

Intelligence Preparation of the Battlespace — An Airman's Introduction

Lt Col Mark T. Satterly, USAF
Lt Col Kevin D. Stubbs, USAFR
Maj Geryl D. Gilbert, USAFR
Ms Cathy L. Iler, GS-13, DAF
Capt Kevin B. Glenn, USAF

*This article was originally published as an AF/XO White Paper in February 1999. (See page 17 for Lt Gen Esmond's Introductory Remarks)

FOREWORD

"If you know the enemy and yourself, you need not fear the result of a hundred battles. If you know yourself and not the enemy, for every victory gained you will also suffer a defeat. If you know neither yourself nor the enemy, you will succumb in every battle."

Sun Tzu - Art of War, c. 400 BC¹

*This article introduces and describes the IPB concept to airmen. It explains why IPB is an important concept for both operations and intelligence personnel to understand, how it fits into Air Force planning and execution activities, and how we plan to institutionalize IPB within the Air Force.

IPB is one of those current acronyms that seem to make it into many of today's operational and intelligence briefings and concept papers. The term is often used incorrectly. Simply stated, IPB is a rigorous analytical methodology that is focused on providing predictive intelligence to warfighters at the right time for use in planning and executing operations. As such, IPB is a critical component of the Air Force's efforts to deliver Information Superiority to the battlefield commander. The Air Force defines Information Superiority—one of our six core competencies—as "that degree of dominance in the information domain which allows friendly forces the ability to collect, control, exploit, and defend information without effective opposition."² Applicable across the spectrum of conflict, we gain and maintain Information Superiority through the conduct of Information Operations (IO)—those actions taken to gain, exploit, defend or attack information and information systems. IO consists of both "Information in Warfare" —gaining and exploiting information—as well as "Information Warfare" —attacking and defending information and information systems. Intelligence, Surveillance, and Reconnaissance (ISR) are specific Information in Warfare activities, which also include navigation and positioning, weather services, and our Air Force communications capabilities. IPB provides a methodology to use ISR assets effectively, develop targets, and support the commander in formulating military objectives, strategy, and operational plans. It does this by assessing environmental effects on friendly and adversary forces and capabilities, identifying adversary centers of gravity and disposition of forces, and predicting threat courses of action and intent. Thus, diligent application of the IPB process ensures commanders have the best available view of the battlespace and are able to formulate the best possible decisions for the employment and protection of aerospace forces.

Why IPB?

IPB is a proven technique that focuses ISR collection, exploitation, analysis, and dissemination on meeting the needs of operational commanders. IPB is a flexible process that assists the Air Operations Center (AOC) and unit level commanders in planning and executing air campaigns and missions. The IPB process provides a structured means to gain, correlate, and exploit information at all levels of war, supporting decision makers from the Joint Forces Air Component Commander (JFACC) down to a flight lead. IPB enhances our ability to conduct aerospace operations in a dynamic environment where timely decisions are critical to the successful employment of aerospace power.

Today. The Air Force is implementing IPB to meet today's key intelligence challenges, while preparing Information Operators to meet tomorrow's challenges. In the past, the Air Force employed numerous techniques to analyze the battlespace. With the exception of targeting, most of these techniques were ad hoc and few made it into formal training venues. Today, a key reason for implementing IPB is to provide a basis for improving and teaching analytical skills to new airmen. In addition, IPB has already proven itself in joint and Air Force circles as a critical skill in providing improved intelligence support to the Theater Missile Defense (TMD) problem. Finally, the Khobar Tower experience reinforced the importance of Force Protection analysis. Existing IPB literature developed by the U.S. Army provides specific techniques to analyze terrorist and ground-borne threats.

Tomorrow. In the future, Information Operators will be called upon to establish Dominant Battlespace Awareness and Knowledge (DBA/DBK). DBA/DBK are a result of real-time knowledge of the environment and the current status of adversary and friendly forces combined with providing accurate assessments and projections of both. This is done by ensuring sensors are positioned at the right place, to collect the right information, at the right time for commanders to make timely decisions. In addition, modeling and simulation will be used to "play forward" and analyze various friendly courses of action (COA). This implies Information Operators must be prepared to provide environmental projections and alternative adversary COAs for this analysis. While technology improvements are required to truly establish full DBA/DBK, IPB establishes the required predictive analytical approach and methodology necessary for the future. In addition, IPB is critical to the effective Air Force execution of the National Military Strategy—Shape, Respond, and Prepare Now. IPB must support the full spectrum of conflict from humanitarian assistance through Major Theater Wars. To ensure we capitalize on the speed, range, flexibility, and overwhelming firepower capabilities of our aerospace forces, Air Force intelligence analysts must be familiar with and capable of basic surface force analysis.

What is IPB?

IPB is a systematic, four step analytical methodology employed to reduce uncertainties concerning the adversary and to exploit or minimize environmental factors. It is a continuous process, which enables the commander and his staff to visualize the full spectrum of adversary capabilities, potential centers of gravity (COG), and possible courses of action (COA) across all dimensions of the battlespace. IPB assists intelligence analysts to identify facts and assumptions about the battlespace environment and the adversary. This facilitates staff planning and the

development of friendly COAs. During execution, IPB provides the basis for intelligence direction and synchronization that supports the COA selected by the commander by tying ISR collection and analysis efforts to key decision points.

