

A Culminating Point for Air Force Intelligence, Surveillance, and Reconnaissance

Col Jon Kimminau, PhD, USAF, Retired

The natural goal . . . therefore is the turning point. . . . If one were to go beyond that point, it would not only be a useless effort which could not add to success. It would in fact be a damaging one.

—Clausewitz, *On War*

The culminating point is the point in time and space at which a force no longer possesses the capability to continue its current form of operations.

—Field Manual 3-0, *Operations*, February 2008

“Would you tell me, please, which way I ought to go from here?”

“That depends a good deal on where you want to get to,” said the Cat.

“I don’t much care where—” said Alice.

“Then it doesn’t matter which way you go,” said the Cat.

“—so long as I get SOMEWHERE,” Alice added as an explanation.

“Oh, you’re sure to do that,” said the Cat, “if you only walk long enough.”

—Lewis Carroll, *Alice’s Adventures in Wonderland*

In 2012 Air Force intelligence, surveillance, and reconnaissance (ISR) finds itself at a culminating point—a place where the demand, disposition, and development of current capabilities, arrayed against future requirements, force some critical decision making. After a decade of war, the service is well postured to operate in permissive environments, deploying sufficient airborne ISR with up to 65 combat air patrols (CAP) and enough processing, exploitation, and

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dissemination (PED) capacity to meet war-fighter and national-level needs. However, in the absence of objectively determined joint requirements, continuing demands for additional CAPs are unsustainable. Additionally, a variety of the Department of Defense's (DOD) independent ISR projects driven by joint urgent operational needs to satisfy a considered shortfall for today's fight calls for review. Funding is becoming scarcer, and evolving defense strategy mandates an accounting of capabilities necessary across the spectrum of military missions, especially the ability to characterize nonpermissive environments. If that were not enough, the information architectures (also known as "info-tectures") that must support previous investments are daunting and may not measure up to undergird the newest capabilities, particularly the need for bandwidth and information sharing.

In this accounting, one must recognize that Air Force ISR enables military missions across the board but remains a key component of the national intelligence community (IC), which is also undergoing radical changes mandated by the Intelligence Reform and Terrorist Prevention Act of 2004. The establishment of the Office of the Director of National Intelligence and the accompanying structural and policy initiatives are broadening and deepening the interdependence of IC members. Demands for information sharing exist at strategic (United States to coalition and allies), operational (IC to interagency, state, local, and tribal), and tactical (IC among its members) levels. We enjoy greater integration of products and services, from the president's daily brief, to the Library of National Intelligence, to counterterrorism and counterproliferation centers and task forces, to joint and interagency intelligence operations centers deployed abroad. Furthermore, we are developing responses to presidential directives, intelligence tradecraft standards, training and education, and product evaluation and personnel certification standards for intelligence analysis. As they experience tremendous infrastructure and budgetary pressures, the Air Force and the other services struggle to keep up with the rest of the IC.

In recognition of the changing security environment and the need to understand and present the Air Force's ISR enterprise as a holistic set of capabilities—not a narrowly prescribed set of remotely piloted aircraft system CAPs—in June 2011 the secretary of the Air Force (SECAF) authorized a comprehensive review of that enterprise. He directed that it establish where the service's ISR is today, where it should be in 2030, and how the Air Force balances current capabilities with future requirements against the backdrop of significant limits on resources. This review, led by the Air Force deputy chief of staff for ISR, in partnership with Headquarters Air Force and lead major commands (MAJCOM), delivered a number of fundamental insights, near-term recommendations, and follow-on SECAF-directed tasks to posture the enterprise for 2014 and beyond. Fundamentally, the Air Force ISR enterprise exists to answer questions. The service provides information superiority, first by understanding the nature of the questions asked by decision makers and then by identifying the best ways to combine resources to supply answers. To better leverage and integrate our capabilities in air, space, and cyberspace, the Air Force needs to invest in reliable information architectures, improved sensors, and platforms and analyst tools, all enabled by analysts trained and educated to transform information from multiple sources into intelligence. To grasp the full scope of this culminating point for Air Force ISR, we must understand the SECAF's ISR review and the rationale for the follow-on tasks.

