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ISR:
THE RIGHT QUESTION
TO ASK

by

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BIOGRAPHY

Lieutenant Colonel Danny R. Wolf is a student at the Air War College, Spaatz Center for Officer Education, Air University, Maxwell Air Force Base, Alabama. The Air War College is the Air Force's senior professional military education institution providing post-graduate senior leader development programs based on joint, multinational, multi-agency, warfighting and international security operations, air and space force strategy development and national security planning. He is joined by 250 students representing all military services, the interagency, and 45 allied nations in a fully accredited program awarding a Master of Strategic Studies Degree and Joint Professional Military Education II credit.

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ABSTRACT

Intelligence, surveillance, and reconnaissance (ISR) is critical to our national security and provides the foundation for military operations. Technology has blurred both the impact of the ISR product and the application of the platform. Traditional kinetic and ISR platforms can produce both tactical and strategic effects. These missions have become one, inextricably linked for a common goal. This reality has not been matched by complimentary thinking or consolidated command and control systems. This paper proposes a comprehensive ISR question for the combatant commander: Are we effectively using joint ISR capabilities in an efficient manner to enable superior decisions leading to actionable operations? The question must be assessed in the context of the operating environment to ensure both effective and efficient operations, leading to ultimate success.

INTRODUCTION

Intelligence, surveillance and reconnaissance (ISR) is critical to our national security and provides the foundation for military operations. Analysts use the multitude of intelligence disciplines to assemble a composite picture and enable mission success. Specific to air operations, ISR provides the backbone for the successful application of air power, and it is inseparable from the “fly, fight, and win” mission of the United States Air Force (USAF). Former USAF Chief of Staff, General Moseley, stated “...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.”¹

ISR has the ability to mesmerize leadership at the highest levels, providing a real-time, God’s eye view of an operation. Communications technology has enabled every desktop computer to display a full motion video (FMV) feed from any theater of operations. This highly sought-after capability bridges the gap between displaced control and tactical execution. Likewise, the efficacy of ISR has resonated down to the lowest levels. According to current counterinsurgency writings, ISR is essential for success.² However, the great demand for this prized commodity has highlighted the current ISR limitations; every brigade combat team (BCT) needs ISR support³, but the military does not possess the capacity to support every request.⁴ Secretary of Defense Robert Gates stated in his April 21, 2008 address to the United States Air Force Air University Air War College that “...we now have more than 5,000 UAVs, a 25-fold increase since 2001. But in my view, we can do--and we should do-- more to meet the needs of men and women fighting in the current conflicts....”⁵ Indeed, the ability to link intelligence to both survey and reconnoiter in an efficient manner has become paramount to current operations.

However, the ability to frame the correct question about the employment of ISR is difficult. The question “how effective are my ISR assets” is focused on numbers of platforms vice effects desired, leading to metrics that do not provide the commander a full assessment of how the ISR assets are contributing to the fight.

This paper will present ISR in a new light, inextricably linked to operations. Airborne assets have merged ISR and operational missions; these assets have blurred the lines between the *strategic* and *tactical*. To establish the ISR framework for combatant commanders (COCOM), the paper will begin with the current, metrics-based approach and follow with a discussion on effectiveness versus efficiency, and then qualitative versus quantitative analysis. Once the foundations of the ISR question have been established and the baseline assumptions documented, a single question will be proposed for the COCOM to consider when analyzing ISR operations. Finally, recommendations to improve ISR processes and an outline of future issues specific to airborne ISR platforms that warrant study will be provided.

ESSENCE OF ISR

Intelligence, surveillance, and reconnaissance is, according to Joint Publication (JP) 1-02, 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.⁶ This is an integrated intelligence and operations function. When viewed as separate entities, key words from their individual definitions reveal that intelligence is a product, surveillance is systematic observation, and reconnaissance is a mission to obtain information or secure data.⁷ When analysis is applied to each of these, the synergistic effect makes the whole greater than the sum of the parts. Intelligence has an impact across the entire range of operations, and JP 2-01 goes on to say that, “Commanders use intelligence to anticipate the

battle, visualize and understand the full spectrum of the battle space, and influence the outcome of operations.”⁸

There are a multitude of disciplines in the intelligence community that can provide various effects on the battlefield. These include geospatial (GEOINT), human (HUMINT), imagery (IMINT), signals (SIGINT), measurement and signature (MASINT), open-source (OSINT), technical and counterintelligence.⁹ The data produced from these means can have a synergistic effect when linked through applied analysis to enable decision superiority.¹⁰ This synergy is amplified through holistic analysis of the entire set of collections; the ability to cross-cue assets through dynamic tasking provides an exponential increase in fidelity for decision makers. For example, a HUMINT tip on a group of insurgents planning a terrorist action can be used to cue space and airborne assets to provide IMINT and SIGINT to enable a kinetic strike on the target.¹¹ If the particular insurgents involved happen to be high-value individuals, this tactical application can immediately become strategic in nature. Therefore, the specific type of intelligence discipline does not determine whether the impact is of tactical, operational or strategic value.

Knowing that the ISR product can have both tactical and strategic implications, it is logical to posit that the instrument used for collection can have both tactical and strategic impact as well. Advances in technology have challenged the traditional stratifications of *strategic* and *tactical* instruments. The ability to communicate, transmit full motion video and receive signals analysis in near-real time--direct to the decision maker--has contributed greatly to this situation. One of the current, hot topic discussions in Operation IRAQI FREEDOM (OIF) and Operation ENDURING FREEDOM relates to IMINT and SIGINT products produced from airborne ISR

assets such as the MQ-1B Predator unmanned aerial system (UAS). This platform produces ISR products of both tactical and strategic effect.

Technology has also blurred the lines between ISR and operations platforms. Datalinks and net-centric operations have enabled a multitude of options in the dynamic operating environment. The MQ-1B Predator and MQ-9 Reaper UASs provide both ISR collection sensors and kinetic kill options. The marriage of these capabilities in a single platform has provided synergy to both the decision cycle and the application on the battle field. Likewise, the F-22 Raptor has sophisticated electronics intelligence (ELINT) capabilities--a subset of SIGINT--that make it an excellent ISR collections platform.¹² This combination migrated from operations to intelligence by combining a traditional fighter platform with a collections suite. Thus, technology has blurred the lines between operations and intelligence, providing single platforms that can inherently perform both functions. This brings new meaning to the phrase “combined arms”;¹³ this combined arms teams comes in a single, integrated package.