How Air Force IPB Differs from Army and Marine Corps IPB

Prior to the beginning of the 20th Century, traditional military operations were dominated by considerations of geography, weather, climate, sea state, terrain, darkness, and time. With the advent of military aerospace power, new dimensions of the battlespace were added which changed the importance of these elements. While the Air Force IPB process is predicated on the Army's Field Manual 34-130, Intelligence Preparation of the Battlefield,³ our view of the battlespace and its effects on modern aerospace operations is different than those of surface forces. "Airmen view the application of force more from a functional than geographic standpoint and classify targets by the effect their destruction has on the enemy rather than where the targets are physically located."⁴

IPB is critical to effects-based operations. "The Air Force looks beyond the pure surface role and focuses a considerable portion of its effect on creating decisive theater-level and strategic effects. This ability to look beyond the geographically oriented surface battle is what separates the Air Force from the air arms of the other services."⁵ Operations in the third dimension allow for dominant maneuver above the surface and beyond the horizon, while exploiting the speed, range, and flexibility of aerospace forces—a perspective unachievable by surface forces. "From the outset, air forces pursue tactical, operational, or strategic objectives in any combination or simultaneously. Effects-based airpower is concentrated to directly achieve objectives with theater-wide significance."⁶ Effects-based operations is the 'engine' that drives IPB, dynamic command and control (C2), and ISR management.

Airmen operate in the vertical and information dimensions, which mandates a more detailed analysis of these environments in order to support aerospace operations. Therefore, the Air Force IPB process has been modified to include detailed COG analysis and the battlespace has been divided into a framework for analysis more familiar to airmen and consistent with Air Force doctrine. In addition, the Air Force will develop more detailed air, space, and information IPB methodologies and tailor the land-based methodology developed by the U.S. Army for Air Force operations.

A key difference between aerospace and surface warfare is aerospace forces can strike directly at key target sets that have strategic results, without having to go through the process of drawn-out attrition at the tactical level of war. Air Force platforms deploy globally and will often pursue strategic, operational, and tactical objectives with very little time separation. Within the Air Force context, intelligence personnel will probably not have the luxury of focusing their IPB on only one level of warfare. Finally, aerospace power is the dominant force employed by the United States against an adversary's war making potential. To do this effectively, the Air Force IPB process must focus on carefully identifying and analyzing adversary COGs, as well as identifying adversary COAs traditionally associated with the IPB process. Air Force doctrine defines COGs as "Those characteristics, capabilities, or localities from which a military force, nation, or alliance derives its freedom of action, physical strength, or will to fight. They exist at

the strategic, operational and tactical levels of war."⁷ Airmen must understand the adversary's COGs, his potential and probable COAs, the interrelationships between them, and the adversary's overall ability to conduct military operations, in order to facilitate effective aerospace planning and execution at the strategic and operational levels of warfare. Thus, while the processes will be very similar, there will be some significant differences in emphasis and approach.

What is Battlespace?

Battlespace is "The commander's conceptual view of the area and factors, which he must understand to apply combat power, protect the force, and complete the mission. It encompasses all applicable aspects of air, sea, space, land, and information operations, as well as the human dimension, that the commander must consider in planning and executing military operations. The battlespace dimensions can change over time as the mission expands or contracts, according to operational objectives and force composition. Battlespace provides the commander a mental framework for analyzing and selecting courses of action for employing military forces in relationship to time, tempo, and depth."⁸

Airmen consider four elements in the analysis of the battlespace: aerospace, with its sub-elements of air and space; surface with its sub-elements of land and sea; information, with its sub-elements of data, systems and functions; and the human dimension. (See Figure 1 for a depiction of the battlespace dimensions).

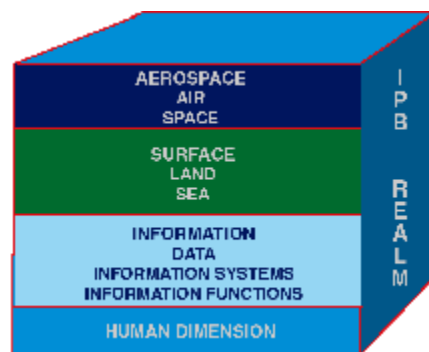


Figure 1: Battlespace Dimensions.

This construct, as depicted in Figure 1 above, is simply a conceptualization of the battlespace derived from Air Force doctrine that can be used to divide the analytical workload. However, one must not lose the fact that all dimensions are seamlessly interrelated and influence each other.

The Air Force IPB Process

The Air Force IPB process, like the other Services' consists of four basic steps:

1. Define the Battlespace Environment
2. Describe the Battlespace's Effects

3. Evaluate the Adversary
4. Determine Adversary COAs

While the IPB process is sequential, it is also continuous and cyclical. It must be conducted before, during, and after an operation, and while planning for and executing other contingencies as they arise. With the acquisition of new information, intelligence staffs modify their assessments of the battlespace, the adversary, and all potential COGs and COAs.

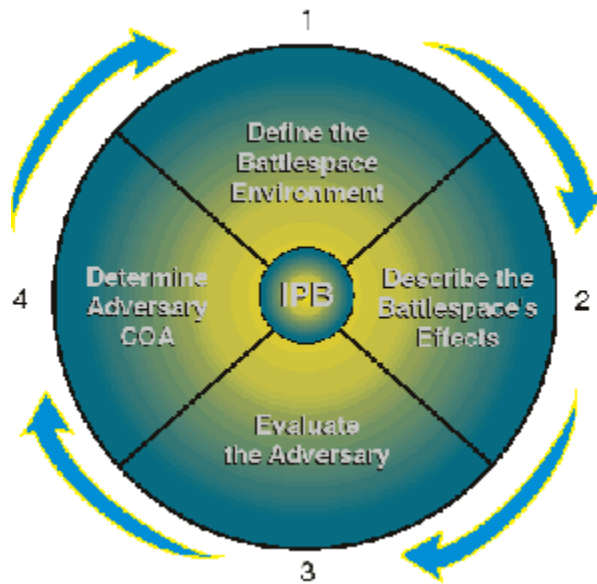


Figure 2: Intelligence Preparation of the Battlespace Cycle.

