INTELLIGENCE, SURVEILLANCE, AND RECONNAISSANCE OPERATIONS

Air Force Doctrine Document 2-9
17 July 2007

This document complements related discussion found in Joint Publication 2-01, *Joint and National Intelligence Support to Military Operations*

BY ORDER OF THE
SECRETARY OF THE AIR FORCE

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SUMMARY OF CHANGES

This document is substantially revised and must be completely reviewed. It updates the definition of intelligence, surveillance, and reconnaissance (ISR) to mirror the joint definition (Chapter 1). In an effort to refocus the document on operational-level doctrine, the ISR application section was deleted in its entirety, and more emphasis was placed on ISR principles by expanding this section to include the principles of persistence, global reach, and network centricity. Chapter 2 introduces predictive battlespace awareness and its association with the ISR process. The terms used to identify the ISR process are updated to match the joint process, with each step in the process expanded. The effects-based approach to operations and the ISR process are introduced. The section on unmanned or remotely piloted vehicles is updated to reflect new capabilities and expanded employment (Chapter 3). Tasking, processing, exploitation, and dissemination systems are introduced, as well as a discussion on alternative sources for surveillance and reconnaissance. Finally, the new structure for assessment is introduced and mirrors Air Force Doctrine Document 2-1.9, *Targeting*. Chapter 4 is completely revised to more clearly illustrate command relationships. A new section on the ISR division of the air and space operations center is provided to show the organization and its role. A new section that discusses intelligence authorities is provided. With the increased availability of surveillance and reconnaissance capable airborne platforms, a new section is provided to discuss the multi-role platform employment and sensor control.

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FOREWORD

Intelligence, surveillance, and reconnaissance (ISR) functions from the air first date back to the use of balloons to observe the adversary during the French Revolution. One of the first missions for military aircraft was observation. Today, as in the past, we observe and analyze the meaning and impact of a wide variety of events and convey useful, timely intelligence on our adversaries' capabilities and intentions to our commanders.

Using doctrine as the foundation, the Air Force is following a transformational vision of networked and linked sensors that is shrinking the sensor-to-shooter cycle and is giving commanders greater situational awareness and better predictive intelligence necessary to achieve decision superiority and battlefield dominance. ISR technology provides us a clear advantage and no commander would want to reverse the direction the Air Force is following. However, our greatest ISR resource is our Airmen. In the best tradition of American ingenuity, our Airmen are constantly finding new and innovative uses for current and developing technology that give commanders a competitive advantage and enable them to create effects across the range of military operations. We have come a long way from the days of wondering what is going on just over the next hill, or half a world away. Through proper employment and integration of ISR capabilities, the Air Force will continue to provide decision makers at all levels of command the intelligence information needed to make policy, acquire capabilities, create strategy, conduct operations, and protect America from its adversaries.

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INTRODUCTION

PURPOSE

This Air Force doctrine document (AFDD) establishes doctrinal guidance for fundamental principles and operational-level Air Force doctrine for intelligence, surveillance, and reconnaissance (ISR) and supports basic Air Force doctrine. It should be used to plan, prioritize, task, coordinate, and execute ISR operations.

APPLICATION

This AFDD applies to the Total Force: all Air Force military and civilian personnel, including active duty, Air Force Reserve Command, and Air National Guard units and members.

The doctrine in this document is authoritative, but not directive. Therefore, commanders need to consider the contents of this AFDD and the particular situation when accomplishing their missions. Airmen should read it, discuss it, and apply it.

SCOPE

Air Force intelligence, surveillance, and reconnaissance doctrine provides guidance for ISR participation in Air Force missions. A common doctrine, shared by all elements of a Service, helps ensure intelligence, surveillance, and reconnaissance organizations provide their commanders and forces with timely, accurate, and relevant information. Doctrine is a guide for the exercise of professional judgment rather than a set of inflexible rules. It describes our understanding of the best way to do the job. The doctrinal statements in this document are general—they are to be implemented through tactics, techniques, and procedures. These are articulated in unified and major command and field operating agency publications, as well as unit concepts of operations, operations plans, and other supporting documents.

FOUNDATIONAL DOCTRINE STATEMENTS

Foundational doctrine statements are the basic principles and beliefs upon which Air Force doctrine documents (AFDDs) are built. Other information in the AFDDs expands on or supports these statements.

- The goal of intelligence, surveillance, and reconnaissance (ISR) operations is to provide accurate, relevant, and timely intelligence to decision makers. The Air Force best achieves this goal through effective employment of ISR capabilities, and by capitalizing on the interoperability existing among our ISR systems, as well as non-traditional sources, to create synergy through integration. (Page 1)

- Air Force surveillance and reconnaissance assets are not inherently strategic, operational, or tactical in nature; they can be used to gather information to meet requirements at all levels of warfare. (Page 2)

- Intelligence products must enable strategic, operational, and tactical users to visualize the operational environment systematically, spatially, and temporally, allowing them to orient themselves to the current and predicted situation to enable decisive action. (Page 4)

- Planning and direction of ISR operations start with the identification of needs for intelligence regarding all aspects of the operational environment. (Page 9)

- The joint force air and space component commander (JFACC) typically serves as the supported commander for theater airborne and spaceborne reconnaissance and surveillance and provides integrated airborne ISR for the joint force commander (JFC). (Page 13)

- The JFC normally delegates operational control to the commander of Air Force forces or tactical control to the JFACC of airborne ISR assets who will task them to support combat operations via the air tasking order. (Page 40)

- The air and space operations center is the best facility to integrate the JFC's theaterwide airborne ISR capabilities, to include reachback and distributed operations ISR support. (Page 41)

- Mission objectives, priorities, and guidance for multi-role systems employment and the authority to task the weapon system must be clear and preferably worked out well in advance of mission execution. (Page 46)

CHAPTER ONE

INTELLIGENCE, SURVEILLANCE, AND RECONNAISSANCE (ISR) VALUE TO OPERATIONS

What enables the wise sovereign and the good general to strike and conquer, and achieve things beyond the reach of ordinary men, is foreknowledge.

—Sun Tzu
The Art of War

ISR DEFINED

Joint Publication (JP) 1-02, *Department of Defense Dictionary of Military and Associated Terms,* defines intelligence, surveillance, and reconnaissance as an activity that synchronizes and integrates the planning and operation of sensors, assets, processing, exploitation, and dissemination systems in direct support of current and future operations. This is an integrated intelligence and operations function.

The goal of ISR operations is to provide accurate, relevant, and timely intelligence to decision makers. The Air Force best achieves this goal through effective employment of ISR capabilities, and by capitalizing on the interoperability existing among our ISR systems, as well as non-traditional sources, to create synergy through integration. Synergy is defined as the interaction of individual parts so that the total effect produced by working together is greater than the sum of individual efforts. Together, ISR operations provide the commander the intelligence and situational awareness necessary to successfully plan and conduct operations.

ISR operations are a significant part of the overall goal of achieving decision superiority. Decision superiority is the competitive advantage, enabled by an ongoing situational awareness, that allows commanders and their forces to make better-informed decisions and implement them as fast and effectively as the situation warrants. Decision superiority is about improving our ability to observe, orient, decide, and act (OODA loop) faster and more effectively than the adversary. ISR is the life blood of effective decision making.

Intelligence, surveillance, and reconnaissance are often referred to as a collective whole, though the capabilities are distinctive and each fulfills a different purpose. These distinctive capabilities are defined below:

"Intelligence is the product resulting from the collection, processing, integration, analysis, evaluation, and interpretation of available information concerning foreign countries or areas; it is the information and knowledge about a topic obtained through observation, investigation, analysis, or understanding." (JP 1-02)

"Surveillance is the systematic observation of aerospace [sic], surface or subsurface areas, places, persons, or things, by visual, aural, electronic, photographic, or other means." (JP 1-02) The Air Force perspective emphasizes that surveillance operations are sustained operations designed to gather information by a collector, or series of collectors, having timely response and persistent observation capabilities, a long dwell time and clear continuous collection capability.

"Reconnaissance is a mission undertaken to obtain, by visual observation or other detection methods, information about the activities and resources of an enemy or potential enemy, or to secure data concerning the meteorological, hydrographic, or geographic characteristics of a particular area." (JP 1-02) The Air Force perspective emphasizes that reconnaissance operations are transitory in nature and generally designed to collect information for a specified time by a collector that does not dwell over the target or in the area.

The information derived from surveillance and reconnaissance, converted into intelligence by exploitation and analysis, is used to formulate strategy, policy, and military plans; to develop and conduct campaigns; guide acquisition of future capabilities; and to protect, prevent, and prevail against threats and aggression aimed at the US and its interests. **Air Force surveillance and reconnaissance assets are not inherently strategic, operational, or tactical in nature; they can be used to gather information to meet requirements at all levels of warfare.** ISR operations are conducted across the range of military operations from peace, to war, to conflict resolution. Combatant commanders typically employ assigned and attached forces through their J-2 staff for day-to-day management of ISR forces. When a joint task force (JTF) is created, the joint force commander (JFC) integrates the actions of assigned, attached, and supporting ISR forces within the operational area. Command and control (C2) of airborne ISR is usually delegated to the joint force air and space component commander (JFACC).

To be more specific, the JFC employs forces assigned or attached to the JTF to achieve campaign objectives. The JFC may retain operational control (OPCON) over airborne ISR assets or delegate it to the JFACC. The JFACC is in the best position to integrate space ISR assets through the air and space operations center (AOC). The JFC's staff develops an overall collection strategy and posture for the execution of the ISR mission. The JTF J-2 reviews, validates, and prioritizes all outstanding intelligence requirements, whether originating from the JTF J-2 staff or a component. The JFC

normally delegates OPCON or tactical control (TACON) of theater controlled, airborne ISR assets (except those organic to combat units) to the JFACC who will allocate them to support operations via the air tasking order (ATO).

STRATEGIC, OPERATIONAL, AND TACTICAL ISR

ISR supports strategic, operational, and tactical operations by providing intelligence and services to a diverse set of consumers, to include national agencies; geographic, functional, or Service components; and unit-level decision makers. Air Force ISR professionals provide valuable contributions at all levels of operations.

Strategic

Air Force ISR systems provide intelligence required at the strategic level to formulate national strategy, policy, and plans. The goal of strategic-level ISR is to provide accurate, timely, and predictive intelligence to enable decision makers to take appropriate actions before crises develop and to support the decision makers as crises unfold. Intelligence is also a key player in research and development, weapon system acquisition, force protection planning and programming, and other national-level programs.

Operational

Air Force ISR systems provide intelligence crucial to planning and executing theaterwide operations to accomplish the JFC's objectives. For example, campaign planners rely on ISR to provide the intelligence crucial to understanding an adversary's weaknesses and key nodes that can be affected by air, space, land, maritime, and information operations. Intelligence analysis helps detect/discover, identify, locate, and describe the vulnerable, vital elements of an adversary's physical and virtual structure and their centers of gravity (COG). Finally, ISR provides the means to assess the effects of current operations.

Tactical

ISR support at the tactical level of operations is primarily focused on tactical threat warning, mission planning, targeting, and assessment. Threat assessment, although performed at every level of military operations, is most common and critical at the tactical level. ISR tasks such as current assessment and defense penetration and warning are guided at the unit level by tailored tactics, techniques, and procedures. Required intelligence, such as target imagery, should be immediately available to support the ATO and mission planning cycle. Wing and squadron personnel also provide valuable information to the ISR process with annotated aircraft cockpit videos and reports based on aircraft sensors and aircrew debriefs. These inputs directly impact campaign assessment and reattack targeting decisions.

ISR PRINCIPLES

ISR operations provide intelligence information to commanders and decision makers at all levels, helping them reduce uncertainties in the decision-making process. It is precisely because intelligence supports all levels of policy, planning, and decision making that ISR is now presented in Air Force doctrine as a keystone publication (previously organized under information operations).

To be effective, ISR products must be responsive to the commander's or decision maker's needs. **Intelligence products must enable strategic, operational, and tactical users to better understand the operational environment systematically, spatially, and temporally, allowing them to orient themselves to the current and predicted situation to enable decisive action.** By adhering to the principles listed below, ISR personnel and systems can maximize intelligence support to consumers.

Integrated

Surveillance and reconnaissance operations and the intelligence process should be fully integrated to meet the timeliness and accuracy requirements of air, space, and cyberspace power. A close relationship between the ISR process and strategy, planning, and execution functions will foster the flow of essential information. The commander considers both the capabilities and limitations of ISR systems and organizations in the decision-making, planning, preparation, execution, and assessment processes. Similarly, as an essential element of all Air Force operations, ISR personnel should be fully aware of mission goals and objectives and integrated into the operational environment at all levels.

Accurate

To best support Air Force operations, ISR-derived products should be as accurate as possible. Accuracy implies reliability and precision. This requires corroboration and analysis of all available information. Extensive knowledge of adversary strategy, tactics, capabilities, and culture enables ISR personnel to anticipate actions and provide the most complete and exact picture possible to planners and operators. Accuracy also aids commanders in defeating adversary deception efforts. Geoposition accuracy is a crucial requirement for targeting, especially with the employment of precision-guided munitions. Sensors acquire information that enables targeteers to produce target locations or aim points suitable for the accurate employment of specific weapon systems. Lastly, one of the most demanding tasks for ISR personnel during emerging crises is the need to balance requirements for accuracy with timeliness (defined below). Judging the appropriate balance between accuracy and expediency requires very close coordination with operations planners.

Relevant

Relevance in ISR means the ISR product is tailored to the requestor's needs. Intelligence and collection requirements should directly apply to determining, planning, conducting, and evaluating operations. Intelligence should focus on the commander's potential, planned, and ongoing courses of action. Ensuring the relevance of intelligence to the requestor means that ISR planners should consider the suitability of specific surveillance and reconnaissance assets to achieve the commander's objectives. Planning the employment of surveillance and reconnaissance assets is based on an asset's capability and its suitability, within the context of the overall collection plan, to meet user requirements. Suitability also applies to the format of the processed intelligence. Both the information and the format should be useful to the user.

Timely

ISR products should be available in time to plan and execute operations as required. This principle applies to identifying and stating requirements, collecting information, and producing actionable intelligence. Timely intelligence is essential to prevent the use of surprise by the adversary, conduct defense, seize the initiative, and use forces effectively. The dynamic nature of ISR can provide information to aid in a commander's decision-making cycle and constantly improve the commander's view of the operational environment. The responsive nature of Air Force surveillance and reconnaissance assets is an essential enabler of timeliness if Air Force assets are made available to collect information when and where required. Collected information is disseminated to the appropriate processing agency or user based on established collection or reporting requirements. As technology evolves, every effort should be made to streamline and automate processes to reduce timelines from tasking through product dissemination. However, since surveillance and reconnaissance assets are limited, responsiveness is often driven by the commander's objectives and priorities. Commanders must ensure proper asset utilization based on the range of missions. Finally, ensuring communications connectivity throughout the ISR "system" is key to delivering timely intelligence to consumers.

Fused

ISR-derived information from many sources is combined, evaluated, and analyzed to produce accurate intelligence. This process is called fusion. Fusion helps defeat adversary efforts to deny information. Intelligence personnel use fusion analysis to increase assessment accuracy and counter adversary denial and deception efforts. Analysts fuse intelligence by considering as many types of target signatures and indicators collected over time as practical. Considering intelligence from multiple collection systems (preferably from different disciplines) over time may reveal activity concealed from a single sensor or discipline. Fusing multiple sources with historic trends and previous assessments enables analysts to generate a more complete and accurate assessment of the operational environment. However, care should be taken not to promote fusion at the expense of timeliness. For example, significant single-source information that relates directly to a current or planned operation, such as a

previously undetected surface-to-air missile site near the target or a credible report of an imminent airfield attack, should be sent to users immediately.

Accessible

ISR-derived information must be readily accessible to be usable. First, intelligence should be easily retrievable; ISR personnel should be able to "get at the information" before they can disseminate, process, exploit, or analyze it. Second, both ISR personnel and the consumer should have the appropriate clearances to access and use the information. Third, ISR products should always be classified at the lowest possible classification consistent with security. Understandably, some intelligence requires extraordinary protection such as sensitive sources and methods or the fact that certain knowledge is held.

Secure

Personnel working with classified material must protect the information and sensitive sources while still managing to keep commanders and their staffs fully informed. Protection of classified information and sources must be consistent with established Department of Defense (DOD) policies and procedures, even if operations are conducted with coalition partners. The difference between peacetime and contingency policies and priorities should be determined ahead of time and be well understood. Criteria, authority, and procedures for declassifying or sanitizing intelligence should be available at appropriate levels and tested during selected exercises. Classification authorities should avoid overclassification and unnecessary compartmentalization that can prevent commanders and staff from accessing needed intelligence. If directives are too restrictive to meet current operational requirements, additional guidance or authorization from the appropriate classification authority should be requested.

