Improving Outcomes

Intelligence, Surveillance, and Reconnaissance Assessment

Brig Gen Timothy D. Haugh, USAF
Lt Col Douglas W. Leonard, USAF

The seemingly insatiable appetite of US DOD combatant commands (CCMD) for intelligence, surveillance, and reconnaissance (ISR) has driven the growth of a massive theater ISR enterprise. Despite this tremendous investment, one that has seen DOD expenditures rise six-fold from 2001 to 2012, the then Air Force deputy chief of staff (DCS) for intelligence, surveillance, and reconnaissance (DCS-ISR), Lt Gen Robert Otto, remarked that the department satisfies fewer CCMD intelligence needs today than at the height of the Iraq surge.[1] How did the DOD get in this remarkable position? The department, it appears, has been a victim of its success. The now retired chairman of the joint chiefs, Gen Martin Dempsey,

wrote: "The current joint force of ISR personnel, sensors, platforms, and networks is so vast, diverse, and distributed that managing their effective employment represents a large and growing challenge for the Department of Defense." He added, "Currently, ISR sensor and PED (Processing, Exploitation, and Dissemination) requirements and associated resources (systems, software, and people) are managed separately, resulting in mismatches in collection, processing, and analysis capacities."[2] Qualitative and quantitative ISR assessment linked closely to a coherent ISR strategy will permit commanders and planners to better align these disparate capabilities and avoid duplication or "mismatches." Commanders can then determine the effect of ISR on theater operational outcomes in the forms of opportunity cost and return on investment while ensuring the closure of intelligence gaps linked to those same objectives.

Current State of Platform Strategy

Since 2001, the DOD has invested significantly in ISR platforms and PED analysts. Unfortunately, the methodology underlying ISR strategy development did not keep pace. Concepts such as special operations forces (SOF) find, fix, finish, exploit, and analyze, mission type orders, and time-dominant fusion show great promise but have not yet approached the scale necessary to reform theater collection and analysis.[3] The rapid fusion of all available intelligence to meet the supported commander's intent ties these disparate approaches together, suggesting an important paradigm shift: success in operational ISR requires not platforms, but a wide variety of inputs analyzed and disseminated for war-fighter consumption as rapidly as possible. At present, each theater interacts independently with the national intelligence community (IC) and the DOD to garner collection for local warfighting needs. The management of this collection falls into a number of different stovepipes loosely organized around collection domain (air, space, sea, land, or cyber) or phenomenology (geospatial, signals, human, or signatures-based). Consequently, theater components compete to maximize gross collection without linking each point of collection to an appropriate lacuna in knowledge (intelligence gap) or supported commander desired effect (operational outcome). Recent conceptual advancements in the national IC, such as activity-based intelligence (ABI), object-based production (OBP), and structured observation management (SOM), when combined with recent advancements in automated algorithms to optimize collection from national assets, should force a corresponding change in the DOD approach. However, DOD doctrine, beyond the statements of some of the leading thinkers outside the formal publication process, does not yet consider these shifts. The complexity of ISR support to operational commanders demands such a reconsideration beginning with a more robust, qualitative ISR assessment operating at the tactical (intelligence production and sensor performance), operational (platform effectiveness and integration), and strategic (resource allocation and future purchasing and programming) levels.

Current State of Assessment

Within the DOD, organizations assess ISR for three primary reasons:

1. Did services acquire the right ISR capabilities in the right number, performing as designed?

2. Were the available theater airborne ISR capabilities apportioned correctly?

3. Was theater airborne ISR employed effectively?[4]

Traditionally, the under secretary of defense for intelligence (USD[I]) assesses service ISR acquisition strategy; USD(I), and JCS/J32 assess apportionment and allocation between CCMDs; and CCMDs and their air components assess the employment of ISR within theaters. The authors of this article propose a three-level pyramidal structure for ISR assessment that links individual intelligence products and sensor performance to operational outcomes and the closing of intelligence gaps as well as the operational (theater effectiveness) and strategic (resource decisions and platform allocation) efforts. Tactical entities such as US Air Force ISR wings and US Army military intelligence brigades must contribute to this process in ways never codified. Space constraints dictate a focus on those tactical and operational levels for the air component in this article, although the methodology will draw on the best practices put forth by USD(I) in strategic-level effectiveness as well.

