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EFFECTIVE AND EFFICIENT USE OF US AIR FORCE AIRBORNE INTELLIGENCE, SURVEILLANCE, AND RECONNAISSANCE (ISR) AND HOW TO MEET COMBATANT COMMANDER REQUIREMENTS

by

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Abstract

The effective use of airborne ISR has been debated for several years. Since Desert Storm, the majority of airborne ISR platforms have been dedicated to Central Command's (CENTCOM) theater of operation. While the other theaters have legitimate intelligence targets to be monitored and pursued, CENTCOM has been the priority. This paper examines how ISR has been used in different theaters, how ISR assets are allocated to the combatant commands, improvements made in how ISR platforms operate, and recommendations on how the platforms can be used more effectively. The Air Force must seek training opportunities with ground forces before Army and Marine units deploy to foster a basic understanding of how ISR platforms can support them, as well as ISR operators learning what information ground forces want. This needs to start within the United States military services, but the education piece needs to happen with coalition partners too. Establishing a level of trust and understanding before ground forces deploy will enable success for real-time ISR operations.

Introduction

> *A more challenging issue today – and for the future – is determining and locating the desired effect we want to achieve. Because ISR capabilities are at the core of determining these desired effects, ISR has never been more important during our 60 years as an independent Service. ISR has become the foundation of Global Vigilance, Reach, and Power.*
>
> --General T. Michael Moseley
> *CSAF Vector: Transforming Air Force Intelligence, Surveillance, and Reconnaissance*
> 29 January 2007

In peacetime or in war, the ability to know information about an adversary is critical. No matter what theater, every combatant commander wants to have as much information as possible, allowing the commander to make informed decisions. To help with this, the combatant commanders use intelligence, surveillance, and reconnaissance (ISR) assets. While ISR assets include airborne, ground, maritime, space, cyberspace, and human intelligence assets, this paper narrows the focus to US Air Force airborne assets. Since these assets are very limited in number, no combatant command has dedicated mission aircraft. Instead, the aircraft are allocated to each combatant command based on the command's justification to the Joint Staff.

To make effective and efficient use of the Air Force's limited number of airborne ISR assets, there has to be better planning and allocation from the tactical to strategic level. Historically, the combatant commands rarely receive the requested amount of ISR. While there have been some major improvements over the last several years with the number of assets available and how they are being used, e.g. placing various types of ISR sensors in the same area at the same time, this should not be just a numbers game with the Air Force providing a certain number of hours each day supporting a combatant commander. This paper will examine if Air

Force ISR assets are being used effectively and efficiently by the combatant commanders, if the ISR allocation process distributes the airborne assets to the combatant commands using the correct weighting and priority, if an analytic framework can be developed to better allocate the limited number of platforms, and how these platforms can be used in different operational environments. Finally, the paper will provide recommendations on how to better educate and train with joint and coalition partners, as well as how the limited airborne ISR can be better used.

Definitions

To establish what ISR is as well as some of the different forms of intelligence that can be collected from airborne ISR platforms, some joint definitions need to be examined. All of these definitions are taken from Joint Publication (JP) 1-02, *Department of Defense Dictionary of Military and Associated Terms.*

Intelligence, Surveillance, and Reconnaissance (ISR)

This is defined as "an activity that synchronizes and integrates the planning and operation of sensors, assets, and processing, exploitation, and dissemination systems in direct support of current and future operations. This is an integrated intelligence and operations function."[1]

Information Operations (IO)

JP 1-02 defines IO as "the integrated employment of the core capabilities of electronic warfare, computer network operations, psychological operations, military deception, and operations security, in concert with the specified supporting and related capabilities to influence disrupt, corrupt, or usurp adversarial human and automated decision making while protecting our own."[2]

Electronic Warfare (EW)

EW is "military action involving the use of electromagnetic and directed energy to

control the electromagnetic spectrum or to attack the enemy. Electronic warfare consists of three divisions: electronic attack, electronic protection, and electronic warfare support." [3] Platforms such as the RC-135V/W Rivet Joint and the U-2 Dragon Lady can be used an electronic warfare support role.

Signals Intelligence (SIGINT)

SIGINT is "a category of intelligence comprising either individually or in combination all communications intelligence, electronic intelligence, and foreign instrumentation signals intelligence, however transmitted."[4] Examples of Air Force SIGINT platforms are the RC-135V/W Rivet Joint and the U-2 Dragon Lady.

Measurement and Signature Intelligence (MASINT)

MASINT is defined as "intelligence obtained by quantitative and qualitative analysis of data (metric, angle, spatial, wavelength, time dependence, modulation, plasma, and hydromatic) derived from specific technical sensors for the purpose of identifying any distinctive features associated with the emitter or sender, and to facilitate subsequent identification and/or measurement of the same. The detected feature may be either reflected or emitted."[5] Examples of an Air Force MASINT platform are the RC-135S Cobra Ball and RC-135U Combat Sent.

Imagery Intelligence (IMINT)

This is "the technical, geographic, and intelligence information derived through the interpretation or analysis of imagery and collateral materials."[6] For this paper, IMINT will focus on FMV, but does include imagery obtained through radar, infrared, film or other means. Platforms with this capability include the MQ-1B Predator, MQ-9 Reaper, RQ-4 Global Hawk, and U-2. Fighter and bomber aircraft equipped with targeting pods such as the Sniper and Litening II also have the capability to provide imagery that the fighter or bomber can use to track

and prosecute targets on the ground.