Survivable, Sustainable, and Deployable

ISR resources, activities, and communications should be survivable to ensure support is available when needed. Important components of survivability include redundancy of critical intelligence, protection against the adversary's asymmetrical threats, information assurance measures, and hardening of communications capabilities. Therefore, commanders should develop concepts of ISR operations that provide for continuity even if communications are severely stressed or lost. Sustainability is vital for all surveillance and reconnaissance systems. A system's ability to maintain the necessary level and duration of operations depends on ready forces and resources in sufficient quantities to support stated requirements. Deployability has to be built into systems. With the exception of aircraft and space-based ISR platforms, most ISR assets are rugged, small, and lightweight. They should be easy to transport and set up and capable of immediate connectivity and interoperability. Finally, from a macro view, ISR-derived intelligence is a large part of the support that goes into the survivability and sustainability of every weapon system acquired and maintained by the Air Force.

Unified Effort

Organizations at all levels should have clearly defined functions that minimize duplication, maximize sharing of information among Services agencies and allies, and are mutually supportive. Unity of effort requires a focus on joint and allied forces' ISR requirements and production. These potential requirements and the support they need should be agreed upon and tested in advance of operations. Finally, collaboration among operators, targeteers, analysts and specialists result in synchronized, efficient target development and assessment.

Persistent and Global Reach

Commanders require the ability to achieve on-demand reconnaissance and persistent surveillance throughout the operational environment. Modern collection requirements are increasingly focused on fleeting, dispersed targets that present a markedly different signature from industrial-age targets such as large military formations and complex industrial facilities. Commanders should, therefore, consider, plan for and ensure diplomatic arrangements are in place for immediate deployment and employment of ISR assets that must overfly sovereign nations en route to targets. To deny enemy sanctuaries of movement, Air Force ISR capabilities focus detailed collection against broad target areas for long periods of

Battle of Fallujah

Although Air Force reconnaissance planes had been circling over Fallujah, the Marines surrounding the Iraqi city could not view what the sensors on the Air Force MQ-1 Predators and C-130E/H Scathe View were seeing. Then, a tactical air control party showed up with the first laptop computer and antenna ROVER II (Remote Operations Video Enhanced Receiver) system. On the laptop's screen appeared the video image downlinked by a circling Predator. This direct support of actionable imagery to the tactical user was invaluable and has saved many lives. In another example, Airmen and Soldiers at Balad Air Base, Iraq, used ROVER to help direct a Predator scouting for insurgents launching mortar attacks on the base. On 11 April 2004, the night after a fatal mortar attack on the base, a Predator spotted two mortars being fired at the base. Before a third round was launched, the unmanned aircraft (UA) crew in close coordination with ground units using ROVER, scored a direct hit on the insurgents. With urban close air support a growing concern, ROVER technology is a valuable tool for warfighters on the ground and aircrews to see the same operating picture without being in harm's way.

time, either through long-dwell sensors or a combination of more numerous short-dwell collectors. Commanders defeat denial strategies and create ISR reach throughout the operational environment through a combination of space-based sensors, remotely piloted systems, and tactically survivable platforms. The combination of persistence and reach complicates enemy planning and reduces enemy choices while creating options for commanders.

Network Centric

Network centricity is a key principle for all Air Force ISR efforts. It is the natural progression of technology and employment that aids in the efficient exchange of actionable information to operators at all levels. Net-centric ISR capabilities, designed from the ground up to plug into a secure global information network that extends out to the tactical edge, provide users tailored information and actionable intelligence that increase situational awareness and foster the capacity to conduct operations more flexibly and rapidly. Networking will enable information derived from a wide variety of sensors on shooters, battle management assets, and dedicated intelligence systems to be directly available to any networked warfighter (i.e., sensor-to-shooter). This capability will also create a high fidelity fused common operational picture which is the cornerstone of battlespace awareness dominance. Net-centric collaborative environments support creation of “virtual organizations” where personnel from numerous agencies around the world horizontally align as a team, quickly focus analytic effort on a problem, and deliver a solution or recommended course of action for employment under the C2 of a vertically aligned organizational construct. Often transparent to the commander of Air Force forces (COMAFFOR), such collaborative efforts (often spontaneous) should be encouraged to make the most efficient use of available resources.

Through net-centric operations, a wide variety of detailed sensor data can be posted to compatible, joint intelligence information stores, and continually searched in order to cross-cue and refine collection operations. Intelligence analysts combine, evaluate, and analyze collected information from a variety of sources in a collaborative environment, then provide fused products for use by decision makers. Combining multiple resources in a variety of spectra works to defeat enemy concealment, denial, and deception strategies. Strategic, operational, and tactical users employ tailored searches to gain access to the right information at the right time to support operations. Ideally, both C2 and ISR planning systems access common databases to synchronize collection and operations requirements. Network-centric ISR capabilities contribute to achieving information superiority.

CHAPTER TWO

THE ISR PROCESS

> *True genius resides in the capacity for the evaluation of uncertain, hazardous, and conflicting information.*
>
> ***—Winston Churchill***

The ISR process is comprised of a wide variety of intelligence operations: planning and direction; collection, processing and exploitation; analysis and production; dissemination and integration; and evaluation and feedback. It should focus on the commander's mission and concept of operations. The process is not a linear or even cyclic operation, but rather represents a network of interrelated, simultaneous operations that can, at any given time, be fed by and feed other intelligence operations. The output of the overall process is actionable intelligence—timely, accurate, and complete—that supports decision making at all levels of war.

PLANNING AND DIRECTION

Planning and direction of ISR operations start with the identification of needs for intelligence regarding all aspects of the operational environment. The President and Secretary of Defense direct JFCs to engage in adaptive planning for the conduct of operations. The JFC should provide the commander's critical information requirements (CCIRs) to the joint staff and components. CCIRs comprise a comprehensive list of information requirements identified by the commander as being critical to facilitating timely information management and the decision-making process. There are numerous legal issues associated with ISR, especially if it could impact US citizens. ISR activities should be coordinated with the servicing judge advocate general (JAG) to ensure compliance with the law and any existing rules of engagement (ROE).

Intelligence preparation of the operational environment (IPOE) alerts decision makers at all echelons of command to emerging situations and threats. JFC guidance provided during planning shapes the overall concept of operations, which in turn drives requirements for air and space strategy. The JFACC's challenge is determining where and when to focus attention in order to influence events early, ready forces, and begin setting conditions for future operations. Therefore, preparation of the operational environment is essential to supporting the commander's visualization process, determining (component-level) CCIRs, anticipating critical decision points during operations, and prescribing ROE. IPOE and target development processes identify and assess the adversary's COGs, key capabilities and vulnerabilities, intentions, and potential courses of action (COAs). By identifying known adversary capabilities, IPOE provides the conceptual basis for the JFACC to visualize how the adversary might threaten the command or interfere with mission accomplishment. By identifying specific adversary COAs and COGs, IPOE provides the basis for friendly and adversary COA comparisons, often referred to as wargaming sessions, in which the staff "fights" each

friendly and adversary COA. This wargaming process assists intelligence and operations in identifying specific indicators that could confirm or deny a given adversary COA or are otherwise required to support a friendly COA

Using knowledge gained via intelligence analysis (IPOE and target development) and the wargaming process, commanders can anticipate when and where action will occur, enabling them to focus on broad friendly, hostile, and neutral force interactions to determine the most effective way to apply Air Force capabilities to achieve desired effects. With this foundation, an optimal ISR strategy designed to sequence ISR operations is derived. ISR strategy is encapsulated in the joint air operations plan (JAOP) and is synchronized with theater and national ISR architectures and strategy. It provides the foundation for development and validation of intelligence requirements, captures the framework for planning and direction of ISR operations, and establishes guidance for the operation of all other elements of the ISR process. Anticipating where and when important events will take place provides a framework in which to orchestrate national, theater, and tactical assets to focus surveillance on specific target elements and guide decisions on how, when, and where to engage adversary forces to achieve the JFC's objectives.

Requirements for intelligence to support operations are identified by the commander and the staff. In the course of intelligence planning and direction, intelligence planners identify the intelligence required to answer the CCIRs. Those intelligence requirements deemed most important to mission

Predictive Battlespace Awareness

Predictive battlespace awareness (PBA) influences all elements of the intelligence process. PBA is a multidimensional understanding of the battlespace in time, space, and effect. It is the capability to correlate and fuse patterns of enemy activity and subsequent events to predict adversary intent or potential future enemy courses of action. PBA is continuous and achieved by the commander through possession of relevant, comprehensive knowledge, including an accurate forecast of pertinent influences in the battlespace. This knowledge of the operational environment, in concert with C2, permits commanders to anticipate future conditions, assess changing conditions, establish priorities, and exploit emerging opportunities. Our ability to act with a degree of speed and certainty not matched by our adversaries permits commanders to shape the battlespace to our advantage.

To achieve this level of awareness requires the development of five key elements: intelligence preparation of the operational environment, target development, ISR strategy and planning, ISR employment, and assessment. These elements are continuously refined, in parallel, to provide a comprehensive view of the battlespace which provides commanders with the capability to anticipate future conditions, assess changing conditions, establish priorities, and exploit emerging opportunities while mitigating the impact of unexpected adversary actions.

accomplishment are identified as priority intelligence requirements (PIRs). PIRs are general statements of intelligence need, such as "what is the operational status of the adversary's integrated air defense system?" or "what terrorist groups are active within the area of responsibility/interest (AOR/AOI)?" They provide the framework for prioritization of all ISR operations. PIRs are driven by, and in turn drive, the IPOE process to refine information requirements and support the commander's potential courses of action. The PIRs drive the development of detailed essential elements of information (EEIs). The designation of intelligence requirements helps ensure ISR efforts are focused on the most critical information needed to support warfighters in addition to Air Force acquisition efforts and defense policy-making. The EEIs define intelligence consumers' specific information requirements. A sample EEI would be, "what is the current location of the adversary SA-20 battery?" EEIs are linked to PIRs in order to maintain traceability for all ISR operations back to commander priorities. Over time, as new direction and guidance evolve, ISR planners will develop new requirements or modify existing requirements.

Information requirements should be validated before collectors can be tasked to fill the requirement. ISR requirements are validated by theater collection management authorities embedded in the JFC's staff. Theater collection managers will typically answer the following questions before validating an information requirement: Does the information requirement meet the commander's concept of operations? Has the information already been acquired but not distributed to the requester? Are there other ongoing operations that might satisfy the requirement? If any of these conditions is met, new ISR collection missions may not be necessary. Once validated, an information requirement becomes a collection requirement and the ISR planning process begins. The process for developing and validating ISR collection requirements is essentially the same during peacetime, crisis, and war—only the nature of the requirements and the timeliness in which they should be satisfied varies. Though the process remains the same across the range of military operations, carefully crafted intelligence requirements are essential in an effects-based approach to operations.

An effects-based approach to operations (EBAO) is one in which operations are planned, executed, assessed, and adapted to influence or change systems or capabilities in order to achieve desired results. EBAO seeks to understand and exploit the complex connections among individual actions, the effects—direct and indirect—that those actions produce, how those effects influence the states and behaviors of complex systems in the operating environment, and how these effects contribute to the accomplishment of desired outcomes. Under an effects-based approach, IPOE and target development products will enable the entire process. Throughout the intelligence process, refinement of information requirements should continuously evaluate whether or not the intelligence provided will satisfy the needs of planning, employment, and assessment. Since EBAO starts with desired outcomes (the end state, objectives and related effects), requests for information should be tailored to ensure the desired effects can be measured—something that is not always easily anticipated or quantified depending upon the capability employed. Assessment of operations will include all efforts to evaluate performance (measures of performance [MOPs]) and progress

toward effects and objectives (measures of effectiveness [MOEs]). Assessment also seeks to anticipate outcomes and answer both questions "are we doing things right (MOPs)," and "where do we go from here?" Assessment requires stringent adherence to apportionment and allocation procedures when employing ISR assets to ensure the correct measurement of the obtained effect. (See AFDD 2, *Operations and Organization*, and AFDD 2-1.9, *Targeting,* for more on the effects-based approach and assessment.)

The process of planning ISR operations begins once requirements have been established, validated, and prioritized. As intelligence collection requirements are aligned with available collection capabilities, the planning process addresses factors such as the availability of ISR assets, platform and sensor capabilities, adversary threats to ISR assets, and timeliness of the ISR response. These factors, when weighed together, affect how ISR assets are tasked and employed. In order to make the planning process more efficient, information requesters should clearly articulate their collection requirements and allow the collection managers and operations planners to decide the best way to meet the requirements. ISR operations planners at every level should coordinate closely with each other to effectively plan ISR operations. ISR planners should thoroughly analyze the combination of the commander's objectives and guidance, potential threats, force capabilities, and ISR systems availability.

Collection managers should first coordinate with operations planners to determine if organic ISR assets are capable of satisfying the requirement. If organic assets are available, then the appropriate unit will be tasked by the proper authority who exercises OPCON or TACON over the collection asset. If organic assets are not available to satisfy the request then the request is forwarded to a higher echelon for consideration.

- At the national level, the Defense Intelligence Agency (DIA), Central Intelligence Agency (CIA), National Security Agency (NSA), and the National Geospatial-Intelligence Agency (NGA) conduct long-range ISR planning and form intelligence task forces in response to crises. These agencies may also augment joint force ISR staffs with joint staff-directed national intelligence support teams (NIST) if requested. These teams, in addition to other duties, help focus ISR planning and collection requirements and provide an additional conduit for two-way communication between theater and national-level ISR collection management efforts.

- At the theater or joint force level, the JFC will provide collection, processing, exploitation, production, and dissemination capabilities. The JFC also establishes priorities for ISR operations that align with national and theater objectives. Further, the JFC's staff produces theater plans, such as the operations plans (OPLAN) and concept plans (CONPLAN), and tailors theater ISR assets to meet crisis requirements. Lower echelon collection requirements are often passed to theater collection managers where the redundant requirements are deconflicted. For peacetime, contingency, and wartime operations without an established JTF, the theater collection managers and operations planners coordinate their efforts in the ISR planning process. If a JTF is established, the JFC's collection managers and

operations planners coordinate their efforts with AOC collection managers and operations planners. The results of these efforts are included in the ATO and other tasking mechanisms as they are developed. The JFC's staff is responsible for development of a federated architecture for intelligence exploitation and analysis, leveraging the support of organic capabilities at the component and JTF level, other combatant commanders, and national agencies to ensure complete coverage of all exploitation and analysis requirements. Finally, in conjunction with functional and service components and coalition partners, the JFC will request ISR capabilities (personnel, platforms, etc.) to support current and planned requirements that exceed on-hand capabilities.

- At the operational level, **the JFACC typically serves as the supported commander for theater airborne and spaceborne reconnaissance and surveillance and provides integrated airborne ISR for the JFC.** If no JFACC is appointed, the COMAFFOR should normally serve as the supported commander for theater Air Force airborne and spaceborne reconnaissance and surveillance. At the operational level, the process of planning and directing ISR operations includes identifying and validating the need for ISR missions, and if a need is determined, prioritizing the missions. At this level, ISR planners consider the tradeoffs of survivability, weather effects, and information acquisition. For example, if land operations are of primary concern, the COMAFFOR/JFACC will position airborne ISR assets to ensure they provide the best possible support to ground operations. However, if the adversary poses a significant threat to these assets, the COMAFFOR/JFACC may need to disperse or reposition assets to improve their survivability. If organic ISR assets are not available, then alternative arrangements should be developed with outside supporting agencies to satisfy the information requirement.

COLLECTION

The collection portion of the intelligence process involves tasking appropriate collection assets or resources to acquire the data and information required to accomplish collection tasking. Collection includes the identification, coordination, and positioning of assets or resources to satisfy intelligence requirements.

Collection managers develop collection plans based on the validated intelligence requirements of commanders and decision makers. The collection manager's task is to first verify the requirements have been validated. Once verified, the collection manager:

- Develops and manages a collection plan that integrates requirements with target characteristics.
- Determines the capabilities and limitations of the available organic collection assets and compares them to the collection plan.
- Develops a collection strategy to optimize the effective and efficient use of all available, capable, and suitable collection assets and resources.

- Identifies collection requirements that cannot be met by organic assets and forwards them up the chain of command for validation and tasking of non-organic intelligence resources.

- Directs processing and dissemination of collected data. Collection managers should understand the capabilities and limitations of each discipline and the procedures for ensuring target coverage by the appropriate collection asset and/or resource. Collection managers keep requesters informed of collection status and capabilities so there are realistic expectations of what can be collected and what level of confidence can be placed in the information.

The key to the collection manager's job is selection of the right combination of collection assets for a particular information requirement. Collection managers should focus on a multidisciplinary approach to collection tasking. Collection capabilities complement each other, and the collection manager should resist favoring or becoming too reliant on a particular sensor, source, system, or technique. Each system's limitations can be mitigated through the capabilities of the others, as different systems provide additional insights into the requirement. While a sensor, source, or system may seem to be an obvious choice to satisfy a requirement, flexibility is the key. Collection managers should match collection resources to the type of adversary activity most likely to be captured by collection operations. Rigid dependence on a single source may result in mission failure, especially if that source becomes unavailable or if the adversary takes measures to counter it. Lack of a multidisciplinary approach may also result in discernible patterns that may play into the adversary's counterintelligence or denial and deception efforts.