A number of studies have attempted to improve ISR assessment, yet none have significantly advanced the doctrine for assessing ISR effectiveness at the operational or tactical levels. Operationally, the CCMD and the combined forces air component commander conduct airborne ISR assessment under the authority of the joint forces commander (JFC). Joint Publication (JP) 2-01 describes the process simply: "The joint force J-2, through the CCMD joint intelligence operations center (JIOC), helps the JFC by assessing adversary capabilities, vulnerabilities, and intentions, and monitoring the numerous aspects of the operational environment that can influence the outcome of operations. The J-2 also helps the JFC and staff decide what aspects of the operational environment to measure and how to measure them to determine progress toward accomplishing a task, creating an effect, or achieving an objective."[5] CCMDs, including coalition or joint task forces, are responsible for creating priority intelligence requirements and collection requirements, while the CFACC's air operations center tasks and directs airborne ISR platforms, sensors, PED, and fusion elements to collect, process, and disseminate intelligence to satisfy CCMD requirements.[6] To date, much of the theater ISR assessment has focused on measures of performance (MoP), which generally consist of quantitative measures focused solely on an individual domain (air) and phenomenology (most often geospatial). Some of the most common measures appear in the following list:

1. Number of ISR sorties planned and executed

2. Sensor availability

3. Number of images collected

4. Essential elements of information satisfied

5. Number of full-motion video hours

6. Number of intelligence products produced by intelligence discipline

These measures are easily quantifiable, but rarely contribute to answering the critical effectiveness questions: Did ISR advance the supported commander's desired operational outcomes (measured in opportunity cost and return on investment) or close intelligence gaps (measured in terms of knowledge advancement on an objective scale)? Why then do CCMDs and air components rely on MoP? RAND Corporation's previous study on ISR assessment states the issue clearly: "(T)he most often reported complaint from intelligence producers and consumers alike—too much emphasis on 'bean counting' of sorties flown, hours spent observing, and percentage of targets collected and too little on whether the ISR effort is actually supporting the commander's objectives. The reason for this emphasis, of course, is that the former is fairly easy to calculate and the latter quite difficult to determine, especially given the time pressures of an ongoing campaign."[7]

The intelligence cycle and associated tasking processes have earned significant description in joint and air component doctrine, but little exists on ISR assessment.[8] As documented in a RAND study in 2008 (and still true today), the USAF's AOC doctrine cites that the Intelligence, Surveillance, and Reconnaissance Division in the AOC should "monitor and evaluate the ISR strategy for effectiveness in meeting overall ISR requirements, JFC/JFACC (Joint Forces Air Component Command) PIR, and supporting JFC/JFACC strategy and plans,"[9] but provides no methodology to accomplish those tasks. JP 2-01 mandates that "all intelligence personnel and consumers" generate "timely feedback to the joint force J-2 staff regarding both successes and problems with the functioning of the intelligence process."[10] JP 2-01.3 provides a basic framework for operational assessment via MoP and measures of effectiveness (MoE) but stops short of any specific approach for ISR.[11] As noted in the RAND study, the rapid pace of operations coupled with the enormous difficulty of assessing product value at the operational level for such a wide-ranging and complex DOD ISR enterprise has caused a drift away from doctrinal requirements.

The greatest portion of the DOD's massive growth in ISR platforms has been through the USAF. The Air Force has committed to ISR as one of its five core missions with the Air Force Distributed Common Ground System (AF DCGS) serving as the primary exploitation weapon system for those missions and a useful representative of the explosive growth of USAF ISR generally. The AF DCGS support to airborne ISR missions increased by more than 1,900 percent from 2001 to 2015 as the Air Force flew 80 percent of all operational ISR hours and provided exploitation for 58 percent of all DOD-affiliated ISR in the second quarter of fiscal year 2016.[12] Such remarkable, almost unconstrained growth, when combined with an industrial age collection management process, has created systemic inefficiencies that demand immediate attention. Recent USD(I) studies may provide a useful methodological baseline but the air component, assisted by the CCMDs and the JCS/J32, should take a prominent role as the owner of a preponderance of theater assets and as the collection operations manager in several ongoing conflicts. Traditionally, USAF tactical advances emerge directly from the operator level in the form of tactics bulletins. Unfortunately, ISR assessment has not been a popular subject for edgy thinking; only one tactics bulletin since 2001 referenced holistic ISR assessment.[13] The

enormity of the problem, perhaps, and its linkage back to national-level processes has made it seem unapproachable. A strong framework should assist in identifying areas for more pronounced and specific tactical advancement.