Step One: Define the Battlespace Environment: The first step of the IPB process focuses on defining the limits of the battlespace. This is done by determining and evaluating the commander's assigned operational area (OA), area of interest (AI), and mission (See Figure 3). The OA is "That portion of the battlespace in which military operations are conducted to accomplish a specific mission."⁹ The AI is "That area of concern to the commander, including the area of influence, areas adjacent thereto, and extending into enemy territory to the objectives of current or planned operations. This area also includes areas occupied by enemy forces who could jeopardize the accomplishment of the mission."¹⁰ The AI is usually larger than the OA.

The purpose of step one is to bound the intelligence problem and identify for further analysis specific features in the environment, activities within it, and the space where they exist that may influence available COAs or the commander's decisions. Once the OA and AI are defined, and mission objectives and desired end states are determined, the commander determines the time available for planning. Time available determines the level of IPB detail possible. Concurrently, the battlestaff analyzes existing information to highlight gaps for future intelligence collection and analysis to acquire the adversary and environmental data needed to complete the remaining steps of the IPB process at a level of detail sufficient to support the commander's decision-making process.

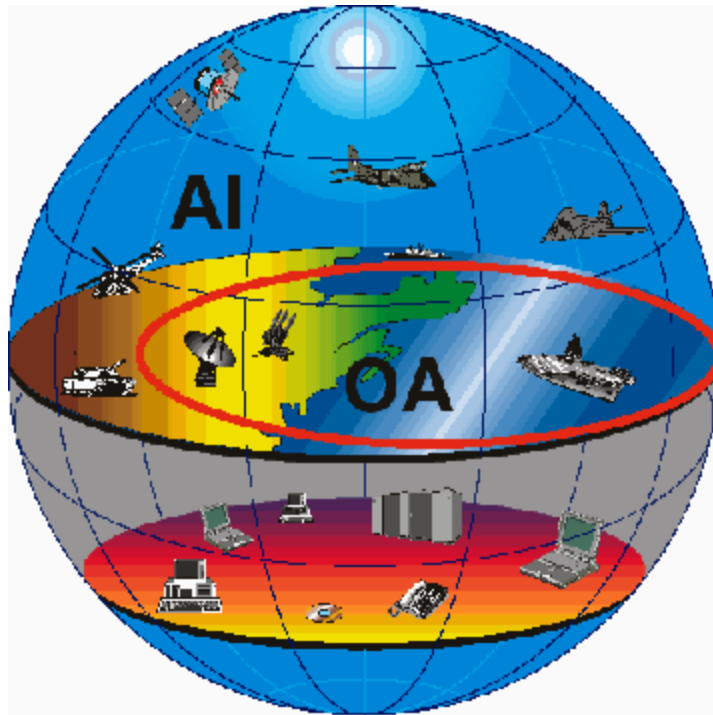


Figure 3: Operational Area and Area of Interest.

Step One Final Results:

1. Preliminary priority intelligence requirements (PIR) delineating the scope and detail required for the mission being planned, which evolve as the IPB process develops.
2. The identification of significant battlespace characteristics affecting the commander's mission.
3. The identification of intelligence gaps and priorities, which also evolve as the IPB process develops.
4. An initial set of intelligence collection and production requirements that support further IPB analysis and the commander's mission.

Step Two: Describe the Battlespace's Effects. The battlespace imposes constraints and provides opportunities to adversary and friendly forces that are crucial in predicting possible adversary COAs and developing friendly COAs. Step two's purpose is to determine how the battlespace affects both threat and friendly operations. Step two is not solely an intelligence function. In some cases other functional areas provide the majority of this information. For example, Air Force Weather is responsible for collecting, analyzing, predicting, tailoring, and disseminating weather and space environmental data to command staffs and operators required to plan and execute the mission.

Step Two Final Results: The final product(s) of step two are varied and may take several forms from simple briefings to complex computer-based battlespace simulations and visualizations. The result should be products that:

1. Depict the total environment's effect on possible broad friendly and adversary COAs at the strategic and operational levels.
2. Depict the battlespace's impact on friendly and adversary weapons systems at the tactical level.

Step Three: Evaluate the Adversary. The purpose of step three is to determine the adversary's COGs, capabilities, doctrinal principles, and applicable tactics, techniques, and procedures (TTP). Step three also distills our knowledge of the adversary into specific intelligence products that succinctly communicate this information to operational users. This step involves:

1. Analyzing and identifying adversary COGs.
2. Creating or updating threat models.
3. Determining the current adversary situation.
4. Identifying adversary capabilities.

Centers of Gravity. COG analysis is conducted after an understanding of the broad operational environment has been obtained and before a detailed study of the adversary's fielded military forces occurs. The battlestaff analyzes leadership, resources, infrastructure, population, transportation systems, and internal and external relationships of the adversary to determine from which elements the adversary derives freedom of action, physical strength, or the will to fight. A determination is made if candidate COGs are truly critical to the enemy strategy and must include a thorough examination of the mechanisms by which COGs influence and affect enemy strategy. Once determined, COGs identified in this step are a significant input to the aerospace campaign plan and provide a foundation for target development.