Collection managers should seek to maximize the use of existing collections. This requires full access to national databases. Collection managers should look first to organic assets as the primary choice for collection tasking. Use of organic collection assets allows a timely and tailored response to collection requirements and serves to lessen the burden on collection resources controlled by other units, agencies, and organizations. However, if requirements cannot be satisfied by organic assets, the collection manager should not hesitate to request collection support from higher, adjacent, and subordinate units, agencies, and organizations. Each echelon in the collection management architecture has specific capabilities and responsibilities:

- At the strategic level, DIA coordinates requirements through NGA, National Reconnaissance Office (NRO) and NSA for tasking of national reconnaissance systems, manages the DOD human intelligence (HUMINT) program, coordinates with the intelligence community on other collection programs, and responds to requests for information (RFIs) submitted by theater intelligence centers.

- At the theater level, the geographic combatant commander (CCDR) exercises collection management authority (CMA) for collection operations in his theater. CMA involves two complementary functions: collection requirements management (CRM), defining what intelligence systems should collect; and collection operations management (COM), specifying how to satisfy the requirement. CRM focuses on

the requirements of the customer, is all-source oriented, and advocates what information is necessary for collection. COM focuses on the selection of the specific intelligence discipline(s) and specific systems within a discipline to collect information addressing the customer's requirement. For specified operations, the JFC will normally retain CRM responsibilities and delegate the responsibility for COM for the joint operations area (JOA) to the COMAFFOR or JFACC as supported commander for theater ISR.

- At the operational level, for peacetime operations, ISR managers communicate the COMAFFOR's or JFACC's tasking through scheduling messages and assembling a prioritized list of collection objectives for sensor use. During contingency operations and wartime, the JFACC tasks airborne and spaceborne platforms through the ATO and ISR managers assemble a prioritized list of collection objectives for sensor use. Specific collection tasking is captured in the reconnaissance, surveillance, and target acquisition (RSTA) annex to the ATO, guided by the ISR strategy developed during the JAOP process.

- Increasingly, airborne ISR capabilities rely on multiple units to execute the mission. For example, a Predator flown by a reconnaissance squadron provides data for exploitation to a distributed common ground system (DCGS) unit. For ground-based systems, like special operations forces (SOF) or HUMINT, the responsibility lies with the competent authority at the tactical level. In all cases, tactical-level commanders should evaluate the risks (threat, tactics, weather, safety, and logistics, for example) involved to complete the mission successfully. The COMAFFOR or JFACC is the final authority on determining whether the benefits of successfully accomplishing the mission outweigh the risks involved for those forces and assets over which he exercises OPCON or TACON. However, the executing tactical commander normally provides inputs concerning these risks during the decision-making process.

- Collection management is not just a pre-mission function. Assets may also be tasked while the mission is ongoing. Changing situations may require that ISR assets be dynamically retasked from their preplanned mission to support new mission requirements. The capabilities of the asset being retasked will determine the success of the reassigned mission. For example, ISR assets with long loiter times or frequent revisit rates generally have the flexibility to respond to dynamic retasking. Dynamic retasking occurs when the requester identifies a time-sensitive need after the appropriate ISR asset has already been tasked. Dynamic retasking does not necessarily imply that a track or an ISR mission must be changed; rather it means that a higher priority collection requirement has emerged that an active platform may have the capability to collect. However, the same asset may not have the right sensor configuration to successfully accomplish the new tasking. Thus, commanders should carefully consider the advantages and disadvantages before deciding to retask assets executing their pre-planned mission. The parameters under which dynamic tasking takes place are a part of ISR strategy development, and are documented in the JAOP and RSTA annex.

PROCESSING AND EXPLOITATION

Once the data satisfying the requirements are collected, they undergo processing and exploitation. Through processing and exploitation, the collected raw data are transformed into information that can be readily disseminated, used, transmitted, and exploited by intelligence analysts to produce multidisciplinary intelligence products. Relevant critical information should also be disseminated to the commander and joint force staff to facilitate time-sensitive decision making. Processing and exploitation time varies depending on the characteristics of specific collection assets. For example, some ISR systems accomplish processing and exploitation automatically and nearly simultaneous with collection, while other collection assets, such as HUMINT teams, may require substantially more time. Processing and exploitation requirements are prioritized and synchronized with the commander's PIRs.

During processing and exploitation, collected data are correlated and converted into a format suitable for subsequent analysis and production of intelligence. Processing remains distinct from analysis and production in that the resulting information receives only a cursory analysis for time-critical exploitation and has not yet been subjected to full analytical assessment. Relevant time-sensitive information resulting from this step in the process (especially targeting, personnel recovery, or threat warning information) should be immediately disseminated through intelligence broadcasts, secure information workspace or internet relay chat channels, imagery product libraries (IPLs), intelligence databases, or message reporting. Additionally, some information is suitable in its raw form to meet user requirements. For example, joint terminal attack controllers (JTACs) can receive a direct feed via ROVER from a Predator or other full-motion video collection source to provide an invaluable "over the next hill" look to support close air support operations. Raw information should be made available to users with the capability to receive it, the knowledge to understand the information they are receiving, and the authority to take action on it.

IPOE provides a disciplined and dynamic framework for processing and exploiting large amounts of data. The knowledge gained as a result of comprehensive IPOE and target development, as well as our capability to anticipate adversary actions, depend on our ability to leverage and fuse all available information. Processing and exploitation architectures should take advantage of network centricity to enable the first part of intelligence fusion—the correlation of multiple source collection into a single, fused report of the operational environment activity. IPOE enables operators and intelligence analysts alike to remain focused on the most critical aspects of the operational environment and adversary. Incoming information and reports can be rapidly incorporated into critical decision-making processes and provide a convenient medium for displaying the most up-to-date information and for identifying critical information gaps.

ANALYSIS AND PRODUCTION

Information is converted into intelligence products through analysis and production, a structured series of actions which, although planned or usually occurring sequentially, may also take place concurrently. These actions include the integration, evaluation, analysis, and interpretation of information in response to known or anticipated intelligence production requirements.

- **Integration.** Information from single or multiple sources is received, collated, and entered into appropriate databases by the analysis and production elements of intelligence community organizations, the theater joint intelligence centers or equivalents, or subordinate joint force elements like the ISR division. Information is integrated and grouped with related pieces of information according to predetermined criteria to facilitate the evaluation of newly received information.

- **Evaluation.** Each new item of information is evaluated by the appropriate analysis and production element with respect to the reliability of the source and the credibility of the information. The reliability of the source and the credibility of the information should be assessed independently of each other to avoid the possibility of one factor evaluation biasing the other.

- **Analysis.** During analysis, deductions are made by comparing integrated and evaluated information with known facts and predetermined assumptions. These deductions are combined and assessed to discern patterns, links or recognized events.

- **Interpretation.** Interpretation is an objective mental process in which the significance of information is judged in relation to the current body of knowledge, covering both adversary and friendly forces, and existing information and intelligence. This mental process involves the identification of new activity and a postulation regarding the significance of that activity.

Taken together, these actions enable intelligence fusion—the synthesis of multiple event reports into an assessment of the nature of ongoing operational environment activity; the extrapolation of all operational environment activity into a predictive assessment of future activities; and the shaping of ongoing ISR operations to refine these assessments. To enable this level of fusion, analysts should work in collaborative environments which provide access to recognized, and often geographically separated, subject matter experts. Through collaboration, intelligence analysts are able to share information, discuss opinions, debate hypotheses, and identify or resolve analytic disagreements. Net-centric connectivity and access greatly enhance an analyst's ability to share, compare, and assess information. Intelligence analysis organizations at all echelons make unique contributions to analysis and production.

- At the strategic level, the joint staff director of intelligence (JS/J2) provides analytic estimates, reports on adversary capabilities, and activates an interagency

Circular Reporting During Bosnia Operations

Several times during Operations PROVIDE PROMISE and DENY FLIGHT, (US operations in Bosnia) information collected from US sources was passed to NATO officials, who later reported the information back into the US intelligence system. The same thing happened in reverse. This "circular reporting" was especially true of air defense radar indications.

On occasion, intelligence officers were led to believe that there were more SAM radars active than there really were, and it took time to deconflict apparently different reports about seemingly distinct radar sites.

SA–6 GAINFUL SAM

F–16 FIGHTING FALCON

assessment cell to directly support targeting missions. In cases in which the JS/J2 needs additional expertise or resources, the JS/J2 requests assistance from the DIA.

- At the theater or joint force level, the JFC staff provides theater assessments, maintains databases, produces some target materials for operating forces in an area of responsibility (AOR), acts as overall battle damage assessment (BDA) validation authority, and supports the J–3 in the assessment process. Joint force J–2s maintain knowledge of adversary and terrain, conduct target development and nomination, and report operational BDA.

- At the operational and tactical level, intelligence personnel update databases; perform target analysis, development, and nomination; produce target materials; and report tactical and operational assessment. Intelligence personnel, through reachback and distributed operations, provide air and space-related intelligence and information operations analytical products and services unavailable in the theater or through the normal chain of command.

Additionally, analysts should have access to intelligence databases—repositories of collected data, processed information, and finished intelligence products which provide analysts with the technological means to rapidly retrieve, sort, and correlate

relevant information. Intelligence databases are usually designed to support specific requirements and functions, and are therefore often "stovepiped" according to intelligence disciplines. For example the NGA national exploitation system is a repository for imagery analysis and production, and the signals intelligence (SIGINT) on-line information system contains current and historical finished SIGINT products. The "stovepiping" of information by intelligence discipline or production category limits the potential timeliness and quality of intelligence production, as analysts are forced to search multiple databases for relevant information. Furthermore, as databases grow in volume and complexity, potentially vital pieces of information may become increasingly difficult for analysts to find and retrieve. In order to overcome this limitation, virtual knowledge bases have been designed to serve as integrated repositories of multiple databases as well as reference documents and open-source material.

Battlespace awareness products provide the foundation for the commander's estimate process as well as a baseline for long-term analysis essential to understanding the multidimensional aspects of the operating environment. The daily demand to support immediate decision-making needs often exceeds existing analytic capabilities, particularly in the forward area. Resources, therefore, should be carefully allocated and made available for the long-term analysis required to sustain operations. The necessary degree of predictive awareness can only be achieved through full participation of our joint, interagency, and multinational/coalition partners in a collaborative environment linking all command echelons and coordinating different functional nodes (e.g., reachback to analytic centers of excellence). In addition, every level of command should define and document the information it requires to build battlespace awareness, creating a deliberate information flow that is responsive to the commander's requirements.

DISSEMINATION AND INTEGRATION

Dissemination of ISR products continues the process by giving the user information required for application in a timely manner. Dissemination may take the form of electronic transmission, hardcopy annotated imagery or maps, direct threat warnings, oral and written reports, or briefings. The dissemination process requires continuous management. Without effective management, communications paths can become saturated by information from single sources being retransmitted by many intermediate collection agencies, resulting in "circular reporting." Advances in technology are also affecting dissemination. Computers and modern communication systems have reduced the information–to–production timeline for delivering ISR products. Likewise, some collection systems are capable of disseminating collected information to requesters on a real- or near real-time basis, vastly increasing their responsiveness. This is especially important for those collection operations supporting ongoing military operations in which the situation may be evolving rapidly and perishable information may lose its usefulness within a matter of minutes or seconds. Implementing new "information profiles" technologies and capabilities puts power in the hands of the warfighter to obtain only pertinent information exactly when and where it is needed. Ancillary to the discussion of classified information dissemination is the need

to expedite dissemination of declassified information. Commercial technology that enables continuous live media coverage of military operations may require expedited declassification and public dissemination of intelligence products in order to counter enemy propaganda or support other operational objectives. ISR planning should include local procedures for rapidly coordinating public release of select intelligence.

This expanding collection capability makes network centricity all the more important because real-time planning and targeting systems depend on tailored intelligence information. Requesters integrate the intelligence into their decision-making and planning processes, and technical barriers to rapid integration, such as system incompatibility or security barricades, complicate operations. Information superiority requires the timely integration of intelligence with operations in an easily understood format that facilitates decision-making at all levels while at the same time maximizing the amount of relevant information available. In the case of threat warning alerts essential to the preservation of life and/or vital resources, such information should be immediately communicated directly to and acknowledged by those forces, platforms, or personnel identified at risk so the appropriate responsive action can be taken. More generally, the integration of intelligence and operations on a continuous basis allows commanders and all operational planners access to the most current information available, thereby optimizing intelligence support to operation planning, preparation, execution, and assessment functions.

The primary vehicle for integrating intelligence and operations is the common operational picture (COP). Intelligence should be disseminated in such a manner that it can be automatically rendered or visualized in the COP and facilitate a shared operations/intelligence view of the operational environment. The COP is a broad merging of inputs from a wide variety of tactical, operational, and national sources into a single picture that serves a broad set of users for multiple purposes. Wide area surveillance radar systems resident on battle management, command and control (BMC2) platforms such as E-3, E-2, E-8, and CRC form the underlying foundation of the COP. These weapons systems use their organic wide-area surveillance radars to develop battlespace situational awareness for battle managers executing real-time tactical battle management decisions and operations. This information is shared near-real time with other networked shooters, warfighters and intelligence centers through tactical data links. It facilitates decision making and planning at all levels, from Secretary of Defense policy decisions to joint force operation planning. The COP depicts friendly, adversary, and third-party (gray/unknown) force dispositions and contacts on tailored graphical backgrounds. It includes a variety of near-real time friendly and adversary air, ground, space and maritime tracks, threat/warning data, and intelligence broadcasts. The COP provides the means for automatically integrating relevant information and finished intelligence into the graphic—not just electronic intelligence (ELINT) and radar tracks. Annotations should facilitate linkage to order of battle (OB) databases, message traffic, and the ATO. This linkage between imagery and other collateral-level intelligence and operational databases facilitates intelligence analysis, battlespace awareness, operations planning, and assessment by providing intelligence and operations staffs with simultaneous access to the same information.

EVALUATION AND FEEDBACK

After receiving the ISR products, the user evaluates the products to ensure they satisfy the requirement. The user then provides feedback to ISR planners, collection managers, and analysts to ensure the process continues to satisfy the requirement.

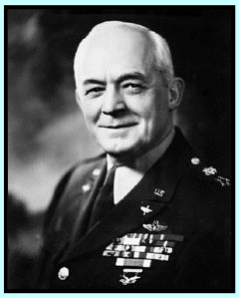
It is imperative that intelligence personnel and consumers at all levels honestly evaluate and provide immediate feedback throughout the intelligence process on how well the various intelligence operations perform to meet the commander's intelligence requirements. All operations in the intelligence process are interrelated and should be evaluated to determine the degree to which they facilitate each other and ultimately succeed in meeting the customer's requirements. For example, planning and direction establish the groundwork for all other intelligence operations, but they are also dependent on the results achieved by other operations in the intelligence process. The collection manager evaluates collection reports, ensures the appropriate requesters receive a copy, and determines, in conjunction with the requesters, if the requirements have been satisfied. Requester feedback establishes customer satisfaction and frees collection assets and resources to be redirected to satisfy other active requirements. Processing and exploitation and analysis and production are evaluated based on the degree to which customers are satisfied that the resulting information or intelligence answers their requirements. Intelligence personnel and consumers at all levels evaluate the quality of intelligence products relative to all the attributes of good intelligence. These attributes include the degree to which intelligence anticipates the needs of the commander, and is timely, accurate, usable, complete, relevant, objective, and available. Finally, intelligence and operations personnel jointly evaluate how well intelligence is disseminated and integrated with operations, and make changes as needed to improve the overall intelligence process.

CHAPTER THREE

ISR ELEMENTS

Strategic air warfare can be neither soundly planned nor efficiently executed without a continuous flow of detailed (intelligence) information....

—General Hap Arnold, USAF

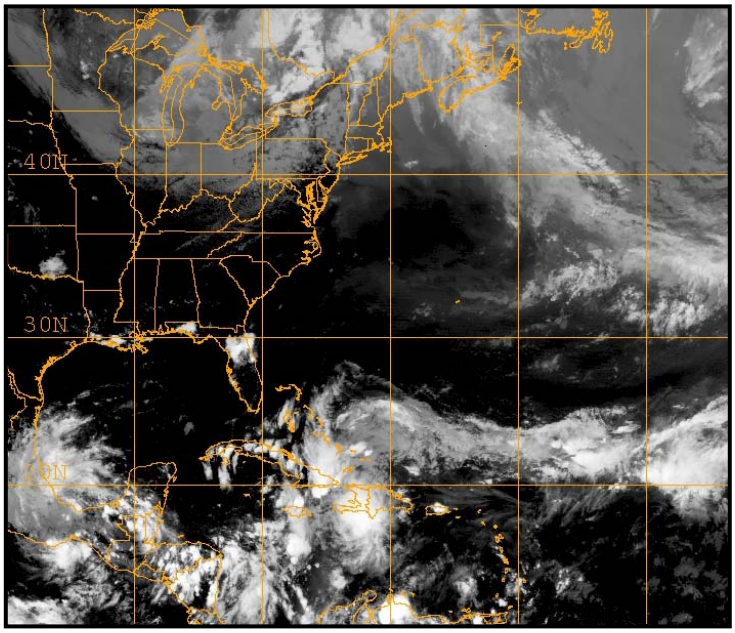


INTELLIGENCE COLLECTION DISCIPLINES

ISR resources collect data that become finished intelligence when processed, analyzed, and integrated. These data can be collected through a wide variety of means. The following is a list of intelligence collection disciplines relevant to Air Force ISR operations.

