The Air Force can't buy many new large ISR aircraft. It must wring out much more from what it's already got.

The Big Squeeze

By John A. Tirpak, Executive Editor

Photo by Richard VandeMuelen

The Air Force is upgrading its large ISR fleet, such as this E-3 AWACS. They may be stuffed with new equipment, but the airframes remain three decades old or more.

The Air Force is seeking fundamental change in the field of intelligence-surveillance-reconnaissance. It's increasingly clear that changes at the margin won't do.

Faced with insatiable demand for up-to-the-minute information, but with limited funds to acquire new hardware, USAF knows it must squeeze more from the system already in place. The service believes it must expand the definition of what constitutes an ISR platform. USAF also seeks to improve relationships between ISR agencies both inside and outside the service.

Air Force officials do not see this drive to overhaul ISR operations and culture as a decade-long campaign, but rather as a transition measured in months. Otherwise, the service won't be able to keep pace with changing conditions and wartime demands.

Driving this shake-up is a fundamental fact: Commanders just can't get enough battlefield information.

"There will always be more demand for the capability than there is supply," said Lt. Gen. David A. Deptula, Air Force deputy chief of staff for ISR, or A2. He's been tasked by Gen. T. Michael Moseley, Chief of Staff, to rethink the entire ISR enterprise. The ISR overhaul is being pursued on many fronts:

- Deptula's own job is a recent creation, meant to highlight the importance of ISR and to be an advocate for the field, which has sometimes suffered because of the bewildering array of organizations and systems it encompasses.
- The old Air Intelligence Agency has been realigned into the Air Force ISR Agency at Lackland AFB, Tex. No longer under Air Combat Command, it reports directly to Deptula.
- The A2 office is shuffling the ways that systems are grouped together and managed, hoping that managers with a broader view of programs will find efficiencies and eliminate bottlenecks.
- The ISR career field is being revamped, with the goal of developing professionals who will not only serve USAF better, but make more attractive joint leaders at the top levels. USAF has not provided an intelligence general on a regional command staff for several years.
- Deptula has campaigned to consolidate the acquisition and tasking of unmanned aerial vehicles under USAF, to save money, deconflict airspace, and make sure all the services buy systems that can feed common distribution pipes.
- All ISR platforms are being upgraded and networked to more broadly disseminate their products. The inherent ISR

USAF photo by SSgt. Stacy Fowler

L-r: Maj. Tim Hart, Capt. Curtis Knighten, and Capt. James Garza, all from the 552nd Air Control Wing, Tinker AFB, Okla., work at their stations on board an E-3 AWACS.

capabilities of other combat systems are being tapped.

The creation of the Air Force ISR Agency was one of the "major muscle moves" in the recasting of ISR, Deptula said, and probably the biggest one coming for a while. It's now a field operating agency.

What did the change solve?

There was a "confusing set of crisscross responsibilities, often making it unclear who was responsible for providing particular capabilities to combatant commanders in national intelligence agencies," said Maj. Gen. John C. Koziol, commander of the AF ISR Agency. "That was the problem. That's why we've restructured everything [to do with ISR] on the Air Staff."

Particularly, the old AIA was "mainly focused on signals intelligence," at the expense of other types of ISR, Koziol said. Human intelligence, for example, has been atrophying, and Deptula wants it reinvigorated. Deptula noted that USAF has "a requirement for 171 Humint slots," adding that they are not cloak-and-dagger clandestine jobs but "mainly in the scientific and technology field." He added that "it's very important to get one-on-one interfaces to acquire information."

The AF ISR Agency "will expand into Air Force human intelligence," Koziol said, and develop greater focus as well on geospatial intelligence, space, ground, and airborne systems.

The goal is to become "an all-source, full spectrum ISR mission-capable organization," he added.

Deptula said he is considering some other organizational changes within the ISR community, but hasn't nailed them down yet. As a rule, they have to do with "flattening organizational hierarchies, as opposed to recreating vertical structure, because ... vertical structure ... induces delay. And in today's fast-moving world, we can't afford staffing through various levels before the leadership gets insight" into a particular issue.

Slice and Dice Capabilities

The swiftness and relative ease of the AIA restructuring was a pleasant surprise, Deptula said. There are tougher nuts to crack ahead.

One of the toughest will be how to reorganize the various ISR capabilities to find efficiencies and synergies between them, Deptula said. He wants to reshape "the way we process, handle, and manage systems from a program-element-based approach to an ISR-capability-based approach, and that's quite frankly turning out to be more difficult than I had anticipated."

As it stands now, ISR is managed by platform, be it Airborne Warning and Control System or Joint STARS or Global Hawk. But Deptula wants a broader approach.

