



*Intelligence*

**AEROSPACE INTELLIGENCE  
PREPARATION OF THE BATTLESPACE**

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OPR: HQ ACC/INXX  
(Capt Jed Cohen)  
Supersedes AFPAM 14-118, 4 May 2001

Certified by: HQ USAF/XOI  
(Maj Gen Glen Shaffer)  
Pages: 182  
Distribution: F

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This pamphlet implements AFPD 14-1, Intelligence Applications and Requirements Planning. It explains the process for aerospace intelligence preparation of the battlespace methodology. It begins with an introduction for airmen, then describes how to conduct each of the four steps in the process, and concludes with how to integrate the methodology into aerospace operations. The information included pertains to tactical, operational, and strategic levels of operations. The attachments in this pamphlet describe the process in more detail for specific mission areas: air operations (air warfare), space operations, information operation, special operations, force protection, theater missile defense, and centers of gravity analysis. To improve future editions of this publication, users submit comments, suggestions, and pertinent material for additions, changes, and deletions. Forward AF Form 847, **Recommendation for Change of Publication**, to HQ ACC/INXX, 129 Andrews St, Ste. 149, Langley AFB VA 23665. The use of names of any specific commercial product, commodity, or service in this publication does not imply endorsement by the Air Force.

**Chapter 1—AEROSPACE INTELLIGENCE PREPARATION OF THE BATTLESPACE:  
AN AIRMAN’S INTRODUCTION**

1.1. Overview. ....	6
1.2. Integrating Intelligence Preparation of the Battlespace (IPB) into Air Force Operations. ....	6
1.3. Predictive Battlespace Awareness (PBA). ....	6
1.4. What is Aerospace Intelligence Preparation of the Battlespace (AIPB)? .....	7
Figure 1.1. Aerospace Intelligence Preparation of the Battlespace Cycle. ....	8
1.5. Why AIPB? .....	8
1.6. How AIPB Differs from Army and Marine Corps IPB. ....	9
1.7. Key Differences. ....	9
1.8. The AIPB Process Outlined. ....	9

1.9. Final Note. ....	10
<b>Chapter 2—STEP 1: DEFINE THE BATTLESPACE IN THE ENVIRONMENT</b>	<b>11</b>
2.1. Overview. ....	11
Figure 2.1. AIPB Cycle: Step 1 ....	11
2.2. Desired End Effect. ....	11
2.3. How to do it. ....	12
Table 2.1. AIPB Step 1: Sub-steps. ....	12
2.4. Analyze the Commander’s Mission. ....	12
2.5. Time and Level of Detail. ....	13
2.6. Identify the Limits of the Operational Area (OA). ....	13
2.7. Establish the limits of the Area of Interest (AOI). ....	14
Figure 2.2. Operational Area and Area of Interest. ....	15
2.8. Determine the Dimensions of the Battlespace. ....	16
2.9. Determine Significant Characteristics of the Battlespace. ....	16
Figure 2.3. Battlespace Dimensions ....	17
Table 2.2. Human Dimension Aspects ....	18
2.10. Identify Intelligence Gaps and Priorities. ....	19
2.11. Collect the Material and Intelligence Required to Support Further AIPB Analysis. ....	20
Figure 2.4. Command’s Initial Intelligence Requirements. ....	21
<b>Chapter 3—STEP 2: DESCRIBE THE BATTLESPACE EFFECTS</b>	<b>22</b>
3.1. Overview. ....	22
Figure 3.1. AIPB Cycle: Step 2. ....	22
3.2. Desired End Effect. ....	22
3.3. How to do it. ....	23
Figure 3.2. AIPB Battlespace Dimensions. ....	24
Table 3.1. AIPB Step 2: Sub-steps. ....	24
3.4. Analyze the Physical Environment. ....	24
3.5. Analyze the Effects of Weather. ....	28
3.6. Analyze the Human Dimension. ....	29
3.7. Describe and Depict Effects of the Physical Environment, Weather, and the Human Dimension on Friendly and Adversary Operations. ....	31

<b>AFPAM14-118 5 JUNE 2001</b>	<b>3</b>
Figure 3.3. Modified Combined Obstacle Overlay. ....	32
Figure 3.4. Example of an Avenue of Approach. ....	33
<b>Chapter 4—STEP 3: EVALUATE THE ADVERSARY</b>	<b>35</b>
4.1. Overview. ....	35
Figure 4.1. AIPB Cycle: Step 3. ....	35
4.2. Desired End Effect. ....	35
4.3. How to do it. ....	36
Table 4.1. AIPB Step 3: Sub-steps. ....	36
4.4. Analyze and Identify Adversary COG. ....	36
Figure 4.2. Warden’s 5-Ring Model ....	37
4.5. Create or Update Threat or Other Models. ....	38
Figure 4.3. Threat Model. ....	39
Figure 4.4. Example of Doctrinal Template. ....	40
Figure 4.5. Tactics, Techniques, Procedures Description. ....	41
Figure 4.6. High Value Targets. ....	42
4.6. Determine Current Adversary Situation. ....	43
4.7. Identify Adversary Capabilities. ....	43
<b>Chapter 5—STEP 4: DETERMINE ADVERSARY COURSES OF ACTION</b>	<b>45</b>
5.1. Overview. ....	45
Figure 5.1. AIPB Cycle: Step 4. ....	45
5.2. Desired End Effect. ....	45
5.3. How to do it. ....	46
Table 5.1. AIPB Step 4: Sub-steps. ....	46
5.4. Explicitly Identify Assumptions. ....	46
5.5. Identify the Adversary’s Likely Objectives and Desired End State. ....	46
Figure 5.2. Example of Strategy to Task. ....	47
5.6. Develop COA Based on Adversary Perception of Friendly Disposition (Reverse AIPB). ....	47
5.7. Identify the Full Set of Potential COA Available to the Adversary. ....	48
Figure 5.3. Example of a Situation Template. ....	51

5.8. Identify and Nominate Targets Valuable to the Adversary in Executing Probable COA. ....	52
5.9. Identification of Initial Collection Requirements. ....	53
Figure 5.4. Example of a TMD Event Template. ....	54
Figure 5.5. Event Matrix. ....	55
5.10. Effective Methods for Streamlining the AIPB Process. ....	55
<b>Chapter 6—INTEGRATING AIPB INTO AIR FORCE OPERATIONS</b>	<b>57</b>
6.1. Overview. ....	57
6.2. Strategic, Operational, and Tactical Level Perspectives. ....	57
6.3. Integrating JIPB and AIPB. ....	58
6.4. AIPB Support to Operational-Level Activities. ....	59
Figure 6.1. AIPB, JIPB and AOC Integration in Joint Operations. ....	60
6.5. COMAFFOR/JFACC Planning Activities. ....	60
Figure 6.2. The Five-Stage JAOP Planning Process. ....	61
Figure 6.3. Decision Support Matrix. ....	68
Table 6.1. ISR Strategy Development. ....	69
Figure 6.4. Targeting Process. ....	70
6.6. AIPB Support to Tactical Level Activities. ....	71
<b>Attachment 1—GLOSSARY OF REFERENCES, ACRONYMS, AND TERMS</b>	<b>79</b>
<b>Attachment 2—AEROSPACE INTELLIGENCE PREPARATION OF THE BATTLESPACE FOR AIR OPERATIONS (AIR WARFARE)</b>	<b>95</b>
<b>Attachment 3—AEROSPACE INTELLIGENCE PREPARATION OF THE BATTLESPACE FOR SPACE OPERATIONS</b>	<b>117</b>
<b>Attachment 4—AEROSPACE INTELLIGENCE PREPARATION OF THE BATTLESPACE FOR INFORMATION OPERATIONS</b>	<b>130</b>
<b>Attachment 5—AEROSPACE INTELLIGENCE PREPARATION OF THE BATTLESPACE FOR SPECIAL OPERATIONS FORCES</b>	<b>147</b>
<b>Attachment 6—AEROSPACE INTELLIGENCE PREPARATION OF THE BATTLESPACE FOR FORCE PROTECTION</b>	<b>165</b>
<b>Attachment 7—AEROSPACE INTELLIGENCE PREPARATION OF THE BATTLESPACE FOR THEATER MISSILE DEFENSE</b>	<b>174</b>



## Chapter 1

### AEROSPACE INTELLIGENCE PREPARATION OF THE BATTLESPACE: AN AIRMAN'S INTRODUCTION

**1.1. Overview.** This chapter introduces and describes the Aerospace Intelligence Preparation of the Battlespace (AIPB) concept to airmen. It explains why Intelligence Preparation of the Battlespace (IPB) is an important concept for both operations and intelligence personnel to understand. The chapter outlines the overall AIPB process and differentiates AIPB from the Army and Marine Corps IPB process.

**1.2. Integrating Intelligence Preparation of the Battlespace (IPB) into Air Force Operations.** 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 achieve Predictive Battlespace Awareness (PBA) and deliver Information Superiority to the commander.

*Information Superiority is "...that degree of dominance in the information domain which allows friendly forces the ability to collect, control, exploit, and defend information without effective opposition."* (AFDD 2-5)

**1.3. Predictive Battlespace Awareness (PBA).** Recent aerospace operations demonstrate that a structured ISR process that synchronizes national, theater, and tactical assets into one collection strategy optimizes ISR operations and is a considerable force multiplier. PBA is knowledge of the operational environment that allows the commander and staff to correctly anticipate future conditions, assess changing conditions, establish priorities, and exploit emerging opportunities while mitigating the impact of unexpected adversary actions. In his role as the supported commander for theater airborne ISR assets, PBA will enable the COMAFFOR/JFACC to prioritize, plan, coordinate, task and execute fully integrated ISR operations. **The PBA construct consists of AIPB, Intelligence, Surveillance and Reconnaissance (ISR) planning and synchronization, and ISR management.**

**1.3.1. Aerospace Intelligence Preparation of the Battlespace (AIPB) :** AIPB is a rigorous analytical methodology that defines the battlespace environment, describes the battlespace's effects, evaluates the adversary, and determines adversary Courses of Action (COA). AIPB supports the COMAFFOR/JFACC's campaign planning and decision making needs by identifying, assessing, and estimating the adversary's centers of gravity (COG), critical vulnerabilities and capabilities, limitations and intentions, most likely course of action (COA), and COA most dangerous to friendly forces and mission accomplishment. This predictive intelligence analysis is the foundation for optimal ISR collection strategy development.

**1.3.2. ISR Strategy and Planning.** ISR strategy development begins the process of aligning intelligence collection requirements with available collection capabilities to determine the best way to employ ISR assets to support the command's COA. The ISR strategy must be synchronized with overall COMAFFOR/JFACC strategy development as well as Joint IPB, combat operations and national collection. ISR strategy development that integrates ISR with operations will yield an integrated ISR plan that addresses the availability of joint ISR assets, platform and sensor capabilities and limitations, adversary threats to ISR assets, and dissemination. These elements determine the best way to

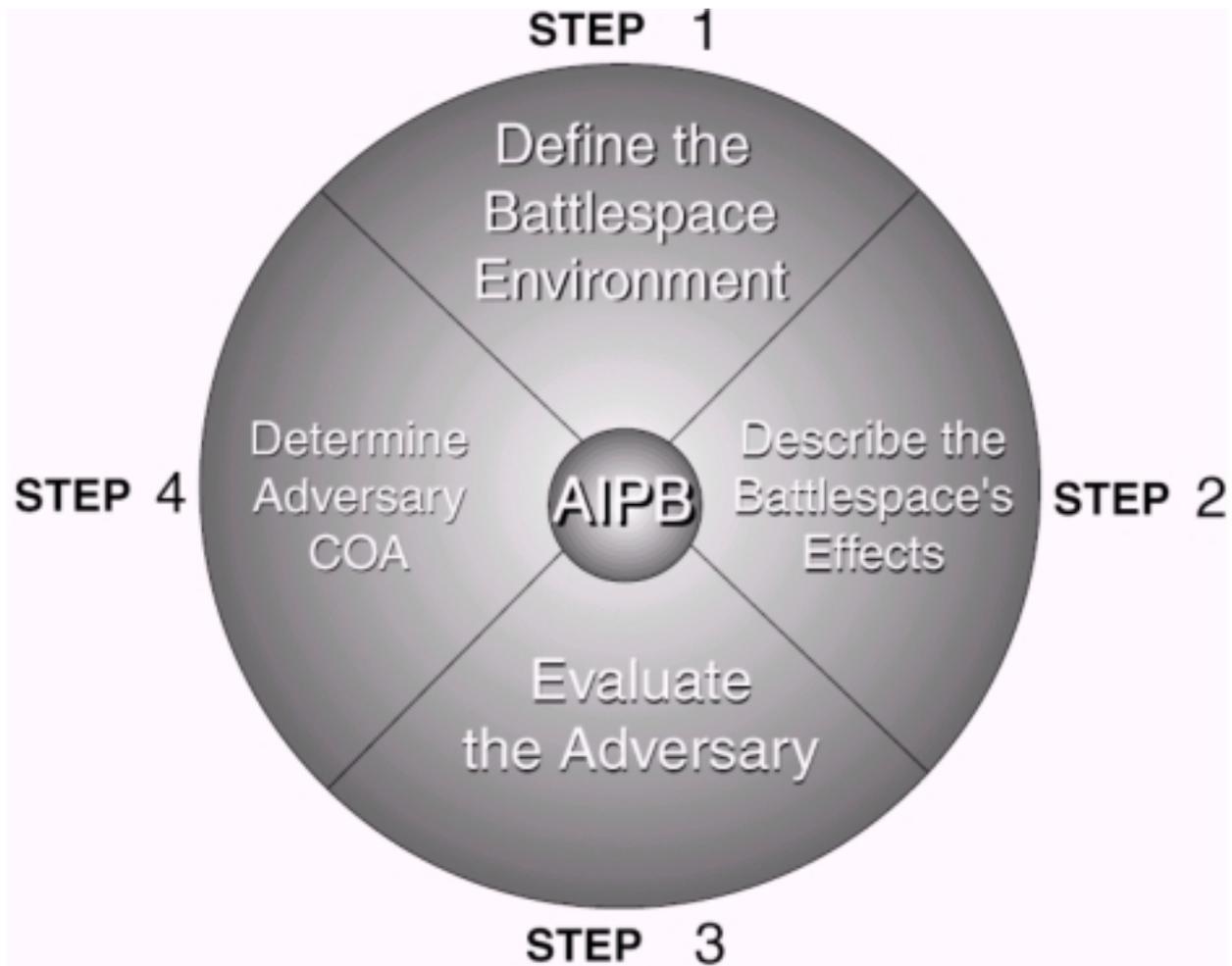
employ ISR forces and integrate with operations. Effective ISR planning will permit us to program flexibility into ISR operations to conduct cross-cueing operations in order to counter new threats and emerging targets.

**1.3.3. ISR Management.** Dynamic execution of integrated ISR operations relies on an operational architecture capable of rapidly adjusting ISR assets in real time to respond to changes in the battlespace and to counter new threats and emerging targets. A robust tasking, processing, exploitation, and dissemination system (TPEDS) is the foundation for this architecture and enables dynamic retasking of ISR assets minimizing the time from target detection to attack.

These three critical components of PBA, when integrated into a coherent framework, will provide the warfighting commander baseline reconnaissance of the battlespace; terrain delimitation; focused surveillance; catalogued analyses of movement patterns; knowledge of adversary tactics, intentions, and disposition; as well as course-of-action analysis. **This forensic-level understanding of the battlespace will allow us to anticipate adversary actions and shift ISR assets from a passive discovery mode to a proactive targeting mode. By predicting adversary actions, we will ultimately assist the warfighting commander select the best means to achieve desired effects in the battlespace.**

**1.4. What is Aerospace Intelligence Preparation of the Battlespace (AIPB)?** AIPB is a systematic, four-step analytical methodology (see [Figure 1.1.](#)) employed to reduce uncertainties concerning the adversary and to exploit or minimize the effects of the environment. AIPB provides the basis for PBA driving ISR planning and synchronization to support the COA selected by the commander. 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. AIPB assists intelligence analysts in identifying facts and assumptions about the battlespace environment and the adversary. The results build an extensive information database for all types of operations that facilitates staff planning and the development of friendly COA.

Figure 1.1. Aerospace Intelligence Preparation of the Battlespace Cycle.



**1.5. Why AIPB?** AIPB leverages a proven, multi-service technique that focuses ISR collection, exploitation, analysis, and dissemination on meeting the needs of operational commanders. AIPB is a flexible process that assists the Air Operations Center (AOC) and unit level commanders in planning and executing aerospace campaigns and missions. The AIPB 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. AIPB enhances our ability to conduct aerospace operations in a dynamic environment where timely decisions are critical to the successful employment of aerospace power.

**1.5.1. Today.** The Air Force is implementing AIPB to meet today's key intelligence requirements, 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 AIPB is to provide a basis for improving and teaching analytical skills to new airmen. In addition, Theater Missile Defense (TMD) IPB has already proven itself in joint and Air Force circles as a critical skill in providing improved intelligence support to the TMD attack operations (AO).

Finally, the Khobar Tower experience reinforced the importance of Force Protection analysis. Existing IPB literature developed by the US Army and Marine Corps provides specific techniques to analyze terrorist and ground-borne threats.

**1.5.2. Tomorrow.** PBA is the basis for future architectures to integrate advanced air and space-based platforms capable of machine-level interaction and performing surveillance, reconnaissance, and command and control functions to precisely locate critical targets and significantly improve AF global engagement capabilities. As such, AIPB establishes the required predictive analytical approach and methodology necessary for the future.

**1.6. How AIPB 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 AIPB process is predicated on the Army's Field Manual 34-130, *Intelligence Preparation of the Battlefield*, 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/denial has on the enemy rather than where the targets are physically located."* (AFDD 2)

**1.7. Key Differences.** AIPB 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 need to look and operate effectively beyond the geographically oriented surface battle is what separates the Air Force from the air arms of the other services. 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. From the outset, aerospace forces pursue tactical, operational, or strategic objectives in any combination or simultaneously. As such, aerospace power is concentrated to directly achieve theater-wide significance. Effects-based operations are the 'engine' that drives AIPB, dynamic C2, and ISR operations to include ISR campaign planning and ISR battle management. Airmen operate in the vertical and information dimensions, which mandates a more detailed analysis of these environments in order to support aerospace operations. Within the Air Force context, intelligence personnel will probably not have the advantage of focusing their AIPB on only one level of warfare. Therefore, **the AIPB process is modified to include detailed COG analysis and the battlespace is divided into a framework for analysis more familiar to airmen and consistent with Air Force doctrine.**

**1.7.1. Global Engagement.** PBA is central to capitalizing on the speed, range, flexibility, and overwhelming firepower capabilities of AF short-notice, global maneuver and attack. PBA yields detailed predictive analysis, provides decision quality information, and gives a commander a proactive view of the AOR necessary to establishing air dominance guaranteeing that joint aerospace, land, and sea forces enjoy both freedom from attack and freedom to attack.

**1.8. The AIPB Process Outlined.**

**1.8.1. Step 1: Define the Battlespace Environment.** The first step of the AIPB process focuses on defining the limits of the battlespace. The purpose of Step 1 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 COA or the commander's decisions. **The desired end**

**effect of Step 1 is to focus the AIPB effort on areas and characteristics of the battlespace that most influence campaign or mission execution.** This is accomplished by completing the eight sub-steps: (1) Analyze the mission; (2) Identify the amount of detail required and achievable within the time available for AIPB; (3) Identify the limits of the Operational Area (OA); (4) Determine the significant characteristics of the OA; (5) Establish the limits of the Area of Interest (AOI); (6) Determine the dimensions of the battlespace; (7) Identify intelligence gaps and priorities; (8) Collect the required material and intelligence necessary to complete the remainder of the AIPB process.