Geospatial Intelligence

Geospatial intelligence (GEOINT) is defined as exploitation and analysis of imagery and geospatial information to describe, assess, and visually depict physical features and geographically referenced activities on the Earth. Imagery intelligence involves the collection of images that are recorded and stored (on film, digitally, on tape, etc.). These images can be used to help identify and locate adversary military forces and facilities and give the commander insight into the adversary's capabilities. GEOINT can also help provide commanders environmental and geospatial information.



Infrared Weather Imagery of the eastern United States

The principal image types are optical literal image and non-optical non-literal image. Optical literal imagery is essentially traditional visual photos (recorded on film, tape, or electronically) using visible light to illuminate the objects photographed. Optical literal imagery uses natural illumination in the portion of the spectrum that humans can perceive unaided. Non-optical non-literal imagery includes infrared, multispectral, and radar imagery.

Both optical literal and non-optical non-literal imagery have advantages and limitations. For example, optical literal sensor systems that use photographic film are not as responsive since a significantly longer time is required to produce a usable image. Infrared, radar, and multispectral sensors detect emissions in the nonvisual portion of the electromagnetic spectrum. However, infrared signatures can be distorted by aerosols, moisture, and other atmospheric gases, much like the optical portion of the spectrum. Radar imagery requires active illumination by a radio frequency pulse; the reflected return provides an image of the target. Radar will work at night and through rain and cloud cover, unlike optical and infrared imagery. Radar imagery can also detect or differentiate moving vehicles using moving target indicator systems. Multispectral imagery uses data collected simultaneously from two or more spectral regions or bands of the electromagnetic spectrum—in other words, the same scene is imaged in several spectral bands at the same time by the same sensor. The resulting image contains more detailed information than can be obtained through the use of only one band.

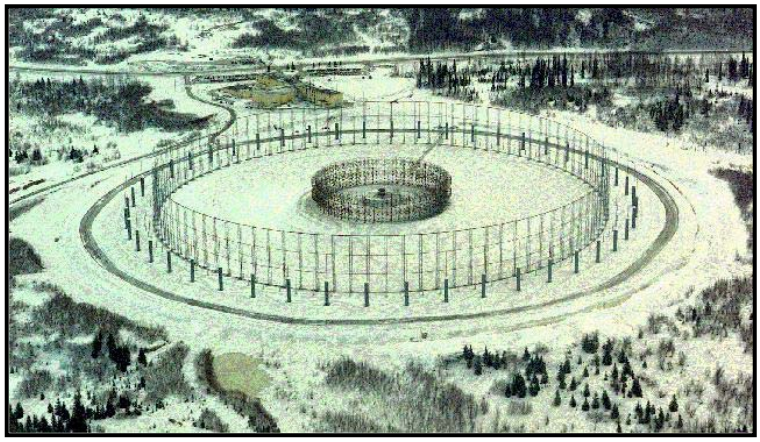
Examples of vertical (left) and oblique imagery

Images can be divided into vertical, oblique, and panoramic imagery. Vertical imagery provides a two-dimensional, overhead view of the target. Oblique imagery provides an angled view of the target area which shows perspective and can be perceived as a three-dimensional view. Panoramic imagery combines the features of both vertical and oblique imagery by scanning from horizon to horizon.

Full-motion video is a new imagery capability that is shortening the sensor-to-shooter cycle by providing the warfighter imagery in real time. Use of full-motion video provided by RQ-1/MQ-1 Predator unmanned aircraft assists commanders in maintaining situational awareness and identification and tracking of targets, and presents the opportunity for our forces to respond as required.

Non-imaging assets also play a key role in GEOINT. Though not as intuitive to the non-intelligence professional, non-imaging assets can provide additional dimensions to an intelligence product. For example, a Defense Support Program (DSP) satellite may provide the first indications of the existence of a previously unlocated rocket test stand (e.g., thermal signature of a rocket engine test). This information, combined with imagery, can reveal much more than either product alone.

Signals Intelligence



SIGINT ground sites remain an important part of global situational awareness.

SIGINT is defined in JP 1-02 as a category of intelligence comprising either individually or in combination all communications intelligence (COMINT), ELINT, and foreign instrumentation signals intelligence (FISINT), however transmitted. More specifically, SIGINT uses intercepted electromagnetic emissions to provide information on the capabilities, intentions, form-actions, and locations of adversary forces. COMINT consists of information derived from intercepting, monitoring, and locating the adversary's communications systems. COMINT exploits the adversary's communications, revealing the adversary's intentions. ELINT consists of information derived from intercepting, monitoring, and locating the adversary's noncommunication emitters. It exploits the adversary's radar, beacon, and other noncommunication signals, allowing friendly forces to locate adversary radars and air defense systems over a wide area. FISINT consists of technical information derived from the intercept of electromagnetic emissions, such as telemetry, associated with the testing and operational deployment of foreign air and space, surface, and subsurface systems. FISINT can provide technical details of foreign weapons system development so US forces can respond quickly to new technological developments.

Measurement and Signature Intelligence

Measurement and signature intelligence (MASINT) is scientific and technical intelligence obtained by quantitative and qualitative analysis of data (metric, angle, spatial, wavelength, time dependence, modulation, plasma, and hydromagnetic) derived

from specific technical sensors for the purpose of identifying any distinctive features associated with the target. The detected feature may be either reflected or emitted. Examples of MASINT might include distinctive infrared signatures, electronic signals, or unique sound characteristics. MASINT can be collected by ground, airborne, sea, and space-based systems. MASINT can be used to monitor potential adversary technical developments and deployments, as well as emerging weapons of mass destruction (WMD) threats. While MASINT is often used in scientific and technical intelligence (S&TI) products, it is becoming increasingly important in the operational area.

Human Resources Intelligence

HUMINT is the intelligence collection discipline that uses people in the area of interest to identify or provide insight into adversary plans and intentions, research and development, strategy, doctrine, and capabilities. Some examples of HUMINT collection include clandestine acquisition of photography, documents, and other material; overt collection by air attaches in diplomatic and consular posts; debriefing of foreign nationals and US citizens who travel abroad; official contacts with foreign governments, aircrew and ground personnel debriefing, and SOF intelligence collection missions.

Open-Source Intelligence

Open-source intelligence (OSINT) is the intelligence collection discipline that uses information of intelligence value that is available to the general public. Particular sources are newspapers, other publications, radio and television media, and the internet. OSINT processing transforms text, graphics, sound, and video into useable information in response to user requirements. For example, at the national level, the Directorate of National Intelligence (DNI) Open Source Center provides translations of foreign broadcast and print media.

ISR RESOURCES

This section describes the types of resources employed to satisfy information requirements through the ISR process. Many of the systems that provide input to the ISR process are not dedicated ISR resources or systems. System ownership may be less important than the actual information satisfying the consumer's requirements.

Airborne Systems

Airborne systems are among the primary sources of ISR capabilities available to support the joint force's intelligence requirements. These systems have varying, but complementary, operating characteristics and restrictions.

Unmanned Aircraft Systems (UAS)

UAS provide significant advantages over other reconnaissance assets, but commanders must be aware of their limitations. The greatest advantage of these systems is that they normally do not put friendly personnel at risk, can have relatively long loiter times, and are generally less expensive than today's high-value manned assets. UAS limitations vary according to system and operational requirements. UAS technology is maturing rapidly, and platforms can be configured with a broad range of imagery sensors or weapons payloads. Because control authorities and mission priorities can shift between users during multi-role UAS missions, commanders should carefully delineate clear lines of authority (See the section on ISR and multi-role aircraft employment, Chapter 4).

Most UAS are tactical in nature, characterized by specific mission capabilities and relatively small area coverage. A new breed of UAS is designed to expand the capabilities to meet the ever increasing demands for intelligence on today's fast-paced battlefield. The Global Hawk high altitude endurance UAS provides broad area coverage and an extended mission range. With enhanced sensor payloads such as an electro-optical/infrared sensor and synthetic aperture radar (SAR) with moving target indicator (MTI) capability, Global Hawk is a day/night, all-weather reconnaissance system. The 14,000 nautical mile range and 35 hour endurance of the air vehicle, combined with satellite and line-of-sight communication links to ground forces, permits world-wide operation of the system. Sensor data can be rapidly processed, correlated to a geographical grid and merged with live and stored images. Spatial information can be presented over common map displays, showing a detailed multi-dimensional situational picture.

UAS flight paths can be preprogrammed or remotely controlled. Recent campaigns have taught us the value of these assets and new systems are envisioned with even greater capabilities to include signals intelligence sensors. Commanders should understand UAS capabilities to support mission requirements as well as their limitations.

UAS come in all shapes and sizes. While they provide valuable surveillance and reconnaissance capabilities, the proliferation of these assets requires definitive command and control relationships and airspace control.

Manned Platforms

Manned airborne ISR platforms and their associated ground stations generally are among the most responsive assets available. They are capable of carrying out critical missions by collecting vital information in near-real time. Aircrews can recognize and respond to changing conditions and are able to modify missions while they are in progress. With their ability to fly long distances, manned platforms can cover a large area with a mix of sensors. Many of these assets have a common data link between aircraft or with ground stations allowing them to distribute large volumes of information in near-real time. Manned airborne ISR capabilities can be divided into two groups: standoff and penetrating.

During peacetime, the majority of airborne ISR missions are accomplished using standoff techniques. The standoff mode is used during military operations when the threat is too great to allow high value assets to penetrate adversary territory or when overflight of an area cannot be completed due to political sensitivities. The primary advantage of the standoff mode is that assets are relatively free from adversary surface-to-air and air-to-air attacks. The primary disadvantage is the limited range and depth of sensor coverage. An example of an ISR platform that uses standoff techniques is the RC-135 RIVET JOINT. Additional examples of standoff battle management, command and control systems with organic surveillance sensors are the E-8 joint surveillance target attack radar system (JSTARS) and E-3 airborne warning and control system (AWACS). (Refer to the Air Force Tactics, Techniques, and Procedures [AFTTP] 3-1 series for individual systems.)

The JSTARS uses a multi-mode side looking radar to detect, track, and classify moving ground vehicles in all conditions deep behind enemy lines.

If necessary, manned BMC2 and ISR aircraft may, upon proper authorization, penetrate threat areas when the target is beyond standoff range and other systems are not available to provide the required coverage, or when weather conditions are such that standoff systems are ineffective. Standoff systems may penetrate hostile airspace when the threat has been suppressed or when mission priority justifies the risk. Because they are high value assets and exist in small numbers, the main disadvantage of manned ISR systems is

the exposure or potential exposure of personnel and equipment to adversary threats. Like UAS, some manned airborne assets are also susceptible to adverse weather conditions. Other collection capabilities, such as targeting pods on the F-16, will allow under-the-weather imaging in a threat environment. As UAS development continues, manned reconnaissance in hostile airspace will likely be limited to a relatively small set of high priority targets. However, UAS and manned aircraft will continue to be subject to host nation overflight and access restrictions en route to and within the AOR based on international law, custom and practice, and arrangements outlined in the DOD 4500.54-G, *DOD Foreign Clearance Guide*.

Space-based Systems

Space-based ISR systems are an integral part of military forces providing support across the range of military operations. Space systems help provide information to commanders allowing them to quickly assess the situation, develop concepts of operation, and distribute changes to their forces. However, commanders must also be aware of the advantages and limitations of these systems. The prime advantage of these systems is their ability to provide worldwide coverage, especially those remote or hostile areas where little or no data can be obtained from ground and airborne sources. Other advantages these systems possess include mission longevity and relative immunity from adversary action.

While able to provide worldwide coverage, demands on individual space-based systems often exceed their capacity and their associated orbit requirements may limit their ability to meet operational requirements. Space systems are divided into military, nonmilitary, and national systems.

A Titan IVB space launch vehicle carrying a DSP satellite that will add to a constellation of similar satellites the Air Force uses to provide early warning of missile launches worldwide.

Military Systems

Military space ISR systems employ a variety of sensor suites and provide a broad range of capabilities. During peacetime, space systems routinely support activities such as training exercises, peacekeeping operations, indications and warning (I&W), disaster and humanitarian relief efforts, counterterrorism, and counternarcotics operations.

Space-based ISR systems' unique advantage of near global coverage allows commanders to observe areas of interest over great distances and where other ISR systems cannot be employed. Detection and warning sensors provide early detection of ballistic missile attack and downlink this information to the appropriate ground stations, allowing commanders to take the appropriate actions against ballistic missile attack. Environmental monitoring systems are crucial to providing an asymmetric warfighting advantage in which we anticipate and exploit the condition of the atmosphere, oceans, soil, and the space environment in order to support friendly and adversary military operations. Awareness of environmental conditions can be the difference between the success or failure of an operation or mission. Accurate weather forecasting also helps commanders anticipate conditions and exploit weather to their advantage.

Space-based ISR systems can also provide military forces with geographic and detailed terrain information that enhances mission planning capabilities. Additionally, these systems can often cue or be cued by other ISR systems to watch a specific area of interest, enhancing accuracy and reaction times for the users of that information. Finally, space communications support ISR operations by distributing the products generated from ISR systems while navigation systems provide ISR sensors with accurate positioning information.

Nonmilitary Systems

Nonmilitary space systems normally complement military space systems and include civil, commercial, and allied capabilities. These systems possess a variety of capabilities; however, in some cases their availability may be limited. Two examples of these systems are weather and multispectral imagery satellites. Theater commanders may be able to task these systems directly, depending on the terms of share-use agreements with the owners.

National Satellite Systems

National satellite systems are controlled by the US intelligence community and provide support to the President, the Secretary of Defense and the military at all levels. These resources provide critical data and are becoming increasingly responsive to military information needs. National systems provide critical support when aircraft are denied access or when access is limited by the capability or range of other systems.

Ground-based Systems

Missile Early Warning System—Ground-based collection can come from many sources.

Air Force ground-based ISR systems are not limited to traditional intelligence collection architectures. They also include the space surveillance network (SSN), the ground-based missile warning sensor system, and those systems used by the theater air control system (TACS) for battle management, airspace management, aircraft control, and surveillance.

Other ground-based "systems" include SOF and other HUMINT collection capabilities. Normally, these systems are not tasked as ISR assets but provide surveillance information as a by-product of their primary mission.

Traditional Ground-based Collection

Ground sites around the world are equipped and tasked to collect information within any of the disciplines previously described (e.g., SIGINT, MASINT, etc.). These sites may satisfy national, theater, or local information requirements, or any combination of these.

- Air Surveillance and Acquisition Radars. Ground-based surveillance systems used to control the movement of aircraft provide a degree of warning and control over air resources within a designated airspace control area. Examples of these systems are ground control intercept (GCI), early warning radars, and tracking and acquisition radars. The advantage of these systems is that they provide an additional layer of control and observation that may not be available with other surveillance systems. Although some ground-based GCI systems are highly mobile, one of the primary disadvantages is their lack of mobility. Also, some of the ground-based warning sensors have unique sensor limitations and are susceptible to adverse atmospheric conditions. In addition, air defense sensors are limited to line-of-sight surveillance.

- Missile Warning and Space Surveillance. Significant ground-based ISR resources are the SSN and ground-based missile warning sensor system. The SSN's purpose is to find, fix, track, and characterize manmade objects in space. An example of an SSN system is the ground-based electro-optical deep space surveillance (GEODSS)

system. SSN data are used to help determine adversary space OB, adversary satellite overflight warning, and adversary satellite status. This information is available to theater commanders. Although ground-based missile warning sensors primarily provide missile warning and attack assessment of a ballistic missile attack, they also contribute to space surveillance. One example of this type of system is the ballistic missile early warning system. The SSN and ground-based missile warning sensors can provide advance notice of hostile over flights to theater commanders. Combatant commanders or JFCs may be called upon to protect these systems from adversary attack within their AOR.

Human Intelligence Sources

Despite the sophistication of long-range sensors and overhead platforms, there are circumstances in which the precision, timeliness, or access requirements (e.g., underground facilities) for reporting critical information requires a skilled eye on the target. Following are some forms of human-resourced information of ISR value.

- Dedicated HUMINT Collectors. Dedicated human resources may be tasked to support theater commanders or national-level agencies. Dedicated HUMINT collectors can also contribute information to the overall ISR picture and can often amplify, clarify, or verify information collected by other airborne, ground-based, or space-based assets. In many cases, HUMINT, along with counterintelligence activities, are the best and only sources of adversary intentions. The Air Force currently relies primarily on DOD and other national-level agencies to provide operational and strategic HUMINT support.

SOF can provide valuable HUMINT to commanders.

- Special Operations Forces. SOF conduct special reconnaissance (SR) operations to obtain or verify information about adversary capabilities, intentions, and activities, or to gather data about meteorological, hydrographic, or geographical characteristics of an area. SR operations complement national and theater ISR resources by obtaining specific, time-sensitive information of strategic and operational significance. SOF have technically knowledgeable observers who may be able to verify critical information about targets or target complexes. These observers attempt to defeat adversary deception efforts and transmit a more complete picture of what is happening at the target area.