Background

Several assets, including the RC-135V/W Rivet Joint, E-8 Joint Surveillance Target Attack Radar System (JSTARS), and U-2 Dragon Lady, are so limited in numbers they are considered national ISR platforms. To obtain the capabilities of these national assets, combatant commanders must make their case to the Joint Staff every year, and then the platforms are allocated based on the most important need. For almost 20 years, Central Command's (CENTCOM) requests for ISR platforms have carried the day and the majority of assets have gone into the Middle East. For roughly the past 10 years, European Command (EUCOM), Pacific Command (PACOM) and Southern Command (SOUTHCOM) have been left to rely on limited ISR assets, ground and sea-based as well as available airborne ISR, in addition to help from national platforms. With Africa Command (AFRICOM) standing up and becoming a separate operational entity, the request for ISR support will grow again with another combatant commander looking to get theater support.

Over the past few years, there has been an ever increasing demand for ISR at the strategic, operational and tactical levels. In fact from FY07 to FY08, the number of theater tasked ISR missions increased by almost 250 percent. The FY09 projections show an increase of 300 percent over the FY07 numbers and the FY10 estimate shows an increase of nearly 400 percent over the FY07 numbers.[7] These numbers are for coalition theater assets only and do not include the Army's and Marine's smaller unmanned aerial vehicles (UAV) or fighter aircraft using their targeting pods in an ISR role.

Theater ISR assets are tasked missions by the Combined Air and Space Operations Center's (CAOC) ISR Division, in conjunction with the Combat Plans Division. The allocation

of assets is accomplished by prioritizing the intelligence requests from the component commanders as well as the national intelligence community and matching the assets to the requests. At the tactical level in CENTCOM, the biggest demand for ISR is from the ground commanders and the focus is IMINT, specifically full motion video (FMV); however, there are just not enough Air Force assets physically available to support these requests. This has led the Army and Marine Corps to procure and deploy their own tactical ISR assets, mostly limited range UAVs, to increase their organic FMV capability. While this has helped fill some of the tactical need, there is still a large demand for greater Air Force capabilities.

To optimize the Air Force's support to the Army, the CAOC has sent ISR liaisons forward to work with the Army in the division headquarters. As then Lieutenant General Ray Odierno (now General Odierno and Multi-National Corps-Iraq Commander), et al points out in a recent *Joint Force Quarterly* article, "providing Air Force subject matter experts as advisors to division staff sections and as key members of the intelligence-operations team has been a combat multiplier."[8] The article further points out that by using a mix of organic, apportioned and allocated assets, the major subordinate commanders can create opportunities to cross-cue between ISR platforms allowing regular Army forces to have tactical successes like their special operations forces (SOF) counterparts.[9] While there are opportunities for ISR cross-cueing and support to ground forces or air forces, much of the day-to-day ISR cross-cueing opportunities in Iraq and Afghanistan are being done at the squadron or wing level. The CAOC historically schedules ISR platforms to be in the same place at the same time, and until recently there was no written guidance on how the platforms should interact to fuse their capabilities, maximizing their utility. This caused the forward deployed Squadron and Wing Weapons and Tactics Flights to work longer hours to coordinate among the platforms.

Ineffective Use of Airborne ISR Assets

For a variety of reasons, at times over the last 20-30 years airborne ISR assets have been used ineffectively. The reasons range from a lack of knowledge about the platforms, insufficient numbers of airframes, intelligence community tasking, and insufficient component and theater tasking, and each will be examined further. Due to the weight of the equipment, no single ISR platform carries all different types of sensors to provide information across all the different types of intelligence. As such, ISR assets provide the best information when they are scheduled to synergistically support each other while simultaneously providing air and ground combat forces critical, perishable, and actionable intelligence. However, the combatant commands and CAOCs have not always scheduled these assets to achieve this synergistic effect.

Historical Lack of Knowledge about ISR Assets from the Tactical to Strategic Levels

Over the years, the capabilities of many of the ISR assets have been classified at the highest levels. While airborne ISR platforms did play a significant role in the Vietnam War, almost all the data collected was passed to the ground and then relayed to combat platforms or units. Because much of this was done using the latest technology and the US did not want the enemy to know it could collect a specific type signal, secrecy was paramount. Keeping the dissemination of information classified protected the collection capability, but also meant very few people knew about the capabilities of the platform or how to request specific, tailored support.

During Operation DESERT STORM and the following years with Operations SOUTHERN WATCH (OSW) and NORTHERN WATCH (ONW), airborne ISR assets played a significant role in pushing the Iraqi forces out of Kuwait and then transitioned to providing a watchful eye and ear on what the Iraqis were doing throughout the 1990s. During DESERT

STORM, OSW, and ONW, the Rivet Joint played a critical role by passing the locations and intent of Iraqi fighter aircraft, surface-to-air missile systems, and antiaircraft artillery to coalition fighter and bomber aircraft. While combat assets came and went, ISR assets like the Rivet Joint never left the theater and today, still remain in the CENTCOM area of responsibility (AOR) roughly 18 years after its initial deployment there. Because of this long term presence, more has become known about the capabilities of these assets which afforded procurement of additional systems to support combat operations in theater. For example, new data links enable ISR platforms to pass information to each other, the CAOC, and combat aircraft. This significantly reduces the time it takes to identify and engage enemy forces in the air and on the ground. Even though the tactics have been slightly modified over the years, the ability of the intelligence and operational community to task and help prosecute a conventional battle is now well understood because of lessons learned in various operations as well as in exercises like the Air Force's Red Flag.

During conventional battles, ISR operations have typically complimented one another. As Major General Glen Shaffer, former Director for ISR on the Air Staff, stated, "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."[10] To accomplish this, requests come into the CAOC from the various countries and services within an AOR 72-96 hours prior to when the requested support was needed. This allows the CAOC to flow the requests into the various divisions so the operations can be supported. While this process worked well for the conventional battle, this timeline has not worked well for the counterinsurgency battle we've faced for the past several years.