Assessment Framework: Decision Advantage and the Three Rights

In concert with the growth of ISR platforms and sensors, the USAF has moved to revolutionize intelligence analysis. The Air Force DCS-ISR called for such rapid change in *Air Force ISR 2023: Delivering Decision Advantage*:

> The fundamental job of AF ISR Airmen is to analyze, inform, and provide commanders at every level with the knowledge they need to prevent surprise, make decisions, command forces, and employ weapons. Maintaining decision advantage empowers leaders to protect friendly forces and hold targets at risk across the depth and breadth of the battlespace—on the ground, at sea, in the air, in space, and in cyberspace. It also enables commanders to apply deliberate, discriminate, and deadly kinetic and non-kinetic combat power. To deliver decision advantage, we will seamlessly present, integrate, command and control (C2), and operate ISR forces to provide Airmen, joint force commanders, and national decision makers with utmost confidence in the choices they make.[14]

Lieutenant General Otto's vision extends beyond a simple satisfaction of collection requirements to a focus on producing intelligence products driving supported commander's decisions and actions. Subsequently, then Maj Gen Jack Shanahan, at the time the commander of Twenty-Fifth Air Force, centered his ISR-focused organization on the *Three Rights*: "Right Intelligence, Right Person, Right Time: Delivering the right ISR to the right person at the right time. . . our job is to turn data into information, information into knowledge and knowledge into actionable intelligence that results in better decisions."[15] These two senior leader vectors overlay with USD(I)'s ISR Task Force-recommended framework for ISR assessment: outcomes (decision advantage) and closing intelligence gaps (Three Rights) provide a foundation for advancing air component ISR assessment tradecraft by emphasizing the result of the intelligence cycle, the intelligence product.

