

Airpower Comes of Age

By James Kitfield



An RC-135 Rivet Joint flies over Afghanistan during Operation Enduring Freedom. ISR aircraft such as Rivet Joint have changed the air battlespace for good.

The seemingly sudden eruption of the so-called Islamic State of Iraq and Syria caught the US Intelligence Community by surprise last year. In one of the most improbable offensives in modern military history, thousands of ISIS shock troops slipped across the northern border of Iraq and, together with allied Sunni tribes, launched a juggernaut that captured a string of northern cities and overran four Iraqi army divisions. Iraqi security forces rapidly folded, allowing

ISIS to capture advanced US weaponry, including artillery pieces accurate to more than 15 miles.

As ISIS advanced on the Sunni belt surrounding Baghdad on three sides, the Obama Administration realized it had only weeks to check the offensive, or Americans would likely have to evacuate the Iraqi capital in a historic and humiliating retreat.

In the chaos and confusion, the Pentagon turned to a little-known unit headquartered at JB Langley-Eustis, Va., to

help cut through the fog of battle in Syria and Iraq. In just a few hours, the 480th Intelligence, Surveillance, and Reconnaissance (ISR) Wing redirected the focus of the US military's vast electronic intelligence network toward the region.

Because it is geographically dispersed around the world, operates largely in cyberspace, and is constantly monitoring multiple global crises, the ISR network can rapidly shift focus and direct its intelligence gathering into a "hard stare" at any place on Earth.

**After a quarter-century of continuous combat,
USAF is much closer to achieving the battlespace
dominance that airpower pioneers envisioned.**



Within days, the 480th had aircraft in the battlespace, to include MQ-1 and MQ-9 Predator and Reaper remotely piloted aircraft, high-altitude U-2 spy aircraft, and Navy P-8 surveillance airplanes. From tasking just a couple of ISR missions over Syria and Iraq the previous month, the 480th conducted 80 missions in June 2014, ramping up since to 300 a month under what has become known as Operation Inherent Resolve.

Analysts with the 480th fused the raw data from those ISR platforms

with signals, human, and open source intelligence collected by the wider US Intelligence Community, distilled it into a common intelligence picture, and shared it in real time with leaders at US Central Command. In the initial days of the crisis, CENTCOM chiefs used that alarming intelligence picture to build a broad anti-ISIS coalition and gain basing rights for US aircraft in the region. Data on the positions, movement, and internal communications of ISIS forces also formed the

basis for the Inherent Resolve air campaign that began with precision US and coalition air strikes on ISIS positions in August 2014.

With only a few hundred US ground forces in Iraq in a train-and-assist role, Inherent Resolve has destroyed or damaged more than 7,600 ISIS targets, to include 472 staging areas, 2,045 ISIS-occupied buildings, more than 1,800 fighting positions, nearly 100 tanks, and 325 Humvees. To date the air campaign has denied ISIS sanctuaries in its stronghold



USAF photo by TSgt. Efrain Lopez

An MQ-1 Predator goes through postflight inspection. In 2000, an unarmed Predator tracked a man thought to be Osama bin Laden. The incident led to the next step: arming the surveillance aircraft.

of Raqqah, Syria, and it proved crucial in helping Kurdish forces defend the northern Syrian city of Kobane and expel ISIS from much of Kurdish territory in northern Iraq.

American air support of Iraqi security forces and militias also proved decisive in their successful counteroffensive to recapture the city of Tikrit earlier this year. According to senior US officials, the campaign had killed more than 10,000 ISIS fighters as of June 2015.