The Secretary of the Air Force's ISR Review

On 22 June 2011, the SECAF issued the terms of reference for the ISR review, which would “conduct a comprehensive AF ISR review to provide context for and inform senior leader decisions on AF ISR capability development.”¹ The terms of reference were coordinated with key Air Staff and MAJCOM staffs prior to the SECAF's signing the document, with the understanding that the coordinating staffs would be

integral to the review.² The SECAF mandated that the “results of the review be available for leadership consideration by 15 Sep 11.”³

The coordinated staff package for the SECAF indicates that the review sought “to provide the SECAF, Chief of Staff of the Air Force (CSAF), and senior USAF leaders an analytically-based, scenario-informed AF ISR compendium which provides a baseline compilation of capabilities that enable AF ISR missions.”⁴ The baseline used air, space, and cyberspace as the means not only to categorize identified capabilities but also to highlight how the Air Force’s ISR enterprise uses the global communications infrastructure across all domains to enable execution of the ISR mission. Additionally, the baseline specifically highlighted information PED capabilities to detail how Air Force ISR delivers actionable information to decision makers. The review’s in-depth analysis of ISR mission execution contrasted the service’s ISR enterprise capabilities with approved analytic scenarios, thereby exposing needs for and gaps in ISR capability and highlighting how integration of capabilities produces synergy in execution of the mission. Finally, the study emphasized areas that warrant further analysis and offered recommendations for the Air Force’s ISR priorities that could inform discussions about planning and programming. Ultimately, the review represents an integrated core function master plan analysis for globally integrated ISR, one that successfully paves the way towards the 2030 vision (see briefing slide on the next page).⁵

The review team would fulfill this challenging charter by concentrating on in-person research visits to all of the MAJCOMs and agencies involved in the ISR enterprise, both as executors and consumers. These intensive meetings involved a candid sharing of facts and observations concerning current capabilities, operations in the field, demands from the perspective of both resources and future strategy, and indications of preferred and possible futures. Team members consolidated and rigorously analyzed the findings and gaps, reviewing them with participants as well as the Air Staff’s deputy chiefs of staff. After this 90-day effort, three broad findings emerged.

A View of the Future: The 2030 Air Force ISR Enterprise

- Offers a seamless, open-architecture, all-domain, sensor-agnostic, “go-to” information source integrated with Air Force command and control architectures
- Characterizes any target set (air, space, cyber, or terrestrial) as a “network” to enable effects-based targeting and assessment
 - Persistently accesses target sets by necessary means
 - Collaboratively plans all-domain ISR operations as a single entity
- Demands trained/equipped analysts with critical-thinking skills
- Needs secure, reliable, and sufficient information pathways
- Provides fully integrated operations in a networked world
 - Includes operators and intelligence professionals working as a fused team in all domains
 - Requires improving the way we think, train, and operate

Success in war depends on superior information. ISR underpins every mission that the DOD executes.

(Adapted from US Air Force/A2, briefing, subject: SECAF ISR Review Road Show [unclassified version], slide 4, December 2011.)

The Air Force Is Well Postured to Conduct ISR Operations in Permissive Environments

The explosive growth in our ISR capabilities over the past decade has met national needs. We are well on the way to reaching 65 CAPs with MQ-1/9 remotely piloted vehicles, augmented by a variety of manned systems (including Liberty MC-12 aircraft) and quick-reaction forces. The Air Force continuously improves its ISR to consolidate gains. However, we must keep in mind some important caveats. First, this enterprise largely operates in a permissive environment, and signifi-

cant concerns exist regarding viability in challenged and denied environments. Second, we might loosely describe the current force as a “surge” force. That is, we have yet to determine the most efficient long-term or steady-state infrastructure, including numbers, balance between manned and remotely piloted aircraft, and considerations of training, basing, and total force. Lastly, the core of our present capability is airborne; by consensus we have not yet fully incorporated our space and cyber ISR capabilities into the enterprise.

- We still require a mix of manned and remotely piloted platforms.
- Nontraditional ISR (NTISR) will provide more information than ever, but we must improve information-transfer mechanisms.
- Space situational awareness involves more than missile warning and avoiding collisions with objects.
- The cyberspace domain offers incredible opportunities to enable military operations.