Assessment must begin with the tactical product (See figure). Operational-level assessors, in the case of the air component residing largely in the AOC, simply do not have the manpower, time, or expertise to adequately link specific products to tactical or operational ISR objectives, strategic-level PIRs, or similar commander questions. The tactical production element, therefore, must take on this element of assessment at the wing or brigade level. This assessment must begin as qualitative, examining the specific information passed in a product for its value to operational effects in the battlespace, measured in terms of knowledge advancement on an objective scale. This assessment begins at the producer level via automated fields in production control software and in combined intelligence and operational briefs and debriefings. In other words, the entire process depends on a structured data environment whereby intelligence production links to the information state of an intelligence object. Each intelligence product, then, contributes to the maintenance (in the case of indications and warning) or increase (in the case of target development) in knowledge regarding that object. The wing or brigade can then take all entries in the aggregate and assign qualitative values, developed in concert with the operations research and lessons learned community, to each product.
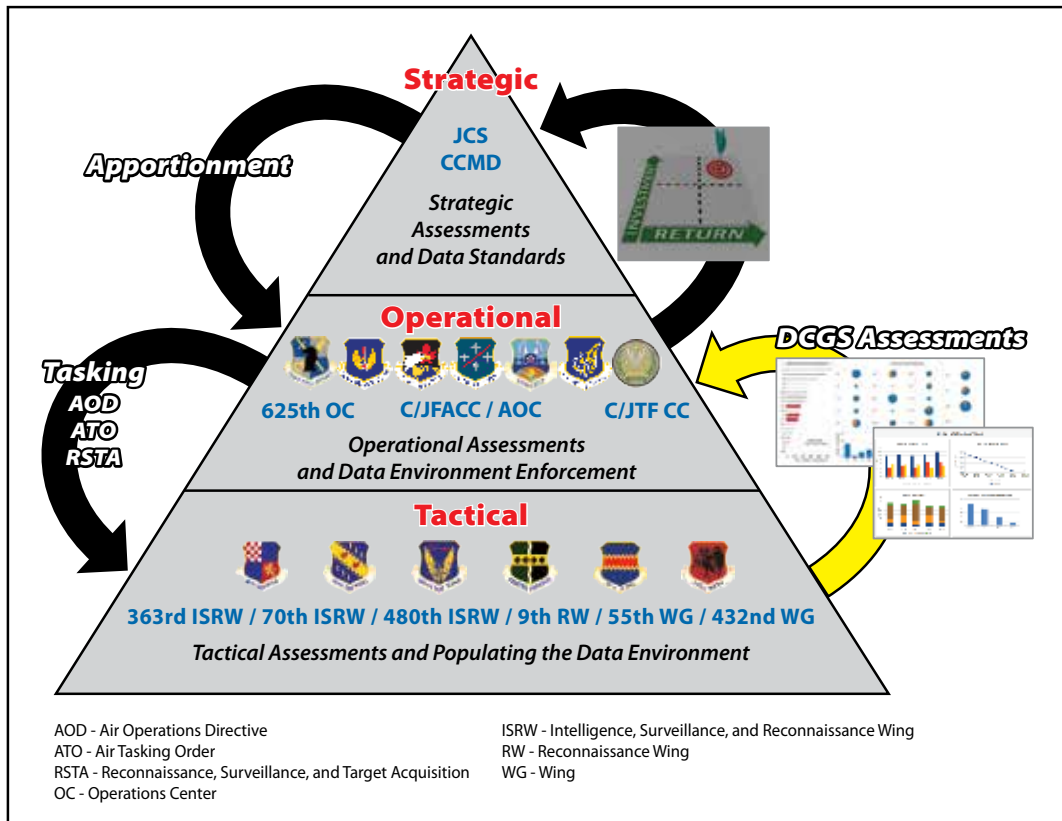
Figure. **ISR assessment levels**

The process will require heavy involvement from forward ISR elements such as ISR liaison officers, and ISR tactical controllers, to assist in the development of appropriately narrow and focused ISR objectives at the operational and tactical levels. Tactical-level product assessment will then feed the larger operational-level assessment of sortie and sensor effectiveness, inform resourcing decisions on ISR platforms and allocation, and feed directly back into the daily process of ISR command and control. The accumulation of tactical level inputs, when compared at the operational level, will serve as comparative validation of the effectiveness of each input. The levels of assessment, then, remain locked together and focused at the operational level.

CCMDs must share responsibility with air components in linking ISR strategy and resulting intelligence production to outcomes and closing intelligence gaps. Effective linkage requires a clear connection between the supported commander's intent and the ISR strategy. While this might appear obvious, traditional industrial age ISR collection management practices, technology, and data structures mandate a focus on individual intelligence collection disciplines such as signals intelligence (SIGINT) or geospatial intelligence (GEOINT) vice an emphasis on the resulting

fused intelligence product.[16] An assessment process based, at least in part on production, will require some changes to guidance, particularly on the sourcing of intelligence reporting. The national IC has made significant strides in tracking the intelligence used to inform senior leader decisions. The clearest example is the presidential daily briefing (PDB). The PDB is meticulously sourced, generating a relatively simple evaluation over time on collection sources informing presidential decisions, the ultimate in strategic outcomes and decision advantage. This approach is not limited just to the PDB. The IC has established standards that require sourcing for all finished intelligence production. CCMDs, JTFs, and components should mimic this practice to identify what intelligence products and collection sources influence senior leader decision making. The DOD, via the Office of the Secretary of Defense (OSD) and joint staff, should mandate sourcing for CCMD and JTF daily briefings and finished intelligence products. This sourcing should link to the originating collection source. Clearly, this data collection comes at a cost, but ultimately the CCMD's benefit from validating effective ISR strategy and employment through demonstrable, intelligence-informed CCMD and JTF senior leader decisions. Sourcing provides easily quantified measurement of decision advantage at the operational level and assists in the tactical-level assessment of products as described above.