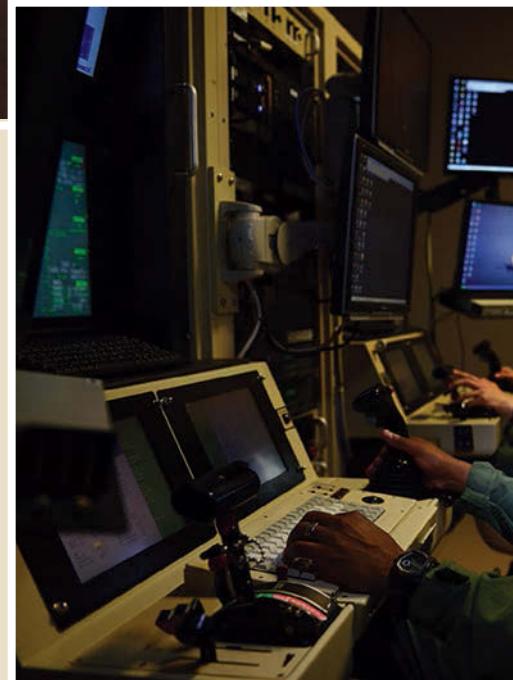
The rapid response, global reach, and lethality of USAF in Operation Inherent Resolve, some experts believe, is just the latest indicator of a paradigm shift that has seen airpower become increasingly decisive in modern conflict. A primary force driving that change is a revolution in the realm of ISR, which has seen an increase of 2,300 percent in the number of missions launched per day since 2001. Many of those missions are flown by RPAs with the ability to loiter over targets or battlefields for 20 hours or more to detect “patterns of life” among unsuspecting targets. The number of RPAs in the Air Force arsenal has ballooned from just 167 in 2002 to about 6,000 today.

The network-centric style of operations the Air Force developed to leverage all those collected data led to the expansion of the Distributed Common Ground System. The DCGS is an intelligence fusion hub at Langley, connected to other network nodes by a superhighway

of bandwidth. It moves huge amounts of data around the globe instantaneously for real-time analysis and exploitation, creating a reachback capability that is revolutionizing concepts of command and control and force dispersal. Meanwhile, advances in sensor technology have greatly improved the precision of airborne weaponry, even as standoff weapons and stealth can increasingly hold even well-defended targets at risk. Underscoring all of those technological advances is an unprecedented level of expertise in an Air Force that has been fighting continuously and honing its combat edge for decades.

RAPID RESPONSE REVOLUTION

“When the Air Force first responded to the ISIS crisis last year, we were already closely monitoring operations and crises in Libya, Somalia, Yemen, Ukraine, and the South China Sea, so this concept of truly distributed operations and the ability to swing our focus rapidly in response to new demands or crises really is revolutionary.” So said Air Combat Command chief Gen. Herbert J. “Hawk” Carlisle in an interview. That revolution is propelled by an ISR enterprise that can rapidly place an “unblinking eye” of manned and remotely piloted aircraft and spy satellites over any place in the world, he said, and a DCGS that processes, exploits, and disseminates that intelligence picture around the world in real time.



Major Bishane, an MQ-9 Reaper pilot, controls a remotely piloted aircraft from Creech AFB, Nev.

“Add to that capability the increased precision of our weapons that allows us to control collateral damage to a greater degree than ever before, and combine all that with the experience level of an Air Force that has been operating in combat-like conditions for the last 25 years,” said Carlisle. “The result is airpower that has become increasingly decisive in combat operations. For those of us who have studied the evolution of airpower, it seems to finally be reaching the potential that its earliest pioneers envisioned.”

All militaries innovate and experiment under the intense pressures of

combat, as technologies are pulled from the laboratory bench and rushed to the front lines, and new concepts of operations are created on the fly to leverage that technological edge. The paradigm shift in the effectiveness of airpower arguably began when USAF deployed to the Middle East to fight in the Persian Gulf War in 1990-91—and never really came home. Air Force leaders and airmen continued to introduce new technologies and hone operational concepts throughout the 1990s in operations Northern and Southern Watch over Iraq and in the 1999 Operation Allied Force air campaign against Serbia.

Since the 2001 terrorist attacks, the Air Force has conducted nearly uninterrupted combat operations in Afghanistan

and Iraq and, as part of the global war on al Qaeda terrorists, in places such as Pakistan, Yemen, Somalia, and Libya. Ongoing operations in Inherent Resolve are just the latest campaign in a quarter-century of conflict.

During Operation Desert Storm, two technologies in particular represented a major step forward in airpower effectiveness: precision strike weapons and stealth. In terms of precision strike, a World War II-era B-17 Flying Fortress dropping “dumb bombs” was accurate within only about a half-mile radius; in airpower-speak, it had a half-mile circular error probable, or CEP. By the time of Desert Storm, USAF’s stockpile of precision guided munitions was small, and only a handful of aircraft such as the F-15E Strike Eagle and F-117 stealth bomber could employ them. But laser guided bombs had a CEP of just a few feet and proved devastating against Iraq’s command and control centers and Republican Guard forces.