ISR TRACKING--METRICS-BASED APPROACH

Assessing the effects of ISR is critical to operational success, and the military generally employs a metrics-based approach to that end. This section of the paper will address the reason the metrics-based approach is used and how it is employed. First, the focus is on effects-based assessment and why it presents such a difficult challenge. These discussions lead to dual issues related to assessment--effectiveness versus efficiency, and qualitative versus quantitative analysis. Finally, this author submits that, for the purposes of the military environment, the two sides of this analysis spectrum are inextricably linked; therefore, both effectiveness and efficiency require optimization and are necessary for operational success.

Assessing performance is a much easier proposition than assessing effects. This axiom is true for military operations, and this includes ISR. Colonel Tomislav Ruby, Chief of Doctrine for the Deputy Chief of Staff for Intelligence, Surveillance, and Reconnaissance, Headquarters US Air Force, provides two main reasons to support this conclusion. The first relates to the relative ease in measuring performance. With the intent to defeat the enemy, it is easy to count the number of enemy soldiers killed on the battlefield and infer success in defeating the enemy. It is entirely more difficult to assess the objective by measuring the enemy's intent or will to fight, and therefore conclude mission success.¹⁴ So it is with ISR--historical approaches have attempted to express ISR effects in terms of quantifiable metrics that lend themselves to measurement, and the same approach exists today.

Metrics-based assessment is prevalent in ISR operations because the analysis deals with tangible results. In a goal-oriented mission, this provides focus for both mental energy and physical resources. Metrics include such items as sortie production, number of orbits, hours of FMV and area of coverage. These numbers lend themselves to easy measurement and provide a straightforward avenue of opportunity to seek improvement. Linear thinkers can grasp these numbers and look for ways to better the statistics. But these numbers, in and of themselves, do not necessarily contribute to a quality ISR product. The effort required to produce additional sorties, or more UAS orbits, or more hours of FMV, can be of little gain if the ISR does not produce the effects necessary for success. It is often this very effect that proves difficult to measure.

Relative to performance, measuring true effectiveness can prove difficult to near impossible. Using the mission to defeat the enemy as discussed above, the end-state effect is more difficult to qualify than tangible performance factors. However, it is these tangible

performance factors that one can measure, and by inference, then determine if the objective has been met.¹⁵ Short of total annihilation, defeat of an enemy involves the defeat of his will to fight. To reduce the human element to a measured analysis of metrics can prove to be a lesson in futility. Thus, the second reason that Ruby cites for the relative ease of measuring performance vice effects is the reciprocal of the first--while it is easy to measure performance, it is relatively difficult to measure effects. It takes effort to isolate the effect and link it to the desired objective. Ruby states that the assessment of effects is "...potentially the most difficult part of the process...." Continuing, he asserts the services are ill-equipped or organized to perform assessments in such a complex environment.¹⁶

And so the paradox of measuring what is easily attainable stands in contrast to assessing what is necessary for success, leading to the two sides of a classic debate: effectiveness versus efficiency, and qualitative versus quantitative analysis. It is important to understand the first imperative for mission success is to focus on the desired *effect* and the associated analysis--*effect* is imperative and is in fact the final determinant of the success of the mission. The complexity of effects-based assessment that is linked to the commander's objectives requires sound and logical inference that links strategy to task.¹⁷ It involves a qualitative analysis of actions through various collections means and requires data synthesis to understand the human behaviors and intentions revealed through the ISR products. While effect is of primary consideration, in a resource constrained world, efficiency must be considered as well.

Complimentary to effectiveness is efficiency, but the impact it has on a mission is less clear and, therefore, requires discussion. As previously stated, the metrics-based norm for assessment is based on a quantitative, measured-performance approach that yields some type of answers relative to efficiency. This quantitative assessment of efficiency deals with numerical

data. This is acceptable only if the first and more important condition--effectiveness--has been met. As Ruby states, this not only happens because the quantitative approach is easier to assess, but the effect itself is not always easy to measure.¹⁸ Whether or not the issue of efficiency is relevant depends on the situation, with the key factor being the resources available to service objectives. For example, if there are limited ISR assets available to cover the objectives, the commander would have to assume risk to pursue effective operations in part of the area of responsibility while accepting a loss of coverage in other areas due to an inefficient scheduling process. With sufficient resources, the efficiency discussion becomes less relevant to the success of the operation. Evidence supporting this position comes from a recent briefer at a Global Intelligence, Surveillance, and Reconnaissance Conference. He stated how the Army is not concerned with the efficiency of high-demand, low-density ISR assets as long as each tactical commander has situational awareness.¹⁹ If there are enough assets to complete the mission, efficiency is not a concern.

However, both forms of analysis--the effective analysis supported by qualitative assessment, as well as an analysis of efficiency as supported by quantitative assessment--are required to achieve mission success. Central to this discussion are the planning assumptions and real-world limitations that impact operations--these will be discussed later. Continuing, analytical assessments dealing with effectiveness and efficiency are linked, and a holistic approach to analysis will yield the best process to ensure success. Many others agree with this position.

Major General Forsyth, who served as the Deputy Combined Force Air Component Commander (DCFACC) for U.S. Central Command from June, 2007 to June, 2008, agrees on the linkage between effectiveness and efficiency. During a personal interview General Forsyth

granted on October 24, 2008, he stated that the CFACC process for scheduling ISR must strive for greater efficiency in a resource-constrained environment, leading to more effective operations.²⁰ Lieutenant General North, the current CFACC for OIF and OEF, also concurred when he referenced airborne ISR platforms in theater. During his speaking engagement at Air War College on December 12, 2008, he stated “if we could maximize our potential, we’d be more effective.”²¹ Finally, Ruby asserts that efficiency as well as effectiveness must be considered in tasking the scarce resources available to the commander.²²

To summarize the effective-efficiency discussion, effective operations are necessary for the success of the mission, and therefore the most relevant factor. While the efficiency of an operation may be of less significance as influenced by resources, the realities of limited personnel and assets dictate a holistic approach to combine these analytical assessments to best achieve overall success in meeting the objective. Performance measurements reveal actions, but not how well those actions were performed or whether they lead to the accomplishment of the objectives.²³ Effective analysis is goal-oriented and focused on doing the right things, whereas efficiency analysis is process-oriented and focused on doing things right.²⁴ A balanced, holistic approach to analysis provides the best approach to achieve success in meeting the objective.

THE RIGHT QUESTION--SCOPE OF THE PROBLEM

The right question for the COCOM to ask concerning ISR must be examined in detail to generate the proper answer. To that end, this section will address the “5 Ws”--who, what, when, where and why-- to frame the basis of the right question pertaining to ISR.

