# Capability Planning and Analysis to Optimize Air Force Intelligence, Surveillance, and Reconnaissance Investments

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Intelligence, surveillance, and reconnaissance (ISR) capabilities have expanded situation awareness for U.S. forces, provided for more precise combat effects, and enabled better decision making both during conflicts and in peacetime. Furthermore, reliance on ISR capabilities is expected to increase in the future. This report reviews the current approach to the Air Force corporate planning and programming process for ISR capability generation and the various analytical methods, processes, and models for large scale, complex domains like ISR. It also identifies best practices and applies the current approach and recommended best practices to the Air Force corporate planning and programming process for ISR in the context of the future Joint, National, and coalition partner environment. Finally, the report recommends improvements/changes to existing analytical tools, methods, roles/responsibilities, organization, and management that would be required to ensure the Air Force corporate planning and programming process for ISR is successful in addressing all Joint, National, and Coalition partners' needs.
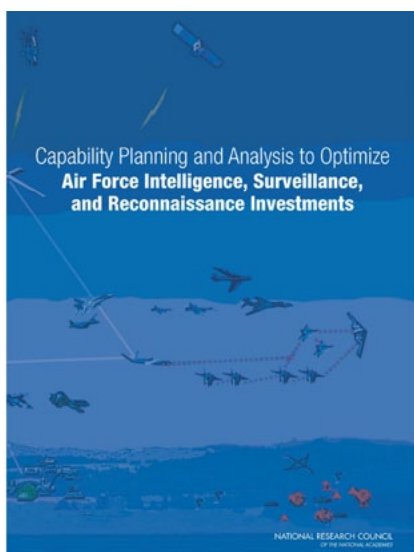
Introduction and Background

The rapid growth and evolution of the use of Air Force ISR capabilities since September 11, 2001 have been focused largely on immediate requirements dictated by the wars in Afghanistan and Iraq.

Managing this enterprise intelligently has involved many challenges, including the following:

- The diverse mission and information requirements in the military services and the intelligence community (IC);

- The diverse domains in which ISR operates (space, air, ground, sea, undersea, and cyberspace);

- The need to balance joint versus organic ISR assets, and command and control;

- The need to balance rapid-acquisition capabilities that will satisfy urgent warfighter needs versus capabilities that will satisfy long-term strategic goals; and

- The need to balance sensor data-collection capability against capabilities for planning and direction, collection, processing and exploitation, analysis and production, and dissemination (PCPAD).

Air Force ISR, defined by the U.S. Department of Defense as "[a]n 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" to enable capabilities that are particularly critical to three of the 12 Service Core Functions. These are Global Integrated ISR (GIISR) and the ISR components of Cyberspace Superiority and Space Superiority, in addition to other functions that are supported by ISR capabilities.

Air Force ISR Capability Planning and Analysis Process

Given the increasingly competitive, congested, contested, and connected global environment, the U.S. military will continue to face numerous national security risks from a wide spectrum of real and potential adversaries. To this end, the DoD is increasingly encouraging closer working relationships between services and the IC in order to reduce redundancy of effort and funds expended. The Air Force also can improve its processes for contributing ISR capabilities to other Services and the intelligence community.

The importance of ISR systems in providing critical, essential, affordable contributions to our national security, including indications and warning, missile defense, and global strike, cannot be overstated. At the same time, there is a significant disconnect between those who view managing ISR as simply acquiring and managing more platforms versus acquiring and managing capability.

The value inherent in the proposed ISR CP&A process is sevenfold in that it enhances the quality, transparency, repeatability, and credibility of proposed investments; provides greater insight into cost, risk, and mission utility assessments; scales from quick-look through long-term analyses; expands the consideration and analysis of Joint and interagency capabilities; more fully addresses all ISR domains (air, space, land, maritime, cyberspace); encompasses the complete "sensor-to-user" chain including PCPAD; and reduces the amount of time and labor required to answer investment questions.

Summary of Selected Report Findings

The current CP&A process employs subject-matter experts from across the service who consider strategic guidance, analyze operational needs, determine operational gaps, conduct risk and solutions analysis, and produce a master plan to guide investment. There is considerable reason and need to improve the present processes, especially to account for new ISR needs in the cyberspace and space domains. Key findings are summarized below. The full NRC report includes a complete list of detailed findings.

Finding 2-1. The responsibility for evaluating and informing decisions about Air Force ISR capabilities is diffuse, overly personnel-intensive, and divided among many organizations, resulting in an excessively lengthy process. Specifically, the respective roles and responsibilities of the AF/A2 and the GIISR Core Function Lead Integrator (CFLI) are not well defined or well understood, and appear disconnected. Both the ISR CP&A and the CFLI processes have positive aspects, but the processes are immature and insufficiently integrated.

Finding 2-2. The Air Force ISR planning process lacks adequate process definition and formal interaction between the Space Superiority, Cyberspace Superiority, and GIISR CFLIs. It also does not rigorously integrate ISR contributions from other military services, the IC, and the Office of the Secretary of Defense. Consequently, the Air Force process does not yield ISR investment priorities across domains and security constructs. The Air Force needs increased awareness of what capabilities it provides, along with the IC and other services, to the Joint fight to reduce duplication of effort and funds expended.