"In the ISR universe, there are many ways you can slice and dice capabilities," he said, wondering out loud whether it should be done by forms of intelligence—signals, human, measurement—or across domains, such as land, sea, air, or space.

"You end up with a matrix," he said, that does not lend itself easily to grouping. The right number of capability areas "can't be too big, and it can't be too little," although he thinks the right answer will be "closer to seven" than 20 mission areas.

He doesn't want to blend the programs. He wants to have people in charge to "monitor what's going on" in related programs, "to ensure that the left hand knows what the right hand is doing." Deptula's determined to avoid expensive snafus, such as services having incompatible data transfer systems.

From a hardware perspective, the new ISR scheme will rely on many very familiar systems. The E-3 AWACS, E-8C Joint STARS, and RC-135 Rivet Joint aircraft—the Air Force's sensor "battleships"—are all old, and the service's plans to begin replacing them with a new platform based on the Boeing 767 have been dropped. It was, as is so often the case, simply a matter of money, not need.

Deptula said the 707-based sensor aircraft—the airframes of which are all 1970s-vintage—can continue for up to about 20 years, assuming avionics upgrades and barring any age-related technical problems.

"There's no crisis" forcing the Air Force to replace the old warhorses, he said. However, "the question becomes, ... Do you want this capability flying around on a 60-year-old airplane?" There are so many unknowns about how old aircraft break that USAF could be building itself "a single-point failure that we might not be able to stand," Deptula said.

He predicted that the Air Force may put the Multiplatform Radar Technology Insertion Program (MP-RTIP) on Joint STARS, or on a new aircraft, possibly the one chosen to be the next aerial tanker.

The Joint STARS has racked up some successes against insurgents in Iraq by allowing commanders to "rewind" the movements of vehicles in an area where roadside bombs have been placed. The origin point of those placing the charges can then be investigated or targeted.

The 17 Joint STARS have long suffered from being underpowered, a problem that should be fixed by a program to re-engine the fleet.

The E-3 AWACS is also in the midst of a program to update its sensors and processing systems in a suite of improvements that will bring it to an "E-3G" configuration. While the AWACS would also benefit from a re-engining like the Joint STARS is receiving, USAF has no plans or funding to do it.

The 13 RC-135 Rivet Joints, which conduct tactical signals reconnaissance missions, get frequent hardware upgrades because of the constantly changing ways that people communicate—everything from radios to cell phones. No major upgrades are planned for the RJ fleet, but they are

Northrop Grumman photo

The E-8C Joint STARS aircraft, such as the one at left, has proved to be a marvel in supplying ground target information in both the invasion of Iraq and the insurgency that followed. It will likely get the new MP-RTIP radar, which will give it finer-grained detail of what's moving on the battlefield.

in virtually a constant state of electronics refreshment.

Since all three of the big sensor aircraft are out of production, the Air Force will have to add more capability to its ISR portfolio in other ways. Deptula said the big aircraft will be vastly augmented by the new F-22 Raptor and in-development F-35 Lightning II, neither of which was originally designed to be a dedicated ISR platform. The Air Force will also continue to add capability with new Predators, Reapers, and Global Hawks.

The two new fighters, in addition to their remarkable abilities at penetrating hostile airspace and conducting stealthy attacks, feature a formidable array of sensors, able to track both air and ground targets, as well as locate a variety of electromagnetic threats, such as radars. They will also be networked with other systems so that the data they collect will be available to all friendly forces that need it.

The F-22, Deptula told a Capitol Hill symposium in April, is "not just an air-to-air platform." It would be more accurate, he said, to describe the Raptor as "an F/A/B/E/EA/RC/AWACS-22. It's a flying ISR sensor that will allow us to conduct network-centric warfare inside adversary battlespace from the first moments of any conflict." He said that traditional nomenclature masks the F-22's true significance—the first of a new breed of super-multirole aircraft.

Deptula added later that the Air Force may need to "re-look ... at the balance [of investment] between sensors and shooters," adding that "there is lots and lots of untapped opportunity to capitalize on the capabilities that are resident in the modern platforms that we're beginning to acquire in numbers."

He quickly pointed out that he doesn't mean that ISR should get a disproportionate share of funding for new systems, but that the capabilities of new systems, like the F-22 and F-35, should be counted when priorities are considered. The new aircraft are like getting several assets in one. A new bomber, for example, will likely have capabilities comparable to those of the F-22, and become yet another stealth forward-area ISR collector.

Headline Demands

"Our Air Force is going to have to change the way they think about these platforms," he observed.

To a degree, that's already taking place. For the past five years, the Air Force has been buying Sniper and Litening targeting pods for its fighters, and is adding them on bombers as well. The pods were designed to improve electro-optical and infrared targeting of surface objects miles away, but provided the added bonus of streaming video that could be used for surveillance.