The first question to address is *who* is asking the ISR question. Perspective is the issue, and how it relates to the underlying foundation of the question is critical to properly understand and analyze the answer. Commanders at various levels hold a point of view concerning ISR as it

relates to the task they have been given. Whether it is a tactical commander, the component commander, the joint task force commander, the joint force commander (JFC), the geographic or functional combatant commander, or ultimately the commander in chief--the perspective of the commander as it relates to the task to be accomplished in the area of concern must be weighed accordingly.

Secondly, *what* addresses task and mission with respect to available assets. It involves both the entirety of the mission and synergy of the assets to be employed. Complex, multifaceted missions require focus and persistence to enable the mission. As discussed previously, the various disciplines of ISR bring unique collection contributions. The ability to cross-cue these assets in a dynamic environment, to link overlapping systems to fill collection gaps, and to provide comprehensive and coherent products leading to decision superiority are key factors that must be considered.²⁵ The object of the collections effort drives the process towards an optimized plan using the available resources.

The third aspect of the question--*when*--must also be understood to fully address the employment of ISR. One issue is when to collect, ranging from the most opportune time because limited assets must be used judiciously, to the persistent stare required to build pattern-of-life analysis for high value missions. Additionally, *when* applies to the application of the ISR product with respect to mission execution. Depending on the collection product, the data may be useful straight from the source, with little or no processing, exploitation and dissemination (PED) analysis required. Such is the case for Predator FMV supporting an operation to provide a God's eye view for situational awareness, which has proven to be one of the most effective airborne sensors.²⁶ The requirement for this information is relevant only if produced in near-real time. Another product of the same Predator mission may be SIGINT collections. This product,

which requires some interpretive analysis to provide useful information, can be of service in the current operation as well as provide additional information once a more detailed analysis is completed. Other types of collections may not be available to influence near-real time decision making due to either a communications or analysis limitation. The U-2 “Dragon Lady” still operates a high-resolution camera using film that must be physically downloaded and processed before it can be analyzed.²⁷

Where applies to both the physical location of the collection and the relation to the electromagnetic spectrum. The location of the collection relative to a combat area of operations, a geographic theater or a multitude of operating areas is a consideration for ISR in terms of coverage, density and overlap. A thorough understanding of the collections program across the electromagnetic spectrum can lead to more useful ISR products. Some bands of the spectrum provide better information against certain target sets. Ground moving target indicator (GMTI) radar is excellent for detecting moving tanks on the battle field, while infrared sensors are better at detecting concealed tanks. Limitations in asset availability or technology itself can be mitigated by using overlapping collections to compensate in these areas.

The final question to consider is *why*. This may be the most important question as it directly relates to the reason for the collection, the desired effect and the success of the mission. In what context will the ISR product fulfill priority intelligence requirements and contribute to the success of the mission? Will the information be used to support an immediate operational takedown, or is the intent to gain awareness through a pattern-of-life analysis? This question, and understanding it, relates directly to priorities and weight of effort towards achieving the desired outcome.

ASSUMPTIONS

General Forsyth provided the DCFACC's perspective on ISR, and he revealed two baseline assumptions that are critical to understanding the ISR question. The first assumption is "there will never be enough ISR."²⁸ General North also states "There will never be enough ISR to satisfy the needs of everybody."²⁹ The Multi-sensor Aerospace-ground Joint ISR Interoperability Coalition (MAJIIC) of the North Atlantic Treaty Organization concludes that "...you can never get enough ISR..." and continues that the assets are invariably in great demand.³⁰ Finally, Ruby summarizes that manning, equipping and funding will never exist to such a degree as to satisfy every requirement. This is the basis for his conclusion that efficiency as well as effectiveness must be considered.³¹ The assertion that there will never be enough ISR is based on limited resource capacity, growing intelligence requirements and external factors.

Even for the sole remaining superpower, limited resource capacity is a constraint that cannot be avoided. Shortfalls in personnel manning is the greatest limitation currently facing ISR, and it permeates nearly every career field associated with the mission. From the pilot to the intelligence analyst, personnel have been restricted to the mission in an effort to meet ISR requirements.³² It takes everyone across the process, including the crews and the "back-end" PED-analysts to enable success. General North states the "...Distributed Common Ground System is required to fuse data...the "back-end" of our business is critical."³³

Another resource constraint continues to be hardware. Platform availability has been able to maintain pace for demand, but there are critical components of the command, control and communications suite that are in short supply. Hardware limitations, coupled with the saturated satellite bandwidth necessary for both flight and data transfer are prime factors that limit ISR capacity.

Requirements for intelligence continue to grow. Commanders on the ground seek intelligence to conduct operations; operations drive intelligence collections. This cycle continues to expand the requirements for ISR, and there is an unending request for FMV on the battlefield.³⁴ Commanders of even small operational missions request primary and backup FMV assets to cover potential spill-outs from the fight; the situational awareness from FMV has provided a level of fidelity that protects lives and enables success. This technology has spurred the quest for complete awareness of the enemy. But the search for complete awareness is limited by the reality of war, and it is highly unlikely that any amount of technology will satisfy this search. Based on these arguments, there will never be enough ISR.

The external factors of constraint and restraint also play a role in the assumption that there will never be enough ISR. For this paper, a constraint is a limitation; a restraint is a choice.³⁵ Budget constraints and restraints must balance requirements and requests. Political influence of limited wars will always be a consideration. If these two issues do not limit ISR, it could be the competing interests of other ISR requirements across the globe.³⁶ Regardless of the reason, there will always be a limitation on the ISR output capacity available to the commander.

The Air Force has made great advances in ISR output, but it continues to pale against the requirements. An ISR orbit is defined as a 24/7 flight capacity to produce ISR.³⁷ With a schedule to produce 21 ISR orbits by 2012, the Air Force is well ahead of schedule, providing 32 orbits as of December, 2008. Per General North, this equates to a 250% acceleration over the UAS system of record.³⁸ This increase in capacity has not filled the warfighters' requests. General Odierno, while discussing a level of ISR capacity the DoD has yet to achieve, confirms this: "...one tactical UAV platoon per Brigade Combat Team will not be enough."³⁹ Secretary of Defense Robert Gates has stated the desire to sustain 50 orbits, but he has floated the need to

consider 75 orbits.⁴⁰ Despite the ISR surge increases, there is not enough ISR to satisfy the requests.