- Aircrews and Ground Personnel. Human visual surveillance and reconnaissance are the most basic and the oldest methods of intelligence gathering. Today, visual surveillance and reconnaissance information come from a wide range of sources and often simply entail observer reporting and debriefing activities. While there are some limitations, observers can include aircrews flying any type of aircraft or SOF conducting assigned missions as described above. Additionally, information gained from onboard aircraft systems such as weapon system, video, and defensive countermeasure suites can provide invaluable ISR information during operations. Security forces, explosive ordnance personnel, and other Airmen who operate outside the base perimeter are also sources of information that are of intelligence value.

Combat Camera supports DOD and Air Force senior leadership.

- Combat Camera. While not a dedicated ISR asset, Combat Camera and their products can play a significant role in the fusion process or in providing graphic support to intelligence assessments. The mission of Combat Camera is to support DOD and Air Force senior leadership with timely and informative visual imagery that will enhance their daily operational decisions and assessments during both combat and peacetime contingencies. Combat Camera technicians operate still and video imagery systems that can distribute images within a six-hour response time.

Non-Traditional ISR Resources

When developing collection plans, to include addressing immediate operational environment needs, collection managers should keep in mind that available resources are not limited to platforms or sensors that were specifically designed to collect intelligence. Ground based radars for GCI, early warning, tracking, and acquisition are used to control the movement of aircraft and provide a degree of warning within designated airspace. The air picture they provide can be simultaneously exploited for real-time data of potential intelligence value. With the increasing sophistication of airborne sensors, many, if not all, aircraft can conduct reconnaissance or surveillance to varying degrees, even if intelligence collection is not their primary mission. Some examples of non-traditional capabilities include F-16 tactical airborne reconnaissance systems, F-16CJs collecting SIGINT, F-15Es collecting imagery via their targeting pods, and AC-130s using video capabilities to monitor a particular building. Understanding how to integrate these capabilities into the collection plan is increasingly important, as traditional intelligence collection-only assets can rarely satisfy all collection requirements. Typically, collection managers will not be able to directly

New systems, like the F-22, are designed with sensors that collect valuable intelligence.

task such assets, and will need to coordinate with operations personnel in the strategy, combat plans, or combat operations division of the AOC to do so. As such, collection managers should understand the broad range of collection capabilities associated with such aircraft and, based on this knowledge, articulate the intelligence these assets can provide. Depending on the operation, these assets can be called upon to provide a wide range of intelligence collection support, from providing GEOINT for IPOE, collecting post-strike intelligence for assessment to performing ad hoc collection for emerging threats. The availability of these assets may be haphazard, at best, and collection managers should have knowledge of the current operational environment to take advantage of these capabilities when they become available. ISR professionals may require additional training and on-the-job experience in order to gain the greatest benefit from these capabilities.

Tasking, Collecting, Processing, Exploitation, and Dissemination Systems

Many of the ISR systems mentioned above send the data they collect to tasking, collecting, processing, exploitation, and dissemination (TCPED) systems. The Air Force's primary TCPED system is the AF DCGS, a network-centric, global enterprise designated as the Air Force AN/GSQ-272 SENTINEL ISR weapon system. It is tasked and managed to support CCDRs and forces—primarily at the JTF level and below—with actionable, decision-quality information in accordance with established priorities as approved by the Secretary of Defense via the Joint Chiefs of Staff deployment order process. It operates with the full flexibility of the established intelligence process, as detailed in JP 2-01, *Joint and National Intelligence Support to Military Operations*, in order to make usable information immediately and simultaneously available to both engaged forces and intelligence analysts. AF DCGS takes advantage of Air Force, sister-Service, national, and coalition sensors in the air, on land, in space, and at sea spanning multiple intelligence (multi-INT) sources and provides tailored, correlated information to those who need it in the formats, timelines, and channels they need it, at all levels across the globe in peace and in combat. It is scalable and comprised of fixed and deployable total force components capable of forward-based activities and robust, full-scale reachback operations. AF DCGS is a component of the larger DOD DCGS enterprise.

PRODUCTS

Intelligence products can be used in a variety of ways to support national-level decision makers, theater commanders, and individual warfighters. In a general sense, situational awareness (SA) is a major goal of ISR operations. SA is provided at a number of levels. For example, it could mean passing direct threat warning information to a pilot in near-real time or providing a combatant commander with a comprehensive picture of the AOR's operational environment. Information must be communicated to be effective. Intelligence can be tailored through formal reporting methods, informal or formal briefings, memos or background papers, annotated imagery, graphic or video presentations, dynamic databases, and near-real time displays. Dissemination of

intelligence products depends on the commander's requirements and, to a lesser extent, on the kind of information communicated. For example, it may be best to present current intelligence with a formal or informal briefing instead of a written product, whereas technical intelligence may be best presented as a written document. Below are some of the capabilities, processes, and products that contribute to SA at all levels and highlight the ISR contribution to Air Force forces.

Indications and Warning (I & W)

ISR performs vital I&W functions. Through continuous surveillance or as required reconnaissance, ISR provides timely and near-real time information necessary to assess potential threats to the US and its allies. The space-based infrared system which detects missile launches is one example of continuous surveillance.

I&W products are derived from a worldwide I&W system that analyzes and integrates operations and intelligence to assess the probability of hostile actions, and provides sufficient warning to preempt, counter, or otherwise moderate their outcome. I&W systems rely on tip-offs from sources at all levels. An integrated and responsive intelligence architecture should be established to satisfy theater requirements. The focus of I&W products varies at each echelon and is most specific at the operational and tactical levels. In general, I&W products focus on the following:

- Emerging crisis situations and foreign government responses to them.
- A potential adversary's politico-military intentions, past behaviors, motivations, and doctrine.
- Significant political, economic, or social situations that could lead to crisis-triggering events in both friendly and adversary states.
- Changes in adversary force dispositions, military activities, and mobilization status.
- Adversary information operations capabilities in the region.
- Key civil or bureaucratic activities that suggest follow-on military activity.
- Status of other military forces in the AOR or operations.

Current Intelligence

Current intelligence involves producing and disseminating all-source intelligence products on the current situation in a particular area or on activities of specific groups. It is similar to I&W in that both depend upon continuous monitoring of world events and specific activities in an AOR. Information required to produce current intelligence products includes, but is not limited to, the following:

- Adversary intentions, capabilities, and will to use military force.

- Potential adversaries' centers of gravity, operational plans, and vulnerabilities.
- Geographic, environmental, and social analysis of the operational area.
- Current and forecasted weather conditions that affect potential operational areas.
- Significant military and political events.
- Status of strategic transportation nodes (major airfields, seaports, and surface networks).

The information gained during development of current intelligence forms the basis for the general military intelligence (GMI) effort and other analytical products. Conversely, GMI provides the threat backbone through OB, tactics, technology, etc., for producing accurate and meaningful current intelligence.

General Military Intelligence

Current intelligence and GMI efforts are interdependent. GMI produces information concerning the political, economic, and social aspects of foreign countries as well as all information on the organization, operations, and capabilities of selected foreign military forces or groups. GMI products can be tailored to specific air and space force missions. For example, some GMI products support operational planning, while other products may support Air Force modeling and simulation or acquisition efforts. Here are some examples of GMI products:

- Military-related Infrastructure Assessments. These assessments can provide detailed indicators of an opposing force's capabilities and vulnerabilities, including its warfighting sustainability. Examples include assessments on adversary C2 systems, defense industries, energy production and distribution networks, and transportation systems.
- Military Capabilities Assessments. Determining the adversary's potential military capability includes identifying forces and dispositions, evaluating their vulnerabilities, and assessing their ability to employ military force to counter friendly force objectives. Specifically, military capability assessments focus on adversary leadership and C2, orders of battle, readiness, sustainability, and technical sophistication.

Situational Awareness

A number of dissemination systems provide near-real time and real time threat, target and friendly status to the JFACC, operational units, and other operators. Air Force surveillance and reconnaissance systems will contribute to building a common operating picture in all domains—land, air, sea, space, and cyberspace. Information from various intelligence disciplines may be fused to form the threat picture. The threat picture can be conveyed to tactical users via audio, video, or data links. In the current

environment of rapidly improving technologies, having the capability to provide rapid, accurate, and timely information is vital.

Intelligence Preparation of the Operational Environment

IPOE is a systematic continuous process of analyzing the threat and environment to help the commander better understand the operational environment. The IPOE methodology is an effective analytical process used during peacetime and during hostilities at all levels of command.

IPOE is a valuable methodology for focusing intelligence on the commander and the commander's supporting C2 elements. IPOE facilitates getting "inside" the enemy's decision-making cycle. Specifically, IPOE focuses on the interrelationship between the threat and environment and the effect of that interaction on both friendly and enemy courses of action. IPOE results in the production of adversary courses of action, named areas of interest, and high-value targets, which are inputs to the JFACC planning, intelligence collection, and targeting processes. Additional advantages of the IPOE process include integrating analysis, collection management, and targeting processes, as well as providing a standardized analytic approach for training purposes. Air Force intelligence entities at all levels of command should use IPOE principles, focusing on environmental and threat characteristics and activities that significantly influence Air Force operations.

Defense and Penetration Analysis

Defense and penetration analysis provides the basis for detailed mission planning and defense suppression, as well as for assessments of friendly force vulnerabilities. For example, intelligence personnel analyze adversary force capabilities to penetrate or operate over or within friendly territory.

Scientific and Technical Intelligence (S&TI)

S&TI products address foreign scientific and technical developments that have warfare potential. These developments include weapon system characteristics, capabilities, vulnerabilities, limitations, and effectiveness; research and development activities related to those systems; and related manufacturing information. ISR-generated S&TI products play a vital role in the acquisition process by allowing the acquisition community to develop new systems or upgrade existing ones to meet current, developing, and potential future threats.

Target Intelligence

ISR operations play a prominent role in the targeting cycle by detecting, locating, and identifying targets, as well as supporting mission planning and assessment. Successful employment of precision munitions against mobile targets often requires near-real time targeting information.

Detection is an ongoing process using surveillance and reconnaissance assets to identify potential targets or significant changes to existing targets. Once detected, a

target should be accurately and precisely located within a designated geospatial reference system.

Identification involves recognizing and classifying targets in sufficient detail to give commanders the ability to make informed decisions on targeting and tactics. Multiple surveillance and reconnaissance missions may be necessary to identify and verify a target. ISR assets can provide the level of detail necessary to support the precision engagement of specific high-value targets.

Examples of targeting production requirements include target threat characteristics and vulnerabilities, adversary capabilities and intentions, adversary centers of gravity, analysis of IW and other non-lethal weapons, and precise target location information and target signatures. Target intelligence products also include current imagery and geospatial information.

Advances in technology have increased the capability for intelligence to be passed directly to the cockpit ("sensor-to-shooter"). For example, RC-135 RIVET JOINT can provide threat information to aircraft performing both counterair and counterland missions. Target imagery can be provided directly to the same aircraft. To effectively use target information, commanders and planners should ensure proper procedures and systems are in place.

Assessment

Assessment is not strictly an ISR responsibility, though ISR forces play a leading role. Assessment encompasses all efforts to evaluate effects and gauge progress toward accomplishment of actions, effects, and objectives. It also helps evaluate requirements for future action. It helps answer several questions: “What happened and what is its impact?” “How is the conflict going?” and “What needs to be done next?” In an effects-based approach, it is not possible to think about actions and their effects without considering how accomplishment of those effects should be measured. Effects and objectives should always be measurable and planning for them should always include a means of measurement and evaluation. It is important to understand assessment as an integral component of the air and space tasking cycle to help define the direction and emphasis of the campaign. Assessment is an inseparable and integral component of the effects-based approach to operations.

Any comprehensive view of assessment should tie evaluation of progress at the tactical level to all other levels of war. An effective assessment construct should also support commanders’ objectives at all levels, support commanders’ decision cycles in real time, and provide the basis for predictive analysis. The proper focus of assessment conducted by the JFACC should be at the operational level of war. An effective assessment construct should address the entire spectrum of operations and all levels of war, permit component validation of assessment elements, focus on effects, standardize federated intelligence support, utilize intelligence specialties effectively, and integrate analysis efforts to the maximum extent possible. This suggests a four-tiered approach that is illustrated in Figure 3.1 and explained further below.

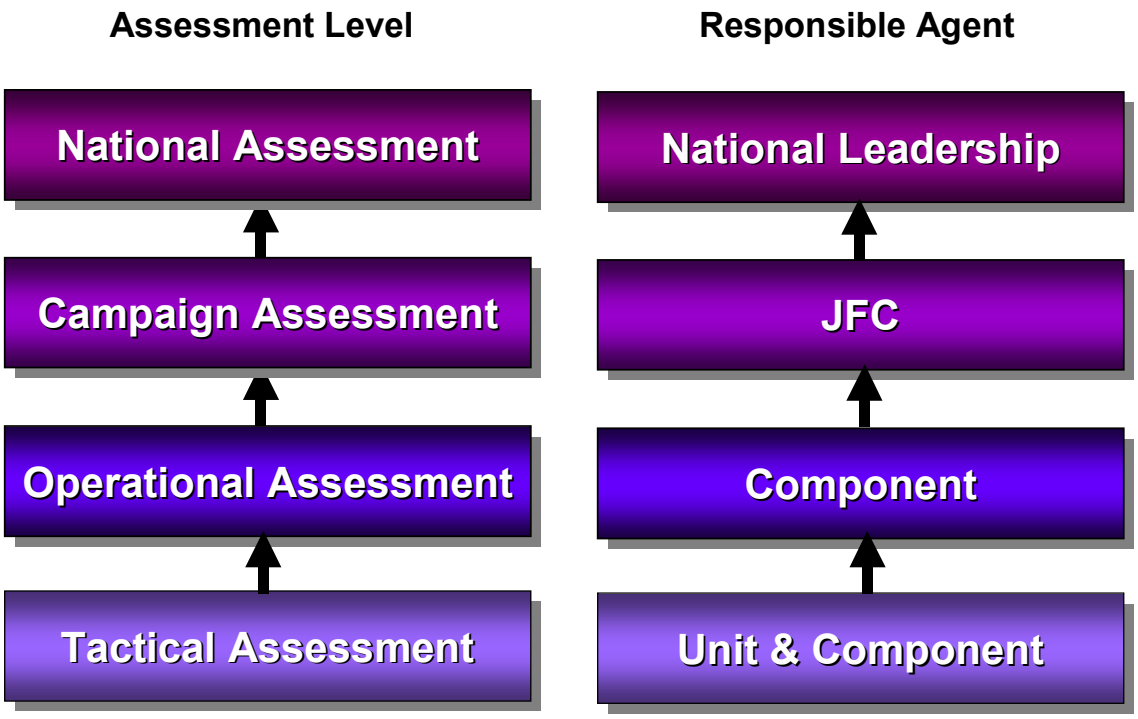


Figure 3.1. Four Levels of Assessment

The Four Levels of Assessment

Assessment consists of four distinct but interrelated levels:

- Tactical Assessment: Determination of the effectiveness of kinetic and non-kinetic tactical military operations through empirical and objective methods.
- Operational Assessment: Evaluation of effects generated by tactical actions and other operational environment influences toward achieving component operational objectives and recommendations for future action. Usually conducted for the JFACC at the AOC by the strategic division's operational assessment team, manned by a mix of operational, ISR, and analysis subject matter experts.
- Campaign Assessment: The JFC's broad qualitative and analytical determination of the overall effectiveness of military operations and recommendations for future action.
- National Assessment: Broad review of the effectiveness of national security strategy and whether national leadership's objectives for a particular crisis or contingency are being met.

For a more detailed description of assessment, see AFDD 2-1.9, *Targeting*.

CHAPTER FOUR

COMMANDING, ORGANIZING, AND EMPLOYING ISR FORCES

Experience in combat theaters has proven the requirement for centralized control by the air commander, of reconnaissance aviation .

—Field Manual 100-20
Command and Employment of Air Power, 1943

Allied "AOC" at Uxbridge, England 1944

Typical AOC Today

COMMAND RELATIONSHIPS

Command relationships delineate the degree of authority commanders have over forces. This chapter discusses ISR command relationships from the combatant commander, JFC, JFACC, COMAFFOR, and national perspectives. Refer to AFDD 2, *Operations and Organization*, for a detailed discussion of command relationships.

The Combatant Commander's Role

The combatant commander employs assigned and attached ISR forces to achieve national and theater objectives. When airborne ISR assets arrive in theater, OPCON may be delegated to the COMAFFOR. The combatant commander is responsible for employment of these assets, to satisfy national, theater, and outstanding component requirements. If necessary the combatant commander will coordinate with other combatant commands to utilize ISR assets not normally assigned to his/her theater, or coordinate the cooperative use of assets to improve coverage. Based on guidance and direction from the combatant commander, the combatant commander's J-2 staff develops an overall collection strategy and posture for the execution of the ISR mission.