The counterinsurgency battle is much more fluid and requires ground forces to engage

across a broader arena which demands an increase in intelligence collection and dissemination. In this environment, ground forces cannot accurately request what support they will need three to four days out. In an attempt to fix this, the CENTCOM CAOC "peanut butter" spreads the airborne ISR platforms across the daily schedule. This approach divides the assets among the various requestors and tries to give each a portion of what they asked for.[11] This approach has had limited success. Because the assets are spread across the daily schedule in time and location, the platforms have little opportunity to share, or cross-cue, data with each other. In many instances, the ISR orbits were in locations where they could not support the combat or mobility aircraft. When ISR assets can cross-cue each other, the bigger intelligence picture takes shape because the intent of an enemy force may be determined. Also, the size of the force and possible target quality coordinates can be passed on to combat forces for engagement.

Additionally, this type of scheduling has had another effect. Because the schedule may not place an ISR platform in the same area with combat aircraft, many combat aircraft have stopped seeking information from ISR platforms and simply concentrated on using their internal capabilities to support the ground units. On the opposite side, ISR platforms supported the ground units they were tasked and did little communicating with combat aircraft. In many instances, some of these aircraft were operating from the same base, but the crews were not talking to each other prior to, during, or after their flights. This demonstrates a lack of understanding from all levels of leadership of how combat and ISR platforms can complement each other as well as complacency for the status quo. However, in 2007-2008, this attitude started to shift with various levels of leadership starting to examine how to improve the coordination between ISR, combat aircraft, and ground forces. This improvement is examined in a later section.

Finally, irregular warfare has created a new group of individuals needing critical education to understand the capabilities of the various ISR platforms available to support combat operations. From my experience, US special operations teams work have a good understanding of ISR, and the teams will consistently work with airborne ISR platforms; however, the joint terminal air controllers (JTAC) and Army and Marine Corps company and platoon leaders would benefit significantly by learning more about ISR capabilities and the support ISR can provide. More and more, airborne ISR operators find themselves talking to these individuals while they are under fire and experiencing the fog and friction of combat. Some ISR units are trying to talk to these individuals before they are "in-country," but at that point it's too late. ISR units need to train with individuals and units during their deployment spin-up training so the ground forces understand what the air assets can bring to the fight and conversely, the ISR platform operators can better understand the type of support the ground forces want and need in combat.

Insufficient Number of ISR Platforms

The term low density/high demand (LD/HD) was created in the 1990s as the number of requests from combatant commanders for various command and control, intelligence, surveillance, and reconnaissance (C2ISR) and combat search and rescue platforms started to grow. For large, manned C2ISR assets, the capabilities of the platforms have increased since the 1990s, but the number of available aircraft has remained static. Unmanned aerial systems (UAS) have significantly increased in numbers over the last 15 years and have helped fill some of the void. However, the ever increasing requests for information by the combatant, component, and tactical commanders far outweigh the collection capability of Air Force platforms. As Lt Gen David Deptula, AF/A2, stated, "There will always be more demand for capability than there is supply."[12]

The number of ISR platforms and how they were tasked were problems during the initial phases of Operation IRAQI FREEDOM (OIF). On D-day, the 1st Marine Expeditionary Force found themselves in the middle of three Iraqi divisions without theater priority for ISR.[13] Because of this, the Marines had to rely solely on their organic assets from one of their aviation combat elements to provide their intelligence picture. Army units have also complained about the lack of theater level ISR support.

Due to the lack of, or at least perceived lack of, theater level ISR support, the Army has procured and deployed organic airborne ISR assets, but these still have limited range and capability. Some have said that the Army is essentially recreating the Army Air Corps with UASs.[14] To help with the search for improvised explosive device placement, the Army has created and deployed a small aviation unit made up of UAVs and helicopters.[15] Yet even with these assets, the Army is still seeking more FMV coverage to provide each brigade combat team with persistent, unblinking coverage.

Inefficient Combatant Commander and Intelligence Community Tasking

Besides the lack of knowledge of airborne ISR platforms and limited number of assets, the combatant commander, the component staff, and sometimes even the intelligence community tasks these assets in an inefficient manner. While CENTCOM currently gets the bulk of the airborne ISR assets, this is not an issue with just one platform or just within CENTCOM. This problem can be seen across the various commands and occasionally, within the greater intelligence community. A 2008 RAND study on ISR agrees stating, "Lessons learned from operations in Afghanistan and Iraq have indicated that commanders are often unaware of how their ISR assets are being employed and that they are perhaps not being used to their full potential."[16]

Since the mid to late 1990s, SOUTHCOM has received little support from larger airborne ISR platforms like the Rivet Joint. When the command did receive Rivet Joint support, it came on relatively short-notice, and it did not have a complete reconnaissance, surveillance, and target acquisition (RSTA) plan spelled out. While it did have a Secret RSTA plan, SOUTHCOM did not have one at the specialized compartmented information (SCI) level. This forced the aircrew members flying the missions to work with the component staff and others in the intelligence community to develop more detailed target information so the platform could provide optimum support. This process took approximately two weeks to fix. While this does not sound like a great deal of time, the platform was deployed for just under a month so a little over half the time the crews did not have complete tasking. This translates to the inefficient use of a critical national asset.

The CENTCOM theater provides a few recent examples of how airborne ISR platforms are not being used to their fullest capability. Besides having an ISR mission, the JSTARS also has a command and control mission. The theater does an effective job of tasking the JSTARS for its surveillance role of monitoring movement of vehicles on the ground. However, the JSTARS could also be tasked for its imagery capability too. This piece and the platform's command and control (C2) capability often get overlooked for the sake of its moving target indicator (MTI) capability. While the crew can analyze the synthetic aperture radar picture and the information it's providing, the squadron leadership has been told by individuals in the component multi-national staffs that the crew just needs to collect the MTI data and pass it to the ground for analysis. While the JSTARS is collecting solid, actionable information, the whole platform is not being used efficiently and only about a third of the mission crew is actually working to ensure the MTI information is collected. The coordination and execution of the C2

mission is currently non-existent.