The expert assessors in the ISR Task Force have identified other indirect measures that can inform operational-level ISR assessment.[17] A robust operational-level process must be introspective and begin with operational effects. Ultimately, the process must provide the supported commander with the answers to the questions he posed related to the battlespace, typically expressed as PIRs. The ISR assessment process must operate at the tactical level, sometimes in SIGINT, GEOINT, or other subdisciplinary stovepipes, but accumulate at the operational level for translation back into command-level language. In short, each intelligence report and ISR sortie must circle back to the operational effects it generates.

If the supported commander is a ground element, traditional operations orders and fragmentary orders capture the appropriate information in either the situation or enemy disposition. However, an appropriate assessment process requires some connective tissue from PIRs, typically general and difficult to use as an objective measure, and the conduct of ISR and the accompanying analysis. ISR objectives, as mentioned above, can provide these linkages from the commander's intent to operational efforts and ultimately to tactical objectives and the actual collection. These objectives will emerge from a close collaboration between components, the appropriate theater-level command and control entity (in this case, the AOC), and the intelligence production element with the greatest analytical understanding of the theater and problems in question. Assessment must remain firmly anchored in an understanding of the changes to intelligence objects prioritized by their proximity to these operational and tactical objectives.

Full accomplishment of such a linkage between production and theater-level objectives for the air component must occur within the AOC. Consequently, the AOC must prioritize such assessment for those practices to take root and generate useful conclusions. At present, AOCs have an operational assessment team (OAT) that could fill this role. An OAT is comprised of operational research analysts dedicated to the science and art of assessing operational activities. Traditionally, these experts

have focused on assessing the effectiveness of close air support planning and execution and munitions effectiveness. Instrumenting the ISR processes within the AOC and collecting the right data can also enable these experts to assist in ISR assessment.[18] Admittedly, changing this emphasis will not be easy, but recent successes highlight the potential opportunity.

During a recent crisis in the US Central Command (CENTCOM) area of responsibility (AOR), the deputy coalition forces air component commander (D-CFACC) requested intelligence products from the US Air Force ISR enterprise at various classification levels. Producing intelligence at multiple classification levels is routine for the expert enlisted intelligence analysts assigned to AF DCGS, but the timeline and intent behind the D-CFACC request made this request stand out. He needed the intelligence to negotiate basing rights with a coalition partner. Within hours of the first sortie in the new area of operations, AF DCGS analysts provided GEOINT products at five different classification levels to contribute to these negotiations. The successful outcome of these senior leader negotiations was at least partially enabled by effective ISR sorties and intelligence products tailored to the senior leader intent. This was a successful outcome, but the standard assessment process had no means to capture this success. Instead, the CFACC's intelligence team developed a separate reporting mechanism to track the thousands of intelligence reports provided to coalition partners and reported these results to CENTCOM and OSD monthly, though that mechanism included only raw numbers without an effort to link those specific products back to supported outcomes or gaps. Modification of previously static processes can occur, particularly when the supported commander is producing successful outcomes. SOF has been moving toward the tracking of successful outcomes for more than a decade, identifying the right data to report, capture, and analyze to validate ISR apportionment. It is time for CCMDs, JTFs, and AOCs to follow suit by capturing and reporting indirect measures to inform ISR assessment.

Closing Intelligence Gaps (Right Intelligence, Right Place, Right Time)

Employing ISR effectively to close the highest priority intelligence gaps is a shared responsibility between CCMDs, the national IC, CFACCs, ISR platforms, PED, and intelligence fusion analysts. Each organization has a critical role to play. The CCMD plays the most important role by identifying the highest priority intelligence problem in the form of PIRs. Cogent PIRs are the first link in crafting an effective ISR strategy. Developing the strategy to effectively employ ISR is a team sport comprised of CCMD ISR planners, CCMD intelligence analysts, AOC planners, ISR platform operators, AF DCGS planners, IC representatives, and intelligence fusion analysts. ISR strategists and collection planners should evaluate all potential sources of intelligence based on timeliness, phenomenology, the availability of analytical assets, and relevant platform availability when aligning collection. Ideally, analytical elements such as AF DCGS should not "chase" airborne ISR collection but instead should analyze and exploit any and all sources available that will successfully answer the questions posed by the supported commander, questions ultimately posed as operational and tactical objectives more easily translated into real