Full-motion video, Deptula said, has become one of the headline demands from battlefield commanders. The pods provided a capability not unlike the Predator UAV, and have been described as "nontraditional ISR."

An Air Combat Command spokesman said ACC is planning to acquire 835 advanced targeting pods, and production will continue beyond Fiscal Year 2012. More than 520 have been delivered.

"My stretch goal is that, in five years, there will be no term ... 'nontraditional ISR,'" Deptula said. "There will be just 'ISR,' and you will gain that capability

USAF photo by TSgt. Cohen A. Young

Lt. Gen. David Deptula (gesturing at center), shown here at a Pentagon seminar, wants USAF to recast its notions of what constitutes ISR, operations, and strike.

The Once and Future ISR Aircraft

In recent years, the Air Force had planned to replace its three big ISR platforms—the E-3 AWACS, E-8 Joint STARS, and RC-135 Rivet Joint—with the E-10, which was intended to incrementally blend the capabilities of Joint STARS—which uses radar to map the ground and track moving vehicles—with AWACS, which surveys the airspace and tracks individual aircraft, and potentially the Rivet Joint, which collects signals intelligence.

The E-10 was also to be an airborne battle management system, or flying command post, and use the Multiplatform Radar Technology Insertion Program, or MP-RTIP, a fine-toothed, long-range mapping radar ideal for precisely locating ground targets and low-flying aircraft.

Over the last few years, owing to the cash demands of the wars in Southwest Asia, the E-10 has steadily slipped from being a viable program to a technology demonstrator and, in Fiscal 2007, disappeared completely. It was felled by the "demands of the immediate circumstances we find ourselves in," said Lt. Gen. David A. Deptula, the deputy chief of staff for ISR.

However, the E-10 remains something "the Air Force is very much interested in," he added.

"The issue is, when can we afford it, ... and when will we *have* to bring it on board." Deptula predicted there will be a "resurrection" of the system at some point in the future, because of its unique capability in defense against cruise missiles.

"It's something our nation's defense requires," he added.

from a variety of different platforms."

He noted that pressing fighters into the ISR role, while putting weapons on UAVs such as the MQ-1 Predator and MQ-9 Reaper, is blurring the lines between strike and ISR anyway.

Lt. Gen. Donald J. Hoffman, the Air Force's uniformed deputy to service acquisition chief Sue C. Payton, said at an August conference on UAVs that the Predator and Reaper are not even considered ISR platforms, even though that was what they were designed for. The new UAV squadrons being stood up at Creech AFB, Nev., and elsewhere are counted "as attack squadrons," he said, because that will be their primary mission.

That won't be the case with the RQ-4 Global Hawk family, at least for the near future. Although there have been some discussions about arming the Global Hawk, which flies at 65,000 feet, so far, the Air Force prefers that its payload be either sensors or fuel. Lower-flying attack aircraft can usually be vectored to a target discovered by Global Hawk.

The first seven Global Hawks of the Block 10 variety are "in the war right now, flying daily missions," Hoffman said. They can fly for up to 24 hours, providing a persistent view of targets of interest. They will be joined shortly by the Block 20, whose wings are larger, enabling both a greater payload to be carried and tripling its on-station time to three days.

The Block 20, Hoffman said, will be the basis for all future Global Hawk variants. The Block 20 will have electro-optical, infrared, and synthetic aperture radar capabilities.

Owing to its roots as a technology demonstrator—quickly rushed from experimental status to war use—Global Hawk is not easy to modify, Hoffman said, and it takes "major surgery to the central nervous system" to make changes to the aircraft.

It will be a major challenge to the Air Force to integrate Global Hawk, Predator, Reaper, and other unmanned systems that have "nonstandard architectures" into the Air Force worldwide network, Hoffman reported.

The Air Force expects to add 47 RQ-4Bs to its initial batch of seven RQ-4A Global Hawks. It is the intended replacement for the manned U-2, which the Air Force plans to phase out in a few years.

Although "counted" as strike platforms, the Predator and Reaper UAVs will still provide a large quantity of ISR data to the Air Force. Plans call for about 170 MQ-1 Predators and about 60 MQ-9 Reapers to be built, providing electro-optical and infrared imagery, as well as target lasing. Hoffman noted that the Reaper flies "twice as high, twice as fast, with 10 times the payload" as a Predator.

One area of confusion with the Predator-Reaper family, Hoffman noted, is that it's hard to find common definitions of their capability. The Air Force uses the term "orbit" to describe the number of drones needed to maintain 24-hour watch over a particular area. A term coming into vogue is a UAV "cap," but it is not well-defined, and has different meanings for different branches of the armed services.

"We're hoping to develop a common lexicon we can all use," he said.