**1.8.2. Step 2: Describe the Battlespace Effects:** The battlespace imposes constraints and provides opportunities to adversary and friendly forces that are crucial in predicting possible adversary COA and developing friendly COA. The purpose of Step 2 is to determine how the battlespace affects both adversary and friendly operations. **The primary purpose of any product generated in Step 2 is to provide the commander and planning staff an understanding of how aspects of the battlespace provide operational benefits that can be exploited to our advantage.** The sub-steps of Step 2 are: (1) Analyze the physical environment; (2) Analyze the effects of weather; (3) Analyze the human dimension; (4) Describe and depict the effects of the physical environment, weather and the human dimension on friendly and adversary operations.

**1.8.3. Step 3: Evaluate the Adversary:** **The purpose of Step 3 is to determine the adversary's COG, capabilities, doctrinal principles, and applicable tactics, techniques, and procedures (TTP).** Step 3 also distills our knowledge of the adversary into specific intelligence products to succinctly communicate information to operational users. Major sub-steps of evaluating the adversary are (1) Analyze and identify adversary COG; (2) Create or update threat and other models; (3) Determine the current adversary situation; (4) Identify adversary capabilities.

**1.8.4. Step 4: Determine Adversary Courses of Action:** This step identifies, develops, and prioritizes adversary COA consistent with the COG developed in Step 3, the adversary's doctrine, and their assessed political/military objectives. **The purpose of Step 4 is to identify likely adversary COA that can be exploited to shape the battlespace and accomplish the friendly mission.** Sub-steps for adversary courses are: (1) Explicitly identify assumptions; (2) Identify the adversary's likely objectives and desired end state; (3) Develop COA based on adversary perception of friendly disposition (Reverse IPB); (4) Identify the full set of potential COA available to the adversary; (5) Identify and nominate targets valuable to the adversary in executing probable COA; (6) Identify and nominate collection requirements that monitor potential COA and key battlespace characteristics.

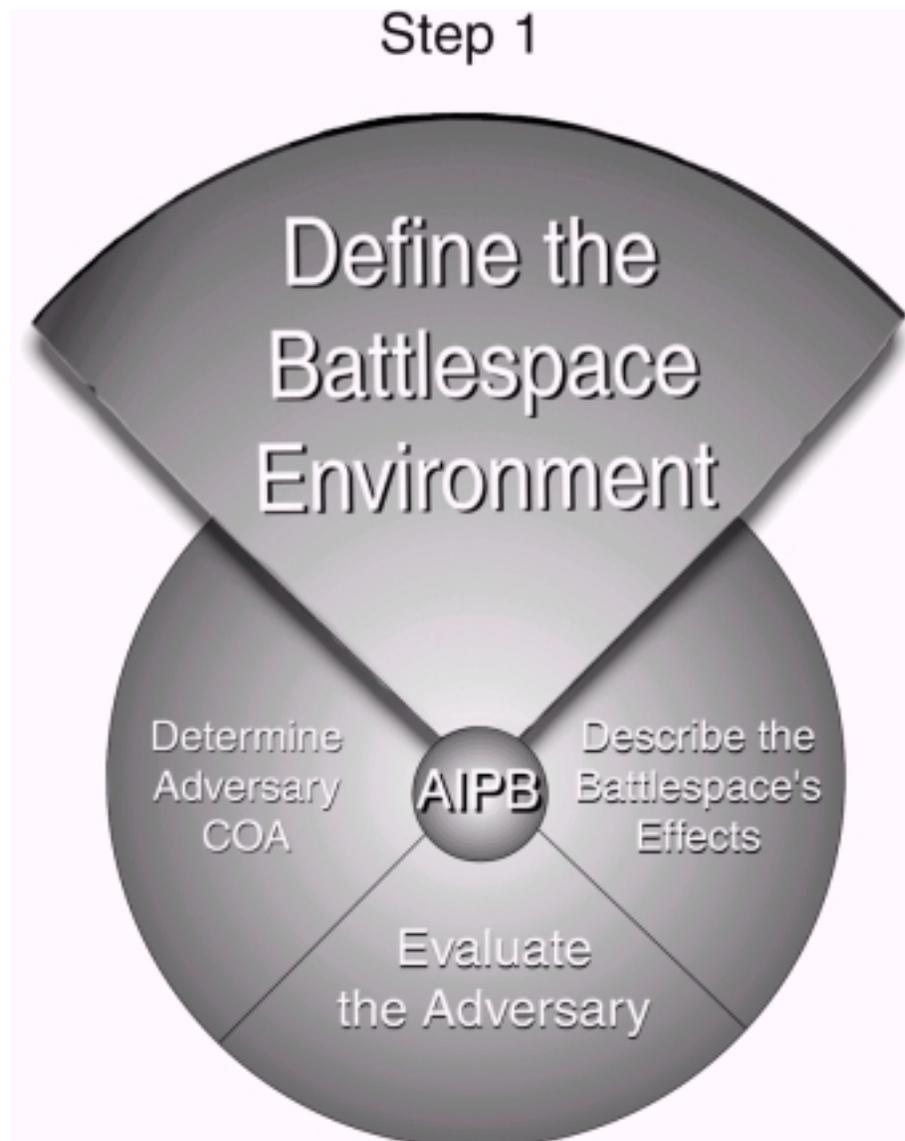
**1.9. Final Note.** The AIPB process outlined above is a fairly straight forward process with each step setting the stage for the next. However, its implementation and execution can be challenging, and is most assuredly time consuming if done in depth. PEACETIME PREPARATION is the key to applying AIPB principles successfully. At their most basic level, Steps 1-3 build a combat intelligence baseline, while Step 4 is the application of intelligence to operational activities. How to actually perform the AIPB process and where it fits in Air Force operational activities is the subject matter of the rest of this pamphlet. However, in using this pamphlet it should be remembered that it is one of the early steps in the Air Force's attempt to institutionalize IPB—a step in a long journey. We look forward to your future input and refinement of this initial step.

## Chapter 2

**STEP 1: DEFINE THE BATTLESPACE IN THE ENVIRONMENT**

**2.1. Overview.** The first step of the AIPB process focuses on defining the limits of the battlespace. The purpose of Step 1 (see [Figure 2.1.](#)) is to bound the intelligence problem and identify for further analysis specific features in the environment, activities within it, and the space where these features exist that may influence available COA or the commander's decisions.

**Figure 2.1. AIPB Cycle: Step 1**



**2.2. Desired End Effect.** The desired end effect of Step 1 is to focus the AIPB effort on areas and characteristics of the battlespace that will most influence campaign/mission execution. It also focuses on acquiring the intelligence needed to complete AIPB in the degree of detail required to support

the decision making process. Step 1 also helps to save time and effort in later AIPB steps by determining the important from unimportant up front. The final results of Step 1 include the following: preliminary Priority Intelligence Requirements (PIR), collection requests, establishment of the Operational Area (OA), Area Of Interest (AOI), and an awareness of intelligence gaps required to complete AIPB process.

**2.3. How to do it.** There are eight primary steps in defining the battlespace environment listed at [Table 2.1](#).

**Table 2.1. AIPB Step 1: Sub-steps.**

(1) Analyze the mission.
(2) Identify the amount of detail required and achievable within the time available for AIPB.
(3) Identify the limits of the Operational Area (OA).
(4) Determine the significant characteristics of the OA.
(5) Establish the limits of the Area of Interest (AOI).
(6) Determine the dimensions of the battlespace.
(7) Identify intelligence gaps and priorities.
(8) Collect the required material and intelligence necessary to complete the remainder of the AIPB process.

**2.4. Analyze the Commander's Mission.** Before determining significant characteristics of the environment, review higher headquarters (HHQ) and your immediate commander's objectives and guidance. This review helps the AIPB analyst understand the envisioned military campaign or operation and desired end state. The review also helps focus the AIPB process on aspects of the battlespace environment that will have the greatest mission impact.

**2.4.1. Mission Analysis.** Mission analysis is accomplished under the direction of the commander in cooperation with the operations staff as part of the commander's Planning, Decision, and Execution (PDE) process. Normally the A-3 and A-5 staffs (NAF level) or Wing Plans Office (Wing level) lead the process in peacetime. During contingencies, the AOC's Strategy Division or Wing's Battle Staff will normally take the leading role.

**2.4.2. Mission Analysis Sources.** Several sources of information are used in analyzing the mission. At the highest levels the National Command Authorities (NCA), the Joint Chiefs of Staff (JCS) and the Unified Commands promulgate guidance and desired end states in formal documents including, the National Military Strategy (NMS), Joint Strategic Capabilities Plan (JSCP), Theater Operations and Concept Plans (OPLAN/CONPLAN) and various Crisis Action Planning (CAP) process documents and orders. Lower down the chain, the Joint Aerospace Operations Plan (JAOP), Phase Directives or Joint Forces Air Component Commander's (JFACC) estimate of the situation may be used to gain insight into the intended mission. Those characteristics of the mission that could influence the commander's decisions or affect COA available to friendly forces, or the adversary, are of special significance in the AIPB process. In many situations, these characteristics will expand the battlespace beyond the OA. Important mission characteristics include: the type of operation being considered; the purpose of the operation; the amount of time available for planning and execution; the expected duration of the operation; and whether allied or coalition forces will be involved. **The primary reason for**

**mission analysis by the AIPB analyst is to thoroughly understand the informational requirements of the commander being supported.** Without clear understanding of what is to be achieved it is impossible to build focused AIPB.

**2.5. Time and Level of Detail.** Before entering the AIPB process, the A-2 staff and OSS Intelligence Flight Commander must take the leading role in guiding AIPB analysts in identifying the feasible amount of battlespace detail required within the available time. There may not be sufficient time available to implement every AIPB step in detail or build detailed graphical AIPB products. Overcoming time limitations requires focusing on parts of AIPB that are most important in planning and executing the mission. Identifying the time required avoids developing more detail than necessary and helps prioritize the effort. **Thorough pre-conflict analysis, when it can be accomplished, alleviates time constraint problems and result in a better AIPB process.** For example, AIPB analysis should begin immediately (and remain ongoing) planning for anticipated adversaries identified in an OPLAN. Advanced preparation allows for an AIPB that can be developed in-depth, thereby enabling commanders to make the best decisions for the deployment, employment and force protection of aerospace forces.

**2.5.1. Technique.** There are many ways to plan your time and allocate workload. One way to structure the AIPB process is to plan backwards from the time when the information is required to determine the amount of time available for executing each step. Using this method, the analyst would start at the suspense for planning information and allocate specific time blocks for each step and AIPB activity. Analysts should only commit the amount of time required to execute the AIPB process, sufficient to ensure the best possible intelligence support to the commander in response to his specific planning needs. In the event the available time is inadequate to perform all steps of this process, inform the commander and then determine what steps will have to be held in abeyance until time becomes available. Usually, when AIPB preparation time is compressed the resulting response is an increase in the number of assumptions made. While making a large number of assumptions is not optimal, sometimes it is necessary. When assumptions are made the AIPB analyst should remember the sound advice given by General Colin Powell former Chairman, Joint Chiefs of Staff. *“Tell me what you know...Tell me what you don’t know...Tell me what you think...always distinguish which is which.”*

## **2.6. Identify the Limits of the Operational Area (OA).**

**The operational area** *“is that portion of the battlespace in which military operations are conducted to accomplish a specific mission.”* (AIPB WG)

The size of these areas and the types of forces employed within them depend on the scope and nature of the crisis and projected duration of operations. The boundaries of the OA are normally specified in the operational order (OPORD) or concept plan (CONPLAN) from the higher headquarters that assigned the JFACC/Commander Air Force Forces (COMAFFOR) or supported commander’s mission. In the case of surface forces (land and maritime), the OA is often defined by a stated geographical Area of Operations (AO) in an OPLAN or OPORD, whereas air, space and information forces are normally not as geographically constrained. For example, the JFACC’s Director of Mobility Forces (DIRMOBFOR) has missions that originate outside of the traditional joint forces AO. Meanwhile, space forces do not operate within the AO at all. Thus, OA is a broader term, analogous to AO, but one that also encompasses portions of the battlespace in which the COMAFFOR/JFACC operates but is not defined by the geographical AO.

**2.6.1. Operational Level.** For units planning and executing aerospace operations at the operational level of war (e.g., COMAFFOR/JFACC), the OA is **usually synonymous with the Joint Operations Area (JOA) or Theater Area Of Responsibility (AOR)**. However, depending on the mission or forces assigned AIPB analysts may want to expand the OA in accordance with the discussion in paragraph 2.6.

**2.6.2. Tactical Level.** In the case of specific tactical units it may be helpful to define a smaller OA. For example, a Combat Control Team (CCT) may define the OA as an area immediately surrounding a landing or drop zone or a Control and Reporting Center (CRC) may define it as the maximum range of its radar. In the case of an aircraft wing or squadron, the air operations OA may be defined as above, but a smaller OA may be defined for force protection or individual missions.

## **2.7. Establish the limits of the Area of Interest (AOI).**

*The AOI “is the 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 that could jeopardize the accomplishment of the mission” (JP 1-02).*

The AOI is the geographical area from which information and intelligence are required to permit planning or successful conduct of the mission. The AOI is generally larger than the OA (see **Figure 2.2.**) and encompasses areas from which the adversary can affect current or future friendly operations. The limits of the AOI include each of the dimensions of the battlespace environment identified as exerting an influence on available COA or command decisions.

**Figure 2.2. Operational Area and Area of Interest.**

**2.7.1. Defining AOI Limits.** AIPB analysts should produce a graphical representation of the OA and AOI. It should include the adjacent countries that are allied with the adversary, allied with coalition forces, and neutral countries. Include coastlines when appropriate. When defining the AOI, especially for AIPB generation, it is important to include all areas from which an attack on friendly forces can be made. It is imperative to include mobility and civilian transportation corridors in order to give the commander a perspective on areas to avoid, or concentrate upon, in terms of avoiding collateral damage and in terms of watching for the adversary's allies to re-supply him. In addition, understanding political issues can be critical to defining the AOI by assessing intent when dealing with issues of national allegiances.

**2.7.2. Military Capabilities and the AOI.** A key consideration in establishing the AOI is the adversary's (and potential allies') ability to project power or move forces into the OA. For example, ports and airfields located outside the OA would be inside the AOI if they could be used to launch sea or air attacks on friendly forces. Likewise, possible launch sites for theater ballistic missiles that are capable of striking targets within the OA would be in the friendly commander's AOI.

**2.7.3. Time and the AOI.** Time is another important factor in establishing the limits of the AOI. When addressing the relationship between time and the AOI, the AIPB analyst must consider both the adversaries' mobility (ground, air, maritime) and the amount of time needed to accomplish the friendly mission. For example, if a commander estimates that it will take 48 hours to complete an operation, the AOI must encompass all adversary forces or activities that could influence mission accomplishment within that timeframe. For missions that are of relatively short duration, such as surgical air strikes or non-combatant evacuation operations, the immediate and direct threats to operations may be the only considerations. In these situations the AOI might be relatively small. Longer-term missions will result in an extensive AOI that involves many political and economic factors as well as more conventional military factors. For these missions' pre-conflict analysis, if possible, it is critical to develop a complete picture of the adversary.

**2.7.4. Neutral Countries and the AOI.** Since the limits of the AOI are based on an adversary's ability to hinder mission accomplishment, the AOI might include neutral countries. For example, if political developments in a neighboring country might influence the accomplishment of the unit's mission, that country should be included within the AOI. Likewise, if the population of a neutral country provides a base of support for forces opposing friendly operations, it should also be included within the AOI. The chain of command up to the highest levels of the Department of Defense should be notified when information becomes available showing that a neutral country is supporting or being used as a base of support for a belligerent. Such activity would implicate neutral status of that nation with important law of war consequences. Also, note, overflight of neutral airspace by friendly forces cannot be taken for granted.

## **2.8. Determine the Dimensions of the Battlespace.**

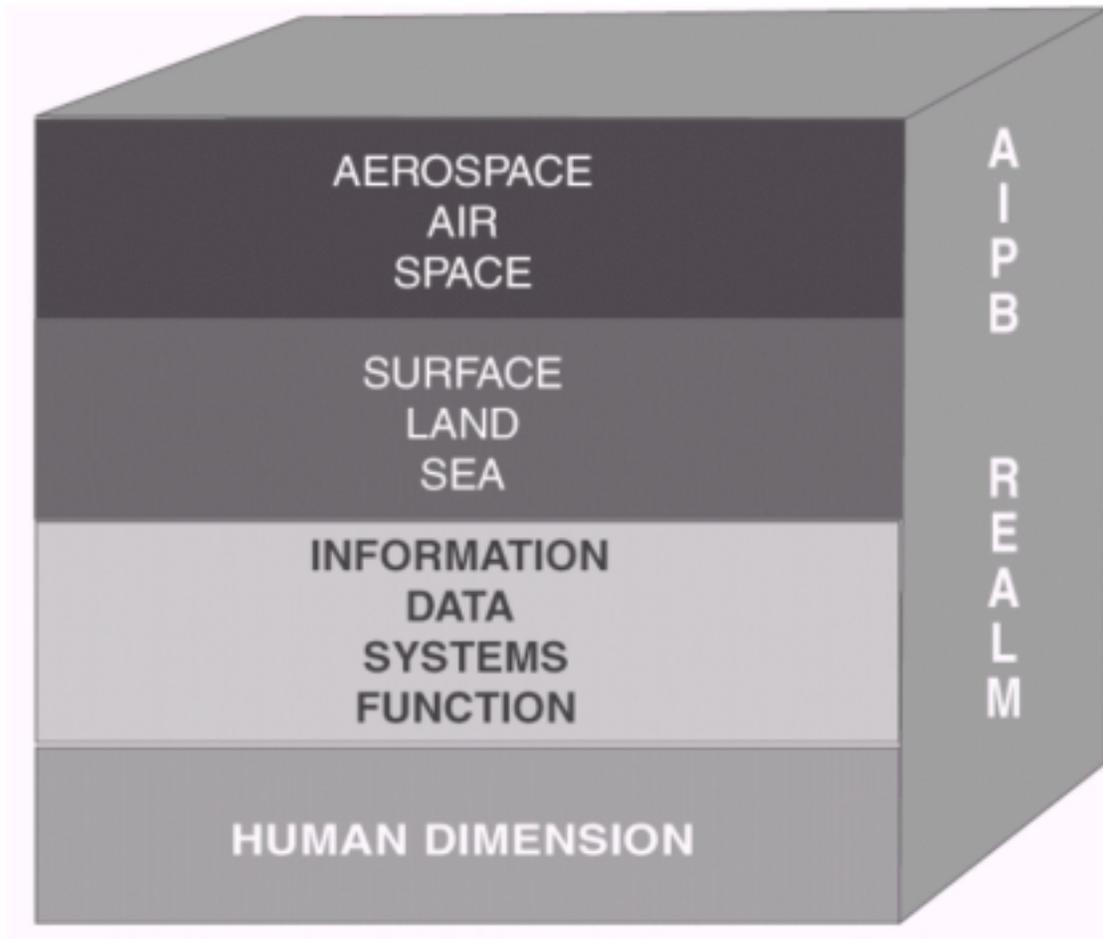
The **battlespace** is *"the commander's conceptual view of the area and factors, which he must understand to apply combat power, protect the force, and complete the mission. It encompasses all aspects of air, sea, space, information and land operations the commander must consider in planning and executing 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 forum for analyzing and selecting courses of action for employing military forces in relation to time, tempo and depth."* (AFDD 1-1).

