then we might have to go back to those units we have already fielded and add to their kit," he said.

Training and Cost

Two other areas in which Kioutas would like to see changes involve operator training and air vehicle costs. Each system takes 10 days of training time, he said: 10 days to train Raven; 10 days to train Puma; and, if an SRM is fielded, likely another 10 days for that system as well. "[Those are] workdays," he said, "so that's six weeks. What I want to do is get that down to five days for the first platform and one day for each additional platform. Once we have TOGA, it should be easy to get each additional air vehicle down to one day."

When asked about additional changes that warfighters would like to see, Kioutas said: "Soldiers don't like having to go out and find the system if it gets lost. They would like us to make the system cheaper so they don't feel like they just lost a very expensive item." Transferring more capabilities from the air vehicle to the controller could help in that effort, while also reducing the technology that might be recovered by potential enemies. This could potentially pave the way for "expendable" small UAS operations.

"That was the original concept. Small UAVs were supposed to be a 'launch and possibly lose' concept, but they're just not there yet. They are still too expensive."

In summarizing the focus of the Army's small UAS program, he said: "Small UAS makes things smaller—smaller costs, smaller technology integration time line, smaller soldier load, smaller cognitive load, smaller contract delivery timelines, smaller sensor-to-shooter timelines and smaller training time." ★



U.S. Army/Sgt. Hillary Rustine

Pfc. Robert Goodwin, 3rd Brigade Combat Team, 25th Infantry Division, launches a Puma during training at Schofield Barracks. The Puma, largest of the Army's small unmanned aircraft systems, has a slightly greater range and endurance time than the Raven.