Such would be one of the benefits of the Air Force's obtaining executive agency for UAVs.

In July, the Joint Requirements Oversight Council—made up of the vice chiefs of each service—decided to allow the Air Force to be the executive agent for UAVs, but the decision was still awaiting the input and signature of Defense Secretary Robert M. Gates in early August.

A common refrain from field commanders, Deptula said, is "give me more Predators," but what they really want, he said, is full-motion video, a capability that can be provided by more than 1,000 other UAVs now in the Southwest Asia theater.

"The issue is, how do we build an architecture that can rapidly task, retask, and share that information across the theater to where it's needed the most?" The Air Force, as executive agent, would network all sensor aircraft so the actual platform would be irrelevant, and users would simply pull down data, perhaps not even aware of where it was coming from.

Without executive agency, services may restrict access to UAVs. The Army, for

USAF photo by Steve Zapka

Targeting pods not only add high precision to legacy aircraft, they can turn them into prodigies of reconnaissance as well. Here, a B-1B sports a Sniper pod.

USAF photo by SSgt. Suzanne M. Jenkins

SSgt. Jeffrey Hicks, with the 46th Expeditionary Reconnaissance Squadron, performs a flight inspection of a Predator in Iraq. Unmanned armed aircraft such as Predators and Reapers highlight the blurring lines between strike and ISR platforms.

example, wants to reserve its Warrior UAVs—a close relative of the Predator—for use by individual divisions.

"Ownership at the division level means that if that division is not deployed, its assets are not deployed, so the nation doesn't have access to those assets," Deptula asserted. That doesn't jibe with the unrelenting demand for video surveillance.

Near-Space Possibilities

"Concept of operations is a big piece of solving ISR demand in the FMV [full-motion video] arena," he said.

He also said the Air Force has no intention of forcing its own systems on anyone else. To prove it, USAF is buying two Warriors to test. If they prove superior to the Predator, "then we're going to buy them." The Warrior differs from the Predator in its size, power, and use of heavy fuel. Predator runs on aviation gas.

The Air Force continues to be interested in extremely high-flying UAVs—what are called "near-space" systems. Deptula said that, after an initial assessment, "near-space" was transitioned from Air Force Space Command to Air Combat Command because "it's more 'air' than it is 'space.'"

Hoffman reported that near-space is "very attractive" because of its potential to offer long dwell, but it would not be pursued for its own sake. Near-space capability must "earn its way" into the portfolio by offering something unique—something better or cheaper than Global Hawk at those same altitudes, or higher, with the desired sensor payload.

The Air Force has done experiments, he said, where a Global Hawk carried a data server, and those on the surface within line of sight could, with a handheld device, access imagery the UAV had collected over the previous month.

"Lots of potential, there," Hoffman noted.

He also noted that China's anti-satellite test has now proved that satellites are vulnerable, and near-space systems may be "part of the solution" if it turns out to be too costly to harden or protect satellites.

A huge element of national ISR capability is in space systems, an area about which the Air Force doesn't provide much detail. A big boost to the nation's ISR capabilities would be the Space Radar, an orbital constellation of radar satellites with enough power to keep detailed watch over areas of interest—with moving target recognition capability—almost indefinitely. Congress is interested, and has provided seed money to get the project going, but so far, the Air Force is not planning to retire anything else in anticipation of a Space Radar capability.

Deptula said he is building a relationship between his new position and the National Reconnaissance Office and Air Force Space Command.

"One of my goals is to ... make space part of the Air Force ISR enterprise to a degree that we haven't seen in the past," partly because the Air Force often held back and let the NRO and the rest of the intelligence community work out requirements and systems.

However, Deptula sees a greater need for Air Force involvement because of needs such as space situational awareness, which "sounds like another term for intelligence in space to me," he said. Deptula wants to ensure that the Air Force is a full partner in the space "enterprise" and that ISR planners both within and outside the service think of space, and not just "airborne things" such as Rivet Joint, Global Hawk, and U-2.

He added that his job will be to lay out "a vision for the future" and make sure the Air Force will meet needs as they come along. His job is not in directing investment.

Underlying all the efforts to rethink ISR is the need to keep it as a whole, and not a series of pieces, Deptula said.

"Some people want to separate the intelligence from surveillance and reconnaissance, when in fact, all three are interrelated," he asserted.

"We conduct surveillance and reconnaissance to obtain intelligence. ... If you separate them, then how can you think about identifying the system requirements that provide the information we'll need 10, 20, 30 years from now?" ■

USAF photo by TSgt. Robert J. Horstman

MSgt. Curtis Bodart confers with crew chiefs as they prep an RC-135 for a mission. Rivet Joints must get constant updates to keep up with changing technology.