Aerospace and information operations are not totally constrained by geography. In determining the dimensions of the battlespace, analysts must move beyond addressing only the concrete, physical aspects of the geographic environment. Beyond just the OA and the AOI, a commander's battlespace includes all elements of the environment that are relevant to the commander's mission. For example, the electromagnetic spectrum, coalition political factors, and cultural differences may also be incorporated in the conceptual view of the battlespace. The land area and airspace of a neutral or allied nation is not battlespace.

**2.9. Determine Significant Characteristics of the Battlespace.** This sub-step of "Defining the Battlespace" consists of a cursory examination of each battlespace dimension for the purpose of identifying those characteristics of possible significance or relevance to the commander's mission. A more in-depth evaluation of identified characteristics then takes place during Step 2 of the AIPB process. Identifying significant characteristics of the battlespace focuses analytical efforts during the rest of the AIPB process. It identifies information gaps, focuses ISR tasking, and establishes a baseline analytical database. Certain characteristics of the battlespace may take on added significance based on the type of mission assigned to the commander. Analysts must identify characteristics that require further in-depth evaluation of their

affects on friendly and threat operations such as terrain, weather, logistical infrastructure, and demographic factors relevant to military operations. Other important characteristics may include countries or non-governmental organizations that might provide support to an adversary. **Figure 2.3.** breaks out the four dimensions of the battlespace: aerospace, surface, information, and human. The following physical and human environmental dimensions influence adversary and friendly operations.

**Figure 2.3. Battlespace Dimensions**



**2.9.1. Aerospace.** The aerospace dimension has only one boundary—the earth’s surface. Lateral boundaries do not restrict movement within it. The aerospace dimension extends from the earth’s surface to infinity. Usually the aerospace environment is divided into two sub-dimensions—air and space, due to the unique characteristics of each.

**2.9.1.1. Air.** The air dimension extends from the earth’s surface to an altitude of approximately 28 miles. Surface characteristics such as vertical obstructions or support infrastructures often influence air operations. Analysis of these areas can provide clear limitations on maneuver capabilities and operational distance limits. Weather provides the other major air obscuration (fog, cloud density, smoke, smog, dust and haze) and its evaluation is an ongoing process within AIPB. With the addition of Unmanned Aerial Vehicles (UAV) as ISR assets, a surface aspect must be considered for the support and control of UAVs.

**2.9.1.2. Space.** Space assets generally operate above the atmosphere, where the effects of lift and drag are diminished. Space analysis also has a surface aspect—many terrestrial assets support or control space vehicles. Because space assets are orbital, the space OA or AOI may be global in scope. When present, national space assets belonging to neutrals and national technical means of verification are not considered part of the battlespace and should be noted to avoid confusion.

**2.9.2. Information.** This environment—perhaps the most difficult to precisely define—is composed of three elements: information, information systems, and information functions. The information domain may be considered as any medium adversary or friendly elements could use to transfer, defend or attack information. It may consist of human thought, radio waves traveling through space, digital information passing through a computer network, or techniques as simple as flashing Morse code with a light or mirror.

**2.9.3. Surface.** For the purpose of this document, Surface AIPB includes land and maritime surface phenomena. It also includes all subterranean and submarine features of the battlespace that can have a bearing on the air operation or campaign. Current geospatial information databases must be reviewed. The National Imagery and Mapping Agency (NIMA) is the primary source for surface data. Maps depicting surface configuration (plains, hills, mountains) and vegetation (forested areas, scrub, swamps, deserts, and open grasslands) help depict the surface impact on operations. Weather personnel can assist in providing information on weather effects on traffic.

**2.9.4. The Human Dimension.** The human dimension consists of physical and non-physical aspects of the battlespace created by man. Like the natural physical environment, human factors shape the way military operations will be conducted. Evaluating the human aspects of the environment in some ways is more important and more challenging than evaluating the natural physical environment. The physical environment is fairly static and somewhat predictable, whereas the human environment is ever changing—sometimes in almost unpredictable ways. In addition, when assessing the human aspects of the battlespace we are doing it against an adversary who also thinks, adapts, improvises and tries to deceive. Finally, another challenge is that we look through colored glasses that mirror image our own experience and make judgments accordingly. The history of warfare is filled with examples of intelligent human beings making the wrong decisions because of predisposed biases and perceptions. Aspects of the human dimension are included in [Table 2.2](#).

**Table 2.2. Human Dimension Aspects**

Political factors
International Relationships
Socio-cultural and Psychological Factors
Economic Elements
Population Demographics
Infrastructure
Rules of Engagement (ROE) and Laws of Armed Conflict (LOAC)
Military Forces and Objectives

**2.9.5. A Final Caveat on Determining Battlespace Dimensions.** OA and AO are usually geographical areas defined by the appropriate command authorities in which military operations are permitted for political or operational reasons. AOI are a flexible technique or tool using geography or other factors that assist commanders and AIPB analysts in visualizing, defining or limiting the battlespace for further analysis. The A-2 staff must look beyond the OA and AOI to identify any other factors that may affect accomplishment of the mission or COMAFFOR/JFACC objectives. For example, an A-2 staff may incorrectly conclude that an adversary does not have access to space-based intelligence collection because the adversary country has no satellites of its own. The A-2 staff must look beyond the geographic limits of the OA and AOI to determine if **any** country (or commercial entity) that does possess such satellites is providing (or may provide) satellite-derived intelligence to the adversary. If so, the battlespace must be extended to cover the links between the adversary and the sources of its intelligence data. **There are no fixed rules for defining OA and AOI – only suggestions and considerations. The most basic guide is: “Am I operating there? If so, it should probably be in the OA. The second question to be asked is: “Can it affect the mission?” If so, it should probably be in the AOI.**

**2.10. Identify Intelligence Gaps and Priorities.** First, AIPB analysts evaluate databases, intelligence documents, and open source materials to determine if the necessary information is available to conduct Steps 2 through 4 of the AIPB process. The following data bases and Intelink sites contain information applicable to the AIPB process, and should be reviewed and evaluated to determine the availability of current data, information, and intelligence products relative to the battlespace and mission. This list is by no means exhaustive and other databases and/or Intelink sites should also be reviewed.

**2.10.1. Modernized Integrated Data Base (MIDB).** MIDB is accessible via Intelink and contains current, worldwide, Order of Battle (OB) data organized by country, unit, facility, and equipment.

**2.10.2. NIMA National Exploitation System (NES).** Accessible via Intelink, NES permits users to research the availability of imagery coverage over targets of interest, and to access historical national imagery archives and imagery intelligence reports.

**2.10.3. Country Knowledge Bases and Crisis Home Pages.** These Intelink sites contain the best and most up-to-date intelligence products available from the Intelligence Community and are accessible via the Defense Intelligence Agency (DIA) Intelink Home Page.

**2.10.4. Signals Intelligence (SIGINT) On-line Information System (SOLIS).** The SOLIS database contains current and historical finished SIGINT products.

**2.10.5. Secure Analyst File Environment (SAFE) Structured Data Files.** The following databases are accessible via SAFE.

**2.10.5.1. Intelligence Report Index Summary File (IRISA).** IRISA contains index records and the full text of current and historical intelligence information reports.

**2.10.5.2. All Source Document Index (ASDIA).** ASDIA contains index records and abstracts for hardcopy all source intelligence documents produced by DIA.

**2.10.5.3. Intelligence Collection Requirements (ICR).** ICR is a register of all human intelligence (HUMINT) tasking and collection support documents.

**2.10.6. Modernized Defense Intelligence Threat Data System (MDITDS).** MDITDS is a collection of analytic tools that support the retrieval and analysis of information and intelligence related to counterintelligence, indications and warning, and counterterrorism.

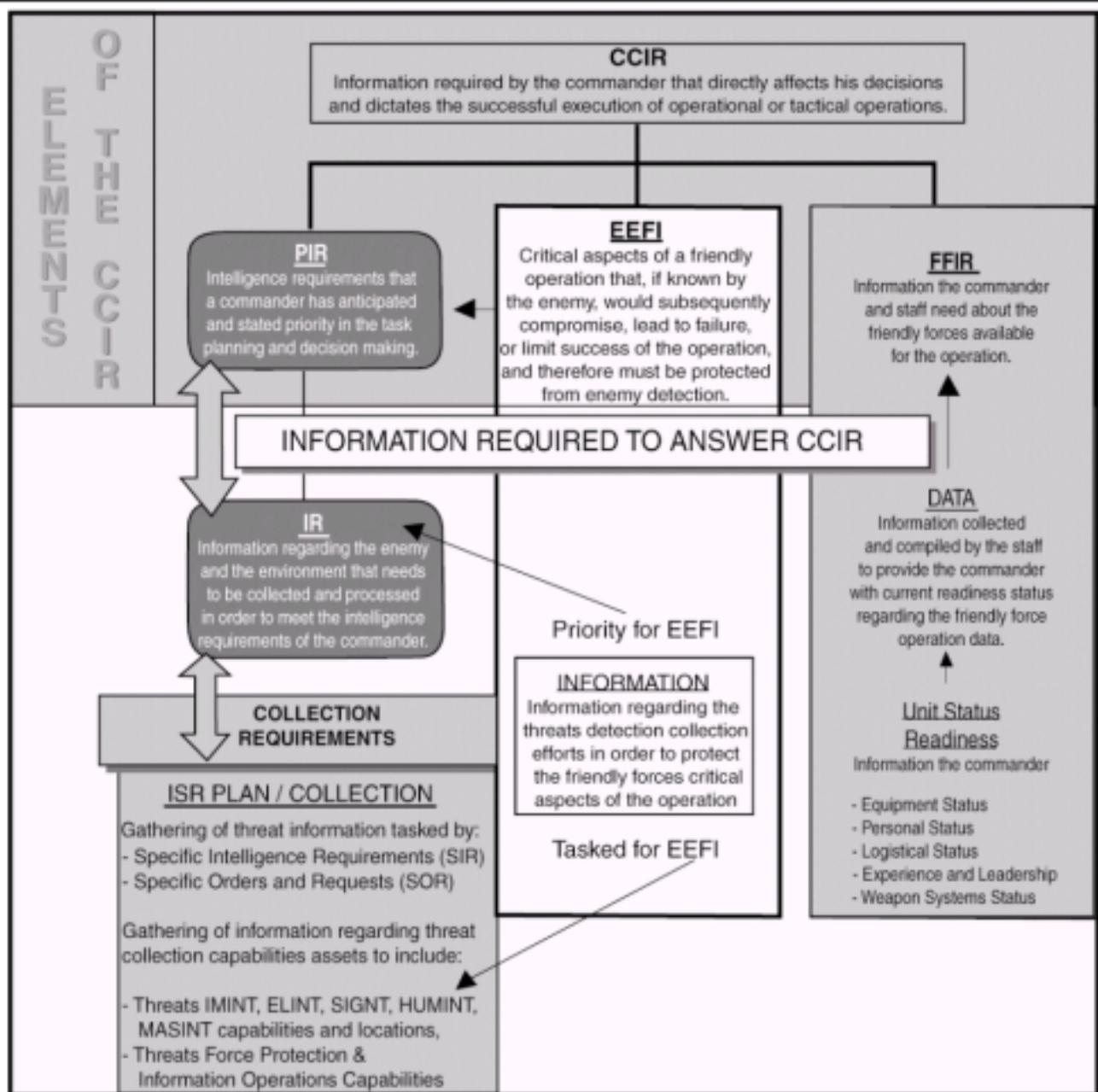
**2.10.7. Community On-Line Intelligence System for End Users and Managers (COLISEUM).**

This data base application allows the user to identify and track the status of all validated crisis and non-crisis intelligence production requirements.

**2.10.8. Gaps in Existing Information.** In nearly all situations, there will be gaps in existing information holdings. Early identification of intelligence gaps allows ISR operations to be tailored to meet specific information needs. Once approved by the commander, the specific information required to fill in gaps in knowledge of the adversary and battlespace become the command's initial intelligence requirements. Afterward, collection managers convert intelligence gaps into detailed intelligence collection requirements to initiate the appropriate intelligence collection. The A-2 staff uses JFACC objectives and initial PIRs to establish collection priorities. Not all intelligence or information gaps may be satisfied within established time constraints. The A-2 staff will identify any gaps that cannot be filled within the time allowed for AIPB and informs the COMAFFOR/JFACC and other appropriate staff elements. When necessary, the A-2 staff should formulate reasonable assumptions to fill in the gaps. During the remainder of the AIPB process, and during the decision making process, the A-2 staff must ensure that any assumptions made are clearly identified as such.

**2.11. Collect the Material and Intelligence Required to Support Further AIPB Analysis.** Collecting intelligence and incorporating it into the AIPB process is a continuous process. The A-2 staff initiates collection operations (see [Figure 2.4.](#)) and issues Requests for Information (RFI) to fill intelligence gaps to the required level of detail. As additional intelligence is provided, the A-2 staff updates all AIPB products. The A-2 staff informs the COMAFFOR/JFACC and the operations staff when new intelligence confirms previously made assumptions. If any assumptions are repudiated by new intelligence, the COMAFFOR/JFACC, A-3 staff, and other appropriate staff elements should reexamine any evaluations and decisions that were based on these assumptions.

Figure 2.4. Command's Initial Intelligence Requirements.

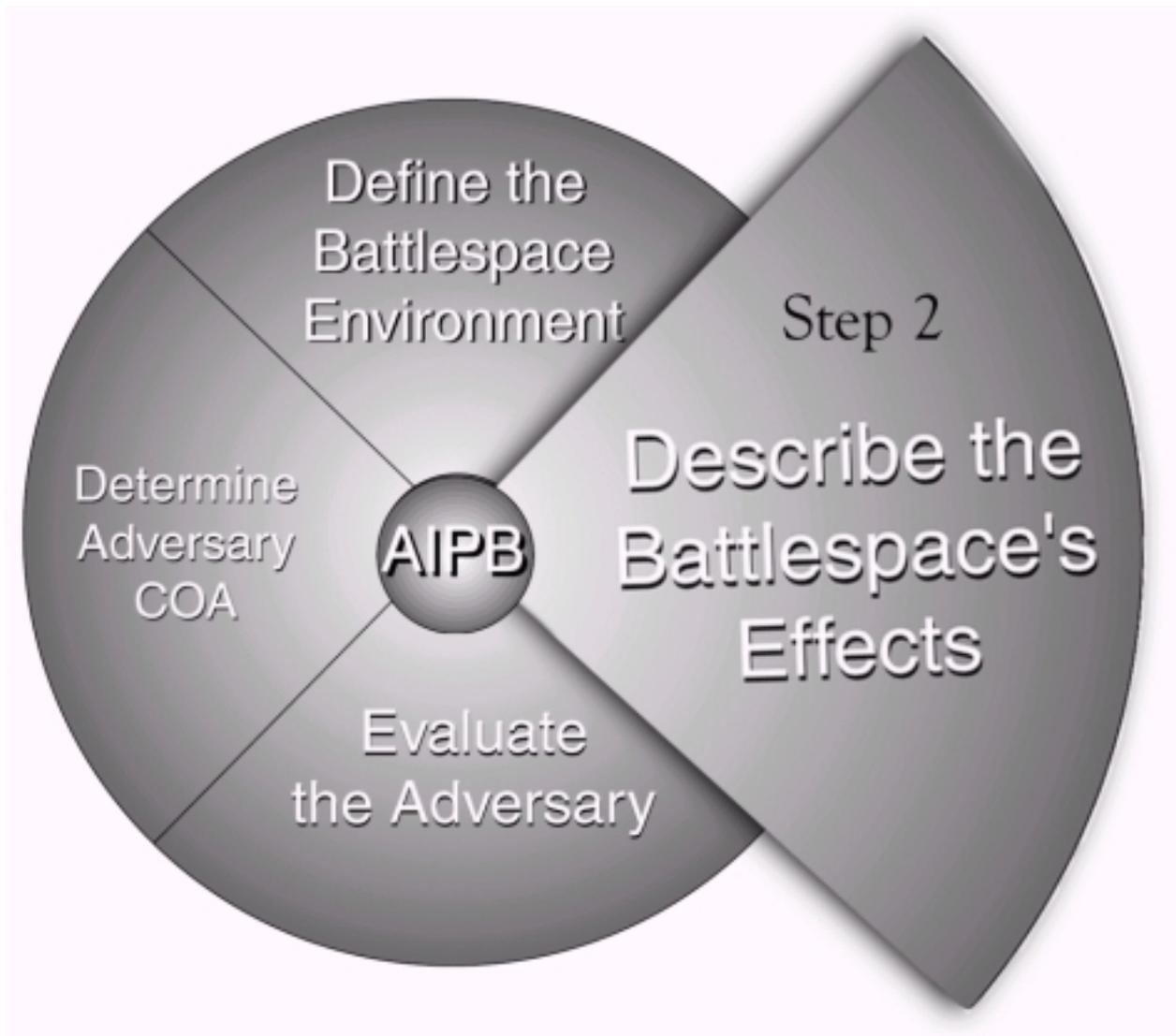


## Chapter 3

**STEP 2: DESCRIBE THE BATTLESPACE EFFECTS**

**3.1. Overview.** The battlespace imposes constraints and provides opportunities to adversary and friendly forces that are crucial in predicting possible adversary COA and developing friendly COA. The purpose of Step 2 (see [Figure 3.1.](#)) is to determine how the battlespace affects both adversary and friendly operations.

**Figure 3.1. AIPB Cycle: Step 2.**

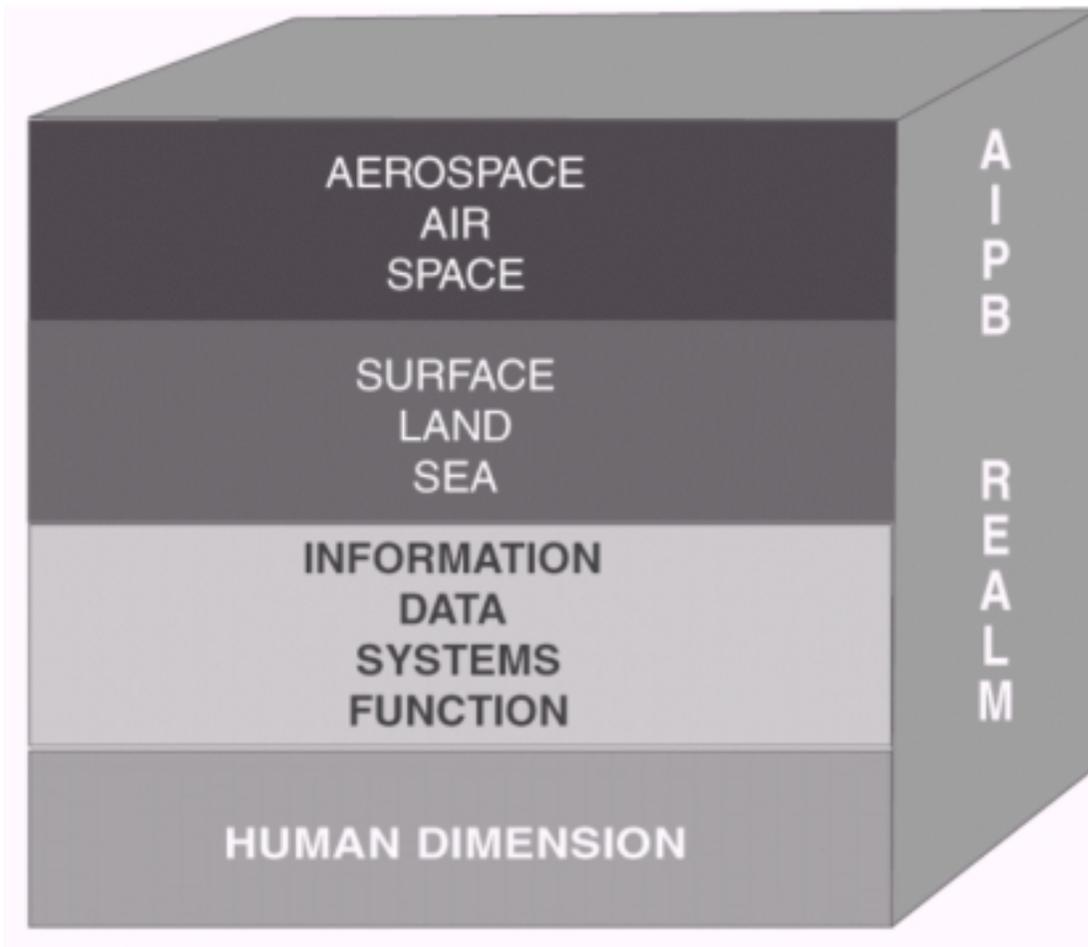


**3.2. Desired End Effect.** Identify how the battlespace environment influences operations and COA of threat and friendly forces. Final products of Step 2 are varied and could take any form from simple briefings to complex, computer-based battlespace simulations and visualizations. Product results should depict: (1) Operationally significant physical characteristics of or locations in the battlespace. Examples

include, mobility corridors, avenues of approach, key interdiction points, communication hubs, orbital launch locations, etc.; (2) Effects of weather on friendly and adversary operations; (3) Key human factors likely to impact friendly and adversary operations; (4) Total environment's effect on broad COA at the strategic and operational levels of war; (5) Battlespace impact on friendly and adversary weapon systems at the tactical level of war. **The primary purpose of products generated in Step 2 is to provide the commander and planning staff an understanding of battlespace aspects that provide operational benefits that can be exploited to our advantage.** Secondary purposes include providing better battlespace awareness, visualization and understanding to build the combat intelligence baseline for future use. Whenever possible the results should be graphically depicted.