General Forsyth continues with a second assumption that must be considered; it is a simple statement that has great depth of meaning: “You don’t know what you don’t know until you find it.”⁴¹ While this may seem an obvious statement, it clarifies the uncertainty of war. War is a human endeavor, and the influence of fog and friction on the battle space magnifies the complexity of operations. As Clausewitz stated, “Everything in war is simple, but the simplest thing is difficult.”⁴² The business of seeking out critical pieces of information, something akin to searching for a needle in a haystack, is a challenging proposition. ISR collections may be ineffective and inefficient--right up to until the point where a critical discovery is made that transforms the outcome of the war.⁴³ In an instant, the ineffective collection was worth the effort, and the inefficiency is tolerated. This is a cost of the business of ISR that pays incalculable dividends in success, but it must be understood in the bigger context of the political and military environment as the effectiveness and efficiency of ISR collections is evaluated.

THE RIGHT QUESTION--PROPOSAL

So what is the right question to ask concerning the employment of ISR? Considering all the factors that have been discussed, this single, all-encompassing question is proposed that applies to all ISR collections at any level of command:

Are we effectively using joint ISR capabilities in an efficient manner to enable superior decisions leading to actionable operations?

The research makes clear that the answer is influenced by the environment. As such, a discussion on the assigned mission and how it impacts the requirements placed on ISR operations is warranted. This section will conclude with an analysis of the proposed question.

How this ISR-focused question applies to the type of operation--specifically the mission and operating environment--depends on the situation. To address the two sides of this spectrum, OIF will be used to demonstrate the impact of the assigned mission. OIF reveals characteristics of both a major theater war (MTW) in March of 2003, and an irregular warfare counter insurgency (IW/COIN) operation following the fall of Baghdad. These two different types of conflicts necessitate different collection requirements to fulfill the Priority Intelligence Requirements (PIRs).

The setting for a MTW pits state against state in a force-on-force battle. During late March, 2003, the Iraqi Republican Guard established a layered defense around Baghdad as they dug in for the confrontation. Despite attempts to conceal and camouflage their positions, ISR platforms were able to effectively determine the enemy order of battle through IMINT, GMTI radar and various other intelligence disciplines.⁴⁴ In this example, ISR was relatively unchallenged in determining enemy force structure and positions. In a MTW of conventional forces, ISR has a relatively easy time finding the enemy. In contrast, IW/COIN presents a different problem for ISR.

IW/COIN, as seen in OIF today, deals with an entirely different enemy requiring a different ISR solution set. Though there may be fewer enemy combatants to target, ISR requirements increase because the threat is much harder to find. The enemy hides in a complex, urban environment where there is little distinction between enemy and combatant. This setting requires persistent ISR to understand the enemy through pattern-of-life analysis and networking associations. The focus of ISR migrates to the tactical unit as this is the primary actor in the conduct of the war.⁴⁵

Despite the differences these two situations present in the context of a single operation, it is important to understand that these situations can occur simultaneously on the battlefield. The combatant commander's perspective about ISR and the process used to provide relevant information should remain constant. The question, as proposed, has several key words that deserve attention. To reiterate, the proposed question with the key words highlighted, is:

Are we effectively using joint ISR capabilities in an efficient manner to enable superior decisions leading to actionable operations?

Effectively is the first key word; effective operations are paramount to the success of the mission. *Joint ISR* pertains to the entirety of the ISR assets available to the unified commander; these must be synchronized to maximize their effect on the battle space in an *efficient* manner. The next phrase--*enable superior decisions*--enables mission success. *Actionable operations* is the final phrase. While superior decision-making enables mission success, *actionable operations* delivers it. This term is derived from the phrase "actionable intelligence" that emanated from the Army's Task Force Actionable Intelligence in 2004.⁴⁶ Based on the inextricable connection between intelligence and operations, *actionable operations* fuses the missions of ISR and operations into a seamless function to deliver victory on the battlefield.

RECOMMENDATIONS

This research has led to several conclusions, resulting in three recommendations. The foundation of these recommendations is that there is no magic answer that obviates the need for the intelligence analyst.⁴⁷ While technology has advanced the machine-to-machine interface and increased the availability of analytical tools, the human in the loop remains the decisive point that must not be overlooked. The requirements for the mental synthesis associated with ISR collections will always exist, no matter what "question" the commander asks. However, asking

the proper question will focus the staff and drive the collections to be effective in action and efficient in use.

For the first recommendation one must establish the best approach to ensure success. Therefore, a single system or process should apply to all situations, missions, and environments. This is a complex business, and learning one approach well is preferred to operating with multiple approaches and achieving mediocre results for each. Missions are altered, environments change, and the enemy has a vote; one single system that addresses ISR with a comprehensive and adaptable approach provides the best course of action to ensure success on the battlefield.

The second recommendation is to locate the allocation of ISR assets at the appropriate level, similar to the current process used with traditional fixed-wing kinetic platforms. Apportionment should reside with the JFC; by setting this percentage or priority of the air effort, the JFC has a direct influence over the priority and weight of effort for the air assets supporting his plan. Subsequent to apportionment, allocation of air assets should reside with the air component commander. This enables the CFACC to use his “Airmanship” to work the details of the plan to achieve the commander’s intent. To hold this decision at the JFC level places the commander’s focus on today’s fight vice the overall conduct of the war. To remove this critical decision making process from the control of the CFACC removes his expertise from the process, resulting in a less effective and less efficient process. As the commander directly responsible for the air domain, it is imperative that the inherent trust and responsibility to complete this task fall under his operational control.⁴⁸

Based on the assertion that a given platform can have both tactical and strategic effects, and given that technology has blurred the lines between kinetic and ISR platforms, the paradigms of tactical and strategic ISR must be reevaluated. In OIF, the central issue is the allocation of

“strategic” MQ-1B Predator assets. These assets are currently allocated by specific orbit at the direction of the JFC. As previously stated, Predator assets should be allocated and scheduled by the CFACC.

This author advocates that the CFACC is not only the appropriate component commander to handle allocation according to JP 3-30, but he is also the best qualified. According to General Forsyth, the CFACC is the best qualified for the job: “...given the opportunity, an Airman should be able to command and control ISR better than anyone else....”⁴⁹--allocation is implied in this statement. There are several points that support this argument. The CFACC already has a process to address component issues on behalf of the unified commander; the vetting and servicing of joint targets via the Joint Targeting Coordination Board is a joint endeavor. Second, in these current fights, the Air Force Service Component (dual-hatted as the CFACC) commits his total force to the joint effort and holds nothing back as “organic”;⁵⁰ he is the most neutral in pursuing the intent of the JFC. Finally, by accepted practice, the CFACC is normally assigned as the Airspace Control Authority and the Area Air Defense Commander.⁵¹ Central to these roles is the air and space domain--the domain that is inherent to the CFACC position. The CFACC is best able to facilitate the integration of the multiple intelligence disciplines in a coherent approach to meet the requirements of the joint force.