CENTCOM and national tasking for the theater has also been a problem with the Rivet Joint. Because tasking the Rivet Joint has been delegated to the theater, national agencies felt they could not task the platform when it is in the CENTCOM theater. They failed to realize that the platform has transition time to and from its tasked CENTCOM mission area. While the platform does have standing national tasking, there were a few years that national agencies could have issued special tasking, but they did not.

This section has focused on collection tasking, but how the airborne ISR assets are tasked and employed is another issue. As previously mentioned, ISR platforms are most efficient when they can complement each other. The Rivet Joint has the ability to provide a location and determine an enemy's intent. However, if the enemy is moving, it does not have the ability to track them as accurately as other platforms. By combining the Rivet Joint's SIGINT capability with a Predator's FMV capability or the JSTARS ability to track a moving target, a synergistic and succinct product can be fused and exploited. Currently, these platforms are not being utilized in this manner. As mentioned earlier, they are being peanut butter spread across two AORs and at different times, often acting independently of each other. When small battles are being fought throughout two distinct countries, operating traditional ISR assets in the same area takes tremendous coordination between the CAOC and the multi-national staffs of both countries. Another avenue that has been pursued recently is teaming these assets up with advanced targeting pod equipped fighter and bomber aircraft. This has shown some promise and will be examined later in the paper.

Recent Improvements in ISR

Although there is still a lack of understanding of the capabilities of all the airborne ISR

platforms and there are disagreements between the Army and the Air Force on how these platforms can best be utilized, there has also been an increased knowledge of the support these assets can provide and how to request them in time critical circumstances. This has been accomplished in different ways: by placing Air Force intelligence personnel with Army units; by wings sending their personnel forward to provide briefings to ground forces; by placing Army ground liaison officers (GLO) in Air Force wings; and by wings talking to the JTACs concerning ISR capabilities on the JTACs way into or out of the theater. This education and liaison process has paid dividends and allowed for better day-to-day planning and support.

Improvement in Number of ISR Platforms

Over the last couple of years, ISR has been getting highlighted more and more as an immediate need to help prosecute the war on terror. Secretary of Defense William Gates has made this one of his top issues and has criticized the Air Force for its lack of ISR support to CENTCOM. As a lecturer to Air War College briefed, the Air Force has increased the number of daily UAV orbits to 32 and plan to increase to 50 orbits by early to mid-2009. This increase in the number of UAVs will enhance the overall ISR FMV capability in theater, but as mentioned earlier, the Army still does not see this as adequate and is currently planning on acquiring more than 500 MQ-1C Sky Warrior platforms to provide direct support at the brigade level.[17]

This has answered some of the need for FMV, but has done little to increase the capacity of some of the other ISR assets. Because platforms such as the Rivet Joint and JSTARS have been operating above their maximum surge level for four years or more, there is little room to increase station times and sortie durations without exceeding the maximum crew duty day of the aircrew members and the total flight hour restrictions for a one ,two or three-month period. To

help answer the SIGINT and FMV need, the Air Force is purchasing smaller aircraft, such as the MC-12, to boost coverage and provide enhanced tactical level support. This effort is part of the Air Force's Project Liberty program which utilizes the Air Force's Big Safari quick reaction acquisition program to modify 37 Beechcraft King Air 350s and King Air 350ERs into the MC-12 configuration for increased support in Iraq and Afghanistan.[18] The aircraft is currently being designated a MC-12 versus a RC-12 because there are ongoing discussions pertaining to the aircraft getting the ability to drop weapons in addition to the onboard SIGINT and FMV capabilities.

Secretary of Defense Gates recently said in situations where the United States has air dominance it makes sense to use low-cost, low-tech aircraft that can be used in greater quantities.[19] He elaborated that mating advanced sensors onboard turboprop aircraft could produce an increase in ISR support. In the past, small turboprop aircraft like the RC-12 have been used solely by the Army for tactical support. Like Secretary Gates implied, one of the reasons the Air Force is purchasing the MC-12 is because it can be delivered and modified quickly. If current plans stay in place, the first aircraft will be deployed in April 2009. The Air Force has currently purchased the first 31 aircraft and will obtain delivery of the remaining aircraft by December 2009.[20] If funding comes through for the remaining five aircraft, current plans show the remaining aircraft finishing delivery by June 2010.[21]

In a time of long term procurements, this purchase demonstrates the Air Force still has the ability to bring a new platform into the fleet in a very short time. Problems arise however in getting the platform, crews, and maintenance fully mission capable. First, the crews need to be identified and trained. With a crew of two pilots and two mission crew members, this does not seem like an insurmountable obstacle. The current plan is to have a 5.0 crew ratio which equates

to 47 crews or a total of 740 crew members.[22] With this many individuals required, the Air Force is obtaining individuals from Air Combat Command and Air Mobility Command as well as initial training schools to fill the pilot and mission crew member positions.

How will this information be processed? Currently, the plan is to process the SIGINT information on the aircraft, down linking the information to forward deployed exploitation centers, and using a reach-back capability. For instance, the FMV information will go to the ISR processing, exploitation, and dissemination (PED) cell in each AOR.[23] This extra source of information will drive an increase in the manning of these forward PED cells. Where the increase in manning will come from is still being discussed, but initial plans are to deploy individuals from the Air Force's Distributed Common Ground Stations.[24]

The shift to purchase smaller, tactical ISR platforms is a change for the Air Force. Historically, the Air Force has purchased aircraft that can cover the full range of operations, from tactical to strategic. Over the last five to ten years, the Air Force was developing a new large ISR platform, the MC-10 that could take the place of the Rivet Joint, JSTARS, and AWACS. Due to the ongoing operations and the shift in budget priorities, this new ISR aircraft has been put on hold so the service can invest its money elsewhere to provide a more immediate impact. While the MC-12 will be a capable platform, there are a couple questions remaining: with the shift in priorities to purchase aircraft focused on supporting the Army at the tactical level, will aircraft like the MC-12 be able to support a more conventional war or national level tasking? Would the money have been better spent on modifying aircraft into more capable SIGINT platforms like the Rivet Joint or increasing the capabilities of the current Rivet Joint fleet?