**3.3. How to do it.** For Air Force operations, four different dimensions may be involved—aerospace, surface, information and human (see [Figure 3.2](#)). The dimensions to be analyzed will be dictated by mission type. The degree of detail in the analysis will vary depending on the mission and area of the battlespace environment being evaluated. Generally, the evaluation of the OA is more detailed than the AOI. Whenever possible, AIPB analysts should seek to obtain AIPB products and information from those most qualified to produce them. For example, at the AOC terrain analysis products may be obtained from US Army or joint sources. At wing level, the base weather officer can assist in obtaining and producing information for impact of weather on wing weapon systems.

Figure 3.2. AIPB Battlespace Dimensions.



There are four primary steps in describing the battlespace effects listed at [Table 3.1](#).

**Table 3.1. AIPB Step 2: Sub-steps.**

(1) Analyze the physical environment
(2) Analyze the effects of weather
(3) Analyze the human dimension
(4) Describe and depict the effects of the physical environment, weather, and the human dimension on friendly and adversary operations.

**3.4. Analyze the Physical Environment.**

**3.4.1. Aerospace Dimension.**

**3.4.1.1. Analyzing the Air Dimension.** The air dimension of the battlespace is the environment in which military air and counterair operations take place. It is the operating medium for fixed wing and rotary wing aircraft, air defense systems, unmanned aerial vehicles, cruise missiles, and

some theater ballistic missile systems. Airpower is inherently flexible and free from many of the concerns of surface forces. For example, aerial avenues of attack may be entirely different from surface avenues. Airpower has the unique characteristic of being able to approach from any azimuth and a variety of altitudes, with great rapidity and little warning, from potentially great distances into the heart of an opponent's territory. Although the air dimension is not directly related to the surface (land and sea) environment, it may be influenced by surface characteristics. For example, some military air operations may take advantage of terrain masking. Another factor to remember is that most mission targets are on the surface and are influenced by its characteristics. Since air operations invariably originate from surface-based infrastructure, certain aspects of the surface environment (such as the location or potential location of airfields, missile sites, and aircraft carriers) must be considered when analyzing the air dimension of the battlespace. In addition, the effects of weather on the air environment are particularly critical in analyzing military air operations. For example, a combination of mountain peaks and low cloud ceiling may make air operations hazardous or unfeasible for some types of aircraft.

**3.4.1.1.1. One Approach to Air Analysis.** One suggested technique is to begin the process by identifying, locating, and analyzing potential sites, origins or objectives of air operations, both friendly and adversary. This should include the identification of airfields, cruise and tactical ballistic missile launch sites, and potential aircraft carrier locations from which air attacks might be launched, and all potential targets or objectives that could be within range of potential air operations. The surface and aerospace environments that are located between objectives and air operations points of origin are then analyzed to determine likely air avenues of approach, and to determine any other characteristics of the battlespace environment that may influence air operations. Operational orders such as the Air Tasking Order (ATO), Airspace Coordination Order (ACO), and Rules of Engagement (ROE) further define or restrict the limits of the air environment. The air dimension of the battlespace is analyzed in a four-step process that examines the various military aspects of the environment and then evaluates how the environment will affect military operations.

**3.4.1.1.2. Analyzing the Air Dimension in Four Steps:**

3.4.1.1.2.1. Assess, determine and plot known or assessed operating locations and facilities to include: target characteristics and configuration; airfields and associated support infrastructure; missile launch sites and associated support infrastructure; potential aircraft carrier, submarine, and sea launched cruise missile locations and operating areas; Anti-Aircraft Artillery (AAA) and Man-Portable Air Defense System (MANPADS) locations; known or assessed Combat Air Patrol (CAP) locations; friendly defended asset list and other key friendly operations areas or locations.

3.4.1.1.2.2. Plot weapon systems threat ranges and service ceilings or operating altitudes (i.e., minimum/maximum engagement altitudes and ranges) at known or assessed operating locations and facilities.

3.4.1.1.2.3. Evaluate the effects of other dimensions on the above factoring in the effects of: surface features (e.g., terrain masking, vertical obstructions, cover and concealment and cross-country mobility etc.); weather; man-made features and constraints (e.g., hardened aircraft structures, ACO, commercial air corridors, ROE, etc.).

3.4.1.1.2.4. Synthesize results into a Modified Combined Obstacle Overlay (MCOO) for Air depicting likely air Avenues of Approach (AA), significant weather effects, significant surface effects, threat operating locations with their associated weapon system ranges, ceilings and coverage areas. **Note: Additional details on assessing the air dimension, weather and the MCOO can be found later in this chapter and in [Attachment 2](#), *Aerospace Intelligence Preparation of the Battlespace for Air Operations*.**

**3.4.1.1.3. Future Capabilities.** As noted earlier, describing the battlespace effects can be done using anything from text descriptions to computer-based simulations and displays. Given current technology available to most AIPB analysts, air MCOOs will probably be a two-dimensional product plotted and drawn on a paper chart. However, this is rapidly changing and in the not too distant future automation capabilities will allow 3D visualization and rapid import of weather and other data to better assess and understand battlespace effects. Thus, AIPB analysts should be alert to new methods of implementing the concepts noted above.

**3.4.1.2. Space Dimension.** Unconstrained by political boundaries, space-based vehicles deployed in specific orbits and in sufficient numbers can maintain a continuous presence over adversary territory. The space dimension of the battlespace begins at the lowest altitude at which a space object can maintain orbit around the earth (approximately 93 miles) and extends upward to approximately 22,300 miles. It is the medium in which the space missions of force enhancement, force application, and space control take place. Space is an environment with a unique set of constraints. The absence of atmospheric conditions, the limitations dictated by the laws of physics on orbiting bodies, and the cosmic effects of the sun are significant factors that influence military use of the space environment. As with air operations, weather can also have significant effects on space operations. **Note: Additional details on assessing the space dimension can be found in [Attachment 3](#), *Aerospace Intelligence Preparation of the Battlespace for Space Operations*.**

### **3.4.2. Surface Dimension.**

**3.4.2.1. Land Dimension.** Analysis of the land portion of the battlespace concentrates on terrain features such as transportation systems (road and bridge information), surface materials, ground water, natural obstacles such as large bodies of water and mountains, the types and distribution of vegetation, and the configuration of surface drainage. Terrain analysis must always consider the effects of weather as well as changes that may result from military action. For example, freezing temperatures can change a nearly impassable muddy road into a high-speed artery by hardening the ground. Likewise, the mobility characteristics of the operating area can be affected by military actions that may reduce built-up areas to rubble or destroy dams and bridges. It is also important to analyze the combined effects of weather on the potential use of weapons of mass destruction in order to take the appropriate defensive measures. The first step in terrain analysis is to analyze the military aspects of the terrain (Observation and fields of fire, Cover and concealment, Obstacles, Key terrain and Avenues of Approach (OCOKA)). This analysis is followed by an evaluation of how the land environment will affect military operations. This terrain analysis is usually compiled and depicted in the form of a land Combined Obstacle Overlay (COO). A land COO usually identify the following: (1) cross-country mobility; (2) transportation systems; (3) vegetation type and distribution; (4) surface drainage and configuration; (5) surface materials (soils); (6) ground water; (7) obstacles. Identify Mobility Corridors (MC) and Avenues of Approach (AA) from the COO. It is essential to consider maneuver when determining, indexing, and prioritizing AA that

involve possible land COA. Joining MC and AA to the COO will produce the land MCOO. It is also important to remember that terrain analysis is not the end product of the AIPB process; rather, it is a means to determine which friendly COA can best exploit the opportunities the terrain provides and how the terrain affects the adversary's available COA. Ensure that terrain analysis includes the impact of weather on the terrain. Consider the existing situation as well as weather conditions forecast to occur during mission execution. Terrain analysis is a continuous process. Changes in the battlespace environment may change the evaluation of its effects. For example, if built-up areas are reduced to rubble or lines of communication (LOC) are destroyed by battle, you must reevaluate the mobility characteristics of the operating area. Similarly, if weather conditions change you must reevaluate the terrain's effect on military operations.

**3.4.2.1.1. Additional Resources.** Specialized products are available from various producers (e.g., national agencies, sister Services, etc.). For example, the National Imagery and Mapping Agency (NIMA) and other delegated production centers create specialized maps, overlays, and databases to aid in terrain analysis. Usually, a Battlefield Coordination Element (BCE) from the US Army will be assigned to at an AOC to conduct terrain analysis. **Note: terrain analysis is fully explained in Army Field Manual 34-130, Intelligence Preparation of the Battlefield and Army Field Manual 5-33, Terrain Analysis.**

**3.4.2.2. Sea Dimension.** The sea portion of the battlespace is unique in that it incorporates aspects of the surface, subsurface, and air dimensions of the battlespace. It is the dimension in which all naval operations take place, to include logistical support, sea control, sea denial, power projection, and amphibious operations. The sea and adjacent landmasses (littorals) are often referred to as the maritime environment. Just as the surface affects the aerospace dimension, land affects the sea. The open ocean represents a three-dimensional space with unrestricted room for tactical maneuver in the air, on the surface, and beneath the surface. However, in open ocean areas, distant landmasses may impact naval operations due to the range of an adversary's weapon systems. Littoral or "green water" areas may contain geographic features such as straits or choke points that restrict tactical maneuver or affect weapon or sensor effectiveness. The effects of maritime geography on the battlespace must be examined in all three dimensions (surface, subsurface, and air) in both open-ocean and littoral environments for both the operating area and the AOI. Key military aspects of the sea dimension can include the following: maneuver space and choke points; natural harbors and anchorages; manmade infrastructure (e.g., ports, airfields, and naval bases); Sea Lines of Communication (SLOC); and the ocean surface characteristics (weather and sea state) ocean subsurface characteristics (topographic characteristics of the ocean floor; ocean saline content; water temperature) and littoral characteristics (e.g., tides, currents, and coastal geography).

**3.4.3. Information Dimension.** The information environment is composed of three elements: information data, information systems, and information functions. It may consist of any medium adversary or friendly forces use to gain, exploit, defend, or attack information. This environment encompasses communications in the electromagnetic spectrum, the transfer of information in cyberspace, or communications through human interaction. Information provides knowledge, influences perceptions, and is often used to automatically control major systems or infrastructures. It can illuminate friendly or adversary perceptions, intentions, and COA. Once information paths are identified, the information that passes through these paths can be assessed for military value and evaluate an adversary's capabilities to disrupt or affect friendly information. This leads to the identification of critical nodes as an information-related step in evaluating adversary capabilities. **Note: Additional details on assessing**

the information dimension can be found in [Attachment 4](#), **Aerospace Intelligence Preparation of the Battlespace for Information Operations**.

**3.5. Analyze the Effects of Weather.** Weather is one of the most important considerations when analyzing the physical environment. Phenomena such as temperature, moisture, wind, precipitation, pressure differences and obscuration can all effect operations. **Weather affects the battlespace in two ways: it can interact with, and thereby modify, the environmental characteristics of each battlespace dimension; or it can directly effect military operations regardless of battlespace dimension.** Therefore, evaluation of the weather is an ongoing process within AIPB. At the AOC, weather conditions should be anticipated for the whole operating area and forecasts should be made for the expected duration of the operation. Of course, forecasts longer than four days may not be extremely accurate. The adversary will usually know predictable weather patterns better because most operations are normally carried out in the adversary's environment. Considering the fickle nature of weather, commanders should remain somewhat flexible during campaign planning. Weather analysis is performed for each mission area within the AIPB process and tailored to the mission and its associated weapon systems, communications, and ISR platforms. This process determines the weather's direct effects on aerospace and information operations. The analysis begins with available weather trend or climatology-based information for specific operational locations within the operating area. The focus for mission planning is on meteorological parameters over the friendly and adversary AOI. The evaluation is updated as new data is received. Current and forecast weather conditions will impact both friendly and adversary COA. At a minimum, weather is analyzed for the following conditions potentially affecting each phase of aerospace and information operations: (1) visibility, illumination, target acquisition, and Intelligence Surveillance and Reconnaissance (ISR); (2) wind speed and direction; (3) precipitation type and amount; (4) temperature and humidity; and (5) solar activity.

**3.5.1. Visibility, Illumination, Target Acquisition, and ISR.** Visibility is obviously a double-edged sword. It can provide a degree of cover or concealment against attack, but also degrades weapons employment in certain scenarios. During Operation DESERT STORM, adverse winter weather conditions and associated visibility problems severely restricted the expenditure of "dumb" munitions. ROE forbade pilots from dropping ordnance through the weather due to the cultural sensitivity of some target areas. On the ground, gunners and Surface-to-Air Missile (SAM) operators were unable to track aircraft visually, offering aircrew some degree of safety. Likewise, during Operation ALLIED FORCE reduced visibility negatively impacted operations in the early days of the conflict. It is important to consider all aspects of weather when evaluating visibility. For example, temperature conditions can have either an adverse or beneficial effect on the use of modern thermal sights. In Combat Search and Rescue (CSAR) scenarios, the evading aircrew member on the ground may be "hidden" in the background.

**3.5.2. Cloud Cover.** Cloud cover can affect ground operations by limiting illumination and the solar heating of targets. Heavy cloud cover can degrade many target acquisition systems, the use of infra-red-guided munitions, and general aviation operations. Cloud cover can negate the illumination provided by the moon, but can enhance illumination provided by lights from a large city. For example, F-117 operations and intelligence planners closely monitor the degree of moon illumination: too much and there is increased probability of detection from ground observers.

**3.5.3. Wind Speed and Direction.** Winds play a key role in operations and contingency planning, as they affect virtually all aspects of air operations, including the following: (1) Aircraft fuel flow planning; (2) Aircraft maximum weight planning; (3) Airfield take-off and recovery; (4) Refueling opera-

tions; (5) Munitions employment patterns; (6) Nuclear, Biological and Chemical (NBC) operations; (7) CSAR recovery operations; (8) Drop Zone planning; and, (9) ISR systems operations.

**3.5.4. Precipitation Type and Amount.** Precipitation affects soil trafficability, visibility, and the functioning of many weapon systems. Monsoon rains in Vietnam grounded many of the aircraft for days and even weeks at a time. The aircraft simply could not get off the ground. This had a corollary affect on the ground campaign. The Air Force was unable to provide Close Air Support (CAS) and air-lift support for the Army during those times. During the winter, frozen precipitation can mask targets or even make them more visible from the air. For instance, buildings painted with a jungle camouflage scheme stand out when the surrounding foliage is covered in snow.

**3.5.5. Temperature and Humidity.** Extremes of temperature and humidity reduce personnel and equipment capabilities, and may require the use of special personnel shelters or equipment. Air density decreases as temperature and humidity increase, which reduces aircraft performance and often requires reduced aircraft payloads. Temperature "crossovers," when target and background temperatures are equal, degrade the use of thermal target acquisition systems. The length of the crossover time depends on air temperature, soil and vegetation types, amount of cloud cover, and other factors.

**3.5.6. Solar Activity.** Solar activity can degrade satellite system effectiveness. Solar flares, coronal mass ejection and geomagnetic storms degrade system effectiveness and cause communications problems that deny satellite controllers positive control of their systems. For air operations it can deny users the data obtained or transmitted by satellite. Solar activity can also affect the performance of systems using HF communications.

**3.6. Analyze the Human Dimension.** The human dimension includes all aspects of the battlespace environment that affect friendly and adversary COA not already incorporated into the aerospace, information, and surface analysis of the physical battlespace. An analysis of these characteristics often indicates the adversary's centers of gravity.

**Centers of gravity (COG)** *"are 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."* (AFDD 2)

Since aerospace power can strike at all levels of war simultaneously, COG have special significance in the employment of aerospace forces. COG analysis is primarily an analytic framework for evaluating the adversary (Step 3), but is also a useful tool for examining friendly entities within a battlespace. Many non-military factors at the strategic level of war can be examined in the context of COG analysis, but there may be other intangibles associated with these topics that may warrant separate consideration. For example, a state may—wittingly or unwittingly—be host to a number of state-sponsored and non-state sponsored terrorist organizations, each with varying degrees of influence on the host state's domestic politics and economic condition. Or, culture may lead an adversary away from what the analyst would consider more likely COA to less likely COA. A list (though not exhaustive) of the aspects of the human dimension that should be evaluated include the following:

**3.6.1. Political Factors.** Political considerations are among the most important of characteristics to consider. They include forms of government, governmental stability and leadership styles. In addition, analysts must determine how and to what extent an adversary government may be influenced. This dictates that they identify both official and unofficial decision-makers to find an "in." Understanding

the domestic and opposition political situations helps identify weaknesses and clarify which objectives are attainable.

**3.6.2. International Relationships.** AIPB analysts and planners must look at the advantages and disadvantages of fighting with or against, alliances and coalitions. Besides the delicacies of the coalition structure, military leaders must also consider world opinion and its influence on military operations. The world outlook of a potential enemy is also a critical consideration. Courses of action should exploit weaknesses noted in an enemy's outlook, be it inward, outward, expansionist, or satisfied with the status quo. Proper consideration of international relationships will allow the US to direct multi-country operations and exploit weaknesses within an enemy's coalition or alliance.

**3.6.3. Socio-cultural and Psychological Factors.** At a macro level AIPB analysts should consider the behavioral norms of a country. They must also assess the pervasiveness of its nationalism, its technological sophistication, and its demographics. On a smaller scale an adversary leader(s)' background and psychological characteristics may yield important information on their decision making process. Both types of analyses help us understand the worldviews, approach and potential actions and reactions an adversary will take in a conflict. **Perhaps the most critical result or influence this analysis will have is a reduction in our susceptibility to "mirror imaging" (i.e., believing others see a situation the same way we do).**

**3.6.4. Economic Elements.** AIPB analysts should evaluate the strengths, weaknesses and interdependencies of an adversary's economy. As new economies emerge and form trade blocks, vulnerabilities increase because of interdependency. Few, if any, countries today are economically self-reliant. Many have great economic deficiencies in heavily consumed products and resources, which can be exploited by savvy adversaries. In addition, an economic analysis may indicate potential centers of gravity or vulnerabilities that may impact fielded military forces.