The air campaign was also greatly aided by the introduction of stealth technology in the form of the arrowhead-shaped, radar-evading F-117. It was able to slip through Iraqi air defenses to hit strategic nodes in the Iraqi command and control system in the first hours of the air campaign.

Building on those lessons, the Air Force greatly expanded its arsenal of

precision guided munitions. By the time of Allied Force in 1999, that arsenal included the Joint Direct Attack Munition, or JDAM, an all-weather precision guidance system utilizing the satellite guidance of the Global Positioning System. JDAMs could be attached to unguided dumb bombs relatively cheaply. The new AGM-130 munition essentially turned a standard bomb into a rocket-boosted, GPS guided cruise missile with a range over 35 miles, heralding an era of affordable “standoff” weapons that could be delivered outside the range of enemy air defenses. By the end of the decade, a single B-2 stealth bomber armed with JDAMs could accurately hit 20 targets on a single bombing sortie, representing orders of magnitude improvement in effectiveness over unguided bombs. Global precision strike had come of age.

The Balkan conflicts of the 1990s also witnessed the first combat deployments of the Predator RPA. Though Predators were initially flown line of sight—like their radio-controlled junior cousins sold in hobby stores—US airmen in the Balkans designed a novel concept of remote split operations. This method bounced a Predator’s signal and video feed off a satellite to a mobile ground station housed in a leaky trailer crammed with equipment and stationed in nearby Hungary.

An MQ-9 waits out a sandstorm under a shelter at JB Balad, Iraq, in 2008. The remotely piloted aircraft are performing ISR and combat duties for Operation Inherent Resolve today.

USAF photo by A1C Jason Epley



After one of the experimental Predator surveillance aircraft in the Balkans captured video of Serbian troops committing atrocities in Bosnia, the Air Force refined the machine. It developed computer software that attached precise GPS coordinates to the images and gave the Predator a laser designator, transforming it from strictly a surveillance platform to a target acquisition and designation platform.

The Predator's game-changing potential in the realm of counterterrorism was proved out in 2000, when a video feed clearly showed a white-robed man, probably Osama bin Laden, at one of his terrorist training camps in Afghanistan. Because there were no aircraft in the vicinity capable of launching weapons, however, the chance to take out the terrorist who had declared war on the US was lost.

"When that video made the rounds of the Air Force leadership, [then ACC chief Gen. John P. Jumper] had the idea to put weapons on the Predator, and he ordered us to make it happen," said a senior Air Force official. "Less than four months later we conducted the first test of an armed Predator that was strapped to a piece of concrete and fired a Hellfire missile that we borrowed from the Army. Luckily, the wing didn't come off."

ARMING THE PREDATOR

Those advances in airpower capability were employed with devastating effect beginning on Oct. 7, 2001, when, less than a month after the 9/11 terrorist attacks, CENTCOM launched Operation Enduring Freedom in Afghanistan, unleashing an air armada of attack and ISR aircraft. Using Special Forces teams on the ground to coordinate air support for lightly armed Afghan militias, CENTCOM targeted Taliban formations and defensive positions with precision, toppling the group from power in a matter of weeks.

Enduring Freedom also marked the first combat deployment of the armed Predator. As a result of refinements in the concept of remote split operations that transmitted its signals through fiber-optic cables under the Atlantic Ocean, Predators were flown by aircrews in the US, and their full-motion video feeds were projected into command and control and intelligence fusion centers both at home and abroad. During the early phases of Enduring Freedom, the Air Force developed a method for streaming the Predator videos directly into the cockpits of AC-130 gunships and to Special Forces teams on the ground via Rover video

