

The All-Seeing Air Force



Sophisticated networks and tactics have turned ISR into an “in-your-face” asset for America’s combat forces.

By Rebecca Grant

Not long ago, the task of gathering and processing intelligence was generally viewed as a staff function carried out in support of operational commanders. The terms “surveillance” and “reconnaissance,” meanwhile, still conjured up images of spyglasses and Jeb Stuart’s Civil War cavalry movements.

Now, however, the three functions have been fused into the hybrid known as ISR, a capability seen by many as perhaps the top Air Force contribution to the Global War on Terrorism. In less than a decade, ISR has vaulted to this lofty position on the strength of sophisticated networks and new tactics

that have created an in-your-face asset for America’s combat forces.

ISR now encompasses activities of numerous fixed-wing and space-based sensors, plus the cyberspace networks that link these platforms together.

How good is today’s ISR system? Fighters such as the F-16 now routinely use their sensors not only for weapon targeting but also for surveillance. Lt. Gen. Gary L. North, commander of US Air Forces Central, told the *National Journal* not long ago, “We literally have pilots now walking ground forces through cornfields and backyards, telling them where insurgents are hiding.”

Indeed, these nontraditional ISR mis-

sions—known as NTISR—have become a staple for fighters in today’s war zones.

“ISR has never been more important during our 60 years as an independent service,” said USAF Gen. T. Michael Moseley in 2007, when he was the Air Force Chief of Staff. “ISR has become the foundation of global vigilance, reach, and power.”

Intelligence-surveillance-reconnaissance efforts today “make up the vast majority of the operations required to achieve our security objectives,” Lt. Gen. David A. Deptula, deputy chief of staff for ISR on the Air Staff, wrote in a recent article for *Air and Space Power Journal*.

with making intelligence an integrated function.

Prominence has also stirred up controversy. Open conflicts between the Air Force and Army over medium- and high-altitude UAVs grabbed headlines in 2007. The dispute was part of the reason why the House Armed Services Committee voted to order a roles and missions review in 2008.

But it is Secretary of Defense Robert M. Gates who has taken the most prominent shots at the Air Force's ISR efforts.

Teeth-Puller Story

Gates, who served briefly as an intelligence officer for a Minuteman ICBM wing in 1967, butted heads with the Air Force over its lack of interest in funding a UAV with the CIA as far back as 1992. He's consistently explained that he wants the services to focus on today's war.

In April, he acknowledged tremendous increases in ISR, but made clear it wasn't enough.

"I've been wrestling for months to get more intelligence, surveillance, and reconnaissance assets into the theater," Gates told students and faculty at the Air War College in April. "Because people were stuck in old ways of doing business, it's been like

pulling teeth. While we've doubled this capability in recent months, it is still not good enough," Gates concluded.

To that end, he commissioned a task force to find ways to rush more ISR assets to Central Command and subsequently requested \$240 million more from a war supplemental to move things along.

"I just found that the only way to get a lot of these things that are high priority that we need into theater now is for me to take ownership of the problem and galvanize the department," Gates added in May.

Air Force training and deployment of Predator crews is at the heart of the matter, but the bigger issue is how ISR moved from a supporting function to a roles and missions flashpoint.

It all began inside the Air Force with a renaissance of tactics, technology, and platforms in the 1990s.

In the Cold War, a static enemy put the emphasis on long, measured collection of data on the order of battle. Detailed photographic intelligence such as that delivered by the U-2 was particularly prized both by combat forces and intelligence officials building national policy. Electronic and signals intelligence was important, too, and led to the development of dedicated platforms such as the RB-47.

A U-2 in flight. Right: TSgt. Donnavon Huss puts ISR into action as he directs an F-16 during a live-drop mission.

ISR has come a long way, and fast. When a US-led coalition launched ground operations in Iraq in March 2003, it did so with just nine Predator UAVs in theater. Today, a force of 76 Predators sustains 25 full-time orbits over US Central Command's hotspots and the number is set to grow.

Welcome to ISR, the Air Force's dominant new mission area.

While airmen have long performed intelligence-surveillance-reconnaissance functions, it has only been in recent years that ISR has risen to the status of a true mission area.