To enable this process under the control of the CFACC and to extract the most efficiency possible, the use of a single, efficient process will provide the most effective results, producing benefits over the current practice involving two separate systems for scheduling platforms.⁵² Thus, recommendation number three involves a change involving the planning tools used to integrate ISR assets. This change is required because the platforms currently employed have blurred the traditional mission roles, making the separation of ISR and other fixed-wing

platforms an obsolete notion. This move will help squelch the requests for specific *platforms* and instead encourage requests for ISR *requirements* in an effects-based structure. This change in philosophical mindset and paradigm will enable more efficient operations, providing the latitude to the CFACC to service these requests with the most capable platform in the most efficient way.⁵³

The specific recommendation is to implement a single scheduling tool for airborne assets. This requires the CFACC to stop using Planning Tool for Resource Integration, Synchronization and Management (PRISMS) as the primary scheduling tool for ISR. The Joint Tactical Airstrike Request (JTARs) system, which is currently used to schedule kinetic platforms, will need to be modified to integrate both traditional, fixed-wing assets as well as ISR platforms. This single process will provide gains in both effective and efficient operations.^{54, 55}

FUTURE ISSUES

Coupled with implementation of a single scheduling tool for airborne assets, the joint force must continue to state ISR requirements in terms of effects vice platforms. The dated use of “strategic” and “tactical” ISR terms led to a philosophical separation of missions for intelligence and operations. This old mindset is changing--intelligence and operations are inextricably linked and cannot be separated. The mission is one in the same. Complete change requires more than a change in philosophy, necessitating that the structures and processes currently used must be adapted to facilitate the change in application. Without this change, forces will continue to request platforms instead of effects. To that end, the stratification and mission roles of airborne ISR platforms must be addressed.

Much debate revolves around the operational control of UASs, with a focus on the Air Force Predator and the Army Sky Warrior. Both assets are made by General Atomic and have

similar capabilities. Army and Special Operations Forces tactical units have advocated for direct command, or decentralized control--of these assets at the tactical level.^{56, 57} Two central issues to this debate include the philosophical discussion over centralized versus decentralized control and the practical application of command and control of the air domain.

The two issues are somewhat related; the mindset to address control and the practical application of that control fall within the same realm. These issues have been highlighted as the number of service UASs continue to rise. Therefore, both the philosophical discussion of command and control differences between the Army and the Air Force and the practical application need to be explored from the joint perspective. The Air Force principle of “centralized command and decentralized execution” was instrumental in the creation of the independent Air Force in 1947. Reeling from losses at the Battle of Kasserine Pass, General Marshall declared that, “Control of available air power must be centralized and command must be exercised through the air force commander if this inherent flexibility and ability to deliver a decisive blow are to be fully exploited.”⁵⁸ The ambiguities of aviation employment articulated in Field Manual 31-35, dated April 9, 1942, were replaced by clear and concise statements in Field Manual 100-20, dated July, 1942. This new manual asserted equality of land power and air power and called for centralized command exercised through the air force commander.⁵⁹ It remains part of the justification for creating the CFACC position--to provide oversight and unity of effort under the guidance of a single Airman that is an expert in his domain.

Irregular warfare has, however, provided credibility to tactical units declaring that decentralized command is imperative for success.⁶⁰ As the services continue to procure more and more UASs, and in light of the Army’s multibillion-dollar Sky Warrior UAS program, the prevalence of these platforms has brought decentralized command to the forefront.⁶¹ Lieutenant

General Odierno, Commander of US Army III Corps, states, “The BCT is the nexus of ISR operations.”⁶² He goes on to say that the BCT must “own” organic ISR assets as well as higher headquarters assets for periods of time, and that the “...control of ISR, especially the UAV, at the lowest possible level was the key.”⁶³ And yet, one of the Special Operations Forces best practices is to mass airborne ISR to increase effectiveness by an order of magnitude,⁶⁴ a suggestion that seems to oppose decentralized control. Lieutenant General Deptula, the Air Force Deputy Chief of Staff for Intelligence, Surveillance, and Reconnaissance, used the analogy of a city with five fire trucks to highlight the need to place UAVs under the control of the unified commander. Dedicating each fire truck to a specific city block leaves much of the city unprotected; this is similar to the Army’s plan for UAV control. By placing the trucks under the control of a fire marshal, he is able to protect the entire city by allocating trucks to fires that need the most attention.⁶⁵ This is the position of the Air Force, advocating for the role of the CFACC under the direction of the unified commander.

This decentralized control would be less of an issue if every soldier had a dedicated ISR platform. However, as the number of Army ISR assets increase, the question migrates from control to one of unity of effort. Synergy and participation in the *joint* fight come into play. Where the Army says the UAV is an extension of the ground force, the Air Force counters that it is an extension of the joint force.⁶⁶ Regardless, the issue of synchronizing and deconflicting the air domain will remain a complex problem set that continues to push the limits of airspace deconfliction as it becomes more and more saturated. General North concluded that the issue does not revolve around ownership, but with deconfliction. Just like a helicopter, it is not the ownership that proves critical in the joint fight, but it is the ability to effectively command and

control the assets across the domain that enables victory.⁶⁷ These issues warrant further study in the context of the joint environment.

CONCLUSION

Intelligence, surveillance, and reconnaissance is critical to the success of our military and nation. It provides the product that enables decision superiority to positively influence strategy, the application of power, and the outcome of war. Technology has blurred both the impact of the ISR product and the application of the platform. Traditional kinetic platforms can perform ISR collections, and ISR assets have kinetic kill options; both can have tactical and strategic effects on the battlefield. These two missions have become one, inextricably linked for a common goal.

The military currently uses a metrics-based process to measure performance focused more on efficiency vice effectiveness. Performance efficiency is easier to measure, while measuring effects proves difficult. Effectiveness is essential, and efficiency is necessary. This links both qualitative and quantitative analysis to produce the best possible system.

In determining the right ISR question for the COCOM to ask, this paper addressed the “5Ws” that must be considered, along with several key assumptions: there will never be enough ISR, and the endless search for intelligence data is an inherently inefficient operation that can prove worth the effort.

A comprehensive ISR question for the combatant commander provides focus: Are we effectively using joint ISR capabilities in an efficient manner to enable superior decisions leading to actionable operations? The question must be assessed in the context of the operating environment to enable success.