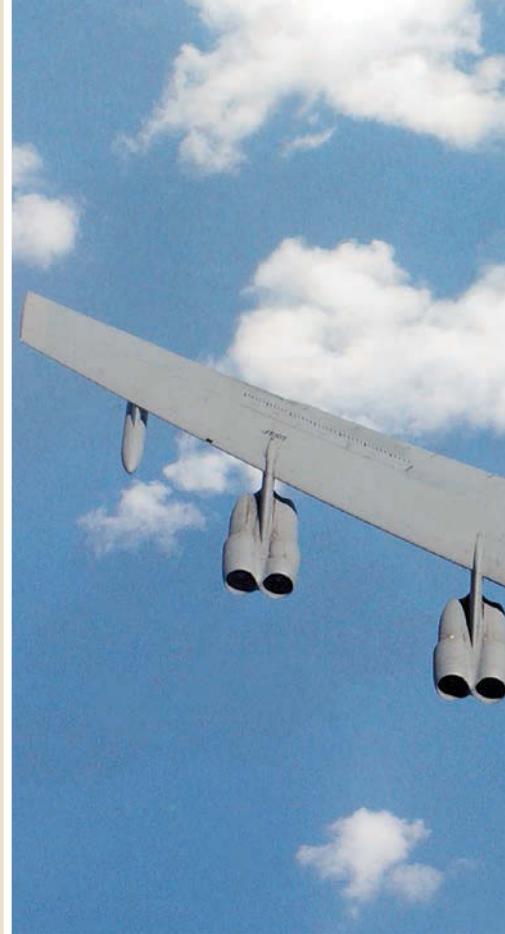
USAF photo



uplink transmitters the size of suitcases. Today, Rover transmitters have shrunk to the size of smart phones, and in response to the US military's insatiable demand for full-motion video from RPAs, the Air Force has fielded 20,000 of them.

In its hunt for al Qaeda terrorists and insurgents during the long Iraq War, Joint Special Operations Command task forces further refined an intelligence-driven cycle of operations dubbed F3EA, for find, fix, finish, exploit, and analyze. It leveraged the unique attributes of persistence over the target, the lethality of RPAs, and the vast command and control and intelligence analysis network USAF developed alongside the Intelligence Community to support them.

Over the last decade of conflict, the Air Force strengthened every link in that operational chain, greatly increasing the number of platforms designed to find and fix enemy targets, the precision weapons to finish them, and the analysts tasked with exploiting all of that raw data and turning it into actionable intelligence. Along the way, its communications infrastructure of digital bandwidth increased exponentially. In the decade between Operation Desert Storm in 1991 and Enduring Freedom in 2001, for instance, the bandwidth at the combined air operations center in the Middle East grew from the equivalent of a single fiber-optic T-1 line, able to carry 24 digitized voice channels, to the equivalent of nearly 100 high speed T-1 lines—a hundred-fold increase.



"People talk about how many RPAs we can put in the air, but the key is the concepts of operations that we developed to exploit them," said Carlisle. "From remote split operations, we created this incredible reachback capability that al-



Clockwise from top left: Airmen work the Distributed Common Ground System, USAF's globally networked intelligence, surveillance, and reconnaissance weapon system. They collect and analyze data from ISR assets worldwide. Gen. John Jumper, then ACC chief and pictured here with German Lt. Gen. Peter Vogler, came up with the idea to arm Predators, and ordered the armed RPA delivered within four months. A B-52 loaded with Joint Direct Attack Munitions on a close air support mission to Iraq during Operation Iraqi Freedom.

lows us to keep our operational footprint largely inside the United States.” He said the Air Force is still figuring out the right mix of forward deployed vs. reachback, “but that ability to provide accurate situational awareness in real time to the joint warfighter from [the US] truly is revolutionary. It’s changed the way people think about operations.”

On a recent afternoon in the 480th ISR Wing’s darkened command center, a three-person crew monitored an Air Force airdrop of relief supplies to Yazidi tribesmen stranded on a mountaintop in northern Iraq. The Yazidis were surrounded by ISIS fighters who had captured and killed many of the tribe’s men and sold its women into sexual slavery.

GORGON STARE

An analyst monitored the video feed from a Predator in Iraq that was being flown by an aircrew at Creech AFB, Nev., watching intently as a line of parachutes blossomed onto his greenish screen and drifted gently to earth. At the same workstation, another analyst took screenshots from the video for collection into an intelligence report for the operational commander. Between them sat a “screener,” who constantly updated intelligence on the mission’s progress in multiple classified chat rooms monitored on his split-screen computer. No one had to tell the enlisted airmen, who make up the vast majority of the 480th’s 6,000 personnel, that their mission had real, life-and-death consequences for the people on their video screens.

At similar workstations in the sprawling command center, kept dark for optimum screen monitoring and chilly for the sake of the computers, crews tracked scores of other ISR missions being conducted around the globe. Raw data from a host of ISR platforms poured into the control room for rapid distillation and analysis. When the Air Force initially fielded the Gorgon Stare wide-area surveillance system in Afghanistan, it created so much data that it overwhelmed the analysts’ bandwidth, forcing the 480th to deploy a team directly to Bagram to help digest the “data crush.”