We Expect Air Force ISR to Operate across the Spectrum of Operations, Humanitarian Assistance, and Disaster Relief through Major Conflict

Although most of the past decade has seen a counterinsurgency emphasis in operations, we have also made excursions into homeland- and coalition-based crises; the only unexercised operations are large-scale, conventional conflicts. Our experiences have shown the necessity of robust, reliable, and secure information architectures and communications that enable all of our operations. We have sufficiency today but realize that we are not yet ready for tomorrow. Alongside the information architecture requirements, our ability to PED information on ever-shorter timelines demands focused efforts. The expanding volume of data from ISR collection, coupled with greater technological capability, has forced us to adapt organizations, manning, and training as well as exploitation, analysis, and reporting processes. The latter three in particular represent expanding requirements for analyst training

and improved tool suites to reduce time spent on routine data manipulation and monitoring, and to increase it in collaboration, knowledge production, and actionable intelligence. Current operations have also allowed us to adapt how we plan and task our ISR capabilities—both collection platforms and the necessary PED. However, by consensus we must evolve to “mission-driven exploitation” and find the means to apportion, allocate, and task ISR efficiently in full-spectrum operations, especially all-domain antiaccess / area denial operations. Doing this well means that we must integrate command and control (C2) of ISR with other Air Force and joint C2 architectures to realize maximum return on investment.

- Information architectures should account for and integrate PED requirements.
- We need to develop C2 holistically, maintain consistency across domains, consider whole capabilities, and refrain from tying ourselves to individual platforms.
- We should base C2 of ISR and PED resources on information, products, and services rather than link them to platform apportionment.
- Multidomain tipping and cueing can radically change a situation.
- The Air Force should characterize the full spectrum of potential targets in all domains.
- Analysts need training and tools to enable the full capability of PED.

The Demand for Air Force ISR Is Increasing Worldwide and Warrants Prioritization

An anecdote familiar to many senior leaders concerns a numbered air force commander's use of a single slide in 2007 to accentuate a point about ISR. This slide (used effectively in many meetings) depicted a startling contrast between the growth in ISR CAPs and a rough order-of-magnitude measure of combatant command and national ISR requirements. Specifically, for every increase in ISR capability (CAPs in-

crease), the documented needs grew at a greater, expanding rate. This fact underscored what we previously treated as a useful exaggeration: the never-ending appetite for ISR. By 2011 the need for ISR had expanded, and it had arguably become more highly valued—considered the coin of the realm for planning and executing the DOD's and other national agencies' missions. The review team pointed to the Air Force as the lead service for joint PED—by a wide margin—and noted some external expectation that the service's contribution would increase in the future. Due to these factors, the pending rebalance towards the Pacific in national strategy—while we simultaneously maintain effectiveness in the Mideast and other operations—means that we must consider how to prioritize ISR capability, doing so in terms of operations (authorize, apportion, and allocate) as well as resources and policy (organize, train, and equip.)

- Antiaccess / area denial should be a key part of the Air Force's concerns.
- We must refine the global demand from combatant commands and holistically develop future ISR capability to account for requirements and to leverage all domains.
- We should emphasize policy development with respect to multi-level security, thus enabling coordination and collaboration—both within the United States and with coalitions.
- We need to acknowledge persistent ISR as a critical characteristic for air, space, and cyberspace—not just air.

The findings of the review covered considerable airspace. Collectively, they drove near-term recommendations to the secretary and follow-on SECAF tasks to inform the direction of the Air Force's ISR enterprise for the long term. We must address these recommendations and tasks in order to realize the ISR vision embodied in "A View of the Future: The 2030 Air Force ISR Enterprise," the briefing delivered to the service's senior leaders and accepted by the SECAF.⁶ Based on the findings, the recognized need to rebalance capabilities for the future, and co-

ordination with the staffs at Headquarters Air Force and the MAJCOMs, on 28 December 2011 the SECAF directed seven follow-on tasks.⁷

Tasks Directed by the Secretary of the Air Force

Conduct an Analysis of Information Architecture to Frame Air Force Discussions on the Architecture of the Future

As recently as two decades ago, intelligence—for the most part—remained product oriented, delivered in material forms (e.g., books, charts, photos, overhead slides, articles, and artifacts). Now it has become not only mostly digital but also dynamic with interactive delivery, to the extent that we more often refer to ISR as products *and services*. Similarly, in the past the links between collection and analysis—or between sensors and PED—were electronic but self-contained, part and parcel of the particular, individual ISR system. Today, the connections consist of multiuse fiber and communications pathways, and systems acquired already depend upon a communications architecture not part of the acquisition. The information-architecture communications enterprise supplies the bandwidth, routing, distribution, and security that links platforms, sensors, operators, PED, and the myriad of ISR consumers. It is the “long pole” in the tent for the future of ISR.