Finding 2-3. Air Force platforms do not appear to be included in Air Force cyberspace-related planning processes, even though cyberspace vulnerabilities do exist onboard platforms and in the connectivity between them. Moreover, cyberspace functions can play a very positive role in support of ISR and ISR systems can help support cyberspace functions. Additionally, the complexity of the multi-organizational relationships involved in current DoD and IC interactions leads to confusion in both execution and planning processes, particularly for cyber operations.

Finding 2-4. The Air Force lacks integrated modeling and simulation and analysis tools that provide traceability from requirements to capability and that conduct operationally-relevant ISR trade-space analysis across the doctrine, organization, training, materiel, leadership and education, personnel, facilities, and policy (DOTMLPF-P) framework and within and across air, space, and cyberspace domains.

Finding 2-5. The Air Force corporate process "disassembles" the ISR portfolio planning analysis, classifies the elements into isolated, or stovepipe, function components, and then makes trade-offs and/or decisions without the ISR trade-space underpinnings.

Finding 2-6. The ISR CP&A process lacks the ability to respond in a timely way with appropriate fidelity to meet the increasing speed of technology development, operational requirements, and the required decrease in planning-cycle time, particularly in the cyberspace domain.

Finding 2-7. PCPAD is not adequately considered and prioritized by the ISR CP&A process.

Finding 2-8. The ISR CP&A process does not adequately consider affordability in capability trade-space analysis.

Finding 3-1. The U.S. Army's Integrated Sensor Coverage Area (ISCA) construct uses a process that links requirements analysis with force development and portfolio management in a way that helps synchronize planning and execution. Keys to this linkage are the ISCA analytical underpinnings and the methodology that enables sensor-platform aggregations. Additionally, the ISCA construct uses measured performance to inform acquisition decisions in a manner that lends transparency, responsiveness, and repeatability.

Finding 3-2. The U.S. Navy's capability-based process is collaborative across the Department of the Navy and is synchronized with the planning, programming, budgeting, and execution system and system acquisition life cycles. The process can be streamlined to address urgent needs. The process deals largely with naval requirements; utilizes existing PCPAD/TCPED (tasking, collection, processing, exploitation, and dissemination) architectures; and connects with other ISR enterprise providers through the Office of the Under Secretary of Defense for Intelligence (OUSD[I]).

Finding 3-3. The CP&A-like process employed by OUSD(I) addresses ISR enterprise concerns across the DoD and the IC and includes consideration of the capabilities of enterprise networks and PCPAD and TCPED. The OUSD(I) recognizes the need to improve the capability development process in the following ways: (1) by attaining better upfront fidelity on trade-offs involving cost and schedule and performance; (2) by providing more analytic rigor and risk/portfolio analysis; (3) by placing stronger emphasis on prioritizing requirements and capabilities; and (4) by strengthening the alignment of the acquisition process.

Finding 3-4. Booz Allen Hamilton's Capabilities-Based Portfolio Management process requires leadership engagement, diverse skill sets to analyze a portfolio, and stakeholder participation and transparency. The resulting assessments are repeatable and rigorous enough to enable long-term planning, yet agile enough to incorporate new scenarios, priorities, and missions. The process includes the modeling of extant TCPED and communications architectures, which yields more realistic estimates of cost and performance and risk. Although many results are scalable, any consideration of broader, more complex enterprises requires good analytical judgment for the development of the right approach.

Finding 3-5. TASC's capability-based assessment process employs Multi-Resolution Analysis (MRA), which in turn allows the complexity of ISR to be handled in a straightforward, transparent, tailorable, scalable, repeatable manner, incorporating a suite of tools that are optimized for a specific purpose. Such an approach can support a wide range of decisions and decision time lines.

Finding 3-6. RadiantBlue's modeling, simulation, and analysis capability focuses on the physics-based capability and architecture analysis and mission utility analysis found in MRA. The BlueSim tool, combined with their methodology, has been used to successfully support trade space studies of various ISR and PED architectures.

Summary of Report Recommendations

Recommendation 4-1. The Air Force should adopt an ISR CP&A process that incorporates the following attributes:

- Encompasses all ISR missions;
- Addresses all ISR domains and sources;
- Includes all ISR assets in a sensor-to-user chain (e.g., PCPAD and communications);
- Collaborates with ISR-related entities;
- Provides traceability from process inputs to outputs;
- Is mission/scenario-based;
- Is repeatable and enduring;
- Supports trade-off analyses;
- Is scalable in size, time, and resolution; and
- Reduces labor and cost over time.

Recommendation 4-2. The Air Force should evolve its ISR CP&A process to an integrated overarching ISR investment process with clear organizational responsibility identified for each subprocess.

Recommendation 4-3. The Air Force should adopt the proposed ISR CP&A process by incrementally building on its existing process using pilot projects. The scope of each pilot project should be compatible with available resources, be relevant to both current and future mission scenarios and include metrics to measure achievement of the desired improvements (such as, manpower reductions and increased timeliness).

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