**3.6.5. Population Demographics.** Population demographics include an analysis of ethnic groups, religious groups, age and income distributions and income groups. Demographic analysis may yield insights into segments of society that can be exploited or otherwise influenced for our gain.

**3.6.6. Infrastructure.** Infrastructure includes communications, electrical power, transportation or other fundamental underpinnings of a country that enable the movement and or production of people, goods and services. A country with a robust infrastructure will have more potential courses of action than one that does not.

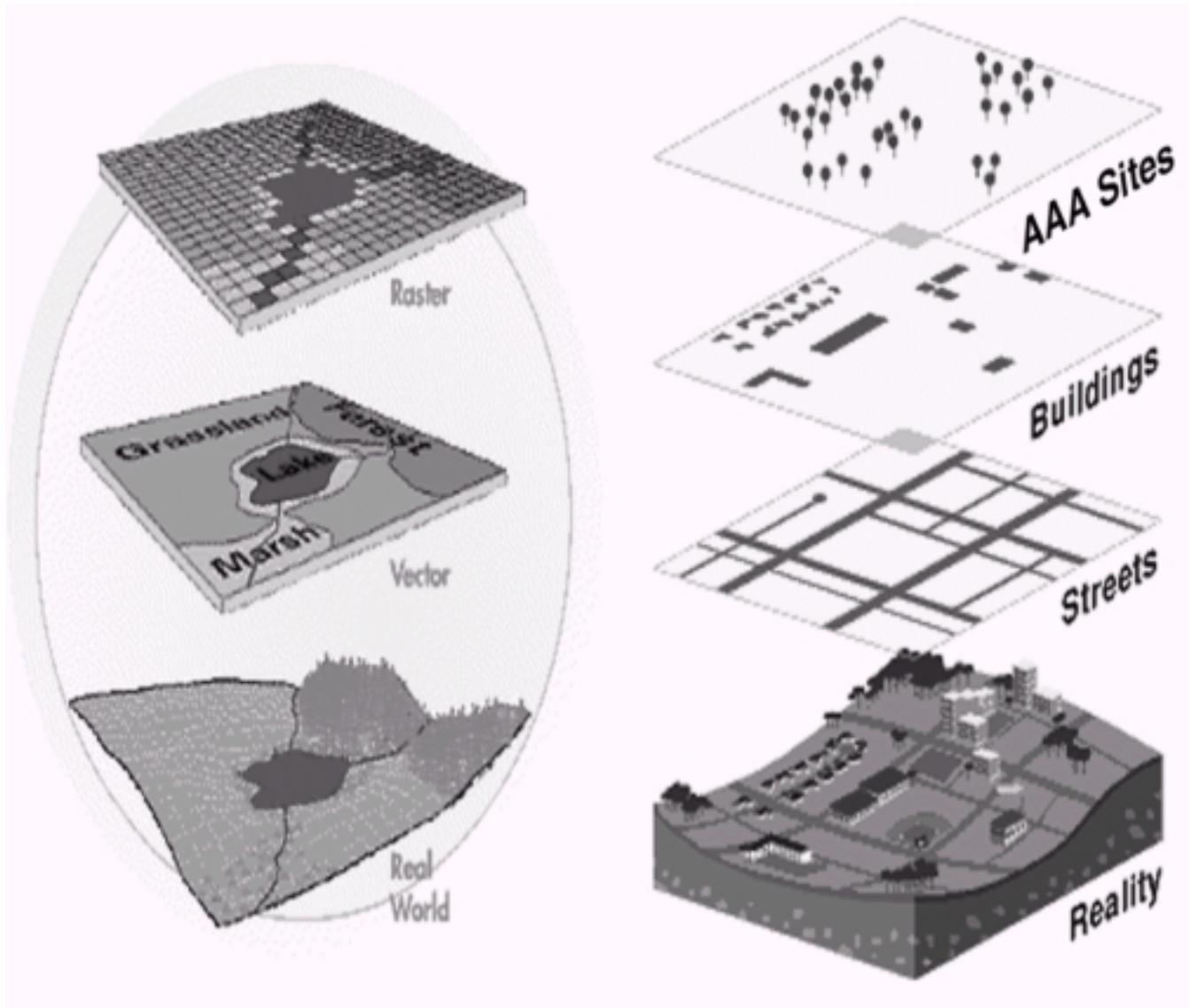
**3.6.7. Rules of Engagement (ROE) and Laws of Armed Conflict (LOAC).** ROE and LOAC place legal restrictions on military operations and as such can have a significant influence on how both friendly and adversary military operations will be conducted and transpire. Restrictive ROE are not always detrimental to combat. For example, during World War II the humane treatment extended to German POWs on the Western Front reduced the frequency of fanatical "fight to the death" battles often exhibited by German soldiers on the Eastern Front where humane treatment of POWs was often the exception rather than the rule.

**3.6.8. A Final Note.** When operating in a host nation or as part of a coalition or alliance, AIPB analysts and planners should also consider the human aspects of all potential actors, for host or coalition nations, and for other state or non-governmental entities in the operating area and AOI. While not the adversary, the above elements impacting your host or coalition/allied partner(s) will most likely affect your operation as well. Most recently, Operation ALLIED FORCE demonstrated realities of operating within an alliance and different perspectives nations bring to the same situation.

**3.7. Describe and Depict Effects of the Physical Environment, Weather, and the Human Dimension on Friendly and Adversary Operations.** The final step in the process is to communicate the overall effects of the environment on adversary and friendly capabilities as well as broad COA. Do not focus on the individual factors that lead to your conclusions, but concentrate on the total environment's effects on COA available to both friendly and adversary forces. There are several techniques to accomplish this goal:

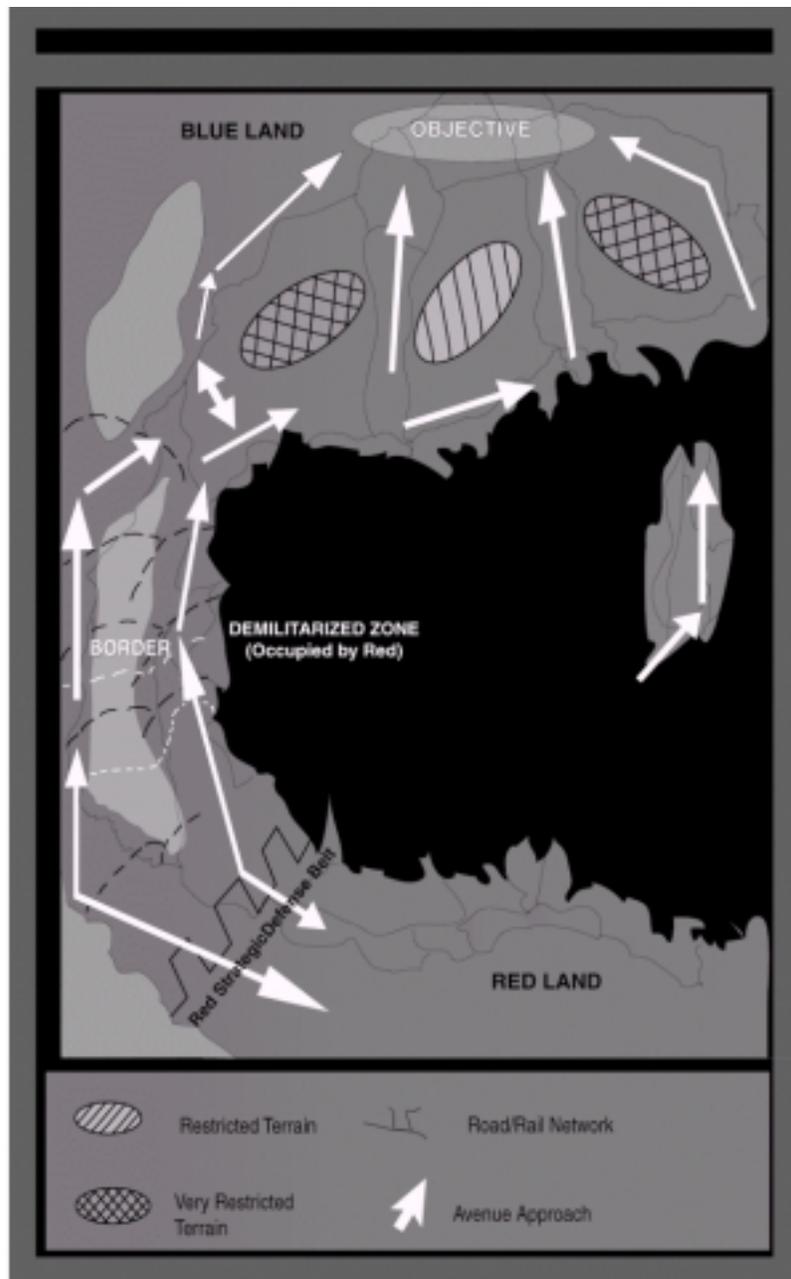
**3.7.1. Modified Combined Obstacle Overlay (MCOO).** One way to depict these effects is to construct a MCOO. The MCOO is a graphical display (see [Figure 3.3.](#)) of the significant environmental effects on military operations. It consists of a series of overlays illustrating the impact of each environmental factor on friendly and adversary operations. It is used as a baseline for the Situation Template and to assess environmental impact on broad enemy and friendly COA. The MCOO could include: MC, AA, weapon system ranges, effects of terrain masking, LOC, potential amphibious landing areas, key communications nodes and paths, population characteristics, and/or solar flare activity. MCOOs may be built for individual battlespace dimensions or a mission-based MCOO may be built combining all relevant factors into a single multi-dimensional product.

Figure 3.3. Modified Combined Obstacle Overlay.



**3.7.2. Avenues of Approach.** An important part of the MCOO is the depiction of potential avenues of approach (AA). An AA is an aerospace, surface, or information route of an attacking force leading to its objective (see [Figure 3.4](#)). The identification of AA is important because many COA will depend upon available AA. Identify AA for reconnaissance, attack and defensive operations. During offensive operations, the evaluation of AA leads to a recommendation on the best AA for aerospace operations planning to meet mission objectives as well as the identification of AA available to the adversary. During the defense, identify AA that support the adversary's offensive capabilities. Prioritize the AA based on how well each supports the adversary's broad COA. Do not confuse AA with direction of attack or axis of advance, which, to achieve surprise, may not follow AA. To develop AA, use the results of evaluating obstacles to identify (1) air corridors, (2) space orbitology, (3) information paths, (4) ground force mobility corridors, and (5) SLOC.

Figure 3.4. Example of an Avenue of Approach.



**3.7.3. Describing Human Effects on Operations.** In some situations, the human dimension is of more concern than the physical dimensions. A simple technique for describing the effects of the human dimension on operations is to simply list the various factors for analysis and their specific impact. Some examples: (1) Infrastructure: The adversary can produce 150 new tanks per month. This allows the adversary to sustain operations for an extended period of time. (2) Political: The adversary faces significant internal dissent. As a result, the adversary's national leadership may seek a negotiated settlement to ensure regime survival. (3) Demographics: The adversary's conscript force is com-

posed largely of minorities of questionable loyalty. As a result, the friendly PSYOPS campaign should exploit potential divisions between ethnic groups.

#### **3.7.4. Broad Course of Action (COA).**

*A Course of Action is “a plan that would accomplish, or is related to, the accomplishment of a mission. The scheme adopted to accomplish a task or mission...” (JP 1-02)*

A broad COA is a generic action(s) an adversary may take to accomplish strategic or operational objectives. These form a general framework for conducting AIPB and assessing enemy capabilities and intent. As you develop your AIPB you will be able to refine your COA and arrive at specific actions the adversary may take to accomplish his mission. At the same time, articulating the adversary's broad COA early in the AIPB process facilitates the operations staff's development of friendly COA. Examples of broad COA include: Air COA (attack, defend, disperse, evade, harden); Space COA (attack, deny, launch additional assets); or, Information COA (attack, defend, gain, exploit).

#### **3.7.5. Battlespace Impact on Friendly and Adversary Weapon Systems at the Tactical Level.**

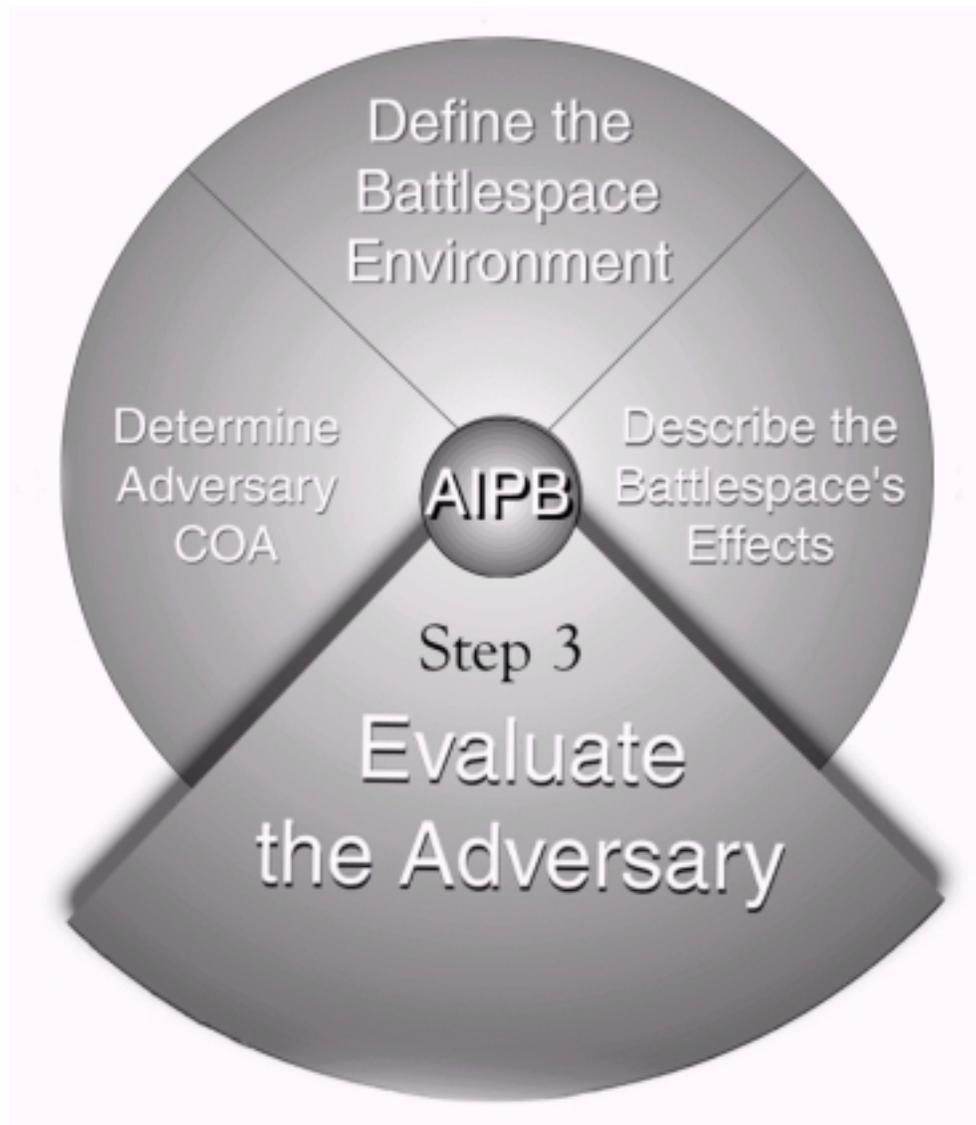
While the adversary may have the capability to employ a given weapon system, the battlespace environment may prevent or limit the use of particular weapons. For example, heavy rains or difficult terrain may prevent deployment of mobile SAM systems to a particular area. Likewise, weather conditions may prevent accurate employment of friendly precision-guided munitions. Therefore, it is important to assess not only the environment's impact on friendly and adversary operations, but also its impact on specific weapons.

## Chapter 4

**STEP 3: EVALUATE THE ADVERSARY**

**4.1. Overview.** The purpose of Step 3 (see [Figure 4.1.](#)) is to determine the adversary's COG, capabilities, doctrinal principles, and applicable tactics, techniques, and procedures (TTP) absent of environmental constraints. Step 3 also distills our knowledge of the adversary into specific intelligence products that succinctly communicate this information to operational users.

**Figure 4.1. AIPB Cycle: Step 3.**



**4.2. Desired End Effect.** The desired end effect of Step 3 is to understand the sources from which the adversary draws strength and know force capability given the current situation. This is achieved through

COG analysis and the development of adversary models that accurately portray how adversary forces normally execute operations and how they have reacted in similar situations in the past.

**4.3. How to do it.** Major substeps of evaluating the adversary are listed at [Table 4.1](#).

**Table 4.1. AIPB Step 3: Sub-steps.**

(1) Analyze and identify adversary COG
(2) Create or update threat and other models
(3) Determine the current adversary situation
(4) Identify adversary capabilities and vulnerabilities

#### **4.4. Analyze and Identify Adversary COG.**

**4.4.1. Background for COG Analysis.** The concept of Centers of Gravity originated with the Prussian military theorist Karl von Clausewitz when he stated: *“One must keep the dominant characteristics of both belligerents in mind. Out of these characteristics a certain center of gravity develops, the hub of all power and movement, on which everything depends. That is the point against which all our energies should be directed.”* Italian air power theorist Giulio Douhet applied the concept of COG to air warfare and air targeting in the 1920s, when he wrote of “vital centers” that, if targeted for strategic bombing, would reduce an enemy’s will and capability to wage war. Douhet’s basic ideas related to the value of strategic attack from the air—as a way of reducing the need for costly wars of attrition on the ground by striking at the heart of an adversary—have held up surprisingly well over time. Similarly during the Gulf War (1991), USAF air power theorist Colonel John Warden modified Douhet’s vital centers concept to adapt to modern realities and to adjust to lessons learned from past conflicts. Focusing on the adversary command structure (both civil and military) as an overarching objective, Warden devised strategic and operational-level COG for targeting to force a leader or leaders to make desired concessions. **The COG framework is not an all-purpose checklist that applies to all types of analysis for aerospace and information operations.** Some Air Force operations may be limited in scope or conducted for limited objectives. For example, during Operation El Dorado Canyon in 1986, USAF F-111 fighter-bombers executed a punitive raid against a terrorist state—Libya. Targets were struck in several areas with the intent being to curtail Libyan terrorist behavior without achieving strategic paralysis. **Note: A full discussion of COG and COG analysis is found in [Attachment 8, COG Analysis](#).**

**4.4.2. The Relationship between COG and COA.** COA can be outgrowths of COG. COG strengths and vulnerabilities may dictate broad COA within the battlespace; conversely, selected COA have centers of gravity. Some technologically advanced states may have very sophisticated communication systems that support COA concentrating in the IO environment. States with expansive ground forces and logistics capabilities are likely to select COA that support large force engagements with the enemy and occupation of seized territory. Friendly or adversary forces naturally emphasize strengths, while protecting vulnerabilities.