Three recommendations can improve the ISR process. These included a comprehensive process that can handle all phases of war, spanning from low to high intensity conflict. Second,

the allocation of ISR assets should occur at the appropriate COCOM level and under the direction of the CFACC, when designated; the CFACC is most capable of fulfilling the unified commander's intent regarding ISR asset allocation. Finally, because the lines have blurred between asset capabilities and their effects, there should be a single process to schedule these assets in the most effective and efficient manner.

The future of ISR continues to provide opportunities for commanders to command and leaders to lead. Unresolved command and control issues of UAS platforms, along with the practical deconfliction of the air domain, warrant further study.

The ISR question proposed for the combatant commander--the right question to ask--addresses effective, joint warfare with the goal of victory. With this as a baseline, the commander and staff can focus ISR to that end.

BIBLIOGRAPHY

- Air Force Doctrine Document (AFDD) 2-9. *Intelligence, Surveillance, and Reconnaissance Operations*, 17 July 2007. [Online] Available <http://www.e-publishing.af.mil/shared/media/epubs/afdd2-9.pdf>.
- Air Power Development Centre Bulletin (2006). Turning Efficiency into Effectiveness - Swing-Role Air Combat Capability. *Pathfinder* (53), 1-2.
- Beene, J. K. (n.d.). *Constraints, Restraints, and the Role of Aerospace Power in the 21st Century*. Retrieved December 15, 2008, from <http://209.85.173.132/search?q=cache:rWIECJ6mXZwJ:www.usafa.edu/df/inss/OCP/ocp38.pdf+military+planning+constraint+restraint&hl=en&ct=clnk&cd=1&gl=us>.
- Butler, A. (2007, April 2). *U.S. Army faults Air Force in UAV debate*. Retrieved December 15, 2008, from The Integrator: <http://integrator.hanscom.af.mil/2007/April/04052007/04052007-19.htm>.
- Butler, Jeffrey T. *UAVs and ISR Sensor Technology*. Maxwell AFB, AL, Air Command and Staff College, 2001. [Online] Available: <https://research.au.af.mil/viewabstract.aspx?id=3335>.
- Culture wars Getting the Army and Air Force working together* . (2008, November 1). Retrieved December 15, 2008, from C4ISR Journal: <http://www.isrjournal.com/story.php?F=3729059>.
- Department of Defense Dictionary of Military and Associated Terms*. [Online] Available <http://www.dtic.mil/doctrine/jel/doddict/>.
- Deptula, L. G. and Brown, M. R. (2008). A House Divided: The Indivisibility of Intelligence, Surveillance, and Reconnaissance. *Air and Space Power Journal*, Volume XXII (No. 2), 5-15.
- Erwin, S. I. (2007, June). *A Never-Ending Feud Over Roles and Missions*. Retrieved December 15, 2008, from <http://www.nationaldefensemagazine.org/archive/2007/June/Pages/NeverEndingFeud2612.aspx?PF=1>.
- Flynn, M. T., Juergens, R. and Cantrell, T. L. (2008). Employing ISR: SOF best practices. *Joint Force Quarterly*, 3d quarter (Issue 50), pp. 56-61.
- BIBLIOGRAPHY \ 1033 Gates, Secretary of Defense R. (2008, April 21). *Remarks to Air War College (Maxwell, AL)*. Retrieved December 15, 2008, from DefenseLink Speech: <http://www.defenselink.mil/speeches/speech.aspx?speechid=1231>.

- General provides clarification on UAV use.* (2007, April 27). Retrieved December 15, 2008, from Air Force Link: www.af.mil/news/story.asp?id=123050533.
- Hodges, J. (n.d.). *Relief for strained predators*. Retrieved December 15, 2008, from TSJOnline.com: <http://www.tsjonline.com/story.php?F=3607762>.
- Intelligence - SENIOR YEAR / AQUATONE / U-2 / TR-1* . (n.d.). Retrieved December 15, 2008, from Global Security: <http://www.globalsecurity.org/intell/systems/u-2-sensors.htm>.
- Iwicki, S. K. (n.d.). *Introducing the concept of "Actionable Intelligence"*. Retrieved December 15, 2008, from Military Intelligence Professional Bulletin: http://findarticles.com/p/articles/mi_m0IBS/is_1_30/ai_n6123719.
- Joint Publication (JP) 1-02. *Department of Defense Dictionary of Military and Associated Terms*, 12 April 2001 (Amended 17 October 2008). [Online] Available <http://www.dtic.mil/doctrine/jpreferencepubs.htm>.
- Joint Publication (JP) 2-0. *Joint Intelligence*. 22 June 2007. [Online] Available <http://www.dtic.mil/doctrine/jointintelligenceseriespubs.htm>.
- Joint Publication (JP) 2-01. *Joint and National Intelligence Support to Military Operations*, 7 October 2004. [Online] Available <http://www.dtic.mil/doctrine/jointintelligenceseriespubs.htm>.
- Joint Publication (JP) 3-30. *Command and Control for Joint Air Operations*, 5 June 2003. [Online] Available http://www.dtic.mil/doctrine/jel/new_pubs/jp3_30.pdf.
- Kappenman, J. (2008). Army Unmanned Aircraft Systems: Decisive in Battle. *Joint Force Quarterly* , 2d quarter (Issue 49), pp. 20-23.
- Flynn, M. T., Juergens, R. and Cantrell, T. L. (2008). Employing ISR: SOF best practices. *Joint Force Quarterly*, 3d quarter (Issue 50), pp. 56-61.
- Mattis, J. N. (2008). USJFCOM Commander's Guidance for Effects-based Operations. *Joint Force Quarterly*, 4th quarter (Issue 51), pp 105-108.
- Moseley, G. M. (n.d.). *Memorandum: Executive Agency for Medium- and High-Altitude Unmanned Aerial Vehicles (UAVs)*. [Online] Available http://www.blog.wired.com/defense/files/dplus2007_0986.pdf .
- Murray, Colonel S. F. "Reflections on Jointness and Tasking Multi-Role Airborne Platforms." Army/Air Force Integration Newsletter II, 09-13, [Online] Available <https://www.jllis.mil/usaf/>, 21-22.
- Odierno, R. T., Brooks, N. E., and Mastracchio, F. P. (2008). ISR Evolution in the Iraqi Theater. *Joint Forces Quarterly* , 3d quarter (50), 51-55.