A 2006 Air Force summit led to the stand-up of the Air Staff's new A2 organization, the first unit to be charged



USAF photo, 14th Air Support Operations Squadron



An E-3 AWACS in flight. At the beginning of Iraqi Freedom, aircraft such as this one helped give US forces greater situational awareness than in any war in history.

These and other aircraft of the Cold War flew daring and difficult missions to capture the data needed. Once collected, it was analyzed methodically behind closed doors. Only those with compartmented “need-to-know” access understood how the process worked or saw the fruits of that labor.

Of course, tactical reconnaissance—usually performed by minimally modified strike platforms—had to be turned as quickly as possible. While the restrictions might be fewer, the basic process was to fly, capture the data, land, and turn it over to be whisked away by analysts on the ground.

Technology advances during and after the Vietnam War moved more reconnaissance closer to the edge of the battlefield. Hunting for emissions from surface-to-air missile batteries became a vital task.

But the real breakthrough linking intelligence and operations would come only with creation of a network of sensors, analysts, and shooters.

One early vision of highly integrated ISR was the 1970s research on an Advanced Research Projects Agency favorite named Assault Breaker. The concept was for an airborne platform to monitor moving targets and direct missiles at Soviet echelons, for example. Assault Breaker caved in due to immature technologies, but what survived was the concept of a superintegrated sensor mission capable of monitoring moving targets under centralized control.

ARPA’s work on Assault Breaker led directly to the moving target indicator that debuted on the E-8 Joint STARS in the Gulf

War of 1991. Joint STARS was rushed to theater while still in test, with contractor personnel still aboard to keep the systems running. It was a roaring success.

A House Armed Services subcommittee praised the Joint STARS and noted that the “Army liked the downlink which showed in real time what was in front of it, while the Air Force used it for target acquisition, chiefly of moving targets.”

Operation Desert Storm foreshadowed the intense demands for continuous battlespace coverage and hinted at the tactical possibilities for this new wave of ISR.

Tighter Links

Immediately after Desert Storm, the Air Force moved to reform its intelligence structures and lay the foundation for the growth of ISR as a dominant mission area.

Step 1 was to bring the headquarters intelligence directorate and several field operating agencies under the command of operators. The goal was to forge a much tighter link where new ISR capabilities functioned as an integrated team with operations and campaign planning.

The first deployments of the RQ-1 Predator for operations in the Balkans in 1995 opened up many new possibilities. By the time of the NATO air campaign to save Kosovo in 1999, the full potential of ISR was emerging. Predators were essential for monitoring Serb forces. “You’d have the Predator up there looking at targets, but you had no way to get that information, other than verbally, to the airplanes that were going to attack those tanks,” recalled Gen. John P. Jumper in 2003, when he was Chief of Staff. He had been commander,

United States Air Forces in Europe, during the air campaign.

Then Predator became an armed reconnaissance vehicle, while command and control improvements centered around the concept of the combined air operations center as a weapon system increased the potential for rapid exploitation of ISR and near real-time attack of targets. A new tactical mind-set for how to employ ISR assets emerged.

The Air Force goal at the turn of the century was to run “a mean, aggressive, in-your-face ISR campaign,” said Maj. Gen. Glen D. Shaffer, who was director for ISR on the Air Staff in 2001.

Networking and the creation of new systems within the AOC laid the foundation for closer integration. “If you run an ISR campaign properly, you put the right sensors over the right part of the battlefield at the right time, and they are sharing data,” Shaffer told *Signal* magazine in 2001. “You are building what many people call a metasensor,” he said.

Never did America need aggressive ISR more than when the Global War on Terrorism began with Operation Enduring Freedom in Afghanistan in October 2001.

Afghanistan was the kind of battlespace where striking power quickly outstripped numbers of targets. The Taliban had no huge bases or second echelons. Instead, commanders found themselves searching for concentrations, tracking retreating forces, and hunting for terrorists over a huge land mass.

In Afghanistan, ISR took on a much more dynamic mission. Crews for systems such as Predator, Global Hawk, and the Navy EP-3s adapted fast. They learned to generate targets for air attack in a fluid battlespace, watch over dispersed ground forces, and supply them with tactical reconnaissance. The ISR operators were able to satisfy the knowledge demands of higher headquarters and hunt for terrorists.