Threat Models. Threat models describe and graphically portray threat tactics and employment options. They consist of three elements: 1) doctrinal templates, 2) description of preferred tactics, options, and follow on activities, and 3) identification of type high value targets (THVT). Doctrinal templates are "Graphic models based on known or postulated threat doctrine. Doctrinal templates illustrate the deployment pattern and disposition preferred by the adversary when not constrained by the effects of the battlespace environment."¹¹ See Figure 4 for an example of a doctrinal template. THVTs are "Assets or target systems the adversary commander requires for the successful completion of the activity described as part of the threat model."¹² THVTs are not "real" targets per se (e.g., an actual facility with a BE number). Rather, they simply describe what is important for execution of the activity being depicted. Later, in step four of the IPB process, these threat models are modified to reflect constraints imposed by the battlespace upon the adversary's preferred method of operations. In addition to a graphical depiction, threat models are accompanied by textural information that describes the activities noted on the template, likely alternatives if the depicted activity fails (branches) or subsequent operations if the activity succeeds (sequels). Finally, threat models conclude by identifying and ranking the relative importance of THVTs.

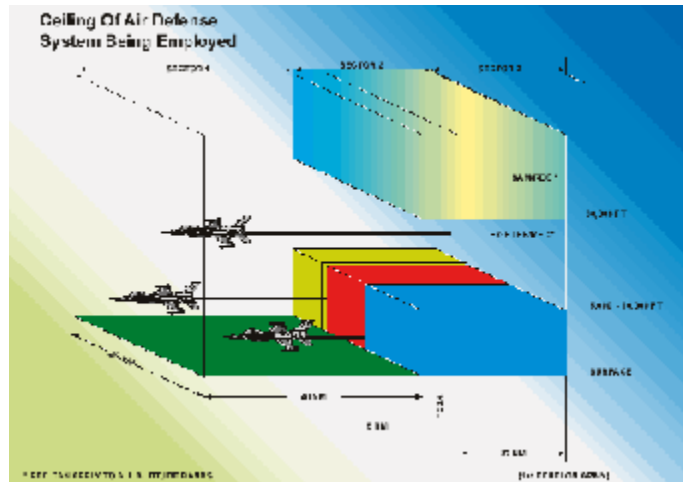


Figure 4: National Air Defense Doctrinal Template.

Current Adversary Situation. The intelligence analyst determines the current adversary situation through a careful and detailed analysis of relevant order of battle (OB) data including force strength, composition, and disposition as well as observed TTPs and current training activities.

Adversary Capabilities. The intelligence staff then combines quantitative OB analysis with a qualitative assessment of the adversary's readiness, training, and effectiveness to develop a complete picture of adversary capabilities. Comparing the current adversary situation with threat models highlights current strengths and weaknesses.

Step Three Final Results:

1. A listing of adversary COGs.
2. Graphic threat models.
3. A prioritized listing of THVTs for various adversary operations.
4. A definitive and current adversary OB.
5. A qualitative assessment of the adversary's current capabilities, strengths, and weaknesses.

Step Four: Determine Adversary Courses of Action. This step identifies, develops, and prioritizes adversary COAs consistent with the COGs developed in step three, the adversary's doctrine, and their assessed political/military objectives. Step four's purpose is to identify likely adversary COAs that can be exploited to shape the battlespace and accomplish the friendly mission. Crucial to this step is the identification of associated high value targets (HVT) that the adversary must preserve in order to execute their intended COAs and named areas of interest (NAI) which are used to determine which of the projected COAs the adversary has actually chosen. Information derived and products produced while performing steps one through three are fused together to project what the adversary is likely to do given the environment and his capabilities. Finally, as friendly information requirements are identified during execution, decision support products are produced to ensure the commander has the right information at the right time.

Sub Steps. In order to meet the needs and requirements of Air Force planning and execution processes, the Air Force IPB model step four consists of six sub steps. These steps are also step four's final products whether presented orally, graphically, or textually.

1. Identify the adversary's likely objectives and desired end state.
2. Evaluate and prioritize adversary COAs and their associated strategic, operational or tactical COGs.
3. Explicitly identify threat assumptions.
4. Identify targets valuable to the adversary in executing probable COAs and nominate for attack those targets that will achieve the chosen friendly COA and objectives.
5. Identify collection requirements that monitor significant battlespace characteristics, provide indications on which COA the adversary has chosen, and assist the commander in assessing his operational effectiveness.
6. Produce decision support products that ensure intelligence sensors and producers are arrayed to collect, process, exploit and disseminate the right data at the right time to support key operational decisions.

The Final Result of IPB—The COA Package. Throughout the IPB process several intermediate intelligence products are produced, which are helpful to the planning process and can be used for a myriad of other purposes. However, these earlier products are preparatory to the final result. The culmination of the IPB process yields very specific intelligence products, which are tailored to meet the needs of the commander being supported. At a minimum, two COAs are always developed—the adversary's most likely COA and the most dangerous COA. This gives the commander a "best estimate" and "worse case" for planning purposes. If time allows, alternative adversary COAs are developed. Each COA includes a description of expected adversary activities, the associated time and phase lines expected in executing the COA, expected force dispositions, associated COGs, a list of assumptions about the adversary made when projecting the COA, a list of refined HVTs, High Payoff Targets (HPT), and a list of NAIs. This information is then combined into decision support products, which ensure collection assets are on hand to monitor adversary COA projections and provide key battlespace information at the time that the commander needs it. The various components of a COA package are defined and an example of a basic decision support product is included below.