analytical priorities for a production element. In short, collection is not about information from the air domain; it is about information for the air domain. The management of these air assets is a necessary and important subcomponent of the process that also falls under the responsibility of the AOC with the support of tactical production elements such as AF DCGS. When evaluating the ability of airborne ISR to satisfy intelligence requirements, ISR assessors consider the effectiveness of the intelligence product to satisfy a CCMD PIR as decomposed via a regularized taxonomy to operational and tactical ISR objectives. While this seems intuitive, ISR is rarely evaluated against the ability to produce intelligence products that close intelligence gaps. General Shanahan's "go-do" provides a starting point: right intelligence, right place, and right time.

During a review of combatant command and AOC assessment approaches, each CCMD focused on quantitative reporting. The focus on quantity devalues the CCMD's PIR, ISR strategy, and ISR objectives and returns ISR assessment to the trap identified by RAND, "too much emphasis on 'bean counting.' "[19] Now is the time to break this cycle. A number of best practices have emerged that will advance the tradecraft necessary to adequately assess ISR production against the desired metric of the three rights:

1. US European Command (EUCOM) tasking to AF DCGS to provide a tailored postmission summary of each sortie's ability to satisfy priority ISR problem sets. Many of these products have already elevated to the commander of EUCOM, the secretary of defense, and one to the president of the United States.

2. Unified approach in the US Pacific Command Theater between Pacific Air Forces/ISR, 613th AOC, and AF DCGS to craft dynamic lines of effort tailored to JFACC intelligence needs and theater PIRs and specifically called out and linked in all theater-generated intelligence products, a powerful first step toward holistic ISR assessment.

3. A partnership between US Air Forces Central Command (AFCENT), the 497th ISR Group, 693th ISRG, and 363rd ISRG to assess effectiveness of ISR sorties in the CENTCOM AOR to produce fused intelligence products immediately ingestible into AFCENT and supported JTF targeting processes, particularly during the most recent campaign against the Islamic State of Iraq and Syria.

4. The 693rd ISRG national tactical integration (NTI) analyst experimentation with big data methods to assess the effectiveness of SIGINT sensors. NTI analysts used national IC-developed modeling tools intended for intelligence analysis to transform more than 10,000 lines of sortie data into a product capable of linking collection to prioritized PIR.

ISR assessment tradecraft has stagnated for years, but the technology and interest are now present to generate a renaissance. Senior leadership must embrace and institutionalize these emerging practices immediately to optimize ISR employment in all theaters.

Advancing ISR Assessment Tradecraft: Air Components Postured to Lead

Many of the preconditions necessary for success in ISR assessment are now present. The arrival of Air Combat Command (ACC) as the owning ISR major command presents an important organizational backbone even as senior leadership at both the operational and strategic levels recognize the inadequacy of contemporary measurements. ACC and theater air components are uniquely postured to develop this tradecraft in support of the CCMDs; while decision advantage and the Three Rights provide the starting point. Several straightforward steps should enable huge leaps in the tradecraft:

1. Generate a US Air Force Warfare Center (USAFWC) process to collect, store, and advocate advanced ISR assessment tradecraft, to include invitations to SOF ISR professionals, with an eye toward influencing changes in both Air Force and joint doctrine.

2. ACC would lead the writing of an updated ISR assessment concept of operations as the basis for codification of detailed ISR assessment practices in a future 3-3 volume assembled by the USAFWC.

3. ACC would partner with component major commands (MAJCOM), nonappropriated funds, combat support agencies, and the Office of the Director of National Intelligence to codify requirements for the appropriate sourcing of intelligence products, as well as the tagging and tracking of intelligence information. These efforts should link closely with the IC Information Technology Enterprise projects to deliver interoperable data repositories and collection capabilities while enabling advanced ABI tradecraft such as OBP and SOM.