This task frames the Air Force’s discussion on information architecture for the purpose of surveying current, near-term, and midterm modernization/integration efforts and plans in order to identify the requirements for that architecture’s future capabilities. Rather than limit itself to any of the arenas of C2, ISR, or space situational awareness, it will include all information requirements. Air Force Space Command serves as the lead for this task.

Acquire and Develop Framework Tools to Enable Capability-Based Planning and Analysis of the Air Force ISR Enterprise's Platform, Sensor, and PED Requirements to Feed Core Function Master Plans

Air Force developmental planning is in the midst of a transformation, one that links strategic planning to capability-based planning and analysis for the service's 12 core functions. Those strategic, developmental plans are core function master plans, with globally integrated ISR the plan behind the Air Force's ISR enterprise. The ISR review identified the massive issues involved in conceptualizing, analyzing, testing, and prioritizing ISR capabilities related to people, platforms, sensors, and PED. If we wish to advance the enterprise towards the 2030 vision, we must have tools and systems to support our planning and analysis.

This task addresses how to better inform trade-space decisions concerning multidomain and multimission Air Force ISR. We need to develop holistic capability-based planning and analysis tools and data models to inform trade-off decisions about sensor, platform, automated PED, and communications architecture capability for our current and future needs. The investment of effort will go towards refining tool requirements, selection of tool candidates, development and customization of data models, and performance of ongoing "what-if" analyses. Though focused on tools to support the globally integrated ISR core function lead integrator, the recommendations from this effort will support multiple integrators. The Air Force Deputy Chief of Staff for Intelligence, Surveillance, and Reconnaissance (AF/A2) serves as the lead for this task.

Develop a Road Map for ISR Automated Tools and Analyst Visualization Tools

The ISR review capitalized on nearly a decade of other studies, commission inquiries, and after-action reports, together with their observations and recommendations concerning all aspects of ISR. An observation that spans all of these has to do with intelligence analysis—the cognitive or thinking activity that converts processed information into

intelligence through the integration, evaluation, interpretation, and prediction of all-source data to deliver intelligence products and services in support of known or anticipated user requirements.⁸ Four critical needs recur with regard to intelligence analysis: (1) *training* and professionalizing analysts, (2) increasing and even amplifying the *collaboration* and teaming of analysts, (3) using *automation* to reduce the time that analysts spend on mundane monitoring and routine data manipulation, and (4) increasing analysts' *visualization* and creativity with data and information. At the heart of all PED requisites are intelligence analysts and their tools and systems. If we mean to transform our PED for the future, we must tackle the core task of people-dependent analysis.

This task involves two major facets. The first is an effort to gather, review, and prioritize all recommendations for ISR enterprise analysis tools or systems to shape our fiscal year 2015 planning along three dimensions: automation (connecting data to data), collaboration (connecting people to people), and visualization (connecting people to data.) The second entails an intensive effort to go behind the term *road map* and refine the Air Force's processes for technology insertion, development, testing, and operational demonstration of analysts' tools. Doing so would improve how we identify their needs and potential solutions to quickly deploy the best "bang for the buck." AF/A2 serves as the lead for this task.

Develop a Distributed Common Ground System Road Map with Specific Measures to Implement Service-Oriented Architecture and the Ability to Synergize PED for All Air, Space, and Cyber Platforms and Sensors

Arguably the Air Force has the broadest vision among the joint partners for what the distributed common ground system (DCGS) is today and can become, with respect to the ISR enterprise. That vision embraces a globally distributed, regionally focused PED system that is sensor agnostic, robust, and survivable—one that encompasses air,

space, and cyberspace. Today's Air Force DCGS equates to globally distributed, regionally focused PED for most of our airborne platforms and sensors. The current baseline system comprises both proprietary and government systems that require significant lead time for the integration of new software capabilities. Other prominent studies buttressed the ISR review by strongly recommending that the DCGS migrate to an open-software architecture (service-oriented architecture [SOA]) which facilitates technology insertion and collaborative software development. Central to a SOA system is the idea of an inventory of applications that operators can access to perform all aspects of planning, direction, collection, processing, exploitation, analysis, production, and dissemination. We can rapidly add, modify, and update these applications in a SOA, thereby eliminating the effects of proprietary systems and long lead times.