Though the public naturally equates RPAs with their signature full-motion video, the analysts at the 480th routinely correlate data from multiple sensors and spectrums: synthetic aperture radars, ground moving target indicators, electro-optical and infrared radars, hyperspectral imagery, electronic communications intercepts, and even spectral thermograph sensors that can “sniff” the air for chemi-



AC-130H Spectre aircraft on the ramp at Cannon AFB, N.M. USAF streamed Predator video into the cockpits of the gunships during Operation Iraqi Freedom via Rover video uplink transmitters.

cals such as those associated with bomb-making. The experts at the 480th will tell you the true art of ISR is combining all of those myriad streams of intelligence into a coherent, seamless picture.

"There's always an overreliance on video and what people can see, but the art in this business is fusing that video with other sources of intelligence that add context and layers of information, and frames it in a particular time and space," said Col. Timothy D. Haugh, commander of the 480th ISR Wing. "Being able to mass that kind of data, and fuse it into an intelligence picture that empowers a decision-maker or frontline commander, that's the challenge that mentally engages my airmen."

As ISR technology and operations have matured, and US commanders around the world become more comfortable with the reachback capability that the 480th ISR Wing represents, demand for that kind of high-fidelity intelligence has soared. Between June 2014 and March 2015, the wing flew 3,700 missions and logged 57,000 hours of ISR collection just in support of Operation Inherent Resolve. Globally it conducted 13,000 ISR missions in the past year alone.

In the meantime, airpower experts believe the 480th is on the cutting edge of fundamental changes to the nature and effectiveness of airpower. Retired Lt. Gen. David A. Deptula, now dean of the Mitchell Institute for Aerospace Studies, commanded the initial Enduring Freedom air campaign and was USAF's first deputy chief of staff for ISR.

"Everyone focuses on this little piece of fiberglass flying around called an unmanned aerial vehicle," Deptula observed, "but it's just a host for sensors that provide data to this vast analytic en-

terprise we call the Distributed Common Ground System, which turns the data into information and hopefully knowledge." This is the "revolution underway, and we're still in its earliest stages," he said in an interview.

The first hundred years of flight were spent trying to figure out the "finish" part of the F3EA equation, he noted. Now the Air Force has largely achieved the ability to strike any target, in all kinds of weather, rapidly, and with precision.

"Now we're starting to figure out the 'finding' and 'fixing' parts of the airpower equation, which will lead towards a better understanding of what effects we are actually trying to achieve," said Deptula. "That will bring us closer to the vision of dominant airpower of early pioneers like Billy Mitchell and Giulio Douhet, who didn't have the technologies to back up their theories. Now the technology is finally catching up with airpower theory, but it has outpaced the organizational, command, and social structures we have to leverage it. When we get that right you will see the real paradigm shift."

BRINGING THE A-GAME

Demand among Special Forces engaged in counterterrorism operations was so high that Air Combat Command recently established the 363rd ISR Wing devoted specifically to targeting.

In that sense, the Air Force's ISR enterprise is a victim of its own success. The 480th Wing's analysts routinely work 12-hour shifts, often six days a week, and average 220 hours a month. Air Force psychological studies have

found widespread stress among not just RPA pilots and operators, but also among the ISR analysts in the 480th and 363rd. In some cases analysts may track the same individual for months or even years in order to establish a pattern of life, culminating in that target disappearing in the blast cloud of a Hellfire missile. Doing that year after year exacts a heavy, if poorly understood, mental toll.

"Along with RPA crews, we're kind of unique in that we deploy in-place and fight from our home garrisons. There are great advantages to that but it means we never leave the fight," said Haugh. ACC's surgeon general is conducting a study to better understand and mitigate the resultant stresses, beginning with trying to reduce a 220-hour-per-month workload that Haugh readily admits is unsustainable. The wing has opened a 24/7 gymnasium and is considering round-the-clock daycare, and it now boasts a full-time psychologist and chaplain.

"You know, in the Air Force I joined, we used to have to scratch for realistic training, but some of these younger airmen have been in combat continuously for more than a decade and it's all they've ever known," said Haugh. "Every day they come to work expecting to be involved in combat operations, knowing that the work they do will impact lives and what happens on the ground in a combat zone. So every day they have to bring their 'A-Game,' and that makes them very good. Now we need a more mature understanding of the stresses placed on a force that never really leaves the fight." ★

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