4. ACC would partner with component MAJCOMs and NAFs on near-term material solutions to ensure data interoperability between intelligence production databases and AOC baseline systems for operational and ISR assessment.

5. AF-A2 (ISR) and AF-A3 (operations, plans, and requirements), along with ACC, advocate to OSD and the Joint Staff for a policy to link CCMD ISR platform apportionment and allocation, at least in part, to the CCMD's ability to effectively assess ISR based on operational outcomes (decision advantage) and ability to satisfy ISR objectives derived from PIRs (Three Rights).

Conclusion

As the United States moves to deal with instability in the Middle East, Africa, and Central Asia, it also must confront a rising tide of near-peer military competitors. At the same time, ISR collection technology has proliferated sufficiently to remove the substantial advantage the United States has enjoyed for decades. The primary American advantage in the future will rest on the ability of US decision makers to understand and react to emerging situations more rapidly than leaders in opposing states and groups. The key to building that decision advantage, though, is the ability to dynamically employ ISR across all domains and collection phenomenologies for

the benefit of the war fighter and the strategic decision maker. The DOD has reached a saturation point of ISR information; the time has come to harness the full capability of collection resources through improved ISR assessment at all levels: tactical, operational, and strategic. This new approach will require the use of improved qualitative understanding of individual products, a deliberately linked operational assessment process that considers the full scope of response options to enable supported commander-driven operational outcomes, and the efficient closure of intelligence gaps through an integrated big data approach. The sources and platforms currently in use across the collection domains are sufficient in quantity; assessment will make them sufficient in quality. ✪

Notes

1. House, *Performance Audit of Department of Defense Intelligence, Surveillance, and Reconnaissance*, House Permanent Select Committee on Intelligence, April 2012, https://intelligence.house.gov/sites /intelligence.house.gov/files/documents/isrperformanceaudit%20final.pdf; and Lt Gen Robert P. Otto (remarks, *Defense Connect Online*), 8 April 2015.

2. Gen Martin E. Dempsey, "[intelligence, surveillance, and reconnaissance] ISR Joint Force 2020 White Paper," (Washington, DC: Chairman of the Joint Chiefs of Staff [CJCS], June 2014), 3, 6, http:// dtic.mil/doctrine/concepts/white_papers/cjcs_wp_isr.pdf.

3. Michael T. Flynn, Rich Juergens, and Thomas L. Cantrell, "Employing ISR SOF [special operations forces] Best Practices," *Joint Force Quarterly* 50, 3rd Quarter 2008, 56–61, http://www.dtic.mil/get-tr-doc /pdf?AD = ADA516799; Capt Jaylan Michael Haley, "An Evolution in Intelligence Doctrine: The Intelligence, Surveillance, and Reconnaissance Mission Type Order," *Air & Space Power Journal* 26, no. 5 (September– October 2012), 33–48, http://www.au.af.mil/au/afri/aspj/article.asp?id = 99; and Jason B. Brown and David Vernal, "Time Dominant Fusion in a Complex World," *Trajectory Magazine*, November 2014, http://trajectory magazine.com/got-geoint/item/1840-time-dominant-fusion-in-a-complex-world.html.

4. Dean Milne and Ryan Yoho (intelligence, surveillance, and reconnaissance task force [ISRTF] contract support), and interview by the author, 28 March 2015.

5. Joint Publication 2-01, *Joint and National Intelligence Support to Military Operations*, 5 January 2012, IV–15, http://www.dtic.mil/doctrine/new_pubs/jp2_01.pdf.

6. Joint Publication 2-0, *Joint Intelligence*, 22 October 2013, 2-6; Air Force Tactics, Techniques, and Procedures 3, no. 3, Air Operations Center (AOC), *Operational Employment: Air Operations Center*, 31 January 2014, 6-89–6-124, https://fas.org/irp/doddir/dod/jp2_0.pdf.

7. RAND Project Air Force, *Methodology for Improving the Planning, Execution, and Assessment of Intelligence, Surveillance, and Reconnaissance Operations*, 2008, 14.