This task seeks to develop specific actions to move the Air Force's DCGS to a SOA cloud architecture, aligned with the service's DCGS strategic vision and the Defense Intelligence Information Enterprise of the Under Secretary of Defense for Intelligence. It includes the tasks of completing, coordinating, and improving the Air Force's DCGS vision, in addition to identifying the acquisition requirements and phases that will move the current system to a SOA with no interruption in service to our war fighters. AF/A2 serves as the lead for this task.

Develop an Air Force Targeting Road Map to Outline Requirements That Satisfy Target-Folder-Development Support to War Fighters, Including Space and Cyberspace Target Sets

Targeting has a rich history as a specialized operation of ISR and as an expertise of the Air Force at the strategic level. According to Air Force Doctrine Document 3-60, *Targeting*, it is "the process for selecting and prioritizing targets and matching appropriate actions to those targets to create specific desired effects that achieve objectives, taking account of operational requirements and capabilities."⁹ The ISR review exposed a deteriorating situation for targeting. Specifically, since the late 1990s,

the combination of force restructuring, operational needs in a counter-insurgency environment, and service and DOD efficiency initiatives contributed to the atrophy of targeting capabilities across the board. Another critical factor, however, exerted a compounding influence. During that same time period, technological advances and new platforms, sensors, and munitions similarly transformed targeting requirements—the classic targeting folders and weaponeering process had changed into something both digital and dynamic. The result, underscored by experiences in Odyssey Dawn (the operation to enforce United Nations Security Council resolution 1973 in Libya), is that Air Force targeting now lacks sufficient capacity to remain effective within the context of future planning scenarios. Moreover, the development of targeting capabilities is ad hoc and reflects neither the expansion of targeting into space and cyber domains nor the nuances of emerging targeting concepts.

This task endeavors to set a direction for reinvigorating the Air Force's targeting enterprise to address unmet air, space, and cyberspace targeting demands. It will drive changes in targeting concepts of operations; tactics, techniques, and procedures; and training, including improved integration with joint force targeting mechanisms and coalition warfare. Air Combat Command, home of the Air Force Targeting Center, serves as the lead for this task.

Develop a Nontraditional ISR Road Map to Include Platform and Sensor Mix, Requirements for Communication Pathways, Development of Concepts of Operation, and Demands for Personnel Training

According to an anecdote, in the fall of 2002, an F-16 pilot and an intelligence officer found themselves grappling with how to coordinate the use of information from nonreconnaissance and nonsurveillance weapons systems and platforms, asking themselves what they should call this mission. The answer: NTISR.¹⁰ A decade later, the concept still describes any sensor (one not primarily used for ISR) employed as

part of an integrated collection plan developed at the operational level for preplanned, on-call, ad hoc, and/or opportune collection. NTISR has gained prominence in today's environment due to technological advances—the ability to pack ever-more advanced electronics into platforms such as the F-22—and to technological multifunctionality (think of a cell phone that can communicate, schedule, record, calculate, photograph, take local temperature, and locate itself by means of the Global Positioning System). Together, these advances indicate that literally any platform or system in our inventory may be capable of contributing to intelligence collection. If we can simply plan how to do it and link it into the ISR enterprise, we may create a multiplying effect on our ISR operations at reduced additive cost. This is why the ISR review identified NTISR as a potential “game-changer.”

This task sets a clear vector for the development of NTISR, addressing the full spectrum of potential capabilities of tactical platforms, including the “realm of the possible.” Air Combat Command serves as the lead for this task.

Develop a PED Apportionment Model and Associated Road Map That Models Manpower Based on Air-, Space-, and Cyberspace-Fused Information Requirements—Not Apportioned Platforms

For many years, we have generally calculated the manpower necessary for a large ISR system as an ideal package of bodies (analysts, maintainers, managers, and reporters) multiplied by the average number of platforms assigned or attached to a base unit. Within this steady-state foundation, when ISR platforms were allocated/apportioned to theater commanders, we assumed that we had PED resources available and in place. The last decade of operations showed that those calculations and procedures amounted to more than a problem—the dynamic nature of taskings, the growth in number of platforms, and the distributed nature of PED ground systems made it nearly impossible to tie PED resources directly to particular platforms. Since 2007 the joint community (particularly the Joint Functional Component Command

for ISR under US Strategic Command) has been developing ideas for a different apportionment system, one that associates PED “resource units” to war fighters’ information needs instead of one that drives allocation by platform. But this is a difficult problem, and even by 2011 we had not implemented a clear, joint-coordinated solution.