High Value Target (HVT). "A target the enemy commander requires for the successful completion of the mission. The loss of high value targets would be expected to seriously degrade important enemy functions throughout the friendly commander's area of interest."¹³

High Payoff Target (HPT). "A target whose loss to the enemy will significantly contribute to the success of the friendly course of action. High-payoff targets are those high-value targets, identified through wargaming, target systems analysis, or commander's guidance, which if acquired and successfully attacked would significantly contribute to the success of the friendly commander's mission and objectives."¹⁴

Named Areas of Interest (NAI). "The geographical area where information that will satisfy a specific information requirement can be collected. Named areas of interest are usually selected to capture indications of adversary courses of action but also may be related to conditions of the battlespace."¹⁵

Decision Support Template (DST). "A DST represents a graphic record of wargaming. It depicts decision points, timelines associated with movement of forces and the flow of the of the operation, and other key items of information required to execute a friendly COA."¹⁶ Not all decision points are based on intelligence. However, a DST should support those that are based on intelligence indicators, or measures of success relating to the adversary. Decision support products should focus on those necessary to assist the JFACC in making decisions at campaign phase points or key ATO execution events.

Decision Support Matrix (DSM). "A DSM supports the DST by providing details on the type of activity expected at each NAI, the times the activity is expected to occur, and the activity associated with a given adversary COA, key battlespace events, or battlespace conditions."¹⁷ A critical component of the DSM is a well thought out collection management plan which provides multi-sensor coverage (IMINT, SIGINT, HUMINT, MASINT) supporting the JFC/JFACC's campaign/ATO planning, decision, and execution cycle. The identification of intelligence collection requirements depends on the prediction of specific activities and the areas in which they are expected to occur, which, when observed, will reveal which COA the adversary has adopted. The DSM can also be used to assist analysts in performing battle damage assessment (BDA) and munitions effectiveness assessments (MEA), while enabling the JFACC to evaluate campaign objectives, aerospace measures of merit, and making reattack recommendations.

DECISION SUPPORT MATRIX FOR ATO:				ALPHA		
DTG:	18-Nov-98			0600Z - 0715Z		
DECISIONS SUPPORTED:	Can ISR sensors be safely moved to the forward area for better collection? Should ATO package AB be diverted for SAM site restrike?					
PIR:	Are all forward SAM sites destroyed?					
INDICATORS:	1. Lack of Target Acquisition (TA) and Target Tracking Radar (TTR) ELINT 2. TTR observed destroyed					
EVENT	NET	NLT	NAI/HPT	COLLECTOR	TASKED	LTIOV
Package AA TOT	0600Z	0605Z	SAM Site 1-3			
Collection Window	0610Z	0630Z	SAM Site 1	U-2/RC-135	Yes	0645Z
			SAM Site 2	UAV/RC-135	Yes	0645Z
			SAM Site 3	SOF/RC-135	Yes	0645Z
Divert Package AB	0700Z	0705Z				
Move Sensors Forward	0700Z	0705Z				

Figure 5: Example of a DSM Supporting an ATO Execution Decision.

The above example demonstrates the use of a DSM to synchronize the necessary timing of activities involved in attacking, assessing, and reattacking first echelon surface-to-air missile (SAM) sites before deploying high-value surveillance and reconnaissance platforms to their optimum wartime orbit points.

A Continual Process. While each step in the IPB process has a concluding point with associated finished intelligence products, one must not assume that once the process has been cycled through a single time it is completed. Both the environment and the threat change as a result of many influences. During conflict, change is a given. The adversary will change his COA to protect against perceived danger or exploit opportunities. COGs may change as the adversary adapts to attack. Thus, as new information arrives, estimates made concerning the environment, the adversary, and COAs are revised to take into account changed battlespace conditions and to develop updated COGs, HVTs, HPTs and NAIs.

Integrating IPB into Aerospace Power Planning and Execution

This section of the white paper is intended to briefly highlight major aerospace planning and execution activities and documents, and the interrelationship between them and the IPB process. Indeed, these products and activities should not be produced or performed without conducting IPB.

Air Operations Center (AOC)

IPB Support to Aerospace Campaign Planning. The five stage aerospace campaign planning process outlined in AFDD 2-1,¹⁸ (See Figure 6) reflects the deliberate decision making process at the JFACC/JAOC level. In general, the five-stage Joint Air and Space Operations Plan (JASOP) planning process and associated products, like the IPB process and products, move from the generic to the specific. The Air Force IPB process delineated earlier in this paper has been tailored to assist the intelligence staff in preparing their inputs to the JASOP and other associated planning documents to include the Strategic Appreciation and the Air Estimate of the Situation.