- Peng, MAJ Ho Yung and MAJ Teo Cheng Hang. "Airpower In Operation Iraqi Freedom." *Pointer: Journal of the Singapore Armed Forces*, 2004, Vol. 30 No. 3. [Online] Available: <http://www.mindef.gov.sg/imindef/publications/pointer/journals/2004/v30n3/features/feature5.html>.
- Pocock, C. (2008). "NATO intelligence repositories could solve access woes." [Online] Available <http://www.isrjournal.com/story.php?F=3669246>.
- Rife, S. P. (1998-99). Kasserine Pass and the Proper Application of Airpower. *Joint Forces Quarterly* (#20) (Autumn/Winter 1998-1999), 71-77.
- Ruby, Tomislav Z. (2008). Effects based operations more important than ever. [Online] Available: <http://www.carlisle.army.mil/usawc/parameters/08autumn/ruby.pdf>.
- Supersonic SIGINT: Will F-35, F-22 Also Play EW Role?* (2005, 24 October). Retrieved 15 December 2008, from Defense Industry Daily. [Online] Available <http://www.defenseindustrydaily.com/supersonic-sigint-will-f35-f22-also-play-ew-role-01379/>.
- Winters, M. J. *Essence of Intelligence: Consuming Vital Knowledge for Strategic and Operational Advantage*. Maxwell AFB, AL, Air Command and Staff College, 2006. [Online] Available: https://www.afresearch.org/skins/rims/q_mod_be0e99f3-fc56-4ccb-8dfe-670c0822a153/q_act_downloadpaper/q_obj_f3b009f9-3ae3-432b-b3f6-7e62a6f3fbbe/display.aspx?rs=enginespage.

END NOTES

-
1. Lieutenant General David A. Deptula and Major R. Greg Brown, "A House Divided: The Indivisibility of Intelligence, Surveillance, and Reconnaissance," *Air and Space Power Journal* 22, No. 2 (Summer 2008): 5.
 2. Michael T. Flynn, Juergens and Cantrell, "Employing ISR: SOF best practices," *Joint Force Quarterly*, July 2008, 3d quarter (Issue 50), 61.
 3. Jeffrey Kappenman, "Army Unmanned Aircraft Systems: Decisive in Battle," *Joint Forces Quarterly*, Issue 49 (2d quarter 2008): 20-23.
 4. Raymond T. Odierno, Nichoel E. Brooks and Francesco P. Mastracchio, "ISR Evolution in the Iraqi Theater," *Joint Forces Quarterly*, 3d quarter, no. 50 (2008), 53.
 5. Secretary of Defense Robert M. Gates, Remarks to Air War College (Maxwell, AL), DefenseLink Speech 2008 April 21, <http://www.defenselink.mil/speeches/speech.aspx?speechid=1231>
 6. Joint Publication (JP) 1-02, Department of Defense (DOD) Dictionary of Military and Associated Terms, 273.
 7. *Ibid.*, 270, 532, 457.
 8. Joint Publication (JP) 2-01. *Joint and National Intelligence Support to Military Operations*, 7 October 2004. [Online] Available <http://www.dtic.mil/doctrine/jpintelligenceseriespubs.htm>, I-3.
 9. Air Force Doctrine Document (AFDD) 2-9. Intelligence, Surveillance, and Reconnaissance Operations, 22-25.
 10. Joint Publication (JP) 2-0. *Joint Intelligence*. 22 June 2007. [Online] Available <http://www.dtic.mil/doctrine/jpintelligenceseriespubs.htm>, I-25.
 11. Michael J. Winters, *Essence of Intelligence: Consuming Vital Knowledge for Strategic and Operational Advantage*. Maxwell AFB, AL, Air Command and Staff College, 2006. [Online] Available: https://www.afresearch.org/skins/rims/q_mod_be0e99f3-fc56-4ccb-8dfe-670c0822a153/q_act_downloadpaper/q_obj_f3b009f9-3ae3-432b-b3f6-7e62a6f3fbbe/display.aspx?rs=enginespage, 6.
 12. *Supersonic SIGINT: Will F-35, F-22 Also Play EW Role?* (2005, 24 October). Retrieved 15 December 2008, from Defense Industry Daily. [Online] Available <http://www.defenseindustrydaily.com/supersonic-sigint-will-f35-f22-also-play-ew-role-01379/>.
 13. Michael T. Flynn, Juergens and Cantrell, "Employing ISR: SOF best practices," *Joint Force Quarterly*, July 2008, 3d quarter (Issue 50), 56.
 14. Tomislav Z. Ruby, "Effects based operations more important than ever," (2008), <http://www.carlisle.army.mil/usawc/parameters/08autumn/ruby.pdf>, 9.
 15. *Ibid.*, 9.
 16. *Ibid.*, 8.
 17. *Ibid.*, 9.
 18. *Ibid.*, 9.
 19. *Ibid.*, 8-9.
 20. Major General Maury Forsyth, Deputy Combined Force Air Component Commander for U.S. Central Command (June 2007 to June 2008), personal interview on October 24, 2008.

-
21. Lieutenant General Gary L. North, Combined Force Air Component Commander for U.S. Central Command (February 2006 to present), remarks to Air War College (Maxwell, AL) on December 12, 2008.
 22. Tomislav Z. Ruby, "Effects based operations more important than ever," (2008), <http://www.carlisle.army.mil/usawc/parameters/08autumn/ruby.pdf>, 9.
 23. Ibid., 7.
 24. LtCol Dr. Michael J. Masterson, USAF, Instructor, Department of Warfighting, Air War College, Air University, Maxwell AFB, AL. Seminar discussion/lecture Fall, AY09.
 25. Michael J. Winters, *Essence of Intelligence: Consuming Vital Knowledge for Strategic and Operational Advantage*. Maxwell AFB, AL, Air Command and Staff College, 2006. [Online] Available: https://www.afresearch.org/skins/rims/q_mod_be0e99f3-fc56-4ccb-8dfe-670c0822a153/q_act_downloadpaper/q_obj_f3b009f9-3ae3-432b-b3f6-7e62a6f3fbbe/display.aspx?rs=enginespage, 6.
 26. Michael T. Flynn, Juergens and Cantrell, "Employing ISR: SOF best practices," Joint Force Quarterly, July 2008, 3d quarter (Issue 50), 57.
 27. Intelligence - SENIOR YEAR / AQUATONE / U-2 / TR-1 . (n.d.), [Online] Available <http://www.globalsecurity.org/intell/systems/u-2-sensors.htm>.
 28. Major General Maury Forsyth, Deputy Combined Force Air Component Commander for U.S. Central Command (June 2007 to June 2008), personal interview on October 24, 2008.
 29. Lieutenant General Gary L. North, Combined Force Air Component Commander for U.S. Central Command (February 2006 to present), remarks to Air War College (Maxwell, AL) on December 12, 2008.
 30. Chris Pocock, "NATO intelligence repositories could solve access woes." (2008), <http://www.isrjournal.com/story.php?F=3669246>.
 31. Tomislav Z. Ruby, "Effects based operations more important than ever," (2008), <http://www.carlisle.army.mil/usawc/parameters/08autumn/ruby.pdf>, 9.
 32. Jim Hodges, "Relief for Strained Predators," TSJOnline.com, <http://www.tsjonline.com/story.php?F=3607762>.
 33. Lieutenant General Gary L. North, Combined Force Air Component Commander for U.S. Central Command (February 2006 to present), remarks to Air War College (Maxwell, AL) on December 12, 2008.
 34. Raymond T. Odierno, Nichoel E. Brooks and Francesco P. Mastracchio, "ISR Evolution in the Iraqi Theater," Joint Forces Quarterly, 3d quarter, no. 50 (2008), 53.
 35. Jeffrey K. Beene, "Constraints, Restraints, and the Role of Aerospace Power in the 21st Century," 15 December 2008, pg# 26, 27, <http://209.85.173.132/search?q=cache:rWIECJ6mXZwJ:www.usafa.edu/df/inss/OCP/ocp38.pdf+military+planning+constraint+restraint&hl=en&ct=clnk&cd=1&gl=us>.
 36. General Maury Forsyth, Deputy Combined Force Air Component Commander for U.S. Central Command (June 2007 to June 2008), personal interview on October 24, 2008.
 37. Jim Hodges, "Relief for Strained Predators," TSJOnline.com, <http://www.tsjonline.com/story.php?F=3607762>.
 38. Lieutenant General Gary L. North, Combined Force Air Component Commander for U.S. Central Command (February 2006 to present), remarks to Air War College (Maxwell, AL) on December 12, 2008.