Besides new aircraft, the Air Force is always looking at purchasing new systems to enhance current capabilities. The U-2 has an electro-optical system called the Senior Year

Electro-optical Reconnaissance System (SYERS). This system has been on the U-2 for many years providing high-resolution electro-optical and infrared imagery.[25] The latest version of this system, SYERS-3, includes an enhanced capability to provide precise geo-location of targets in addition to improved processing tools that increase the sensor's MASINT capability.[26] The Air Force is also looking at putting similar capability on the JSTARS. Currently, the JSTARS can track moving targets on the ground, but has to coordinate with another platform to get a higher quality picture that combat aircraft can utilize for targeting. Having the SYERS-3 sensor on board with the JSTARS will not only increase the capability of the aircraft, but will also free up the U-2 to support other requirements in the AOR.

More Effective Real-Time Tasking

Just a couple of years ago, there was a perception that airborne ISR assets were not being allowed to adjust their tasked orbits. One of the inherent capabilities of having an airborne asset is its flexibility to be rolled into a different mission or move around the theater. Instead of adjusting to the fluid nature of the ground environment, ISR crews flew planned orbits each day. While the missions were still supporting the combatant commander, flying an established orbit for several hours or taking pictures from the established collection deck was more in line with the ISR platform's previous Cold War strategic missions. The recent RAND report on ISR highlighted this problem stating, "…the ISR planning process must appropriately prioritize many competing tasks, and at the same time, allow flexible, real-time changes to the plan with a minimum of delay and friction."[27]

Recently, there has been a shift to allow platforms to flex from their planned collection areas and support the troops on the ground. Part of this is due to the increased communication capability on several aircraft. With the introduction of an internet relay chat (IRC) capability on

assets like the Rivet Joint and JSTARS, the crews have a means of simultaneously working with not only the ISR Division of the CAOC, but also the forward Air Support Operations Centers (ASOC). With IRC, the crews can immediately read when a troops in contact (TIC) situation has been declared and determine where it is. If the CAOC does not immediately request a platform to support the TIC and if the platform is not collecting something of significance, the crew has the ability to ask the CAOC if they can provide support to the ground. The results of allowing the airborne assets to take advantage of their flexibility and range have added to the Air Force's ability to provide the unblinking and persistent eye over the ground forces.

Still Need for More Platforms to Support Ongoing Operations

As previously discussed, the demand for ISR platforms has skyrocketed. Additionally, even though the Air Force and Army are procuring new platforms, these assets will probably be seen as a good start, but still not providing all the support required. With the current economic conditions in the US, buying new systems will certainly be scrutinized. So, the question becomes how do we maximize the effectiveness of the assets the Air Force already has?

One of the answers is to continue to shorten the time it takes to get tasking to each platform. Shortening the request cycle down to the 36-40 hours prior to a mission will help the flexibility to support the Army and still effectively plan for the mission. Additionally, taking on new taskings to meet the emerging threat each day allows Air Force ISR assets to meet their theater assigned tasks and still support the tactical ground forces. As I witnessed, in a single day, Air Force combat, ISR, air refueling, and mobility assets will have their tasked missions changed by as much as 60 percent from their original missions.

An example I witnessed happened in Afghanistan in May 2008. The Rivet Joint had a planned mission to support operations in the eastern part of the country. However, before the

Rivet Joint entered Afghani airspace, it received new tasking to support a TIC in the western part of the country. Over the course of the next 12-14 hours, a single Rivet Joint provided critical support to the ground forces, while numerous combat aircraft were re-tasked to also support the TIC. Multiple times, tanker aircraft were also pushed from their established orbits so the Rivet Joint could refuel on the track it had established to support the TIC. IRC was used to coordinate the mission's extension and multiple air refuelings. Intelligence on an ambush and the location of two Taliban leaders was pushed directly to the JTAC over secure voice. Numerous strikes happened on or near the locations the Rivet Joint was exploiting, with the JTAC verifying the location and passing it to strike aircraft. This one mission resulted in the ground forces being able to avoid an ambush and concentrate on the capture of the Taliban leaders. Allowing multiple aircraft to validate their flexibility and range, the CAOC was able to demonstrate the Air Force's ability to prosecute an emerging target with great success.

The previous example is just one of hundreds of success stories from the past couple years. While a plus up of theater ISR assets will help, it will more than likely not be enough to support the ongoing operations in two AORs. Allowing ISR operators to support emerging targets and allowing them to extend to the utmost of their ability to support the ground situation will be critical to the Air Force in establishing and keeping the trust of the ground forces.

Future Platforms and Equipment

This paper has already looked at a couple of newly purchased platforms being fielded as well as the new SYERS-3 capability being examined for the JSTARS. Besides these new capabilities, are there any other future platforms or equipment the Air Force is developing or should be looking to develop to enhance its overall ISR capability?

Because most current UASs have a limited field of view, the Air Force is developing a

wide-area airborne surveillance (WAAS) capability. The WAAS system will be an improvement over current systems, such as the Army's Constant Hawk and Marine Corps Angel Fire systems, because it will image a larger area, have the ability for night operations, provide real-time support to ground forces, and support several simultaneous targeting and surveillance missions.[28] The system under development will have 12 programmable views in addition to a FMV capability with future versions having the ability for 30 separate views.[29] The Air Force hopes to field this capability first on the Reapers and as technology allows a smaller version on the Predators. In addition, there is a push for a similar capability to go on the Army's Sky Warriors and Shadows.