This task builds a way ahead, complete with plans of action and milestones, for enabling efficient allocation and apportionment of PED for airborne sensors and platforms. Additionally, it will encompass the allocation/apportionment of PED for space and cyber sensors as well as platforms. Altogether, the model seeks to enable apportionment of PED resources based on information requirements and associated information products, moving away from the model that ties manpower to airborne (or particular) platforms apportioned. AF/A2 serves as the lead for this task.

Conclusion

These seven SECAF tasks do not represent all the recommendations given to Air Force leadership; other near-term recommendations received approval and are in progress today. Instead, the tasks constitute the follow-on, top-priority, demanding problems that we must address soon if we want the Air Force’s ISR enterprise to manage current operations successfully, navigate resource limitations, embrace shifts in national strategy, and progress towards a new vision—doing all of this simultaneously. The tasks demand quarterly updates to the SECAF, and a one-year deadline (the end of calendar year 2012) for completion.

In warfare, military leaders who had the foresight and wisdom to recognize a culminating point in battle and make the appropriate changes in forces and actions at the right time and place enjoyed success. The tremendous progress of the Air Force’s ISR in the last decade, together with new resource constraints, a rebalancing of defense strategy and force posture, and continuing requirements of the current fight, presented Air Force leadership with its own culminating point

for ISR in 2011. In response, the SECAF and his staff have put into action a multipath program that will inform the program objective memorandum for fiscal year 2015 and set the long-term Air Force ISR enterprise way ahead. This is the story and legacy of the Air Force's ISR Comprehensive Review of 2011. ★

Notes

1. Hon. Michael B. Donley, Staff Summary Sheet (signed), 22 June 2011; and Hon. Michael B. Donley, *Intelligence, Surveillance, and Reconnaissance Review Terms of Reference* (Washington, DC: Secretary of the Air Force, 22 June 2011).

2. The staffs included those of the following organizations: Chief of Staff of the Air Force; Under Secretary of the Air Force; Vice Chief of Staff of the Air Force; Assistant Vice Chief of Staff of the Air Force; Air Force Executive Action Group; Air Force Deputy Chief of Staff for Personnel; Air Force Deputy Chief of Staff for Intelligence, Surveillance, and Reconnaissance; Air Force Deputy Chief of Staff for Operations; Air Force Chief of Warfighting Integration and the Chief Information Officer; Air Force Deputy Chief of Staff for Plans and Programs; Air Force Deputy Chief of Staff for Analyses, Assessments, and Lessons Learned; Air Force Historian; Assistant Secretary of the Air Force (Acquisition); Air Force Reserve Command; Air National Guard; Air Force Global Strike Command; Air Combat Command; Air Force Materiel Command; Air Force Space Command; and Air Force Special Operations Command.

3. Donley, *Review Terms of Reference*, 1.

4. Donley, Staff Summary Sheet.

5. Ibid.

6. US Air Force/A2, briefing, subject: SECAF ISR Review Road Show (unclassified version), slide 4, December 2011.

7. Hon. Michael B. Donley to key Headquarters Air Force deputy chiefs of staff, deputy undersecretaries, and MAJCOM commanders, memorandum, 28 December 2011.

8. This definition, which captures common elements from multiple DOD and intelligence community definitions of analysis, has its primary basis in Joint Publication 2-0, *Joint Intelligence*, 22 June 2007, http://www.dtic.mil/doctrine/new_pubs/jp2_0.pdf, and the tier-two concepts of joint capability area battlespace awareness.

9. Air Force Doctrine Document 3-60, *Targeting*, 8 June 2006 (incorporating change 1, 28 July 2011), 1, <http://www.e-publishing.af.mil/shared/media/epubs/afdd3-60.pdf>.

10. Lt Col Lewis D. Hill, USAF, retired, "An Airman's View of NTISR," *Air Land Sea Bulletin* 2007-3 (September 2007): 5-6, <http://www.alsa.mil/library/alsb/ALSB%202007-3.pdf>.



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