-
39. Raymond T. Odierno, Nichoel E. Brooks and Francesco P. Mastracchio, "ISR Evolution in the Iraqi Theater," *Joint Forces Quarterly*, 3d quarter, no. 50 (2008), 53.
 40. Lieutenant General Gary L. North, Combined Force Air Component Commander for U.S. Central Command (February 2006 to present), remarks to Air War College (Maxwell, AL) on December 12, 2008.
 41. General Maury Forsyth, Deputy Combined Force Air Component Commander for U.S. Central Command (June 2007 to June 2008), personal interview on October 24, 2008.
 42. Carl von Clausewitz, *On War*, ed. Anatol Rapoport (New York: Penguin Books, 1982), 390.
 43. General Maury Forsyth, Deputy Combined Force Air Component Commander for U.S. Central Command (June 2007 to June 2008), personal interview on October 24, 2008.
 44. MAJ Ho Yung Peng and MAJ Teo Cheng Hang, "Airpower In Operation Iraqi Freedom," *Pointer: Journal of the Singapore Armed Forces*, 2004, Vol. 30 No. 3, <http://www.mindef.gov.sg/imindef/publications/pointer/journals/2004/v30n3/features/feature5.html>.
 45. Michael T. Flynn, Juergens and Cantrell, "Employing ISR: SOF best practices," *Joint Force Quarterly*, July 2008, 3d quarter (Issue 50), 57.
 46. Stephen K. Iwicki, "Introducing the concept of "Actionable Intelligence,"" *Military Intelligence Professional Bulletin*: pg#, http://findarticles.com/p/articles/mi_m0IBS/is_1_30/ai_n6123719.
 47. Raymond T. Odierno, Nichoel E. Brooks and Francesco P. Mastracchio, "ISR Evolution in the Iraqi Theater," *Joint Forces Quarterly*, 3d quarter, no. 50 (2008), 60.
 48. General Maury Forsyth, Deputy Combined Force Air Component Commander for U.S. Central Command (June 2007 to June 2008), personal interview on October 24, 2008.
 49. *Ibid.*
 50. *Ibid.*
 51. Joint Publication (JP) 3-30. *Command and Control for Joint Air Operations*, 5 June 2003. [Online] Available http://www.dtic.mil/doctrine/jel/new_pubs/jp3_30.pdf, ix.
 52. General Maury Forsyth, Deputy Combined Force Air Component Commander for U.S. Central Command (June 2007 to June 2008), personal interview on October 24, 2008.
 53. *Ibid.*
 54. *Ibid.*
 55. Colonel Scott F. Murray, "Reflections on Jointness and Tasking Multi-Role Airborne Platforms," *Army/Air Force Integration Newsletter II*, 21-22.
 56. Raymond T. Odierno, Nichoel E. Brooks and Francesco P. Mastracchio, "ISR Evolution in the Iraqi Theater," *Joint Forces Quarterly*, 3d quarter, no. 50 (2008), 52.
 57. Michael T. Flynn, Juergens and Cantrell, "Employing ISR: SOF best practices," *Joint Force Quarterly*, July 2008, 3d quarter (Issue 50), 61.
 58. "Culture wars Getting the Army and Air Force working together," *C4ISR Journal*, 15 December 2008, <http://www.isrjournal.com/story.php?F=3729059>.
 59. Shawn P. Rife, "Kasserine Pass and the Proper Application of Airpower," *Joint Forces Quarterly* (#20) (Autumn/Winter 1998-1999), 77.
 60. Raymond T. Odierno, Nichoel E. Brooks and Francesco P. Mastracchio, "ISR Evolution in the Iraqi Theater," *Joint Forces Quarterly*, 3d quarter, no. 50 (2008), 52.

-
61. Sandra I. Erwin, "A Never-Ending Feud Over Roles and Missions," *National Defense Magazine*, June 2007, <http://www.nationaldefensemagazine.org/archive/2007/June/Pages/NeverEndingFeud2612.aspx?PF=1>.
 62. Raymond T. Odierno, Nichoel E. Brooks and Francesco P. Mastracchio, "ISR Evolution in the Iraqi Theater," *Joint Forces Quarterly*, 3d quarter, no. 50 (2008), 53.
 63. *Ibid.*, 55.
 64. Michael T. Flynn, Juergens and Cantrell, "Employing ISR: SOF best practices," *Joint Force Quarterly*, July 2008, 3d quarter (Issue 50), 58.
 65. General provides clarification on UAV use. (2007, April 27). Retrieved December 15, 2008, [Online] Available <http://www.af.mil/news/story.asp?id=123050533>.
 66. *Ibid.*
 67. Lieutenant General Gary L. North, Combined Force Air Component Commander for U.S. Central Command (February 2006 to present), remarks to Air War College (Maxwell, AL) on December 12, 2008.