Another program under development is the Multi-Platform Radar Technology Insertion Program (MP-RTIP). While this program has been around for a few years, the capability has not been fielded yet. With this upgrade, the JSTARS will be getting a larger version powerful enough to detect cruise missiles and potentially ballistic missiles up to 500 nautical miles away.[30] While this capability was originally developed for the JSTARS, a smaller, soda straw version is being considered for the Global Hawk. This upgrade will give both the Global Hawk and JSTARS an active version, electronically scanned array radar, which is the same type of radar technology currently on the F-22.

The previously mentioned programs and upgrades are in development and should be funded in the next two to three years. SIGINT platforms from the other services, like the Navy's EP-3 and Army's RC-12, are acquiring FMV capability. With the ever increasing requests for FMV, should the Rivet Joint have that capability incorporated on it? Of these three platforms, the Rivet Joint has the most advanced sensors and equipment, which is why many consider it the premier airborne SIGINT collector of all the services.

The EP-3 and the Air Force's latest addition, the MC-12, are both being outfitted with FMV by L-3 Communications in Greenville, Texas. This is the same facility that does modifications and upgrades for the Rivet Joint. So with the emphasis on FMV, why not incorporate this capability on the premier SIGINT platform? There are several options to mount a camera system on the Rivet Joint. Besides mounting a ball turret on the exterior, a pod system could be mounted to both wings, or a camera system could be placed inside the aircraft. In the past, the Rivet Joint would have been too high or far away for a camera system to be effective. However, in the current operations in the Middle East as well as some operations in other theaters, the aircraft operates much closer to its target and at lower altitudes.

Besides upgraded equipment, the Air Force is also looking at newer platforms. There are discussions about using aerostats and high-altitude airships. While dirigibles were thought to be a thing of the past, the Air Force is searching for something to provide persistence over the battlefield.[31] Another platform being proposed is a UAV that can stay airborne for days at a time. Once again, the name of the game is persistence and capability over the battlefield. The question is what kind of platforms should the Air Force invest in to provide that persistent support from the tactical to strategic levels?

Analytic Framework to Allocate ISR Assets

There is no doubt that the Air Force's ISR assets are stretched thin, and as long as ground forces are deployed, current ISR platforms will continue to be asked to deploy at or above maximum surge levels. Earlier, the paper examined different ways to make the ISR platforms that are in theater more efficient, but is there a more efficient means of allocating these resources to the combatant commands?

Examination of Existing Frameworks

Currently, ISR assets are allocated using the Guidance for the Employment of the Force (GEF) process. The GEF lays out the priorities for providing forces, to include the limited airborne ISR assets, to the combatant commanders. Even though the GEF sets operational priorities for two years, the exact allocation of ISR assets is still subject to the sensitivities in the military, international, and political environment.[32] The allocation process also utilizes a tool called the Joint Capabilities Requirement Manager (JCRM). This allows the combatant commands to enter what capabilities they need, where and when they need it, and why. The JCRM is a new tool implemented in the past year and stresses capabilities needed by a combatant command versus a specific platform.

The allocation process continues with Joint Forces Command (JFCOM) receiving the combatant commands capabilities request and then forwarding it out to the Air Force, Army, and Navy to determine how they can fill the request. For the Air Force, this is handled by Air Combat Command (ACC) who then tasks the ISR wings. To determine how a wing can support the tasking, it must look at its ability to have the people and airframes available to deploy, train, and perform maintenance. The finalized version of the ISR allocation plan is approved by the Secretary of Defense and published as the Global Force Management Allocation Plan.

This current process also has flexibility built into it to address emergent theater needs. For example, if a combatant commander already has the preponderance, for example 75-80 percent, of the SIGINT platforms in the theater and requests another aircraft, Strategic Command (STRATCOM) and JFCOM will evaluate the utility of deploying the extra aircraft. What STRATCOM and JFCOM will look at are the priorities of what the asset will collect, if any other theater is requesting a SIGINT platform, and how much additional capability an extra aircraft

can provide one theater versus another. In this example, a combatant commander has 75-80 percent of all the SIGINT platforms, but these aircraft are only fulfilling 15 percent of the theater's overall need. Another theater wants SIGINT coverage too and bringing one additional aircraft into that theater will cover 80 percent of the theater's needs. The process allows for the STRATCOM and JFCOM commanders to make a recommendation to the Joint Staff who presents the overall plan to the Secretary of Defense for a final decision.

As mentioned earlier, the military and political environment can affect the deployment of assets. A good example of this is the requirement to get more FMV in both Iraq and Afghanistan. Secretary Gates thought the Air Force was not putting enough ISR in theater to which the Air Force responded by speeding up on the planned increase of Predators into the CENTCOM theater. The Air Force went further by establishing Project Liberty to quickly purchase and field the MC-12. This aircraft and its crews are set to deploy for six months, be home for six months, and then gone again for another six months.[33] This deployment cycle is based on getting a maximum footprint into theater while still leaving a few aircraft at home station to train on. Based on a 5.0 crew ratio, the initial buy for 31 aircraft, and a total of 740 personnel, the Air Force feels that it can deploy 26 aircraft to maximize theater support while still having the ability to rotate personnel.[34] As with any new aircraft, the maintenance rate should be lower, and unlike the older ISR assets, none will be undergoing depot-level maintenance.

Proposed Framework for Air Force Assets

With the exception of the services' smaller, tactical ISR platforms, all of the services' ISR platforms are managed by STRATCOM's Joint Force Component Command for ISR (JFCC-ISR). This makes it difficult to come up with a specific framework for just Air Force

assets. Even though the services determine how many assets they can provide to the combatant commands, under the current framework, there are times when JFCC-ISR works with the services to swap where an asset goes. For example if SOUTHCOM requests SIGINT support and it is determined that the best platform to fill the mission is a Rivet Joint currently allocated to PACOM, JFCC-ISR can work between the services by sending the Rivet Joint to SOUTHCOM and backfilling it in PACOM with a Navy EP-3. Having this joint framework to allocate assets allows the best means to pursue the bigger ISR picture because there is a central office taking into account the needs of the combatant commands and the ability of the services to meet those needs. With this being the case, the current framework provides a sound methodology to allocate forces.