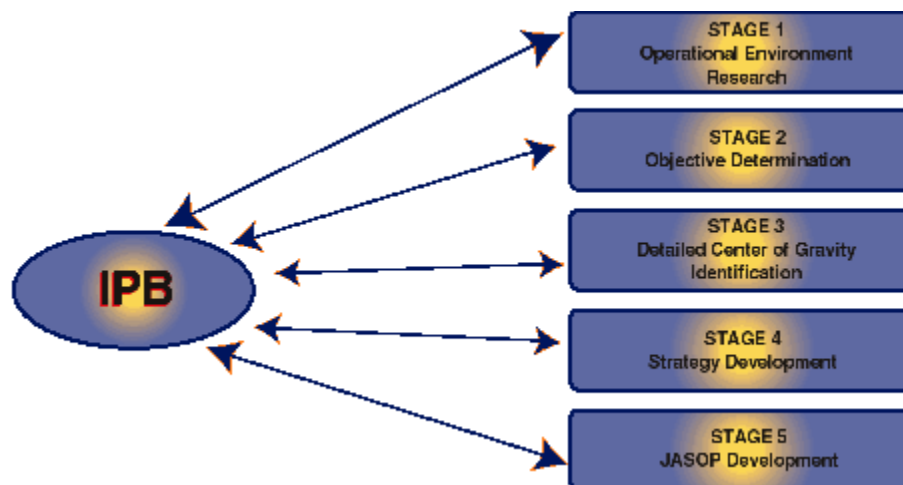


Figure 6: The Five Stage JASOP Planning Process"

The Strategic Appreciation. "The Strategic Appreciation is an evaluation of the political, military, and social environments affecting the theater. It is one of the most useful products of the initial planning stage...The goal is to understand the potential conflict and to conduct military planning with a sound appreciation of social, political, and economic conditions."¹⁹ In all likelihood, this analysis will be produced in some form by national and joint, theater-level intelligence agencies. If it is not, the JFACC intelligence staff should either produce it or request the appropriate intelligence producers or other joint components provide this information. In any event, the intelligence staff will need to tailor and apply information produced internally or externally to the specific task at hand. Completion of the Strategic Appreciation is the culmination point of JASOP stages one (Operational Environment Research) and two (Objective Determination), and IPB steps one (Define the Battlespace) and two (Describe the Battlespace's Effects).

The Air Estimate of the Situation. "This estimate helps identify enemy centers of gravity to attack and friendly centers of gravity to defend...The "Estimate of the Situation" uses a systematic approach to propose courses of action for solving a military problem."²⁰ In the estimate of the situation, theater objectives are stated, friendly COAs are developed, opposing COAs are analyzed, and both are compared to come up with the friendly aerospace COA. This information is used to evaluate adversary and friendly force comparative combat strengths, from which potential friendly COAs are derived. This information is also used to identify potential friendly and adversary COGs. Operations and Intelligence staffs should jointly compare and contrast friendly and adversary COAs and COGs to ensure the best solution—leveraging strengths and reducing risks—is chosen. One technique to do this is through wargaming, where A-3/5 and A-2 assume the roles of opposing commanders to explore strengths, weaknesses, and potential reactions to various COAs. It cannot be overemphasized that COG and COA comparison must be a combined staff—A-2/3/4/5 function. Any office (A-2/3/4/5), planning in the absence of the other is more likely to arrive at false conclusions and therefore a poorly designed campaign plan. After friendly and adversary COGs and COAs are compared, the JFACC selects the aerospace COA for Joint Force Commander (JFC) approval. The Air Estimate of the Situation is the formal embodiment of JASOP stages three & four (COG Identification & Strategy Development).

The Joint Air and Space Operations Plan. "The Joint Air and Space Operations Plan (JASOP) provides the blueprint for air and space tasking...The JASOP and supporting plans state how the air component commander will conduct aerospace operations. This is the heart of what is colloquially called the "air campaign plan."²¹ In the final stage, the analysis and products created in earlier stages are consolidated formally into the JASOP, which details how joint aerospace employment supports the JFC's operation or campaign plan.

Emerging Air Force doctrine clearly suggests IPB is a required skill for all intelligence personnel taking part in air campaign planning. IPB provides a structured approach for providing intelligence support to meet these emerging requirements. JASOP development stages, IPB steps and products, and associated planning documents are summarized in Figure 7.

JASOP Development Stage	IPB Steps & Products	Planning Document
Operational Environment Research	Step One & Two	Strategic Appreciation
Objective Determination	Step One & Two	Strategic Appreciation
COG Identification	Step Three & Four	JFACC Estimate of Situation
Strategy Development	Step Three & Four	JFACC Estimate of Situation
JASOP Development	HVT, HPT, NAI, DST, DSM	JASOP

Figure 7: Air Campaign Planning Phases and the IPB Process

IPB's Relationship to Aerospace Campaign Execution. Any number of factors can change the execution of a campaign plan. The Air Force uses the air tasking order (ATO) development cycle to incorporate and adapt to change. "The ATO cycle provides for the continuous collection, correlation, and prioritization of relevant inputs...The cycle accommodates changing tactical situations, the JFC's revised priorities and requests for support from other component commander's in an air tasking directive, which is the ATO."²² During military operations, IPB at its best provides clear unambiguous signals that the adversary is executing a given COA. During operations, IPB provides the analyst a combat intelligence baseline and comprehensive collection strategy to identify if prior intelligence assessments were accurate and an opportunity to change or update them if not. Thus, IPB can be used as a triggering mechanism to drive changes to the execution plan if earlier assumptions and assessments prove to be inaccurate. However, the adoption of an unexpected adversary COA does not automatically change the campaign or execution plan. Adjustments are made only if changes in the environment or adversary make the friendly COA untenable. Combat assessment is also a significant triggering mechanism. During execution, the continuous IPB process feeds other processes including targeting and ISR management. These processes combined provide battlespace awareness. Orchestrating and synchronizing the ISR, IPB and targeting processes is a key challenge for the JFACC staff and is facilitated through the incorporation of IPB principles and techniques.