**4.4.3. COG Analysis and Target Development.** COG analysis is central to aerospace and information campaign planning and highlights the unique characteristics these warfighting methods bring to a conflict. The air, space and information domains all present the opportunity for **parallel attack**—the near simultaneous attack on large numbers of adversary strategic or operational vulnerabilities. Paral-

lel attack Air Force planners and targeteers to view an adversary from the top down, with infrastructures linked as a “system of systems” with mutual dependencies. The main objectives in COG analysis and targeting should be to reduce the effectiveness of the adversary’s overall system and associated subsystems, influencing its leadership toward friendly goals, while simultaneously protecting friendly systems and subsystems. A desired end state of parallel attack is **strategic or operational paralysis**. This is the point at which an adversary is unable to respond effectively because a large percentage of targets at these levels of war have been hit with a single blow. An example of strategic paralysis might be the inability of a nation’s political leaders to control its political apparatus; at the operational level, the inability of a nation’s military leaders to further control their fielded forces.

**4.4.3.1. Using COG Analysis to Derive High Value Targets (HVT).** At Step 3, adversary COG should be analyzed in terms of strengths, vulnerabilities and relationship to broad COA. Every COG has certain key components or vulnerabilities that, if targeted, could potentially degrade, disrupt, or destroy the entire system. These critical nodes could be considered as HVT within the larger COG. Below are some examples of HVT derived using Warden's 5-ring model for COG analysis

**Figure 4.2. Warden’s 5-Ring Model**

*“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.” (AFDD 2)*



**4.4.3.1.1. Leadership, Command Structure, and Central C4.** Leadership may be vulnerable to direct air attack, or its ability to control or direct forces may be restricted or altered through information warfare. Some things to consider are the ability of lower levels of authority to make concessions or the effectiveness of lower echelons of command to operate autonomously.

mously. Forces who suddenly find themselves in control of their own destiny often function better in a decentralized autonomous mode than when they are tightly tethered to higher authorities, but this is not always true. Key nodes or HVT in the leadership/command ring may include command bunkers, C4 systems, communications paths, or the minds of leaders themselves.

**4.4.3.1.2. Organic Essentials and Logistics.** Like the leadership/command ring, the organic essentials and logistics ring may contain some critical nodes or HVT that make the entire system vulnerable. A few, well-targeted precision guided munitions may disable large sections of a nation's telecommunications network while a well directed computer network attack against a Supervisory Control and Data Acquisition System (SCADA) used to regulate a power grid could leave an adversary "in the dark" for an extended period. Sometimes, however, it is more advantageous to spare communications-related facilities or entities in order to exploit them for information purposes. Air interdiction missions can disrupt the flow of supplies or radically affect the next ring, infrastructure

**4.4.3.1.3. Infrastructure.** Former Chairman, Joint Chiefs of Staff General Colin Powell spoke of fielded adversary forces collectively in the Gulf War: he said, "first coalition forces would cut it off...then they would kill it." Siege warfare and interdiction are time-honored ways of breaking an adversary's will or capability to fight. Air interdiction is an effective method for cutting off the flow of vital supplies and sustenance for adversary forces. When considering bridges, roads, rail lines, airfields, and seaways as potential HVT for disabling or destroying the infrastructure COG, take care to coordinate with operations to ensure that these elements are not key terrain required for subsequent friendly offensive or defensive operations.

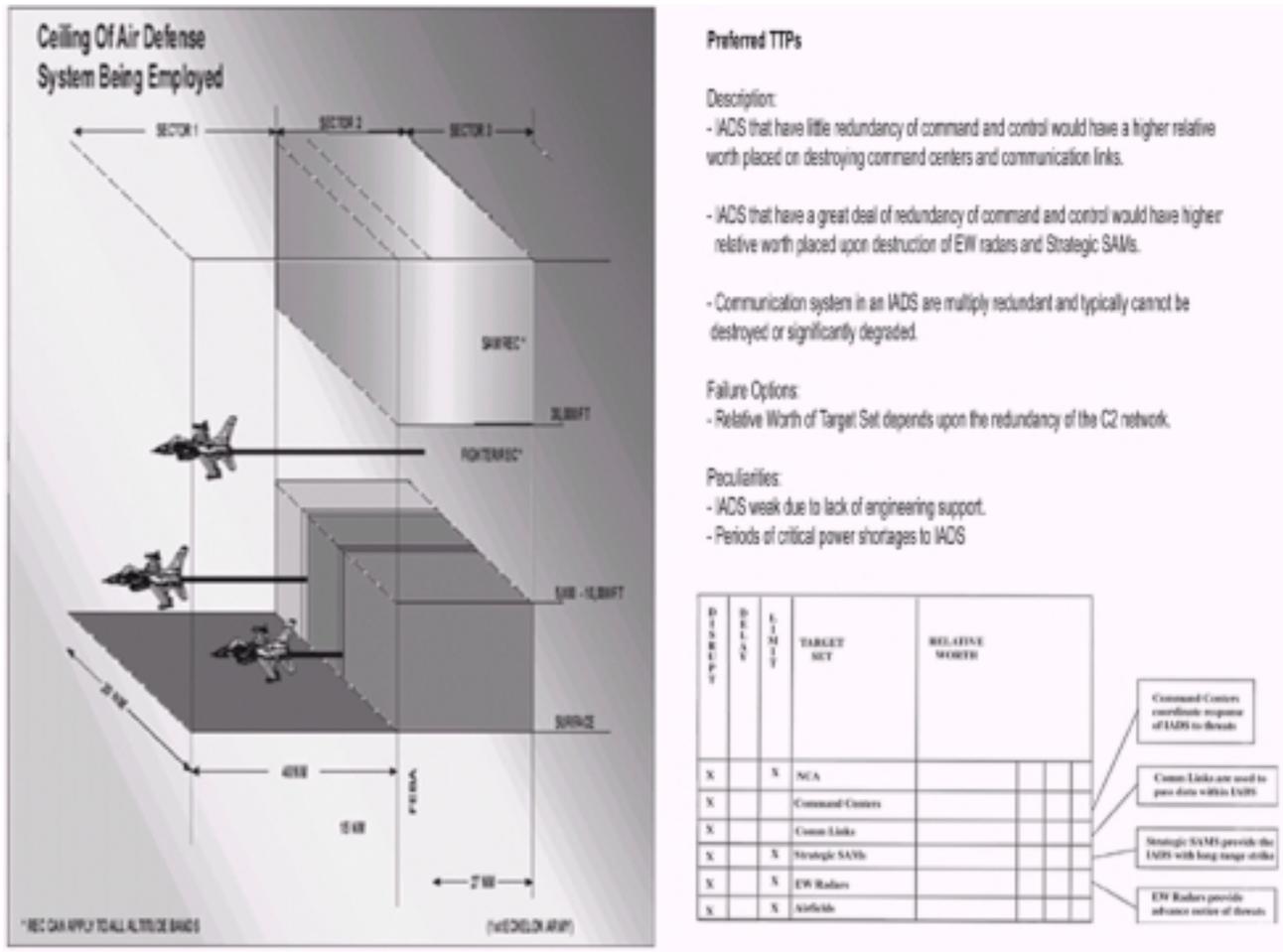
**4.4.3.1.4. Population/Personnel.** An adversary may be able to extend or intensify its level of war effort as long as it maintains popular support. In fact, increased threat from advancing forces may serve to rally adversary populations to increase support to their government. The German attack on Leningrad and subsequent siege only hardened Soviet resistance, prolonging the German effort to take the city by as much as one year. Direct attacks, such as the firebombing of Tokyo, Japan, and Dresden, Germany, during WWII; and indirect attacks, such as the propaganda campaign against the US public during the Vietnam War, may both act to demoralize and defeat the will of the people to actively support a war effort. Analysts must carefully consider what effect attacking this ring will have on the overall campaign.

**4.4.3.1.5. Fielded Forces.** Direct attack of adversary forces in the field is a long duration, high-cost and low-payoff strategy for strategic and operational campaigns. This ring represents the least effective area for air power to decisively destroy the adversary's ability to conduct military operations. Normally, the expanse of the battlespace, quantity and array of adversary forces, limited friendly resources, and the element of time prevent delivering a decisive blow against fielded forces that will result in the collapse of the adversary's will and ability to fight. However, such serial attacks may be required to allow for more direct attacks against the adversary's leadership, organic essentials, and infrastructure.

**4.5. Create or Update Threat or Other Models.** Models describe and graphically portray threat tactics and employment options or other adversary operations and activities.

**4.5.1. Threat Model.** Threat models (see **Figure 4.3.**) consist of three elements: (1) Doctrinal templates; (2) Description of preferred TTPs, options, and follow-on activities; (3) Identification of high value targets (HVT). In Step 4 these threat models are modified to reflect constraints imposed by the battlespace upon the adversary’s preferred method of operations. Maintaining threat models is a continual-process driven by changes in adversary situation and adaptation to the combat environment.

**Figure 4.3. Threat Model.**

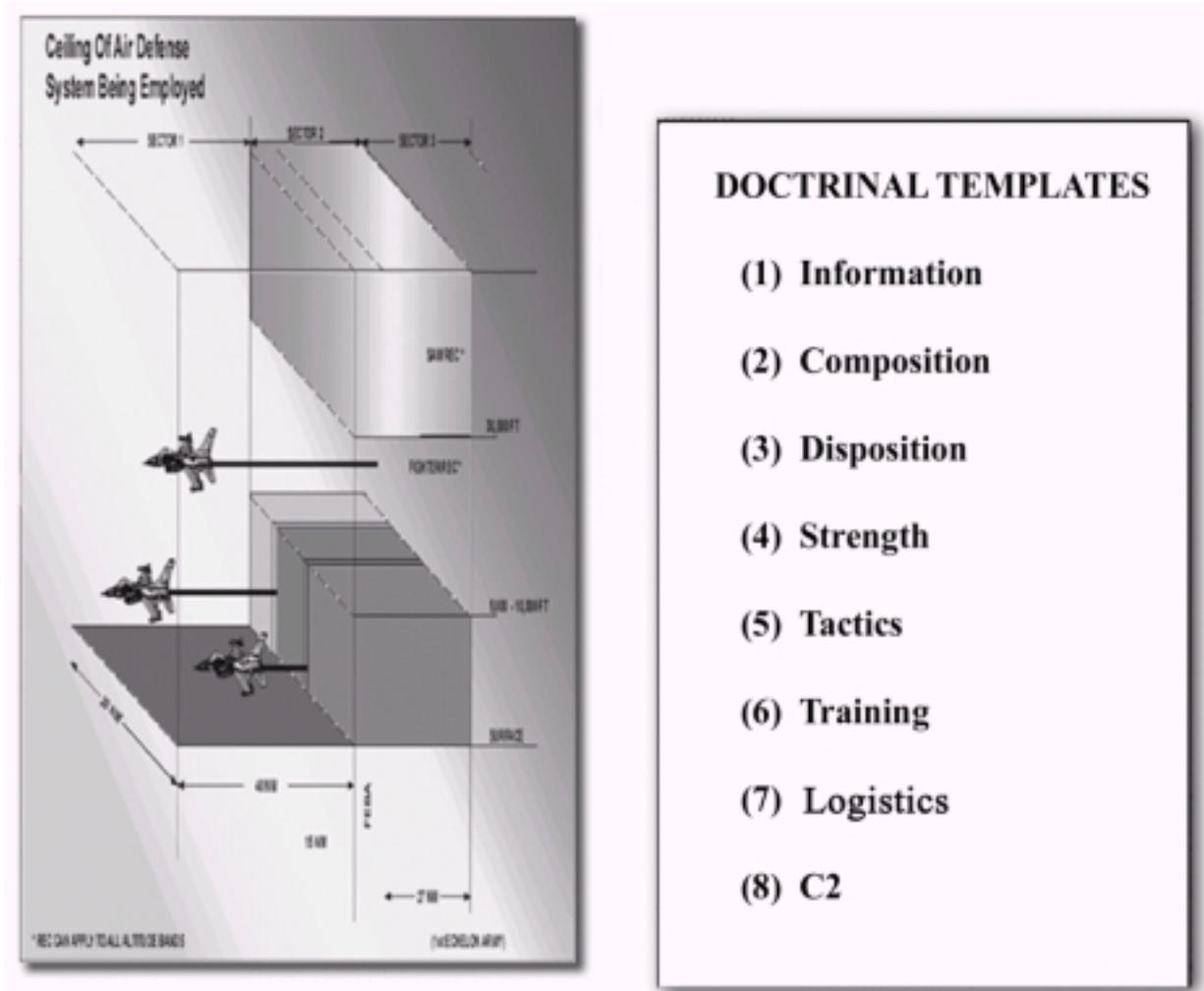


**4.5.1.1. Doctrinal Templates.** Doctrinal templates are:

*“A model based on known or postulated threat doctrine. Doctrinal templates illustrate the disposition and activity of threat forces and assets conducting a particular operation unconstrained by the effects of the battlespace environment. They represent the application of threat doctrine under ideal conditions. Ideally, doctrinal templates depict the threat’s normal organization for combat, frontages, depths, boundaries and other control measures, assets available from other commands, objective depths, engagements areas, battle positions, and so forth. Doctrinal templates are usually scaled to allow ready use with geospatial products.” (JP 1-02)*

Doctrinal templates (see [Figure 4.4.](#)) are constructed through an analysis of adversary's written doctrine (if available), intelligence database holdings, and an evaluation of the adversary's past operations and exercises. Determine how the adversary organizes for military operations and how it deploys and employs forces. The following are factors to consider when building doctrinal templates: (1) Information – amount and quality of information available on the adversary; (2) Composition – identification and organization of adversary units; (3) Disposition – physical location and employment of adversary units; (4) Strength – adversary unit description of available personnel, weapons and equipment; (5) Tactics – adversary force employment doctrine; (6) Training – adversary readiness levels including the amount of training at night and in all weather; (7) Logistics – adversary's ability to sustain combat operations; (8) C2 – adversary's ability to command and control forces through its communications, computers and intelligence collection capabilities.

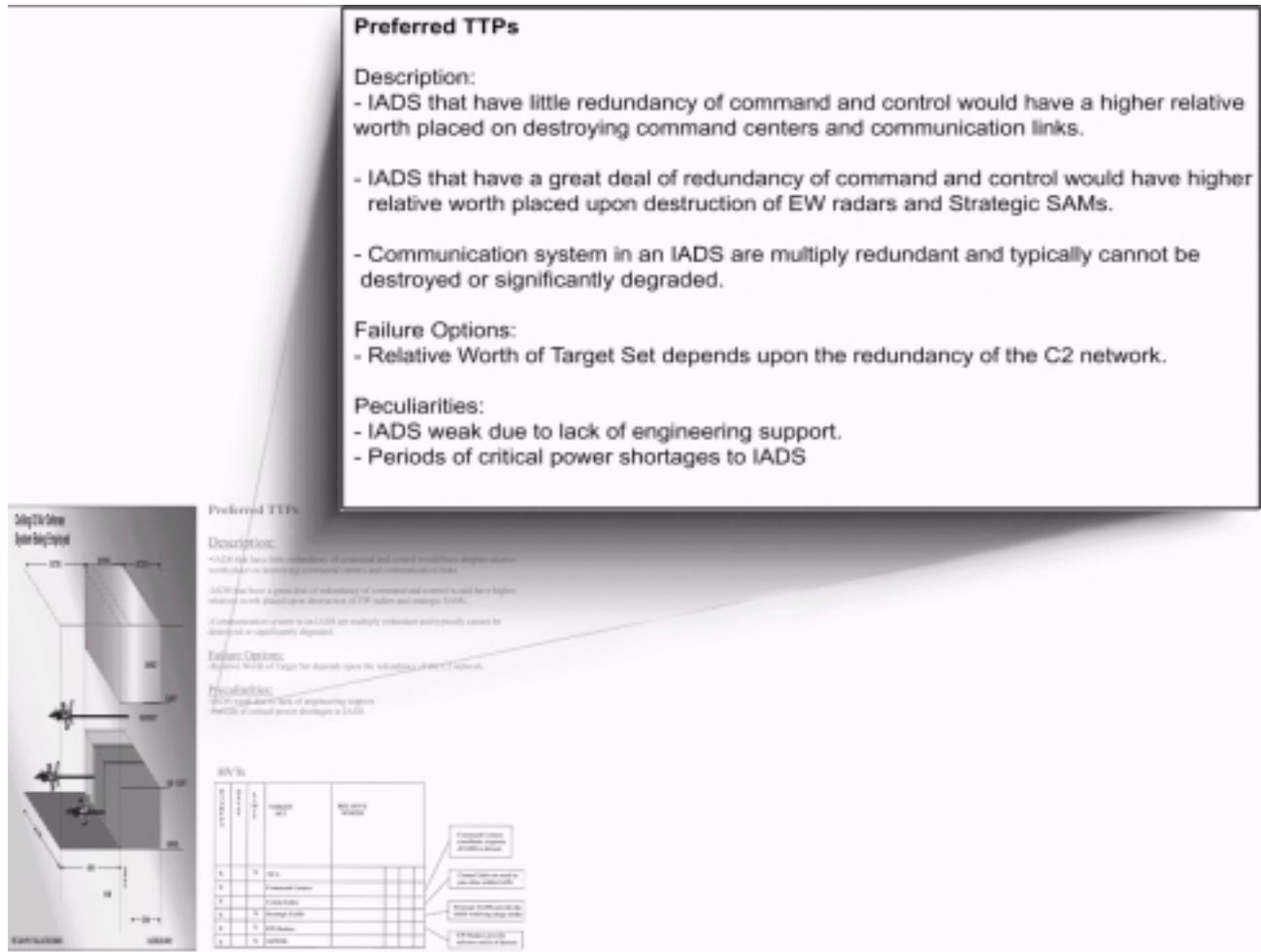
**Figure 4.4. Example of Doctrinal Template.**



**4.5.1.2. Description of Preferred TTPs, Options, and Follow-on Activities.** While building threat models, this step textually describes (see [Figure 4.5.](#)) the deployment and employment patterns, disposition, tactics, training, logistics, and other relevant factors depicted by the doctrinal

template. This product can also describe major operations, associated timelines, and options should an operation fail (branches) or subsequent operations (sequels). Even if the adversary's preferred TTP are described textually, graphics can also be used to depict adversary TTP.