To verify that the allocation of forces will meet the combatant commanders' requirements, the Air Force or JFCC-ISR should use an analytical tool that shows the collection effectiveness of the various ISR platforms. In 2008, RAND released a report, *A RAND Analysis Tool for Intelligence, Surveillance, and Reconnaissance: The Collection Operations Model*. This report develops a model that can place assets like the JSTARS, Rivet Joint, U-2, Predator, and EP-3 in different locations around the world and show the effectiveness of the collection based on sensor capability, how the terrain will affect the collection, and the type of targets the platforms will collect against.[35] This model can recommend track placement and determine how long a platform can remain on its primary orbit. By determining the placement and duration of the orbit, an analyst should be able to determine how many assets and crews are needed to fulfill each combatant commander's requirements.

There are a couple of other avenues the Air Force could pursue to maximize the number of platforms it presents to the combatant commands. First, many of the platforms have been

operating at or above their surge levels for several years. Surge is supposed to be a point where a platform can push to for a period of days or months before it affects training, maintenance, etc. Yet, many assets have been in surge for years. While this has affected initial qualification training and the number of deployments per crew member, units have found solutions to some of these issues. So, should surge numbers be reviewed and updated?

While the surge in aircraft and personnel has delayed training in some wings, the extended surge has not forced them to close their schoolhouses. Another piece that could improve training rates is the use of a realistic simulator for initial qualification or to count for more than just a small percentage for an individual's overall proficiency training. The Rivet Joint has the ability for operators at Offutt AFB to link into a mission and act as extra crew members. This distributed ability should be used for initial qualification or proficiency training as well as providing an extra capability to the mission crew. Additionally, many combatant commands prohibit training in theater. But to sustain the number of crews and for general proficiency, should formal training be allowed in theater? Much of the theater training debate should focus on the level of collection activity in the theater as well as the force protection level of the forward base.

Finally, the crew ratio for the existing ISR platforms could be reviewed. Older ISR platforms have a crew ratio somewhere between 2.0 and 2.5. As previously mentioned, the crew ratio for the new MC-12 is planned for 5.0. An increase in manning would allow more crews to be available to perform missions throughout the world. Even though these proposals are controversial, they should be examined as potential areas for the home station wings, command staffs, and combatant command staffs to review so that the ISR force can meet the overall global requirement.

Recommendations

This paper has looked at a few ways the Air Force and combatant commands are using ISR assets better. However, there are still ways to improve the efficiency of how these platforms are handled in theater. One of best ways to do this is by increasing the knowledge of what these platforms are capable of by instructing individuals from the tactical to strategic level. Currently, some of this is being done in theater, but it needs to happen prior to deployment. Additionally, once the initial education piece has been accomplished, the ISR crews need to train with the deploying ground forces. This education and training piece will allow ground forces to better understand the capabilities each ISR platform brings to the fight. This will also enable the ISR operators to have a better understanding of the support required by the ground forces.

Education of Services and Coalition Partners

In the past, there has been an attempt to educate the ground forces on how ISR platforms can support them. However, this was being done at the squadron and wing levels, and coordinating with all the deploying battalions and brigades was difficult. To overcome this, deployed ISR squadrons sent their personnel forward to brief the ground forces, but the briefs were still going to brigade and division level staffs and not necessarily the people the ISR operators talk to. This leads to a mixed response when ISR crews are attempting to get or pass information to the tactical force.

To overcome this, there must be a concerted effort to brief the ground forces on the ISR platform's capabilities and standard tactics, techniques, and procedures before the ground forces deploy. This needs to be done formally by the combatant command tasking their component with the request, but could also be done by adding a half to a full day onto an exercise or through a video teleconference. This would allow a more consistent education process to the ground

forces and allow an exchange of information.

Additionally, ISR platform capabilities should be taught at programs from the tactical to strategic level. At the tactical level, ISR capabilities should be taught at the JTAC and Air Liaison Officer (ALO) schoolhouses as well as any schoolhouses the Marine Corps or special operations has to train their controllers. It should also be taught in the war fighting curricula at various levels of professional military education, from basic developmental education to senior developmental education. This would allow individuals to have an understanding of ISR capabilities throughout their careers and allow them to make informed decisions on what platforms could support varying missions as well as how they could do so.

While this process is fine to educate the US services, there are many coalition partners that could benefit from this too. In Afghanistan, there are many times when an ISR platform will contact a coalition ground operator to let him know that an ISR platform is in the area and is available to help. How willing the coalition ground operator is to work with the ISR crew will depend on the country the ground operator is from and if the operator has worked with the ISR platform before. While briefing our coalition partners prior to a deployment is much more difficult, it is not insurmountable. Once again, the combatant command can task the component to provide a capabilities briefing. This briefing should be accomplished via video teleconference or by using personnel from squadrons in the coalition countries or from a nearby country. The typical capabilities briefing for the ISR platforms would have to be tailored to the appropriate clearance level of each country.

Joint Training, Exercises, and Simulation

The next step in the education process is incorporating the ISR platforms into close air support (CAS) training, exercises, and simulations. There are many avenues that should be

pursued. Individual wings should get together and work on this integration piece as well as doing this in larger exercises such as Green Flag which was reestablished to allow CAS training for Air Force combat and support platforms. Green Flag is also used to support the Army's deployment spin-up at the National Training Center. This same type of effort, at least for the ISR platforms, needs to be done with the Marine Corps deployment spin-ups.