The Joint Force Commander's Role

The JFC employs forces attached to the JTF to achieve campaign objectives. The JFC may retain OPCON authority over ISR assets or delegate it to the COMAFFOR. The JFC's staff develops an overall collection strategy and posture for the execution of the ISR mission in coordination with national agencies. The JTF J-2 reviews, validates, and prioritizes all outstanding intelligence requirements, whether originating from the JTF J-2 staff or a component**. The JFC normally delegates OPCON to the COMAFFOR or TACON to the JFACC of airborne ISR assets who will task them to support combat operations via the ATO.**

The Joint Force Air and Space Component Commander's Role

The authority and command relationships of the JFACC are established by the JFC. Normally, the JFACC serves as the supported commander for theater airborne reconnaissance and surveillance and provides integrated ISR for the JFC. The JFACC will exercise TACON authority, as delegated by the JFC, of all Air Force forces assigned or attached to the joint force air component, and over those assets made available for tasking by the other Services. In general, the JFACC's responsibility is to satisfy the JFC's requirements. If the JFACC does not have the available assets or capabilities on hand to satisfy these requirements, the ISR division within the AOC will identify unfulfilled information requirements and forward them to higher headquarters for resolution. Regardless of how the information is eventually gathered, it is imperative the JFACC remains aware of all available surveillance and reconnaissance capabilities that can be integrated into air, space, and information operations

The COMAFFOR’s Role

Through the Forces For Unified Commands memorandum, each combatant commander is assigned a COMAFFOR. As the Service component commander, the COMAFFOR is under the combatant command (COCOM) of the combatant commander to whom he is assigned and directly responsible to that combatant commander for missions and functions that may be assigned to the Air Force component. The combatant commander should normally delegate OPCON over assigned and attached Air Force forces to the COMAFFOR, who also holds administrative control (ADCON) authority over Air Force forces through the Service chain. If the JFC elects to designate an Air Force officer as the JFACC, the COMAFFOR, as the Service component commander with the preponderance of air and space assets and the ability to effectively command and control joint air and space assets, will be dual-hatted as the JFACC and will exercise authority through a joint or combined air and space operations center. The JFACC should normally be the supported commander for theater airborne reconnaissance and surveillance, as well as the area air defense commander, and the airspace control authority. These functions demand integration to ensure unity of command and effort.

National Support

National and non-DOD ISR resources are not a part of the JFC's OPCON authority. These resources may provide support to the JFC or one of the components, either full-time or on-call, but are normally shared with other commands, components, or government agencies. The supported commander will be provided liaison teams upon request, such as the NIST. The NIST mission is to provide national level, all-source intelligence support throughout the intelligence community to deployed commanders during crisis or contingency operations. NISTs are comprised of intelligence and communications experts from DIA, CIA, NGA, NSA, and other agencies as required. These teams will normally be the points of contact for coordinating their specific ISR resources and associated capabilities with the supported commander's collection managers. Collection managers forward the requirements to the appropriate command authority for action. In the event of war or periods of crisis, the President may direct the military to exercise greater responsibility for tasking of collections systems. National intelligence collection tasking authority may pass from the Director of National Intelligence to the Secretary of Defense. The JFC may request CMA from the Secretary of Defense and SIGINT operational tasking authority (SOTA) from the Director of the National Security Agency if required to carry out missions assigned to the command.

ORGANIZATION AND EMPLOYMENT

The AOC is the best location to integrate the JFC's theaterwide airborne ISR capabilities, to include reachback and distributed operations ISR support. AFDD 2, *Operations and Organization*, states that one of the responsibilities of the AOC is to plan, task, and execute the theater airborne ISR mission. Subtasks of this responsibility include:

- ✪ Identify and manage JFACC requirements.
- ✪ Manage JFC (theater-level) requirements in conjunction with other Service components and with validation from the JFC.
- ✪ Integrate and synchronize use of air and space assets.
- ✪ Task theater airborne ISR assets to satisfy the JFC's requirements.

JP 3-30, *Command and Control for Joint Air Operations*, states the responsibilities of the JFACC include "planning, coordinating, allocating, and tasking assigned airborne ISR assets to accomplish and fulfill JFC tasks and requirements." Whenever joint and Service mission needs dictate, it is more advantageous to the warfighter to train, equip, organize, and operate centralized ISR under the JFACC and within the AOC structure. The JFACC can best support ISR operations in strategy development and can best execute the planning, tasking, and direction of ISR missions.

Role of the Air and Space Component's A-2

As the Air Force Service component commander for the joint force, the COMAFFOR is responsible for presenting Air Force ISR capabilities to the JFC. The COMAFFOR's A-2 directs Air Force intelligence forces by recommending policy and guidance and ensuring coordination among various intelligence functions. The intelligence structure should be designed to expedite tailored intelligence to operational units. The A-2 exercises day-to-day responsibility for intelligence support to the COMAFFOR and assigned/attached Air Force forces. This includes the following:

- Serves as Air Force forces senior intelligence officer. Advises the COMAFFOR on all intelligence matters impacting mission accomplishment. Recommends Air Force intelligence policy and guidance for operations within the JOA.
- Establishes, coordinates, and monitors AFFOR ISR requirements and capabilities to support operations in the JOA. Coordinates and monitors JFC ISR requirements.
- Coordinates with JFC staff to establish relationships governing federated ISR operations and distributed operations in theater.
- Validates unit intelligence and systems requirements and manages fielding and operation of automated intelligence systems.
- Participates in the contingency planning processes and development of Annex B, Intelligence; Annex M, Geospatial Information; and Services annexes to OPLANs, CONPLANs, and operation orders (OPORDs). Assists the A-3 in developing the COMAFFOR's CCIR by developing PIRs.
- Coordinates the COMAFFOR's current intelligence and situational awareness support, to include briefings and situation report inputs.
- Coordinates with allied/coalition host nations regarding support systems and intelligence infrastructure.
- Plans intelligence architecture support to satisfy Service-specific weapon system employment requirements in accordance with theater/JOA operations plans.
- Establishes procedures for and manages theater/JOA production requests and RFIs. Validates, prioritizes, and sources unit requirements for intelligence information.
- Establishes, conducts, and maintains liaison with Air Staff A-2 and national intelligence community organizations.
- Supports the threat working group and force protection working group providing threat warning, threat analysis and defensive measures recommendations

Role of the ISR Division

The ISR division (ISRD) within the AOC is responsible for effectively orienting the COMAFFOR and AOC to current and emerging enemy capabilities, threats, COAs, and COGs with predictive and actionable intelligence, and to provide the JFACC with ISR operations management and targeting intelligence support. Within the AOC, the ISRD provides information crucial to the air mobility, strategy, combat plans, and combat operations divisions that are planning and executing theater-wide operations. This information helps accomplish the commander's objectives as well as provides the means by which the effects of the operations are measured. Figure 4.1 shows the organization of the ISRD within the AOC and its responsibilities, including:

- Providing analyses of the enemy and a common threat picture to the JFACC and staff planners, other AOC divisions and other Air Force elements in theater.
- Providing, in conjunction with the strategy, combat plans, and combat operations divisions, for planning and executing airborne ISR operations and providing combat ISR support assessment activities for air, space, and information operations planning and execution.
- Directing the AOC's distributed and reachback ISR processes by working with the JTF, national agencies, Air Force organizations, and the TCPED architecture to optimize ISR contributions to the effort.
- Providing direct targeting support to the ATO cycle in response to JFACC guidance.
- Providing all-source intelligence support to other AOC divisions to enhance the execution of their core processes.
- Ensuring actionable, decision quality, all-source IPOE and threat information depicted in the JFACC and AOC picture of the operational environment is consistent with that used by national, joint, component, and theater entities. Aggressively acts to resolve significant differences.
- Ensuring Air Force ISR is optimally managed to operate within the context of large and complex national and joint intelligence architectures. Serves as the focal point for multiple nodes to work together in order to meet the high demand for information.
- Serving as the senior intelligence element of the TACS, to integrate ISR platforms and other Air Force ISR elements external to the AOC in support of the joint force.

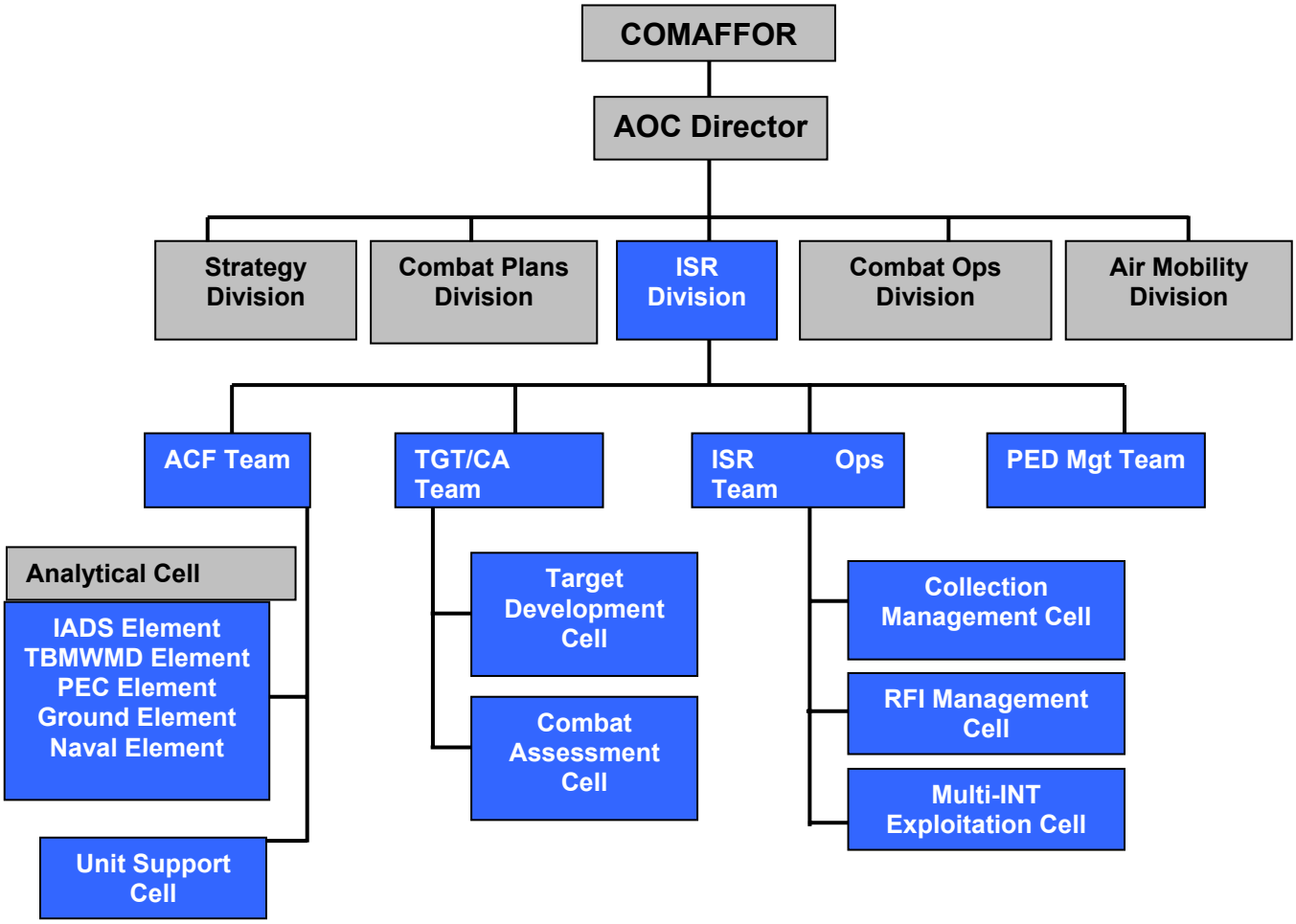


Figure 4.1. The ISR Division's Core Teams

ISR Authorities

Various military missions may be operating within a single AOR that require ISR support. While modern ISR capabilities provide the flexibility to distribute direction and control to a number of users, this flexibility creates challenges for command and control that are not addressed by the basic command relationships described in JP 1, *Doctrine for the Armed Forces of the United States*. This section provides definitions, derived from basic command relationships, for authorities associated with direction and control of ISR operations.

Operational missions in theater vary in composition. If there are needs for more than one service or joint component, a JTF may be established in theater and the JFC may be delegated OPCON over forces attached or assigned. Most often, joint forces are organized with a combination of Service and functional component commands and subordinate task forces with operational responsibilities. The theater J-2 should remain informed of all intelligence collection requirements being levied on assets and resources

within the combatant commander's AOR. The theater J-2 retains full management authority (i.e., to validate, to modify, or to nonconcur) over all intelligence collection requirements within the AOR. This authority may be delegated to a subordinate JFC. The JFC, if allocated a specific set of ISR assets from the combatant commander, will be delegated the necessary authority to employ these assets. However, tasking and employment of any ISR asset required to support more than one JTF commander will be coordinated and deconflicted by a common superior commander to the JTF commanders.

CMA is the authority to determine the priority, focus, and weight of ISR efforts across multiple theater missions and tasks by validating theater collection requirements, establishing sensor tasking guidance, and developing theater collection plans. Commanders delegated OPCON over ISR forces may or may not assume CMA of tasking these ISR assets as part of the delegation of authority. Even if a commander has CMA, it does not necessarily mean that CMA extends to authorities over all theater SIGINT ISR assets. CMA usually includes authority to task ISR GEOINT sensors and lower echelon SIGINT collection systems that have more localized collection capabilities. NSA still retains authority over the tasking of strategic-capable SIGINT ISR systems unless the combatant commander has specifically requested and received SOTA over theater-wide capable platforms and sensors. The delegation of SOTA to the combatant commander and subsequent delegation of this authority to the JFC ensures the theater has the ability to prioritize requirements and focus SIGINT collection where it is needed to carry out the mission assigned to the command.

CRM and validation of collection requirement requests for a theater resides at the combatant command level. CRM focuses on the requirements of the customer, is all-source oriented, and advocates what information is necessary for collection. The COM process organizes, directs, and monitors the equipment and personnel that actually collect the data to satisfy requirements. COM develops strategies for collection against requirements in cooperation with CRM; predicts how well a system can satisfy requirements; evaluates the performance of the collection systems; allocates and tasks collection assets and/or resources and processing and/or exploitation systems; and monitors and reports the operational status of collection systems. The COM process is directly linked to collection plan execution through ISR visualization.

JFCs exercise control over an impressive array of organic and attached intelligence collection and analysis resources. Nevertheless, these alone will not be capable of satisfying all the joint force's information requirements. Some theater missions may require ISR resources not organic to the theater or to the components of the subordinate joint force. ISR resources are typically in high demand and requirements usually exceed platform capabilities and inventory. The joint force J-2 relies on both theater and national intelligence organizations for support in order to provide the JFC with the most accurate intelligence possible. Collection requirements should be satisfied at the lowest possible level. Requirements that cannot be satisfied, and that have been validated by the command's collection manager or J-2, should be forwarded to the next higher echelon for action. This process continues until the

requirement is satisfied, the intelligence is no longer needed, or it is determined that the requirement cannot be satisfied. Validated collection requirements and collection requests for theater and national systems will be forwarded for action to the combatant command theater intelligence CMA. Validated collection requirements from components will become part of the theater collection plan and will be collected by theater collectors or forwarded to the combatant command for national collection consideration and prioritization.

The combatant commander may delegate OPCON or TACON over some theater ISR assets to the JFC. The combatant commander, however, retains the authority to validate and prioritize requirements that will be collected by theater ISR assets not provided to the JFC, and for all requirements forwarded for national collection consideration. The portion of the ISR planning process whereby the JFC identifies all theater and national collection requirements to the combatant commander is when the JFC briefs a draft ISR collection plan to the combatant commander at the joint collection management board (JCMB). The product resulting from this board is a validated multi-source theater collection plan, consisting of collection requirements that are allocated to multiple theater and national collection platforms and sensor capabilities. The requirement allocation effort is usually a JFC-delegated task, performed by the JFACC, prior to the JCMB. The JFACC is also the joint force component commander responsible for the execution of ISR forces via the ATO and therefore should be delegated TACON over these executing forces in theater. High priority, time-sensitive requirements are identified and pre-validated by the JFC for the JFACC to consider for dynamic retasking during execution of ISR forces. Two significant command and control responsibilities of ISR authorities are employment and organization of assigned forces.

ISR and Multi-role Aircraft Employment

Roles and missions for many Air Force assets have expanded beyond what was envisioned in their initial concept of employment to include a variety of innovative functions, often employed during the same mission. Today it is not unusual to find strike aircraft employed in a non-traditional ISR role, and some traditional ISR assets have become weapons platforms. Whether the aircraft is dedicated to providing ISR for the entire mission or performing ISR during part of the strike mission, the **mission objectives, priorities, and guidance for multi-role aircraft employment and the authority to task the weapon system should be clear and preferably worked out well in advance of mission execution.** The JFACC should ensure the following authorities are defined to ensure clear lines of control during multi-role missions:

- **Aircraft Control:** Organization or individual in authority and technically capable of controlling the aircraft.

- **Sensor Control:** Organization or individual in authority and technically capable of controlling the aircraft sensor.

- **Sensor Tasking:** Organization with the authority to direct sensor control and aircraft control to execute ISR tasking.

An example of a multi-role platform is the Predator. On a single mission the Predator can shift between reconnaissance, strike, surveillance, force protection, and other roles. By defining control authorities, and mission priorities, the shift in employment between different organizations or customers will expedite smooth transitions. While the Predator is used as the example, there are many platforms that have similar capabilities where the same principles would apply.

Modern ISR assets, such as the Predator UAS, present opportunities for control of the aircraft, weapons, and sensors by many different agencies. Proper definition of authorities for direction and control of these assets is critical.