Ground forces also got a look at what steady full-motion video could do. Predator literally opened the eyes of ground forces which arrived in theater in greater numbers after mid-November 2001. In intense fights such as Operation Anaconda in March 2002, ground commanders demanded as much real-time video surveillance of the battlespace as possible.

Still, ISR in Afghanistan was a fraction of what it later became.

Major combat operations in Iraq in 2003 set a new high-water mark for ISR.

Intelligence platforms flew more than 1,600 sorties from March 19 to the end of April 2003. They delivered more situation

awareness and fine-grained detail than in any other air war in history.

The ISR armada included eight Joint STARS, nine Rivet Joint RC-135s, 15 U-2s, and more than 30 Navy P-3s. Nineteen AWACS and 20 Navy E-2s fanned out in a command and control network. More than 50 satellites pitched in.

Unmanned forces included 16 Predators and one Global Hawk—the only one in flying condition. Beyond this, bombers, fighters, and gunships with specialized target acquisition capabilities did double duty by making contributions to the ISR picture.

Spectacular results ensured, as the coalition prosecuted 156 time-sensitive targets and another 686 dynamic targets. All of these demanded last-minute feeds of ISR data prior to mission execution.

Yet all of this was just a prelude to the burgeoning of ISR in stability operations.

More than any other single factor, the demands of stability operations vaulted ISR to a new level.

From 2004 onward, coalition air and ground forces settled in for the difficult work of finding and countering insurgents and terrorists. It quickly became apparent that active stability operations would fuel an insatiable demand for ISR.

ISR platforms scanned for individuals placing improvised explosive devices on key routes. They tracked high-value targets on a near-constant basis to attempt to provide actionable intelligence, so ground or air forces could move in for the kill.

When contact was made, ISR assets followed insurgents as they scattered down roads or across open terrain. Then the ISR assets helped find additional hideouts or other suspicious locations.

Specialized signals intelligence assets provided final, positive identification by intercepting an insurgent's cell phone signal or sniffing out other electronic markers. Each mission was urgent, and many were also painstaking.

The 2006 strike that killed Abu Musab al Zarqawi, leader of al Qaeda in Iraq, took an estimated 300 hours of full-motion video to set up.

To manage all this, the CAOC beefed up a separate intelligence-surveillance-reconnaissance division, called the ISRD. Here the blue-suit sleuths worked at combining feeds from multiple platforms to fulfill mission requirements. Their level of play advanced continually, and it was the synergy they created that resulted in some of the most spectacular successes.

Soon stability operations were eating up ISR so fast that it changed the

balance of power between strike assets and ISR.

The ratio shift was plain to see by 2005. During major combat operations, the ratio of ISR sorties to strike sorties was about one-to-12.5; in other words, each ISR sortie supported more than 12 strike sorties.

(Of course, nearly a dozen years of monitoring preceded the March-April 2003 campaign, so plenty of work had been done in advance. However, the ratio also reflected the priorities of major combat operations: ongoing identification of SAMs, sensitive targets, and Iraqi military formations, and equipment.)

Tougher Targets

Stability operations trained ISR assets on a different target set and demanded much longer dwell times. The search for insurgents, their safe houses, routes, and strongpoints demanded a high degree of positive identification. It also took more time and assets to ferret out targets and direct the complicated cuing of assets.

Often, missions required repeated, sequential sweeps of key target areas.

As a result, the ratio of ISR to strike averaged one-to-3.9 during 2005. Stability operations took three times as much ISR by proportion as major combat operations. No wonder ISR assets began to get the attention of top Pentagon officials.

The trend continued through surge operations. The fierce activity of the first half of 2008 shifted the ratio even more. By the end of June, the coalition had flown 5,541 ISR sorties in Iraq and Afghanistan and 16,459 strike sorties—for a ratio of one-to-2.9.

That meant the coalition was consum-

ing ISR at a rate four times greater than required for major combat operations.

The new ISR mission reflects the evolution to a far more dynamic kill chain. It has also blurred distinctions between ISR aircraft and strike aircraft. Many times it still takes a collection of ISR and strike platforms to carry out a mission, but as Deptula said, "Increasingly, a single platform executes the entire kill chain."

An armed MQ-1 Predator may be able to execute most of the kill chain itself—and so can an F-16 using its onboard sensors.