**Figure 4.5. Tactics, Techniques, Procedures Description.**



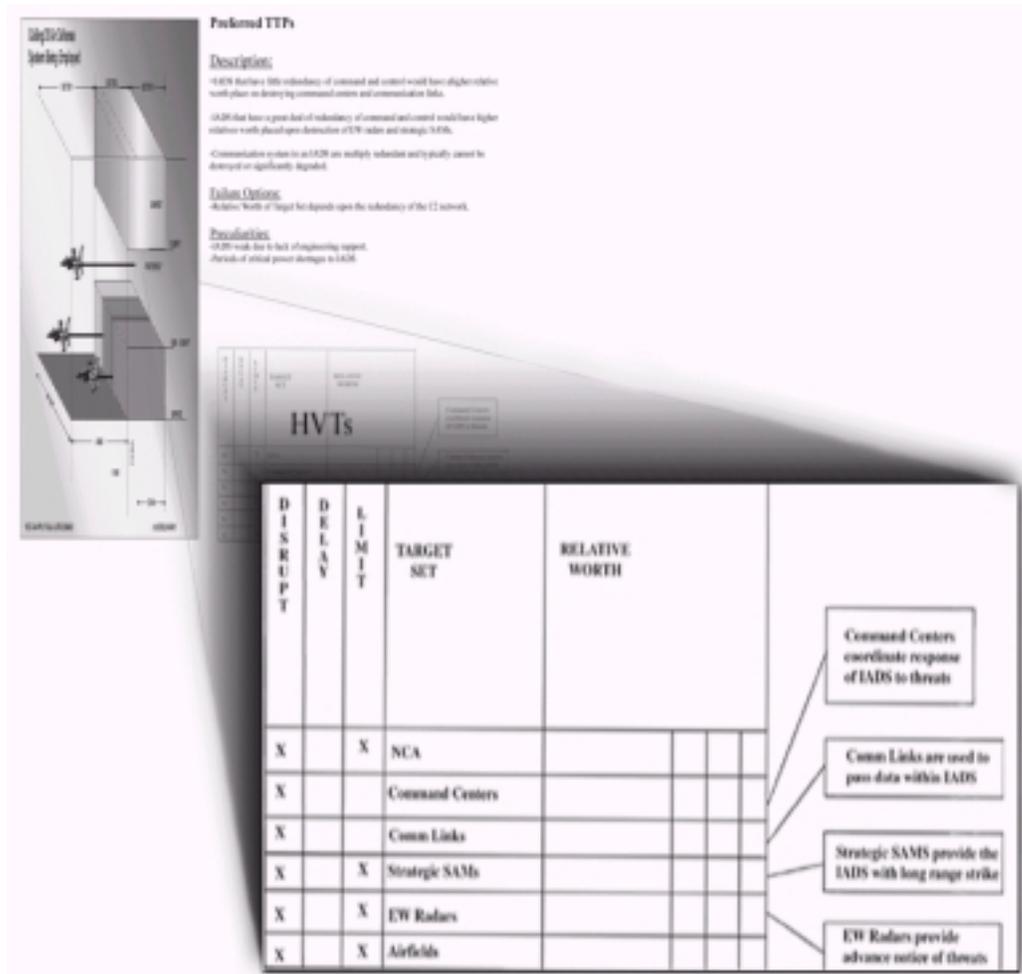
**4.5.1.3. Identification of High Value Targets (HVT). An HVT is a:**

*“Target the enemy commander requires for the successful completion of the mission. The loss of HVT would be expected to seriously degrade important enemy functions throughout the friendly commander’s area of interest.” (JP 2-01.3)*

HVT at this stage of the AIPB process identify those elements in the threat model that are crucial to an adversary commander’s execution of the activity portrayed in the model are referred to as HVT. For example, if a friendly defense against enemy air attack is supported by a well-prepared air defense system, it is logical to assume that the enemy will need an air defense suppression package as part of the strike force. In such a case, threat aircraft commonly used for air defense suppression missions become HVT. HVT are identified from an evaluation of the operation or activity being analyzed and sound use of tactical judgement. Wargaming and thinking through the

operation and considering how the adversary will use forces and equipment to accomplish specific operational functions helps develop the initial list of HVT. HVT can be described on a template as part of the Threat Model seen in **Figure 4.6**.

**Figure 4.6. High Value Targets.**



**4.5.1.3.1. Determine Adversary Reaction .** A determination should be made as to how the adversary might react to the loss of each identified HVT. This includes consideration of the adversary’s ability to substitute other assets, as well as the likelihood of adopting alternate branches to the operation. This information will be captured when developing and describing follow-on activities.

**4.5.1.3.2. Generate HVT List.** As key assets are identified, they should be grouped into categories used to develop target sets. Once the set of HVT has been identified, they are rank ordered with regard to their relative worth to the adversary’s operation and recorded as part of the threat model. The value of HVT usually varies with time over the course of an operation. Changes in value should be identified by phase of the operation. In the air defense suppression example described above, aircraft would only be considered HVT during those periods when

the adversary is required to conduct an air defense suppression mission as part of a broader COA.

**4.5.2. Other Models.** Threat models describe the use of adversary military forces. However, modeling other activities and going through a similar thought process as illustrated above can yield important insights into how the adversary will conduct an activity and its critical components. There are many techniques that can be used to build models depicting other adversary activities. One of the most commonly used techniques in the Air Force is nodal analysis. Nodal analysis is an in-depth study of the interconnections between system elements and surrounding systems. Nodal analysis seeks to discover those “key nodes” within the system that, if removed, cause it to fail. Nodal analysis is often used when evaluating electrical power systems, communications systems and transportation networks. Whether building threat models or performing nodal analysis, the purpose for building models in AIPB is the same—to understand how the adversary operates and identify critical elements that may be affected by attack or other aerospace operations.

**4.6. Determine Current Adversary Situation.** After examining the adversary’s doctrine it is necessary to place it in the context of the real world. The pressures and uncertainties imposed by the battlespace environment will place constraints on adversary actions or provide opportunities to exploit. An analysis of the current situation provides a link between what the adversary believes he can accomplish according to his doctrine and what he is actually capable of doing given the constraints imposed by the environment. Determining the current adversary situation is one of the initial steps that places previously performed AIPB analysis into the current operational context. The current adversary situation is the result of the current intelligence process. Current intelligence analysis involves examining all available intelligence sources methods and databases in an effort to analyze and determine the current adversary situation. This analytic effort primarily focuses on Order of Battle (OB) factors for each adversary threat deployed within the AI, or that are otherwise capable of interfering with the friendly mission. AIPB analysts do not conduct current intelligence activities: they use the results of current intelligence to identify probable adversary COA given the current situation and to maintain and update the various AIPB products produced previously. In effect, current intelligence provides the real world threat to predict actual adversary COA. Assess current adversary situation and objectives by analyzing the following political and military factors and all relevant OB to include: (1) Composition – identification and organization of adversary units; (2) Disposition – physical location and employment of adversary units; (3) Strength – adversary unit descriptions in terms of available personnel, weapons and equipment; (4) Tactics – observed adversary force tactics; (5) Training – adversary readiness levels including the amount of training at night and in all weather; (6) Logistics – adversary ability to sustain combat operations; (7) C2 – adversary’s ability to command and control forces through its communications, computers and intelligence collection capabilities.

**4.7. Identify Adversary Capabilities.** Adversary capabilities are the broad COA and supporting operations the adversary can take to influence the accomplishment of the friendly mission. They take the form of statements, such as: (1) “The adversary has the capability to conduct operations with two full SCUD brigades.” (2) “The adversary has the capability to conduct WMD operations.” (3) “The adversary has the capability to conduct night counterair operations.” (4) “The adversary can conduct up to three separate operations simultaneously.” (5) “The adversary has extensive capability to conduct information operations.” (6) “The adversary has the capability to conduct air operations in all weather.” After evaluating the current adversary situation, adversary capabilities are determined by comparing the current adversary situation with each of the adversary models constructed. Based on the current situation, the ability of the adversary to actually meet the criteria described by each doctrinal model is evaluated. Usually, the adver-

sary's actual capabilities will vary from the ideal capabilities represented by a doctrinal model. Adversary capabilities that fall short of doctrinal requirements should be identified as vulnerabilities, while capabilities that meet or exceed requirements are listed as strengths. Although the Air Estimate of the Situation is the traditional vehicle for disseminating adversary capabilities, strengths, and weaknesses, this type of evaluation should be disseminated as soon as possible to facilitate operational planning.

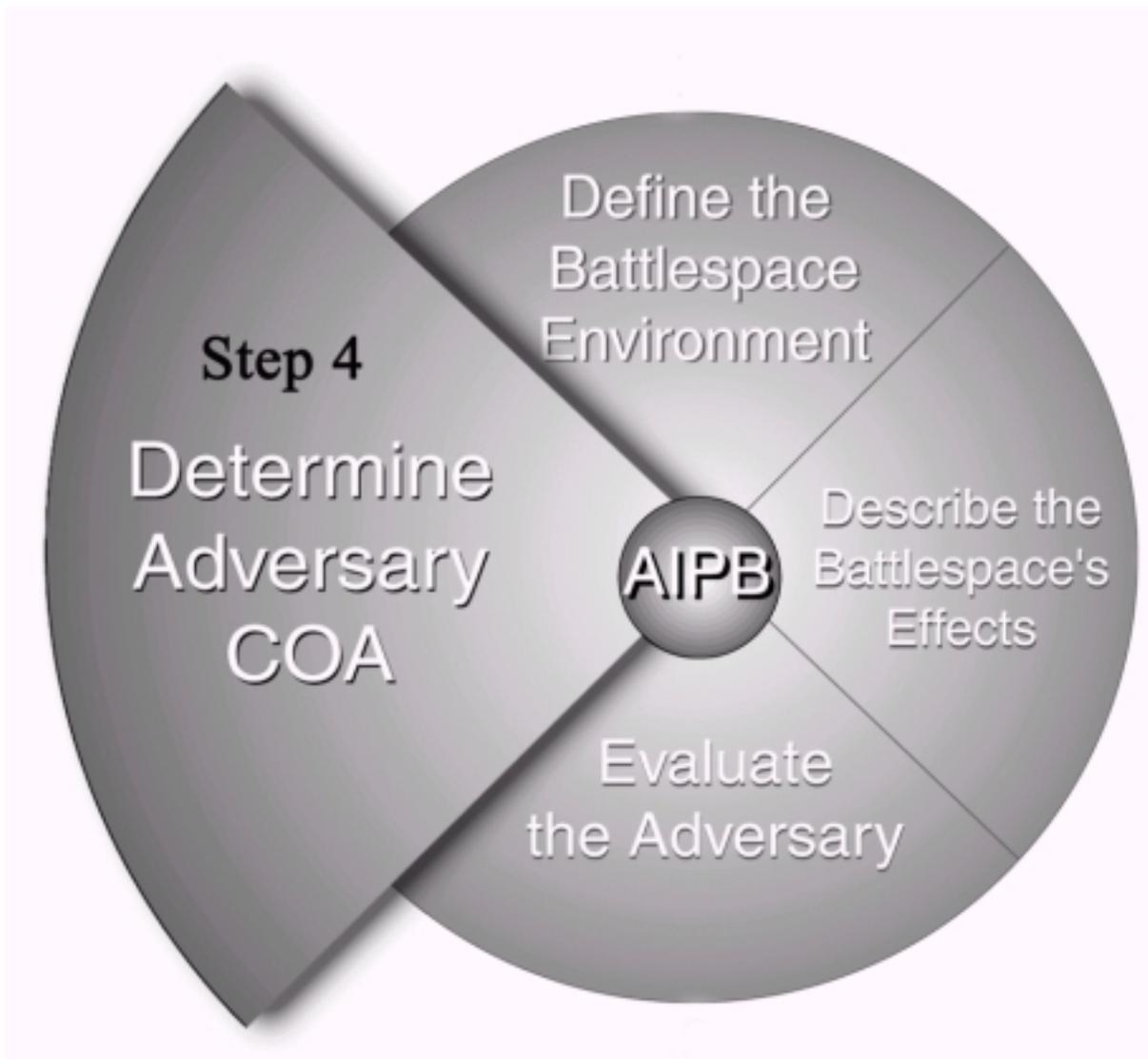
**4.7.1. Time and Capabilities.** When time or some other factor is assessed to be a critical adversary capability, it should be explicitly stated in the overall capability statement. For example, the adversary's forces may be widely dispersed to the point where they are not capable of offensive action. However, the adversary is capable of massing forces and conducting limited offensive operations within 18 hours. The commander must be advised when time or some other factor is a critical element in adversary capability.

## Chapter 5

**STEP 4: DETERMINE ADVERSARY COURSES OF ACTION**

**5.1. Overview.** Step 4 identifies and develops the adversary's likely COA that will influence accomplishment of the command's mission. This step (see [Figure 5.1.](#)) identifies, develops, and prioritizes adversary COA consistent with the significant environmental characteristics identified in Steps 2 and COG, adversary's doctrine, and capabilities developed in Step 3. The purpose is to identify likely adversary COA that can be exploited to shape the battlespace and accomplish the friendly mission.

**Figure 5.1. AIPB Cycle: Step 4.**



**5.2. Desired End Effect.** The desired end effect of Step 4 is to estimate the set of specific COA that the adversary commander and staff are considering. To achieve this, all specific enemy COG and COA influ-

encing the friendly commander's mission needs to be identified, as do named areas of interest (NAI) and high payoff targets (HPTs). NAI are those areas and activities that, when observed, will discern which COA the adversary commander has chosen. HPTs are those areas and activities that, when targeted, will disrupt and/or delay the adversary's COA.

**5.3. How to do it.** Adversary courses of action sub-steps are listed at [Table 5.1](#).

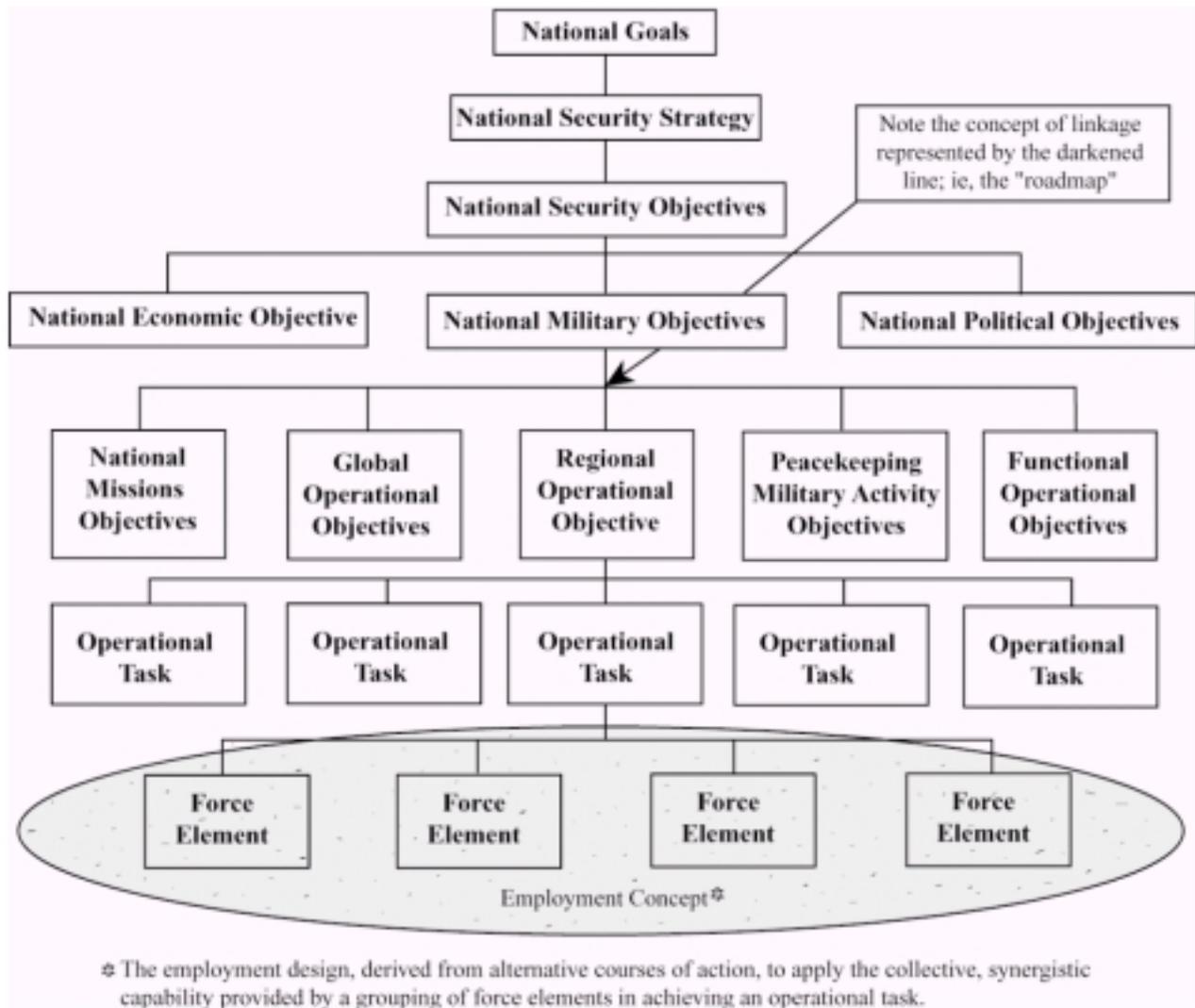
**Table 5.1. AIPB Step 4: Sub-steps.**

(1) Explicitly identify assumptions.
(2) Identify the adversary's likely objectives and desired end state.
(3) Develop COA Based on Adversary Perception of Friendly Disposition (Reverse AIPB).
(4) Identify the full set of potential COA available to the adversary.
(5) Identify and nominate targets valuable to the adversary in executing probable COA.
(6) Identify and nominate collection requirements that monitor potential COA and key battlespace characteristics.

**5.4. Explicitly Identify Assumptions.** There will often be gaps in what is known about the adversary. It may be necessary to develop assumptions to fill the gap(s) between what is known and unknown. Assumptions are educated guesses made when facts are not known. Assumptions most likely will be made throughout the AIPB process. It is important they are recorded and communicated to planners and decision-makers. At the same time, collection requirements should be submitted to confirm or deny the assumption. In all cases, be sure to distinguish assumptions from facts since assumptions involve some form of risk for planners.

**5.5. Identify the Adversary's Likely Objectives and Desired End State.** The adversary's likely objectives and desired end state are identified by analyzing the adversary national goals, national security strategy, and current military and political situation, strategic and operational capabilities, and the country characteristics of the adversary nation. The adversary's national goals will be achieved through implementing national security strategy. Strategy is derived by perusing political, economic, and military COA, that are designed to achieve a desired end state. One way of identifying end states and objectives is to apply a strategy to task analysis as shown in [Figure 5.2](#). This has an additional benefit of directly tying stated national goals to military COA described in further detail below. Objectives and end states can be stated in simple, one-line bullet statements, such as "Attain regional primacy and restore historic borders" or "Impede western influence." Only in rare cases will sufficient intelligence be available to state the adversary's objectives and intended end state as facts. Therefore, when developing estimates it is necessary to ensure that confidence levels are clearly identified.

Figure 5.2. Example of Strategy to Task.



**5.6. Develop COA Based on Adversary Perception of Friendly Disposition (Reverse AIPB).**

Account for the effect of friendly disposition, or the adversary’s perception of friendly disposition, when determining the COA the adversary believes are available. A technique for accomplishing this is to conduct "Reverse AIPB." In other words, replicate the process that the adversary is employing to discern friendly COA—What does the adversary know about me? The COA the adversary's doctrine believes appropriate to the current situation and the likely objectives that have been identified. This requires an understanding of the adversary's decision-making process as well as an appreciation for how the adversary perceives the current situation. Focus on COA that will affect accomplishment of the friendly mission. This obviously includes adversary COA that interfere with the mission. If there are indications that the adversary might adopt a COA that favors accomplishment of the mission, include it as well. This prepares the commander to take advantage of opportunities that might arise. It is possible for the adversary to have objectives and choose a COA that will not interfere with success of the friendly mission.

**5.7. Identify the Full Set of Potential COA Available to the Adversary.** History repeatedly demonstrates that the enemy often surprises those who predict only one COA. To determine the full set of potential COA available to the adversary, the following considerations should be applied. First, the COA should be consistent with adversary COG, doctrine, current situation and likely objectives. This requires an understanding of the adversary's decision-making process as well as an appreciation for how the adversary perceives the current situation. Next, consider "wildcard," or other COA outside normal doctrine that the adversary is capable of executing. Consider the following possibilities that might lead to a "wildcard" COA: Ignorance of the military arts and sciences; Immature decision making; Uncertainty as to friendly disposition or intent; Unexpected objectives or desired end states; Desperation; Bureaucratic inefficiency; or Audacity. However, avoid developing a "full" set of COA that includes bogus options. Finally, recent activities and events may lead to unanticipated COA. Consider all anomalies when developing possible COA and do not overlook the less likely but still viable COA. Do not risk surprise by failing to take the time to consider all feasible COA.