IPB at the AOC—A Scenario. ISR assets and analysts in the Combat Operations Division identify a significant change in the adversary's operations and probable COA using NAIs determined during the planning phase. ISR assets are retasked to determine which of the established, previously known alternative COAs the adversary may have adopted. After collection analysis, this information is evaluated, and analysts determine if the adopted adversary COA will have a negative impact on the planned friendly COA. The JFACC and staff use an abbreviated planning process to adjust the plan rapidly and to make appropriate decisions based on the situation at hand. Under this scenario, the Strategy Division develops a proposed JFACC guidance package expressed in terms of the JFACC's intent, concept of operations, objectives, tasks, measures of merit, limiting factors, assumptions, and risk assessments. At the same time, intelligence personnel in the AOC rapidly update data, assessments, and IPB products to communicate these changes. Weather personnel provide real time data and forecast data to assist

the staff in selecting the best weapon system and sensors to employ. The Combat Plans Division uses the new strategy and IPB package (COGs, COAs, HVTs, HPTs, NAIs, DSTs, and DSMs) as a frame of reference for the master air attack plan (MAAP), ATO, and reconnaissance plans. Once this planning is handed off to the Combat Operations Division the cycle begins anew.

Wing & Squadron

Many of the products used in aircrew threat training, current intelligence briefs, and tactics and analysis team reports are closely aligned with one or more of the IPB steps. The challenge for wing and squadron personnel isn't necessarily to invent new IPB products, but to apply the principles of IPB in a consistent fashion to ensure aircrew and force protection personnel have the relevant environment, threat, and adversary COA information to plan and execute the mission. Wing and squadron intelligence personnel should use the IPB process to develop the unit's combat intelligence baseline and provide aircrew and the battlestaff better situation awareness. Applying the IPB methodology at the unit level is a useful guide to ensure the wing/squadron has the baseline information required to go to war.

IPB Support to Mission Planning. At the very least, intelligence and weather personnel should provide a description of the battlespace (steps one and two), and an evaluation of adversary forces (step three) to aircrews during mission preparation and planning. Wing intelligence personnel should consider mission type, and tailor their IPB to address unique mission requirements. For example, in planning an F-15E strike mission, crews need to know the terrain they will over fly, weather conditions during the mission (step one), and how both will affect mission execution, the crew, their weapon system, and adversary threats en route. They need to determine their best options during attack, the nature of concealment, evasion and escape routes, and food and water options available to the aircrew if they are shot down (step two). They also need to know their adversary's defensive locations, types of equipment, the adversary's tactical air employment doctrine and proficiency (step three). Finally, given the target profile, analysts will examine the target to determine vulnerabilities and target area threats to arrive at optimal weapons employment and attack parameters. Mission planners should also be briefed on how we expect the adversary will react to our missions, which will drive route development and planned target area tactics (step four).

Mission Execution. While unit level intelligence personnel will usually not develop the detailed IPB products produced at higher headquarters, they do provide unit level consumers with required information based on IPB assessments. Unit intelligence analysts must establish an environmental and threat baseline relevant to their unit and brief any deviation from the baseline to mission executors. For example, civil engineering readiness (air base operability/disaster preparedness) personnel will need information about changes in adversary weapons of mass destruction, while civil engineers need to know about new types of munitions and how the adversary will employ them in order to address combat repairs. Aircrews must be advised of threat changes that effect the mission.

Post Mission Reporting. Every unit contributes to higher level IPB processes through post mission reporting. Often, unit personnel are the first to observe a change in the adversary. Change can not be recognized and reported if "normal" has not been defined. Establishing a unit

IPB using locally generated products or products obtained from other units can help unit personnel improve their knowledge, support the mission effectively, and provide improved reporting. In short, IPB at the unit level not only draws upon the IPB process conducted at higher echelons; it also fuels it by feeding new information up the chain.

IPB Inputs to Force Protection. IPB was originally developed to improve intelligence support to the ground commander. As such, a large body of available literature discusses the application of IPB for force protection. The IPB process provides the threat foundation needed to plan base defenses accordingly. The base environment has to be examined, and the effects it has on air base operations must be noted (steps one and two of the IPB process). Then, the adversary's capabilities, psychological mindset, intentions and vulnerabilities must be factored into a force protection equation (step three of the IPB process) to provide the commander a range of possible actions an adversary could take against his personnel and facilities (step four of the IPB process). Again, intelligence personnel should always state the most likely COAs and the most dangerous COAs available to the adversary as a minimum, and formulate a clear list of assumptions about the adversary for planning purposes. Examples of IPB for force protection might include base terrain or street studies. These studies could note possible shoulder fired surface-to-air ambush sites and help to determine approach avenues terrorists could use to attack either the base or military personnel caught in traffic. The commander then uses this information to alter aircraft approach and departure routes and determine location and frequency of security force patrol areas. An awareness of the adversary's ISR activity can provide security forces with the information to develop an effective communications and operations security (COMSEC/OPSEC) plan.

Institutionalizing IPB in the Air Force

The Plan. Initial planning for institutionalizing IPB in the Air Force began in June 1997 when Air Force senior intelligence officers determined IPB was an essential skill required by intelligence personnel to meet future challenges the career field would face. In November 1997 the first multi-MAJCOM Air Force IPB Working Group (AF/IPBWG)²³ was held and began developing an implementation plan. The basic plan laid out, focused on the following three areas and approximate timelines for completion. The AF/XOI has added a fourth component to the plan.