Commanders are not likely to want to give up the highly refined ISR now in their hands. ISR is just too good.

"We spent the last hundred years in aviation endeavors trying to figure out how to target any location on the face of the Earth, rapidly, day and night, all weather, and we can do that today," Deptula said in a 2007 interview. "The issue now becomes, where is it you want to hit? And, oh by the way, do you want to hit it kinetically or nonkinetically? What kind of effect do you want to achieve there?"

Every trend points toward more, not less, need for ISR as a dominant mission area.

Commanders "want more, want it better and want it now," said Marine Corps Gen. James E. Cartwright, vice chairman of the Joint Chiefs of Staff, in a recent Capitol Hill meeting.

Irregular force engagements and policing environments will sustain the demand for unprecedented levels of ISR. As Cartwright put it, we must see "the sweat on the brow" of individual targets.

It will be up to the Air Force to keep leading the way, although the Navy will buy up to 64 Global Hawk aircraft, with sensors specially configured for maritime



An artist's conception of an imagery intelligence satellite. Eye-in-the-sky assets are becoming increasingly valuable in the War on Terror.

Artist's conception by Erik Simonsen



Wearing her pressure suit, U-2 pilot Capt. Heather Fox greets members of the 380th Expeditionary Aircraft Maintenance Squadron in Southwest Asia.

missions, and up to 108 new P-8 aircraft to replace the P-3 Orion.

However, allies and joint partners are unlikely to duplicate fully the US air component's ISR advantages. An additional factor is that ISR assets will enter the fight early, and remain on station even as strike assets deployed decline in number. In the future, sizing for ISR forces should look at metrics such as the strike-to-ISR sortie ratio to plan on heavier use of ISR assets. After all, the term low-density, high-demand was coined mainly for ISR and battlespace management assets.

Joint and Collaborative

The Air Force is proceeding with its restructuring to make ISR "an Air Force-wide enterprise," as Deptula termed it.

Despite the squabbles, the view from the theater has always been brighter than that from Washington. North discussed how the UAV tasking, for example, is handled on a joint, collaborative basis. There are few disagreements from a theater perspective.

There's good news from the Tidewater region, too. Joint Army-Air Force talks in June yielded more agreement on the way ahead for UAVs.

"As opposed to finding independent solutions, we are trying to find joint, collaborative solutions that best support the joint warfighter in any spectrum of war," said Gen. John D. W. Corley, head of Air Combat Command. Washington may not be able to solve this problem, but there's every chance that those leading the war effort can.

Whatever happens with ISR in theater, the Air Force must choose carefully how



An MQ-9 Reaper in flight near Baghdad. The Reaper adds an expanded attack capability to the Predator's already impressive ISR portfolio.

it will cultivate this vital mission area. The public furor over ISR for Iraq and Afghanistan is masking a very real dilemma within the Air Force.

CIA director and recently retired USAF Gen. Michael V. Hayden described it as a split between the application of intelligence and the creation of intelligence. In a 2007 speech, he commented on how USAF has lost its leading role in the production of signals intelligence and imagery, to cite two examples.

Creation of intelligence involves paying attention to analysis and dissemination, not just collection.

From this perspective, ISR improvements from the mid-1990s to the mid-2000s centered on the application of intelligence. The keys to success were linking intelligence sources to operators in ways that cut the time in the kill chain. Future care and feeding of the mission area must also address the creation and production of intelligence.

"What you're seeing now," said Hayden, is an effort to "reinforce this half of the equation—the creation of intelligence, so the Air Force role in Sigint, the Air Force role in imagery, that's what the whole Air Force imagery UAV question is about—the creation of intelligence."

The Air Force is more than ready to take up the challenge.

USAF collects vast amounts of data, noted Deptula. "We suck it up in terms of Sigint. We take multiple pictures with a variety of systems. We collect lots and

lots of full-motion video. We've got so much stuff, we've got to be careful that we don't exceed the processing capability," he cautioned.

The Distributed Common Ground System has helped immensely. However, exploitation of full-motion video remains below par, to note one example. The next wave for ISR will hinge on improvements in rapid and automated analysis to go along with the big gains in the tactical arena.

What's not in doubt is that in 21st century warfare, ISR is a dominant Air Force mission—and one almost certain to continue to grow in importance. ■

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