Direct and Reachback Support to JFACC ISR Employment

Much of today's intelligence support comes from dedicated centers of excellence or agencies where intelligence professionals practice the art of discerning adversary intent and capabilities. Though not always forward deployed, commanders can still rely on the fact that they are working diligently to provide the intelligence JFCs need to achieve battlefield dominance.

Air Force Intelligence, Surveillance, and Reconnaissance Agency (AFISRA)

The AFISRA is a forward operating agency subordinate to the Deputy Chief of Staff (DCS), Intelligence, Surveillance, and Reconnaissance (AF/A2). It is responsible for executing AF/A2 responsibilities in intelligence collection, analysis, and production. AFISRA organizes, trains, equips, presents, and integrates all-source intelligence (e.g., SIGINT, GEOINT, MASINT, HUMINT, etc.) full-spectrum capabilities to the intelligence community, and to JFCs through the COMAFFOR. It provides customers at all echelons with multi-source intelligence products, applications, and services and provides intelligence expertise in the areas of SIGINT, IO (to include information protection), acquisition, foreign weapons systems and technology, and treaty monitoring. When Air Force component intelligence requirements exceed the theater's capabilities, AFISRA may reinforce the combatant command with analytical expertise and products.

Additionally, AFISRA's "centers of excellence" provide detailed analyses and products for Air Force and DOD customers. Specific functions of these centers include vulnerabilities and capabilities analysis on foreign air and space weapons systems and organizations; production of tailored, customer-specific products; and support to US weapon treaty negotiations and compliance verification. Other centers provide leadership in IO and ISR-related activities to support operations, campaign planning, acquisition, and testing.

Wing, Group, and Squadron Intelligence Support

The primary focus of ISR at the operational wing, group, and squadron levels is the application of all-source intelligence information to sustain combat air operations. Although the wing's intelligence capability is focused within a flight of the unit's operations support squadron, intelligence personnel and assets are assigned to each operational squadron or may be assigned or attached to other wing staffs. This ISR capability supports unit deployments, readiness training, mission planning, and other wing-level mission execution functions. Most unit-level intelligence organizations are composed of two branches—operational intelligence (also termed "combat" intelligence) and target intelligence. Each performs a specific function. First, operational intelligence keeps the commander and aircrews informed of intelligence matters needed to perform the mission. It maintains intelligence database holdings, provides briefings and training, and helps with mission planning. Second, target intelligence assembles and maintains mission or planning folders with related target planning documentation. Important ISR functions that may be performed at the unit level include:

- Mission planning and IPOE support.
- Air and space expeditionary task force command element intelligence support.
- Defensive threat capabilities and penetration analysis.
- Mission folder construction and maintenance.
- Aircrew target study, threat training, and certification.
- Debriefing, assessment, aircraft weapons system recorded media exploitation, and intelligence reporting.
- EEI and RFI management.
- Maintenance and operation of intelligence databases, systems, and special security office programs.
- Identification of unit support requirements to include identifying, requisitioning, and safeguarding target materials and geospatial data for combat and training missions.

Air Control Squadrons

Air control units provide surveillance, early warning, airspace control, and airborne battle management capabilities for operations across the spectrum of conflict. While these units do not generally produce raw data specifically designed for the ISR process, much of the information generated by these units is germane and useful to the ISR process and can be used in all-source fusion to create a more accurate picture of the operational environment.

Reconnaissance Units

Air Force reconnaissance units collect and process raw data for input into the ISR process. They are responsible for providing national and theater command authorities with a wide array of timely, reliable, high-quality, reconnaissance products. Air Force reconnaissance units train and equip personnel for worldwide employment in situations across the full range of military operations. Reconnaissance products or data generated by these units are often the chief input into the ISR process; additionally, critical, perishable reconnaissance data can also be routed directly to the shooter in near-real time. Reconnaissance data is often fused together with other intelligence to form a variety of ISR-related products that range from I&W products to long-range assessments of adversary capabilities.

Space Operations Units

Space operations units typically operate military and national-level satellites that collect information to support strategic-, operational-, and tactical-level decision making. These units typically generate raw data for intelligence processing. Forward units can access these data through reachback. Space planning products, like reconnaissance products from manned and unmanned airborne systems, are also fused with various other inputs from the ISR process to create intelligence products.

Other Air Force Intelligence Units

Other Air Force intelligence organizations include the intelligence wing, intelligence group, intelligence squadron and intelligence divisions. The intelligence wing manages the planning of all-source intelligence and assists Air Force components in the development of concepts, exercises, and employment of forces to support the full range of military operations.

Air Force intelligence groups perform a variety of functions. Most intelligence groups are collocated with the MAJCOM they support and often manage intelligence infrastructure and programs and perform lower-echelon unit support. Other specific functions may include the production of tailored intelligence for weapons systems acquisition, mission planning and targeting, collection management, logistics and readiness issues, and communications/computer system support. Some groups manage military and civilian personnel actions and programs, while others maintain imagery data bases, develop aircrew training materials, and provide reachback linkage for deployed intelligence units. Finally, some intelligence groups have specific

operational missions that relate to C2; acquisition/research and development; space surveillance; threat warning and technical analysis; and SIGINT-oriented cryptologic and S&TI support.

Intelligence squadrons collect, process, exploit, and disseminate intelligence in response to taskings from national authorities, theater commanders, and the JFACC. Intelligence squadrons conduct various missions including military capabilities and OB analysis, unit support, targeting support, and GEOINT and SIGINT collection, processing, exploitation, and dissemination.

Intelligence divisions provide intelligence support to technology, acquisition, test, and sustainment organizations. Besides supporting operations, as necessary, intelligence divisions: (1) provide special security; (2) make available intelligence production and applications such as for system threat assessments, program protection, and models and simulations; and (3) facilitate access to foreign materiel and geospatial information and services.

Multinational Intelligence Operations

Multinational operations are becoming the norm for military operations, making intelligence-sharing with allies and coalition partners increasingly important. In some multinational operations or campaigns, JFCs will be able to use existing international standardization agreements (STANAGs) (e.g., NATO STANAGs) as a basis for establishing rules and policies for conducting joint intelligence operations. Since each multinational operation will be unique, such agreements may have to be modified or amended based on the situation. A JFC participating in a coalition or alliance should tailor the policy and procedures for that particular operation based on theater guidance and national policy as contained in National Disclosure Policy (NDP) 1, *National Policy and Procedures for the Disclosure of Classified Military Information to Foreign Governments and International Organizations*. NDP 1 provides policy and procedures in the form of specific disclosure criteria and limitations, definition of terms, release arrangements, and other guidance. The disclosure of classified information is never automatic. Any disclosure should be consistent with US national policy and US military objectives, be done with security assurances in place, present a clearly defined US advantage, and be limited to only necessary information.

At the very Heart of Warfare lies Doctrine

SUGGESTED READINGS

Air Force Publications

Note: All Air Force doctrine documents are available on the Air Force Doctrine Center web page at https://www.doctrine.af.mil; All Air Land Sea Application (ALSA) documents are available on the their website https://wwwmil.alsa.mil/index.html

AFDD 1, *Air Force Basic Doctrine*

AFDD 2, *Operations and Organization*

AFDD 2-1.9, *Targeting*

AFDD 2-4.1, *Force Protection*

AFTTP 3-3.36, *Information Warfare Planning, Integration, and Employment Considerations*

AFTTP 3-10.1, *Integrated Base Defense*

AFTTP 3-3.60, *Operational Employment - Air and Space Operations Center*

Joint Publications

JP 1, *Doctrine for the Armed Forces of the United States*

JP 1-02, *Department of Defense Dictionary of Military and Associated Terms*

JP 2-0, *Doctrine for Intelligence Support to Joint Operations*

JP 2-0.1 *Joint and National Intelligence Support to Military Operations*

JP 2-01.3, *Joint Tactics, Techniques, and Procedures for Joint Intelligence Preparation of the Battlespace*

JP 2-03, *Geospatial Intelligence Support to Joint Operations*

JP 3-0, *Joint Operations*

JP 3-30, *Command and Control for Joint Air Operations*

JP 3-60, *Joint Targeting*

Other Publications

AFMAN 37-123, *Management of Records*[1]

GEOINT Publication 1, *Geospatial Intelligence (GEOINT) Basic Doctrine,* (National Geospatial-Intelligence Agency), June 2004

[1] Ensure that all records created as a result of processes prescribed in this publication are maintained in accordance with AFMAN 37-123, *Management of Records* and disposed of in accordance with the Air Force Records Disposition Schedule (RDS) located at https://afrims.amc.af.mil/

GLOSSARY

Abbreviations and Acronyms

ACF	analysis, correlation, and fusion
ADCON	administrative control
AFDD	Air Force doctrine document
AFISRA	Air Force Intelligence, Surveillance and Reconnaissance Agency
AFTTP	Air Force tactics, techniques, and procedures
AOC	air and space operations center
AOR	area of responsibility
ATO	air tasking order
AWACS	airborne warning and control system
BDA	battle damage assessment
BMC2	battle management, command and control
C2	command and control
CA	combat assessment
CCDR	combatant commander
CCIR	commander's critical intelligence requirement
CIA	Central Intelligence Agency
CMA	collection management authority
COA	course of action
COCOM	combatant command (command authority)
COG	center of gravity
COM	collection operations management
COMAFFOR	commander, Air Force forces
COMINT	communications intelligence
CONPLAN	concept plans
COP	common operating picture
CRM	collection requirements management
DCGS	distributed common ground system
DIA	Defense Intelligence Agency
DNI	Directorate of National Intelligence
DOD	Department of Defense
DSP	Defense Support Program
EBAO	effects-based approach to operations
EEI	essential elements of information
ELINT	electronic intelligence
FISINT	foreign instrumentation signals intelligence
GCI	ground control intercept

GEODSS	electro-optical deep space surveillance
GEOINT	geospatial intelligence
GMI	general military intelligence
HUMINT	human resources intelligence
I&W	indications & warning
IADS	Integrated air defense system
INTSUM	intelligence summary
IPL	imagery product library
IPOE	intelligence preparation of the operational environment
ISR	intelligence, surveillance, and reconnaissance
ISRD	intelligence, surveillance, and reconnaissance division
JAOC	joint air and space operations center
JCMB	joint collection management board
JFACC	joint force air and space component commander
JFC	joint force commander
JOA	joint operational area
JP	joint publication
JTAC	joint terminal attack controller
JTF	joint task force
JS/J2	joint staff/director of intelligence
JSTARS	joint surveillance target attack radar system
MASINT	measurement and signature intelligence
MOE	measure of effectiveness
MOP	measure of performance
MTI	moving target indicator
multi-INT	multiple intelligence
NATO	North Atlantic Treaty Organization
NDP	national disclosure policy
NGA	National Geospatial-Intelligence Agency
NIST	national intelligence support team
NRO	National Reconnaissance Office
NSA	National Security Agency
OB	order of battle
OODA	observe, orient, decide, act
OPCON	operational control
OPLAN	operation plan
OPORD	operation orders
OSINT	open-source intelligence

PBA	predictive battlespace awareness
PEC	pre-authorized engagement criteria
PED	processing, exploration and dissemination
PIR	priority intelligence requirements
PR	personnel recovery
RFI	request for information
ROE	rules of engagement
ROVER	remote operations video enhanced receiver
RSTA	reconnaissance, surveillance, and target acquisition
S&TI	scientific and technical intelligence
SAM	surface-to-air missile
SA	situational awareness
SAR	synthetic aperture radar
SIGINT	signals intelligence
SOF	special operations forces
SOTA	signals intelligence (SIGINT) operational tasking authority
SR	special reconnaissance
SSN	space surveillance network
STANAG	standardization agreement (NATO)
TACON	tactical control
TACS	theater air control system
TBMWMD	tactical ballistic missile weapon of mass destruction
TCPED	tasking, collecting, processing, exploitation and dissemination
UAS	unmanned aircraft system
WMD	weapons of mass destruction

Definitions

administrative control. Direction or exercise of authority over subordinate or other organizations in respect to administration and support, including organization of Service forces, control of resources and equipment, personnel management, unit logistics, individual and unit training, readiness, mobilization, demobilization, discipline, and other matters not included in the operational missions of the subordinate or other organizations. Also called **ADCON**.
(JP 1-02)

all-source intelligence. 1. Intelligence products and/or organizations and activities that incorporate all sources of information, most frequently including human resources intelligence, imagery intelligence, measurement and signature intelligence, signals intelligence, and open-source data in the production of finished intelligence. 2. In intelligence collection, a phrase that indicates that in the satisfaction of intelligence requirements, all collection, processing, exploitation, and reporting systems and resources are identified for possible use and those most capable are tasked. (JP 1-02)

analysis and production. In intelligence usage, the conversion of processed information into intelligence through the integration, evaluation, analysis, and interpretation of all source data and the preparation of intelligence products in support of known or anticipated user requirements. (JP 1-02)

air and space operations center. The senior agency of the Air Force component commander that provides command and control of Air Force air and space operations and coordinates with other components and Services. Also called **AOC** (AFDD 2)

air tasking order. A method used to task and disseminate to components, subordinate units, and command and control agencies projected sorties/capabilities/forces to targets and specific missions. Normally provides specific instructions to include call signs, targets, controlling agencies, etc., as well as general instructions. Also called **ATO**. (JP 1-02)

battle damage assessment. The timely and accurate estimate of damage resulting from the application of military force, either lethal or non-lethal, against a predetermined objective. Battle damage assessment can be applied to the employment of all types of weapon systems (air, ground, naval, and special forces weapon systems) throughout the range of military operations. Battle damage assessment is primarily an intelligence responsibility with required inputs and coordination from the operators. Battle damage assessment is composed of physical damage assessment, functional damage assessment, and target system assessment. Also called **BDA**. (JP 1-02)

battlespace. The environment, factors, and conditions that must be understood to successfully apply combat power, protect the force, or complete the mission. This includes the air, land, sea, space, and the included enemy and friendly forces; facilities; weather; terrain; the electromagnetic spectrum; and the information environment within the operational areas and areas of interest.
(JP 1-02)

collection. In intelligence usage, the acquisition of information and the provision of this information to processing elements. (JP 1-02)

collection asset. A collection system, platform, or capability that is supporting,

assigned, or attached to a particular commander. (JP 1-02)

collection management authority. Constitutes the authority to establish, prioritize, and validate theater collection requirements, establish sensor tasking guidance, and develop theater collection plans. Also called **CMA**. (JP 1-02)

collection manager. An individual with responsibility for the timely and efficient tasking of organic collection resources and the development of requirements for theater and national assets that could satisfy specific information needs in support of the mission. (JP 1-02)

collection management. In intelligence usage, the process of converting intelligence requirements into collection requirements, establishing priorities, tasking or coordinating with appropriate collection sources or agencies, monitoring results, and retasking, as required. (JP 1-02)

collection operations management. The authoritative direction, scheduling, and control of specific collection operations and associated processing, exploitation, and reporting resources. Also called **COM**. See also collection management; collections requirements management. (JP 1-02)

collection plan. A plan for collecting information from all available sources to meet intelligence requirements and for transforming those requirements into orders and requests to appropriate agencies. (JP 1-02)

collection requirement. An established intelligence need considered in the allocation of intelligence resources to fulfill the essential elements of information and other intelligence needs of a commander. (JP 1-02)

collection requirements management. The authoritative development and control of collection, processing, exploitation, and/or reporting requirements that normally result in either the direct tasking of assets over which the collection manager has authority, or the generation of tasking requests to collection management authorities at a higher, lower, or lateral echelon to accomplish the collection mission. Also called **CRM**. (JP 1-02)

collection resource. A collection system, platform, or capability that is not assigned or attached to a specific unit or echelon which must be requested and coordinated through the chain of command. (JP 1-02)

combat assessment. The determination of the overall effectiveness of force employment during military operations. Combat assessment is composed of three major components: (a) battle damage assessment; (b) munitions effectiveness assessment; and (c) reattack recommendation. Also called **CA**. (JP 1-02)

combatant command (command authority). The nontransferable command authority established by Title 10 ("Armed Forces"), USC, Section 164, exercised only by commanders of unified or specified combatant commands unless otherwise directed by the President or Secretary of Defense. Combatant command (command authority) cannot be delegated and is the authority of a combatant commander to perform those functions of command over assigned forces involving organizing and employing commands and forces, assigning tasks, designating objectives, and giving authoritative direction over all aspects of military operations, joint training, and logistics necessary to accomplish the missions assigned to the command. Combatant command (command authority) should be exercised through the commanders of subordinate organizations. Normally this authority is exercised through subordinate joint commanders and Service and /or functional component commanders. Combatant command (command authority) provides full authority to organize and employ commands and forces as the combatant commander considers necessary to accomplish assigned missions. Operational control is inherent in combatant command. Also called **COCOM**. (JP 1-02)

command and control. The exercise of authority and direction by a properly designated commander over assigned and attached forces in the accomplishment of the mission. Command and control functions are performed through an arrangement of personnel, equipment, communications, facilities, and procedures employed by a commander in planning, directing, coordinating, and controlling forces and operations in the accomplishment of the mission. Also called **C2**. (JP 1-02)