1. Air Force IPB methodology development and initial orientation training (Apr 98 - Jun 99).
2. Incorporation of IPB into applicable operations and intelligence training venues, PME courses and exercises (Jun 99 - Jun 01).
3. Leveraging existing TMD IPB automation efforts and expanding automation into other mission areas (Jun 00 - Jun 02).
4. Develop and integrate IPB analysis, targeting, and collection/sensor management tools to facilitate attaining DBA/DBK (2002 - 2010).

Since then, the AF/XOI has designated the Air Intelligence Agency as the lead organization to shepherd Air Force IPB efforts and several working groups have been formed to develop and

tailor the IPB methodology for Air Force application. This White Paper is a result of the IPBWG's efforts and will be followed up by an Air Force Pamphlet on IPB this summer. Additional IPBWGs will be formed to work the various aspects of IPB.

Emerging Doctrine, Tactics, Techniques and Procedures (TTP), and IPB. The Air Force is adopting IPB in a period of rapid change and uncertainty. The Cold War is over—Air Force doctrine is changing to adapt to the post-Cold War environment by adopting the aerospace expeditionary force concept. IPB will evolve to meet the needs of the Air Force's rapidly evolving doctrine. As doctrine evolves, Air Force IPB concepts will evolve. We are working to develop IPB techniques and products adapted to meet the needs of aerospace forces. As the aerospace IPB process is integrated throughout the Air Force, automated IPB battlespace visualization tools will emerge to provide environment and adversary information for air campaign planning and execution, thus bringing a new dimension to the effective use of aerospace power. Critical to the effective development of IPB is its incorporation into exercises and experiments to hone the process and products to meet the needs of Air Force warfighters. Intelligence personnel must "test fly" the concepts and products noted in this white paper to provide feedback on current IPB TTP and develop future TTP. Operators, particularly those involved in strategy development, should ensure the process defined in AFDD 2-1 and this white paper are practiced and refined.

Education and Training. The plan for institutionalizing IPB in the Air Force must include education and training. IPB should become an element of Professional Military Education (PME) and appropriate training courses. Formal IPB training is multi-tier (i.e., IQT, MQT, and continuation). IPB instruction is being incorporated in both the officer and enlisted basic intelligence courses as well as designated intelligence and operational top-off courses (i.e., USAF Weapons School, IO Cadre, and C2 Warrior School) supporting Air Force weapon systems and warfighting activities. Education and training, practice, and doctrine make up the foundation for a three-pronged strategy for institutionalizing IPB across the Air Force.

Conclusion. This white paper has described the Air Force IPB methodology, highlighted some significant differences between the airman's and surface forces' IPB processes, and discussed how IPB can be integrated into Air Force operations and our implementation plan. IPB is an important concept for both operations and intelligence personnel to understand. It provides predictive Intelligence, Surveillance and Reconnaissance information to warfighters at the right place and time—the goal being to deliver Information Superiority to battlefield commanders. Thus, diligent application of the IPB process ensures commanders at all levels have the best available view of the battlespace, and are able to formulate the best possible decision for the employment and protection of our aerospace forces.

IPB effectively applied supports the range of military operations from humanitarian assistance through Major Theater Wars. This white paper also serves as a springboard and foundation for doctrine and a series of publications on tactics, techniques and procedures that will provide additional detail on the more complex aspects of the process. A clear understanding and careful application of IPB is critical to capitalizing on the speed, range, flexibility and overwhelming firepower capabilities of our service.

IPB enables us to leverage information about the adversary's capabilities, potential centers of gravity and possible courses of action across all dimensions of the battlespace. Thus, diligent use of IPB provides the means to reduce uncertainties concerning the adversary and enables us to exploit or minimize environmental factors.

Each service operates within the constraints and opportunities provided by its dominant environment and primary weapon systems. As a service, we look forward to contributing our expertise in the aerospace and information environments to the overall joint IPB effort.

Notes

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2. Air Force Doctrine Document (AFDD) 2-5, "Information Operations," 5 August 1998, 41-42.
3. Army Field Manual 34-130, "Intelligence Preparation of the Battlefield," 8 July 1994.
4. Air Force Doctrine Document (AFDD) 2, "Organization and Employment of Aerospace Power," 28 September 1998, 1.
5. Endersby, Lt Col Gary and Fulbright, Lt Col Barry. "Effects-Based Airpower," *Airpower Journal*, (Way Point), vol. 12, no. 4, (Winter 1998), 89.
6. *Ibid*, 95.
7. AFDD 2, 126.
8. Air Force Doctrine Document (AFDD) 1, "Air Force Basic Doctrine," September 1997, 79.
9. Air Force IBP Working Group (AF/IPBWG), held 20-24 April 1998 at Headquarters Air Intelligence Agency, Kelly AFB, TX.
10. Joint Pub 1-02, "DoD Dictionary of Military and Associated Terms," 23 March 1994, (as amended through 10 February 1999), 37.
11. AF/IPBWG, 20-24 April 1998.
12. *Ibid*.
13. Joint Pub 2-01.3, "Joint Tactics, Techniques, and Procedures (JTTP) for Joint Intelligence Preparation of the Battlespace (JIPB)," (second draft), 4 February 1998, GL-12.
14. AF/IPBWG, 20-24 April 1998.
15. Joint Pub 2-01.3, GL-18.

16. Ibid, GL-8.

17. AF/IPBWG, 20-24 April 1998.

18. AFDD 2-1, "Air Warfare," (first draft), June 1998, 44-47.

19. Ibid, 53.

20. Ibid, 54.

21. Ibid, 43-44.

22. Ibid, 55-56.

23. AF/IPBWG, held 18-20 November 1997 at Headquarters Air Combat Command, Langley AFB, VA