8. See, for example, Joint Publication 2-0, chap. 4, Section E; Joint Publication 2-01, chap. 3; Air Force Tactics, Techniques, and Procedures (AFTTP) 3-3, AOC Sections 6.6 and 6.7; and Air Force Basic Doctrine (AFBD) Annex 2-0, *Global Integrated Intelligence, Surveillance, and Reconnaissance Operations*, 29 January 2015, 16–24.

9. RAND, *Methodology,* 12. See also AFBD Annex 3-0, *Operations and Planning*, 5 November 2012, 106–107; and AFTTP 3–3, AOC, 6–124.

10. Joint Publication 2-01, 3-65–3-66 (quotation on 3-66).

11. Joint Publication 2-01.3, *Intelligence Preparation of the Operational Environment*, 21 May 2014, 6-16–6-21.

12. Distributed Common Ground System (DCGS) mission increase numbers were calculated from Air Combat Command (ACC) and 480th Intelligence, Surveillance and Reconnaissance Wing (480 ISRW) archived mission data. Percentage of allocation was calculated from Joint Staff fiscal year 2016 Global Force Management Allocation Plan.

13. Capt Ryan Skaggs, *561st Joint Tactics Squadron Flash Bulletin* 11-02, "ISR Mission Type Order Planning and Execution," 10 January 2011. For a related and foundational discussion, see also Lt Col Jason Brown and Maj Max Pearson, "Theater Intelligence, Surveillance, and Reconnaissance Concept of Operations," *USAF Weapons Review* (Fall 2008): 18–25.

14. Lt Gen Robert P. Otto, *Air Force ISR 2023: Delivering Decision Advantage*, November 2013, 6.

15. Maj Gen John N.T. Shanahan, *25th AF Strategic Plan 2015*, February 2015, 1.

16. For further discussion on this and related points, see Col Jason Brown, "Strategy for Intelligence, Surveillance, and Reconnaissance" (master's thesis, Air War College, Air University, 14 February 2013). Data management, in particular, remains an important emphasis item that falls outside the scope of this paper. For an example see the Headquarters ACC/A2 "ISR Assessment Functional Concept" (currently in draft) and the office of undersecretary of defense for intelligence OUSD(I) "ISR Assessment and [Idea]: A Practical Perspective" (currently in draft) for a more detailed discussion of data management practices and concepts.

17. ISRTF Requirements and Analysis Division, "Improving ISR Effectiveness Assessments," January 2014. See also *Deputy Director, J-7, Future Joint Force Development, the Joint Staff*, "Iron Bullet 15-3 Global ISR Enterprise Management Seminar Quicklook Report," 3 December 2015.

18. USAF AOC doctrine expects that the operational assessment team will participate in all operational assessments, but, in practice, ISR assessments occur within the ISR Division. See *Air Force Basic Doctrine Annex* 2-0, 24; and AFTTP 3-3.AOC, 6-124.

19. RAND, *Methodology*, 14.

Brig Gen Timothy D. Haugh, USAF

Brigadier General Haugh (BA, Lehigh University; MS, Southern Methodist University; MS, Naval Postgraduate School; MS, Industrial College of the Armed Forces) serves as the director of intelligence, US Cyber Command. He has served in a variety of intelligence, cyber, staff, and command assignments. His staff assignments include the Office of the Secretary of Defense, Air Staff, and the Combined Air Operations Center. Brigadier General Haugh commanded the 480th Intelligence, Surveillance, and Reconnaissance Wing, Joint Base Langley–Eustis, Virginia; the 318th Information Operations Group, Joint Base Lackland–San Antonio, Texas; 315th Network Warfare Squadron, Fort Meade, Maryland; and Detachment 2, 544th Intelligence Group, Sabana Seca, Puerto Rico.

Lt Col Douglas W. Leonard, USAF

Lieutenant Colonel Leonard (BS, USAFA; MA, Florida State University; PhD, Duke University) serves as the commander of the 27th Intelligence Squadron, Joint Base Langley–Eustis, VA. He has served in a variety of intelligence assignments at the unit level and served on staffs at Air Combat Command and Headquarters Air Force. Lieutenant Colonel Leonard previously commanded Detachment 5, 544th Intelligence, Surveillance, and Reconnaissance Group, Chantilly, VA.
.