commander's critical information requirements. Commander's critical information requirements comprise information requirements identified by the commander as being critical in facilitating timely information management and the decision-making process that affect successful mission accomplishment. The two key subcomponents are critical friendly force information and priority intelligence requirements. Also called **CCIR**. (JP 1-02)

common operational picture. A single identical display of relevant information shared by more than one command. A common operational picture facilitates collaborative planning and assists all echelons to achieve situational awareness. Also called **COP**. (JP 1-02)

communications intelligence. Technical information and intelligence derived from foreign communications by other than the intended recipients. Also called **COMINT**. (JP 1-02)

counterintelligence. Information gathered and activities conducted to protect against espionage, other intelligence activities, sabotage or assassinations conducted by or on behalf of foreign governments or elements thereof, foreign organizations, or foreign persons, or international terrorist activities. (JP 1-02)

critical information. Specific facts about friendly intentions, capabilities, and activities vitally needed by adversaries for them to plan and act effectively so as to guarantee failure or unacceptable consequences for friendly mission accomplishment. (JP 1-02)

current intelligence. One of two categories of descriptive intelligence that is concerned with describing the existing situation. (JP 1-02)

deception. Those measures designed to mislead the enemy by manipulation, distortion, or falsification of evidence to induce him to react in a manner prejudicial to his interests. See also **counterdeception.** (JP 1-02)

distributed operations. The process of conducting operations from independent or interdependent nodes in a teaming manner. Some operational planning or decision-making may occur from outside the joint area of operations. The goal of a distributed operation is to support the operational commander in the field; it is not a method of command from the rear. (AFDD 2-8)

electronic intelligence. Technical and geolocation intelligence derived from foreign non-communications electromagnetic radiations emanating from other than nuclear detonations or radioactive sources. Also called **ELINT**. (JP 1-02)

essential elements of information. The most critical information requirements regarding the adversary and the environment needed by the commander by a particular time to relate with other available information and intelligence in order to assist in reaching a logical decision. Also called **EEI**. (JP 1-02)

estimate. 1. An analysis of a foreign situation, development, or trend that identifies its major elements, interprets the significance, and appraises the future possibilities and the prospective results of the various actions that might be taken. 2. An appraisal of the capabilities, vulnerabilities, and potential courses of action of a foreign nation or combination of nations in consequence of a specific national plan, policy, decision, or contemplated course of action. 3. An analysis of an actual or contemplated clandestine operation in relation to the situation in which it is or would be conducted in order to identify and appraise such factors as available as well as needed assets and potential obstacles, accomplishments, and consequences. See also **intelligence estimate.** (JP 1-02)

evaluation and feedback. In intelligence usage, continuous assessment of intelligence operations throughout the intelligence process to ensure that the commander's intelligence requirements are being met. See **intelligence process**. (JP 1-02)

exploitation. Taking full advantage of success in military operations, following up initial gains, and making permanent the temporary effects already achieved.

2. Taking full advantage of any information that has come to hand for tactical, operational, or strategic purposes. 3. An offensive operation that usually follows a successful attack and is designed to disorganize the enemy in depth. See also attack; pursuit. (JP 1-02)

foreign instrumentation signals intelligence. Technical information and intelligence derived from the intercept of foreign electromagnetic emissions associated with the testing and operational deployment of non-US aerospace, surface, and subsurface systems. Foreign instrumentation signals intelligence is a subcategory of signals intelligence. Foreign instrumentation signals include but are not limited to telemetry, beaconry, electronic interrogators, and video data links. Also called **FISINT**. (JP 1-02)

fusion. In intelligence usage, the process of examining all sources of intelligence and information to derive a complete assessment of activity. (JP 1-02)

general military intelligence. Intelligence concerning the (1) military capabilities of foreign countries or organizations or (2) topics affecting potential US or multinational military operations, relating to the following subjects: armed forces capabilities, including order of battle, organization, training, tactics, doctrine, strategy, and other factors bearing on military strength and effectiveness; area and terrain intelligence, including urban areas, coasts and landing beaches, and meteorological, oceanographic, and geological intelligence; transportation in all modes; military materiel production and support industries; military and civilian command, control, communications, computers, and intelligence systems; military economics, including foreign military assistance; insurgency and terrorism; military-political-sociological intelligence; location, identification, and description of military-related installations; government control; escape and evasion; and threats and forecasts. (Excludes scientific and technical intelligence.) Also called **GMI**. (JP 1-02)

geospatial intelligence. The exploitation and analysis of imagery and geospatial information to describe, assess, and visually depict physical features and geographically referenced activities on the Earth. Also called **GEOINT**. (GEOINT Publication 1)

human intelligence. (DOD, NATO) A category of intelligence derived from information collected and provided by human sources. Also called **HUMINT**. See also human resources intelligence.(JP 1-02)

imagery. Collectively, the representations of objects reproduced electronically or by optical means on film, electronic display devices, or other media. (JP 1-02)

indications and warning. Those intelligence activities intended to detect and report time-sensitive intelligence information on foreign developments that could involve a threat to the United States or allied military, political, or economic

interests or to US citizens abroad. It includes forewarning of enemy actions or intentions; the imminence of hostilities; insurgency; nuclear/non-nuclear attack on the United States, its overseas forces, or allied nations; hostile reactions to the United States reconnaissance activities; terrorists' attacks; and other similar events. Also called **I&W**. (JP 1-02)

information. 1. Facts, data, or instructions in any medium or form. 2. The meaning that a human assigns to data by means of the known conventions used in their representation. (JP 1-02)

information requirements. Those items of information regarding the enemy and his environment which need to be collected and processed in order to meet the intelligence requirements of a commander. (JP 1-02)

infrared imagery. That imagery produced as a result of sensing electromagnetic radiations emitted or reflected from a given target surface in the infrared position of the electromagnetic spectrum (approximately 0.72 to 1,000 microns).
(JP 1-02)

intelligence. 1. The product resulting from the collection, processing, integration, analysis, evaluation, and interpretation of available information concerning foreign countries or areas. 2. Information and knowledge about an adversary obtained through observation, investigation, analysis, or understanding.
(JP 1-02)

intelligence federation. A formal agreement in which a combatant command joint intelligence center receives preplanned intelligence support from other joint intelligence centers, Service intelligence organizations, Reserve organizations, and national agencies during crisis or contingency operations. (JP 1-02)

intelligence process. The process by which information is converted into intelligence and made available to users. The process consists of six interrelated intelligence operations: planning and direction, collection, processing and exploitation, analysis and production, dissemination and integration, and evaluation and feedback. See also analysis and production; collection; dissemination and integration; evaluation and feedback; intelligence; planning and direction; processing and exploitation. (JP 1-02)

intelligence preparation of the operational environment. An analytical methodology employed to reduce uncertainties concerning the enemy, environment, and terrain for all types of operations. Intelligence preparation of the operational environment builds an extensive data base for each potential area in which a unit may be required to operate. The database is then analyzed in detail to determine the impact of the enemy, environment, and terrain on operations and presents it in graphic form. Intelligence preparation of the operational environment is a continuing process. Also called **IPOE**. (JP 1-02)

intelligence requirement. Any subject, general or specific, upon which there is a need for the collection of information, or the production of intelligence. (JP 1-02)

intelligence summary. A specific report providing a summary of items of intelligence at frequent intervals. Also called **INTSUM**. (JP 1-02)

intelligence, surveillance, and reconnaissance. An activity that synchronizes and integrates the planning and operation of sensors, assets, and processing, exploitation, and dissemination systems in direct support of current and future operations. This is an integrated intelligence and operations function. Also called **ISR**. (JP 1-02)

interoperability. 1. The ability of systems, units, or forces to provide services to and accept services from other systems, units, or forces and to use the services so exchanged to enable them to operate effectively together. (JP 1-02)

interpretation. A stage in the intelligence cycle in which the significance of information is judged in relation to the current body of knowledge. (JP 1-02)

joint force. A general term applied to a force composed of significant elements, assigned or attached, of two or more Military Departments, operating under a single joint force commander. See also **joint force commander**. (JP 1-02)

joint force air component commander. The joint force air component commander derives authority from the joint force commander who has the authority to exercise operational control, assign missions, direct coordination among subordinate commanders, redirect and organize forces to ensure unity of effort in the accomplishment of the overall mission. The joint force commander will normally designate a joint force air component commander. The joint force air component commander's responsibilities will be assigned by the joint force commander (normally these would include, but not be limited to, planning, coordination, allocation, and tasking based on the joint force commander's apportionment decision). Using the joint force commander's guidance and authority, and in coordination with other Service component commanders and other assigned or supporting commanders, the joint force air component commander will recommend to the joint force commander apportionment of air sorties to various missions or geographic areas. Also called **JFACC**. See also **joint force commander**. (JP 1-02) [*The joint force air and space component commander (JFACC) uses the joint air and space operations center to command and control the integrated air and space effort to meet the joint force commander's objectives. This title emphasizes the Air Force position that air power and space power together create effects that cannot be achieved through air or space power alone.*] [AFDD 2] {Italicized words in brackets apply only to the Air Force and are offered for clarity.}

joint force commander. A general term applied to a combatant commander, subunified commander, or joint task force commander authorized to exercise combatant command (command authority) or operational control over a joint force. Also called **JFC**. See also **joint force**. (JP 1-02)

joint task force. A joint force that is constituted and so designated by the Secretary of Defense, a combatant commander, a subunified commander, or an existing joint task force commander. Also called **JTF**. (JP 1-02)

measurement and signature intelligence. Technically derived intelligence that detects, locates, tracks, identifies, and describes the unique characteristics of fixed and dynamic target sources. Measurement and signature intelligence capabilities include radar, laser, optical, infrared, acoustic, nuclear radiation, radio frequency, spectroradiometric, and seismic sensing systems as well as gas, liquid, and solid materials sampling and analysis. Also called **MASINT**. (JP 1-02)

monitoring. The act of listening, carrying out surveillance on, and/or recording of enemy emissions for intelligence purposes. (JP 1-02)

national intelligence support team. A nationally sourced team composed of intelligence and communications experts from either Defense Intelligence Agency, Central Intelligence Agency, National Security Agency, or any combination of these agencies. Also called **NIST**. (JP 1-02)

near-real time. Pertaining to the timeliness of data or information which has been delayed by the time required for electronic communication and automatic data processing. This implies that there are no significant delays. Also called **NRT**. See also **real time**. (JP 1-02)

open-source intelligence. Information of potential intelligence value that is available to the general public. Also called **OSINT**. (JP 1-02)

operational control. Transferable command authority that may be exercised by commanders at any echelon at or below the level of combatant command. Operational control is inherent in combatant command (command authority). Operational control may be delegated and is the authority to perform those functions of command over subordinate forces involving organizing and employing commands and forces, assigning tasks, designating objectives, and giving authoritative direction necessary to accomplish the mission. Operational control includes authoritative direction over all aspects of military operations and joint training necessary to accomplish missions assigned to the command. Operational control should be exercised through the commanders of subordinate organizations. Normally this authority is exercised through subordinate joint force commanders and Service and/or functional component commanders.

Operational control normally provides full authority to organize commands and forces and to employ those forces as the commander in operational control considers necessary to accomplish assigned missions. Operational control does not, in and of itself, include authoritative direction for logistics or matters of administration, discipline, internal organization, or unit training. Also called **OPCON**. (JP 1-02)

operational environment. A composite of the conditions, circumstances, and influences that affect the employment of capabilities and bear on the decisions of the commander. (JP 1-02)

operational intelligence. Intelligence that is required for planning and conducting campaigns and major operations to accomplish strategic objectives within theaters or operational areas. See also **intelligence**; **strategic intelligence**; **tactical intelligence**. (JP 1-02)

planning and direction. In intelligence usage, the determination of intelligence requirements, development of appropriate intelligence architecture, preparation of a collection plan, and issuance of orders and requests to information collection agencies. See also intelligence process. (JP 1-02)

priority intelligence requirements. Those intelligence requirements for which a commander has an anticipated and stated priority in the task of planning and decision making. Also called **PIR**. See also information requirements; intelligence; intelligence process; intelligence requirement. (JP 1-02)

processing and exploitation. In intelligence usage, the conversion of collected information into forms suitable to the production of intelligence (JP 2-01)

radar imagery. Imagery produced by recording radar waves reflected from a given target surface. (JP 1-02)

reachback. The process of obtaining products, services, and applications, or forces, equipment, or material from Air Force organizations that are not forward deployed. (AFDD 2)

real time. Pertaining to the timeliness of data or information which has been delayed only by the time required for electronic communication. This implies that there are no noticeable delays. See also **near-real time**. (JP 1-02)

reconnaissance. A mission undertaken to obtain, by visual observation or other detection methods, information about the activities and resources of an enemy or potential enemy, or to secure data concerning the meteorological, hydrographic, or geographic characteristics of a particular area. Also called **RECON**. (JP 1-02) [*A transitory mission undertaken to obtain, by visual observation or other detection methods, information about the activities and resources of an*

adversary or potential adversary, or to secure data concerning the meteorological, hydrographic, or geographic characteristics of a particular area.] (AFDD 2-9) {Italicized definition in brackets applies only to the Air Force and is offered for clarity.}

request for information. 1. Any specific time-sensitive ad hoc requirement for intelligence information or products to support an ongoing crisis or operation not necessarily related to standing requirements or scheduled intelligence production. A request for information can be initiated to respond to operational requirements and will be validated in accordance with the theater command's procedures. 2. The National Security Agency/Central Security Service uses this term to state ad hoc signals intelligence requirements. Also called **RFI**. See also information; intelligence. (JP 1-02)

scientific and technical intelligence. The product resulting from the collection, evaluation, analysis, and interpretation of foreign scientific and technical information that covers: a. foreign developments in basic and applied research and in applied engineering techniques; and b. scientific and technical characteristics, capabilities, and limitations of all foreign military systems, weapons, weapon systems, and materiel; the research and development related thereto; and the production methods employed for their manufacture. Also called **S&TI**. (JP 1-02)

sensor. An equipment which detects, and may indicate, and/or record objects and activities by means of energy or particles emitted, reflected, or modified by objects. (JP 1-02)

SIGINT operational tasking authority. A military commander's authority to operationally direct and levy signals intelligence (SIGINT) requirements on designated SIGINT resources; includes authority to deploy and redeploy all or part of the SIGINT resources for which SIGINT operational tasking authority has been delegated. Also called **SOTA**. (JP 1-02, DODD 5100.20)

signals intelligence. 1. A category of intelligence comprising either individually or in combination all communications intelligence, electronic intelligence, and foreign instrumentation signals intelligence, however transmitted. 2. Intelligence derived from communications, electronic, and foreign instrumentation signals. Also called **SIGINT**. (JP 1-02)

special operations. Operations conducted in hostile, denied, or politically sensitive environments to achieve military, diplomatic, informational, and/or economic objectives employing military capabilities for which there is no broad conventional force requirement. These operations often require covert, clandestine, or low visibility capabilities. Special operations are applicable across the range of military operations. They can be conducted independently or in conjunction with operations of conventional forces or other government agencies

and may include operations through, with, or by indigenous or surrogate forces. Special operations differ from conventional operations in degree of physical and political risk, operational techniques, mode of employment, independence from friendly support, and dependence on detailed operational intelligence and indigenous assets. Also called **SO**. (JP 1-02)

surveillance. The systematic observation of aerospace, surface, or subsurface areas, places, persons, or things, by visual, aural, electronic, photographic, or other means. (JP 1-02)

tactical control. Command authority over assigned or attached forces or commands, or military capability or forces made available for tasking, that is limited to the detailed and, usually, local direction and control of movements or maneuvers necessary to accomplish missions or tasks assigned. Tactical control is inherent in operational control. Tactical control may be delegated to, and exercised at any level at or below the level of combatant command. Also called **TACON**. (JP 1-02)

target. 1. A geographical area, complex, or installation planned for capture or destruction by military forces. 2. In intelligence usage, a country, area, installation, agency, or person against which intelligence operations are directed. (JP 1-02)

targeting. The process of selecting targets and matching the appropriate response to them, taking account of operational requirements and capabilities. (JP 1-02)

technical intelligence. Intelligence derived from exploitation of foreign material, produced for strategic, operational, and tactical level commanders. Technical intelligence begins when an individual service member finds something new on the battlefield and takes the proper steps to report it. The item is then exploited at succeedingly higher levels until a countermeasure is produced to neutralize the adversary's technological advantage. Also called **TECHINT**. See also exploitation; intelligence.

validation. A process associated with the collection and production of intelligence that confirms that an intelligence collection or production requirement is sufficiently important to justify the dedication of intelligence resources, does not duplicate an existing requirement, and has not been previously satisfied. 2. In computer modeling and simulation, the process of determining the degree to which a model or simulation is an accurate representation of the real world from the perspective of the intended uses of the model or simulation. 3. Execution procedure used by combatant command components, supporting combatant commanders, and providing organizations to confirm to the supported commander and US Transportation Command that all the information records in a time-phased force and deployment data not only are error free for automation purposes, but also accurately reflect the current status, attributes, and availability of units and requirements. Unit readiness, movement dates, passengers, and

cargo details should be confirmed with the unit before validation occurs. See also **independent review; time-phased force and deployment data; verification**. (JP 1-02)