At the unit level, individual wings should coordinate at planning conferences or hold cross talks to plan CAS training scenarios. The 55th Wing at Offutt AFB, Nebraska has been successful over the past two years developing training scenarios and working with numerous platforms, to include bomber and fighter assets. The training was based on a CAS scenario, but was missing the JTAC or ALO to guide in the bomber for terminal control. The wing was trying to expand the training to include a JTAC or ALO, but due to other training commitments for the controllers, working with them was not always consistent due to the limited number of JTACs and ALOs at their home base. Another avenue wings have is to work ACC's Realistic Training Review Board program. On ACC's training web site, all training taking place across the country is listed. So if an ISR unit wants to give its operators more CAS experience, it can search this web site for existing training. While this is dependent on a squadron or wing to go out and look for training opportunities, there are possibilities for units to train together. It also allows the ISR squadrons and wings to choose training that will fall in line with their flying schedules.

Additionally, spin-up training with ground forces is essential to building a relationship prior to the ground forces deploying. Sending an ISR platform to Nellis AFB to participate in a Green Flag or as support for a Marine spin-up is the ideal situation. It was recently announced that Red Flag will be adding a week to concentrate on CAS. During the Green Flag and Red Flag exercises, there needs to be one day that focuses on ISR support and how these assets can

be used more effectively in their support to the CAS mission. Due to aircraft maintenance or just the limited number of aircraft available, going to Nellis or another base is not always an option. In that case, the wings should still send a planner to work with the ground and air forces and fly the training missions from their home base.

Individual wings can also contact the deploying Army, Marine, or special operations units to develop a training plan. This will establish relationships that can be maintained in the deployed theater. A good example that I witnessed in CENTCOM involved an Air Force special tactics squadron (STS) commander and the Rivet Joint squadron. Whenever the Rivet Joint provided SIGINT support to the STS controllers, the STS commander would provide positive or negative feedback to the Rivet Joint commander. This dialogue improved the support the Rivet Joint crews were able to provide and made the crews feel they were an integral part of successful ground operations. While this relationship was not established prior to the deployment, it does show the effectiveness of maintaining a relationship with the ground forces and the potential that joint training can produce in the field.

Another training option for the Air Force wings is using the distributed simulation capability that numerous wings have. This still allows the ISR crews to work directly with the fighter, bomber, or command and control crews by simulating a real flight. After the simulation, the crews can also debrief via video teleconference or by phone to discuss what went right, what went wrong, and ways to fix the problems or build on the successes. While not as good as debriefing face-to-face, there is one major advantage to conducting distributed mission training. The simulation can also be recorded, to include all radio calls from the other platforms, and used by students in their training or by mission qualified crews as part of their continuation training programs.

All of these recommendations can be implemented now. These simply take advantage of and capitalize on existing programs. The key people at the squadron and wing level are the training flights and the weapons and tactics flights. This will take a concerted effort from the squadron, operations group, and wing leadership to push for realistic training for their crews. Programs like the one started at the 55th Wing need to continue and grow across the ISR community.

Better Use of Limited ISR Resources

Airborne ISR assets are one of the keys to success in any theater. As this paper has discussed, there are more assets being built and deployed into the CENTCOM region. What about the other theaters? While CENTCOM does receive the greatest support, the other theaters do receive some support from airborne ISR assets, but is it enough? I believe all of them would say no.

To maximize ISR efficiency, combatant commands need to let the Air Force know what kind of intelligence and effect they want to achieve. If the theater only wants to look at a very small area for a longer period of time, having a prop-driven aircraft with good sensors may be the best option for them. Another option is to allow ISR platforms to fly missions from their home stations. During the Cold War, SOUTHCOM was able to receive support this way. Within the last couple of years, some large airborne ISR platforms have once again started to support SOUTHCOM in this manner. This saves on deployment costs and it also allows the ISR crews to still meet theater tasking, but not be on the road more than they already are. Flying more missions from home station should be maximized to train individuals too because it allows a student to see a theater environment before being deployed.

The bottom line is that proper employment, allocation, and training of ISR assets and

operators comes down to leadership at all levels. At the tactical level, leaders need to be innovative and look for ways to improve how they're supporting the theater. At the operational and strategic level, leaders need to avoid asking for a platform and ask for a capability. Additionally, once they have the assets they need, the tasking for the platform must be ready and allow the ISR units to execute an aggressive schedule to maximize the platforms time in theater. In the earlier example with SOUTHCOM, the planners did not initially have all the information the crews were looking for; however, on a positive note, the planners did have an aggressive flight schedule to utilize the platform for the limited time it was in the theater.

Conclusion

Secretary Gates recently wrote in *Foreign Affairs* magazine, "The ability to fight and adapt to a diverse range of conflicts, sometimes simultaneously, fits squarely within the long history and the finest traditions of the American practice of arms."[36] Nothing truer can be said of ISR platforms. Some of the current platforms have performed their various missions for over 40 years, and they have been providing vital information from the tactical to strategic level, often on the same mission.

For ISR to be effective and efficient, there must be a concerted effort on how to better plan and employ these assets. The planning and allocation piece has been recently modified to stress to the combatant commands that they need to ask for capabilities and not necessarily a specific platform. Additionally, how these assets are being used has been scrutinized over the past few years, especially within CENTCOM. The CAOC is much more responsive in allowing its ISR platforms to add targets to their collection deck or in the case of a TIC, be rolled into a new mission.

With the recent changes to the allocation framework, the Air Force should continue to

present its ISR forces as part of the greater, joint ISR fleet. However, it can and should look at how each platform defines its surge number as well as examining how ISR forces are manned and trained. The training and education piece is essential in developing ISR operators who fully understand how to support the ground and air forces before the units arrive in theater. Doing so establishes a level of understanding and trust that the capability will be available when the ground forces need it. Without training, ground forces are often left to wonder who is calling them on the radio and what the platform can provide. We can do better. We owe it to the ground forces in harm's way as well as the operators supporting them to do so.

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