**5.7.1. Refine Each COA.** Each broad COA statement can be refined as a set of specific COA. Consider each subset of COA independently to avoid forming biases that restrict the analysis and evaluation. Once each sub-set is evaluated separately, combine them to eliminate redundancy and minor variations. Compare the consolidated list to adversary capabilities identified in Step 3 of the AIPB process, Evaluate the Adversary, and eliminate any COA the adversary is incapable of executing. Based on the evaluation of the threat's capabilities (step 3 of the IPB process), select threat models that will accomplish the adversary's likely objectives. Examine how the effects of the battlespace (from Step 2 of the AIPB process) influence their application as COA. Terrain, weather, and other characteristics of the battlespace environment offer a limited set of COA, encouraging some while discouraging others.

**5.7.2. Criteria for COA.** Each adversary COA identified should meet five criteria: suitability, feasibility, acceptability, uniqueness, and consistency with doctrine.

**5.7.2.1. Suitability.** Adversary COA must have the potential for accomplishing the adversary's likely objective or desired end state. If the COA is successfully executed, will it accomplish the adversary's objective?

**5.7.2.2. Feasibility.** The adversary must have sufficient time, space and resources to successfully execute the COA. However, a COA should not be assessed as unfeasible until all actions the adversary may take to overcome shortfalls are considered. Always try to anticipate innovative or seemingly radical measures the adversary may adopt.

**5.7.2.3. Acceptability.** Another consideration is the amount of risk adversary forces will accept in adopting the COA. Can they afford the expenditure of resources for an uncertain chance at success? This is obviously a subjective judgment based on knowledge of the adversary and its doctrine. In some instances, the adversary might undertake otherwise unfavorable COA, particularly if they are the only means of accomplishing its objective.

**5.7.2.4. Uniqueness.** Each adversary COA must be significantly different from the others. Otherwise, a possible COA would be considered as a variation rather than a unique COA. Factors contributing to the uniqueness of a COA may include its effect on the friendly mission, location, employment concept, and task organization.

**5.7.2.5. Consistency with Doctrine.** Each adversary COA must be consistent with the adversary's doctrine. The evaluation of consistency is based on the adversary's written doctrine and

observations of its past application of doctrine, as revealed in intelligence databases and templates from Step 3. However, do not overlook adversary efforts to achieve surprise by deviating from known doctrine or using “wildcard” COA. History repeatedly demonstrates that the adversary often surprises those who predict only one COA.

**5.7.3. Evaluate and Prioritize Each COA.** The full set of identified adversary COA are evaluated and ranked according to their likely order of adoption. The purpose of the prioritized list of adversary COA is to provide the COMAFFOR/JFACC and staff with a starting point for the development of potential friendly COA. At a minimum, the **most likely adversary COA** and the **most dangerous** to friendly force mission accomplishment should be developed in detail. A third potential COA—the **most effective** COA available that has the least cost in time, resources, and personnel—should also be developed by the Intelligence staff if time is available. This COA may guide the analyst to develop one that most efficiently uses the adversary's resources. Caution should be exercised to remember that these COA are only **assumptions** about the adversary, not facts. It should also be kept in mind that actions associated with a friendly COA might cause the adversary to change to a different COA than the one originally adopted. Therefore, the adversary's reaction to changes in friendly force dispositions must be **analyzed continuously**. This, in turn, may require re-prioritizing the initial list of adversary COA or developing entire new ones. To prioritize each adversary COA: (1) Analyze each to identify its strengths and weaknesses, COG, and decisive points; (2) Evaluate how well each meets the criteria of suitability, feasibility, acceptability, and consistency with doctrine; these criteria should be analyzed in the context of the adversary's culture, in order to avoid cultural bias; (3) Evaluate how well each takes advantage of the battlespace environment; (4) Evaluate the risk factor involved; (5) Consider the possibility that the adversary may choose the second or third “best” COA while attempting a deception operation that portrays acceptance of the “best” COA. The AIPB analyst must also guard against adversary efforts. The adversary may deliberately adopt a less than optimum COA in order to maximize surprise. Additionally, the adversary may gradually increase operations for a specific COA over a lengthy period of time, thereby “psychologically conditioning” the AIPB analyst to accept a level and type of adversary activity previously considered to be abnormal, as a new norm; (6) Analyze the adversary's recent activity to determine if there are indications that one COA is already being adopted. Does its current disposition favor one COA over others?

**5.7.3.1. Example of an Unlikely COA That Was Implemented (Battle of the Bulge, Dec 1944).** In December 1944, the German Army had been defeated in Western France and had lost vast amounts of men and equipment during the retreat that began on 25 July 1944. They had seen the entire German Seventh Army destroyed in the Field, and the Allies were pressing hard in Belgium and the Lorraine Basin. Germany lacked the men and materiel necessary to launch a successful counteroffensive, and should have continued to withdraw to the Rhine River, the last strategic defensive barrier in the West. Instead, the Germans concentrated all remaining strategic reserves of men, materiel, and heavy equipment and launched an offensive aimed at splitting the Allied-armies in two. The operation caught the Allies by surprise. It cost the American Army 19,000 dead, 47,000 wounded and 15,000 captured out of a total of 600,000 Americans fighting in this campaign. Of the 55,000 British soldiers in the campaign, 200 died and 1200 were wounded or captured. This failure to recognize the German decision to attack cost far more than lives, it cost the Allies more than three months to regain their lost positions and push the German Army back into Germany.

**5.7.4. Develop Each COA in the Amount of Detail Time Allows.** Once the complete set of adversary COA have been identified, evaluated, and prioritized, each COA should be developed in as much

detail as the situation requires and time allows. The order in which each is developed is based on its priority and the commander's guidance. To ensure completeness, each COA must answer six questions:

**5.7.4.1. Who** – what assets will the adversary employ?

**5.7.4.2. What** – type of operation: delay, disrupt, destroy, neutralize, attack, or defend?

**5.7.4.3. When** – time the action will begin (state in terms of the earliest time that the adversary can adopt the COA under consideration)?

**5.7.4.4. Where** – direction of attack, air corridors, areas and objectives that make up the COA?

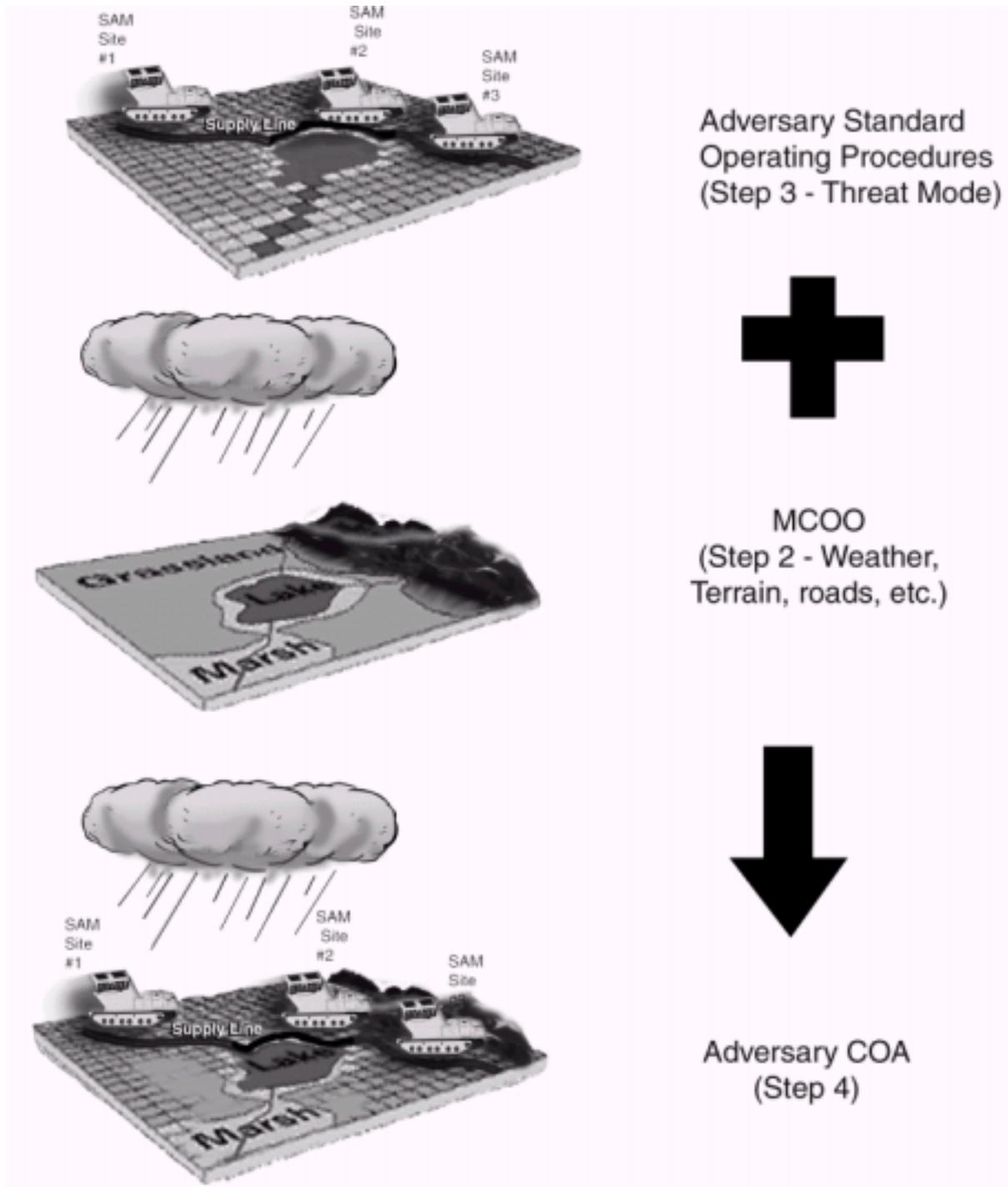
**5.7.4.5. Why** – the objective or end state the adversary intends to accomplish?

**5.7.4.6. How** – the method which the adversary will employ its assets?

**5.7.5. Describing Adversary COA.** Time permitting, adversary COA should be both graphically and textually described: the type of military operation; the earliest time military action could commence; the location; avenues of approach; and the objectives that make up the COA; force disposition; and the objective or desired end state. Each COA should be developed in the order of its probability of adoption, and should consist of three parts: a situation template, a description of the COA with branches and sequels, and a High Value Target List (HVTL).

**5.7.5.1. Situation Template.** Situation templates are graphic depictions of expected adversary dispositions for each COA. The situation template combines the MCOO developed in Step 2 and the doctrinal template developed in Step 3 to produce an integrated display of how the battlespace environment impacts adversary doctrine. From this picture, the AIPB analyst can readily identify possible COA. These are useful in depicting points where the adversary might adopt branches or sequels to their main COA, places where the adversary is especially vulnerable, or other key points in the battlespace such as initial contact or operations against friendly forces. The situation template (see [Figure 5.3.](#)) should include as much detail as the time and situation warrant. The level of command and the type of operation have a direct bearing on the level of detail that goes into each template. Situation templates are used to develop event templates and event matrices, if required.

Figure 5.3. Example of a Situation Template.



**5.7.5.2. Description of the COA and Options.** This is a description of expected activities the forces depicted on the situation template. It can range from a narrative description to a detailed matrix depicting the activities of each unit, their systems in detail, and potential branches and sequels. Start with the description of preferred tactics that accompanies the doctrinal template. Mentally analyze the situation template, note when and where the adversary is expected to take

certain actions or make certain decisions. Record each event into the description of the COA. Where possible, tie each event or activity to specific geographical areas on the situation template. This will help later when constructing the event template. As the adversary approaches decision points, record each decision and its timeline into the COA description. The description developed forms the basis for the development of threat branches or sequels, should they be necessary to support friendly planning. Also record any decision criteria that are associated with each decision point. Develop the description of the COA into as much detail as time allows and the situation requires. Address each of the operating systems. Use whatever tools or techniques best satisfy the unit's needs. The description should address the earliest time the COA can be executed, timelines and phases associated with the COA and decisions the adversary commander will make during and after the execution of each COA. Use the COA description to develop the event template and supporting indicators.

**5.7.5.3. High Value Target List (HVTL).** Evaluate the situation template to determine how and where each of the operating systems provides critical support to the COA. This leads to the identification of HVT, which can be compiled into a HVTL. Use the HVTL in the threat model as a guide, but do not be limited by it. Determine the effect on the COA of losing each HVT and identify likely adversary responses. The relative worth of each HVT will vary with the specific situation and during progression of the COA. Identify the times or phases in the COA when the target is most valuable to the adversary commander and make the appropriate notations on the HVTL. Transfer the refined and updated list of HVT to the situation template. You will use the list to support the targeting process. Note on the situation template any areas where HVT must appear or be employed to make the mission successful. Focus on their locations at the times they are most valuable, or just before.

**5.8. Identify and Nominate Targets Valuable to the Adversary in Executing Probable COA.** The HVT listed on the doctrinal templates associated with each adversary COA should be refined and reevaluated to incorporate **actual** units, target locations and other key elements. **HVT identified at this stage of the AIPB process are forwarded to targeteers for further target development and/or target nomination.** The relative worth of each HVT will vary with the specific situation under consideration and over the course of the COA's conduct. Each COA should be analyzed to determine potential deployment locations for each HVT and the point in time when each target is most valuable to the COA success. Those areas where the adversary is most likely to deploy mobile HVT at the time when they are most crucial to the adversary's operations should be identified and passed to the targeting element. These areas should be designated as **Target Areas of Interest (TAI)** and can be annotated on the situation template or maintained on a separate list or display. TAI may also be passed to collection managers for monitoring if required to support potential friendly attacks or BDA.

**5.8.1. A Note on the Use of HVT in US Army and Marine Corps Operations.** HVT identified in the COA analysis and wargaming process deemed important for attack by friendly forces are called **High-payoff targets (HPT)**. An HPT is:

*A target whose loss to the enemy will significantly contribute to the success of the friendly course of action. HPTs are those high-value targets identified through wargaming that must be acquired and successfully attacked for the success of the friendly commander's mission. (JP 1-02)*

**5.8.2. AIPB Support to Target Development.** AIPB development will produce a number of graphics, textual descriptions, hardcopy, oversized, and imagery products. Some of these products may be

used within target folders. However, some targets generated in the AIPB process may not lend themselves to traditional target folder construction. Thus, graphics, textual descriptions, and imagery products produced during the AIPB process should be packaged and passed on to targeteers and target planners as required. Also, current electronic target folder technology can link electronic media to target folders.

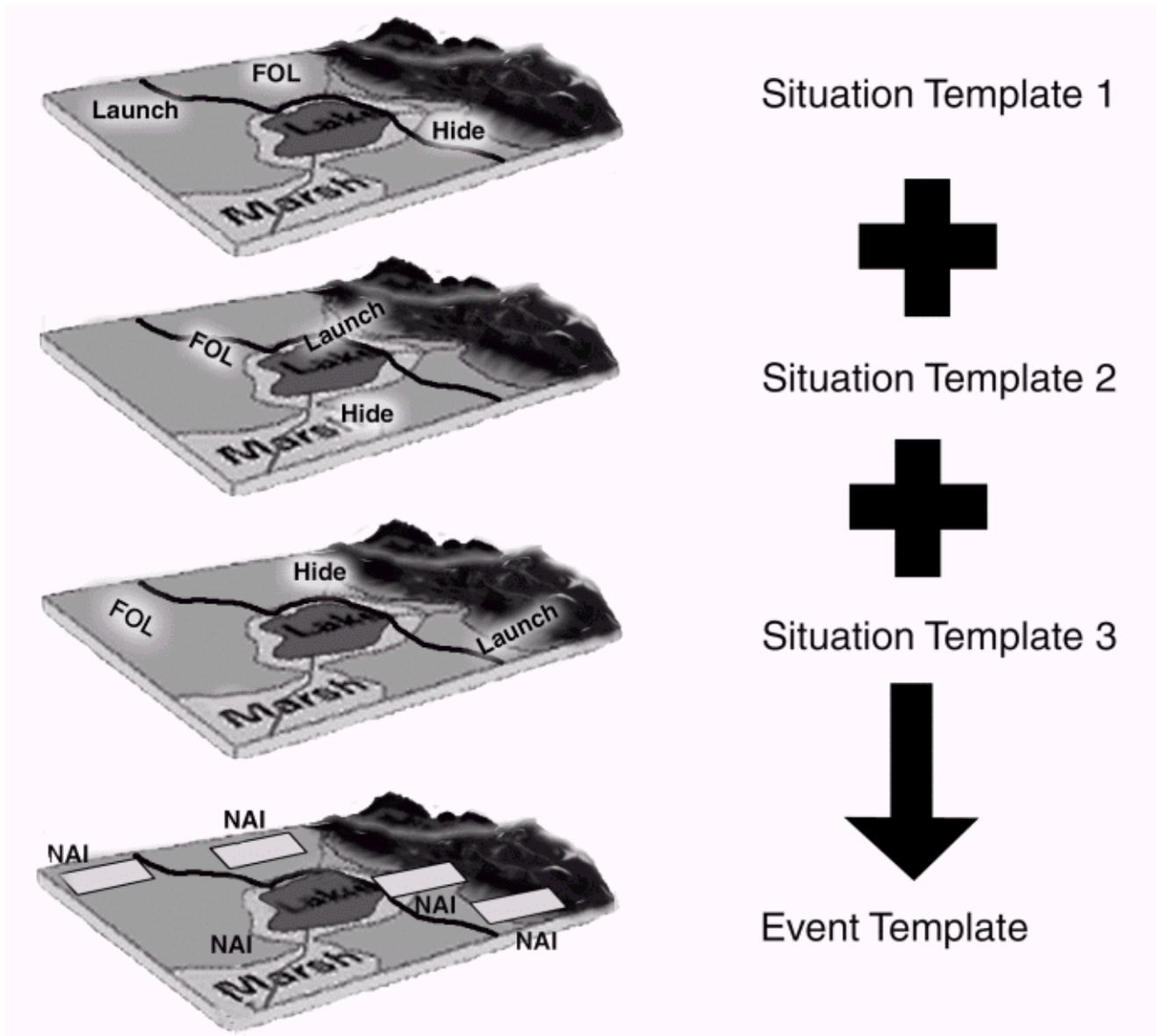
**5.9. Identification of Initial Collection Requirements.** The identification of initial intelligence collection requirements depends on the prediction of specific activities and the areas in which they are expected to occur, which, when observed, will reveal the COA the adversary has adopted. The areas in which these activities, or indicators, are expected to take place are designated as **Named Areas of Interest (NAI)**. The NAI is:

*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. (JP 1-02).*

NAI covering adversary COA of concern to the commander are forwarded to the collection manager for tasking and collection. NAI normally consist of a geographical and time component. **It is critical Collection Managers understand and posture collection assets to be in the proper location and at the appropriate time, otherwise the command may not detect an adversary COA of critical concern.** NAI and their associated indicators can be depicted on the event template\matrix.

**5.9.1. The Event Template.** The event template (see [Figure 5.4.](#)) is a guide for collection, reconnaissance, and surveillance planning. It depicts where to collect the information that will indicate which COA the adversary has adopted. Comparing the analyses depicted on the situation templates for each of the COA the adversary is capable of executing develops the event template. The purpose of this comparison is to identify those NAI that are unique to the adoption of a specific adversary COA or a limited set of COA. Conversely, those areas and activities that are common to all COA are eliminated because they are not useful in differentiating the adoption of one COA over another. The NAI for all the adversary's COA are consolidated and depicted on the event template. NAI should be large enough to encompass activities that serve as indicators of the adversary's COA. The initial event template focuses only on identifying which of the predicted COA the adversary has adopted. Later, the event template can be updated and further refined to reflect current battlespace conditions and friendly decisions as required.

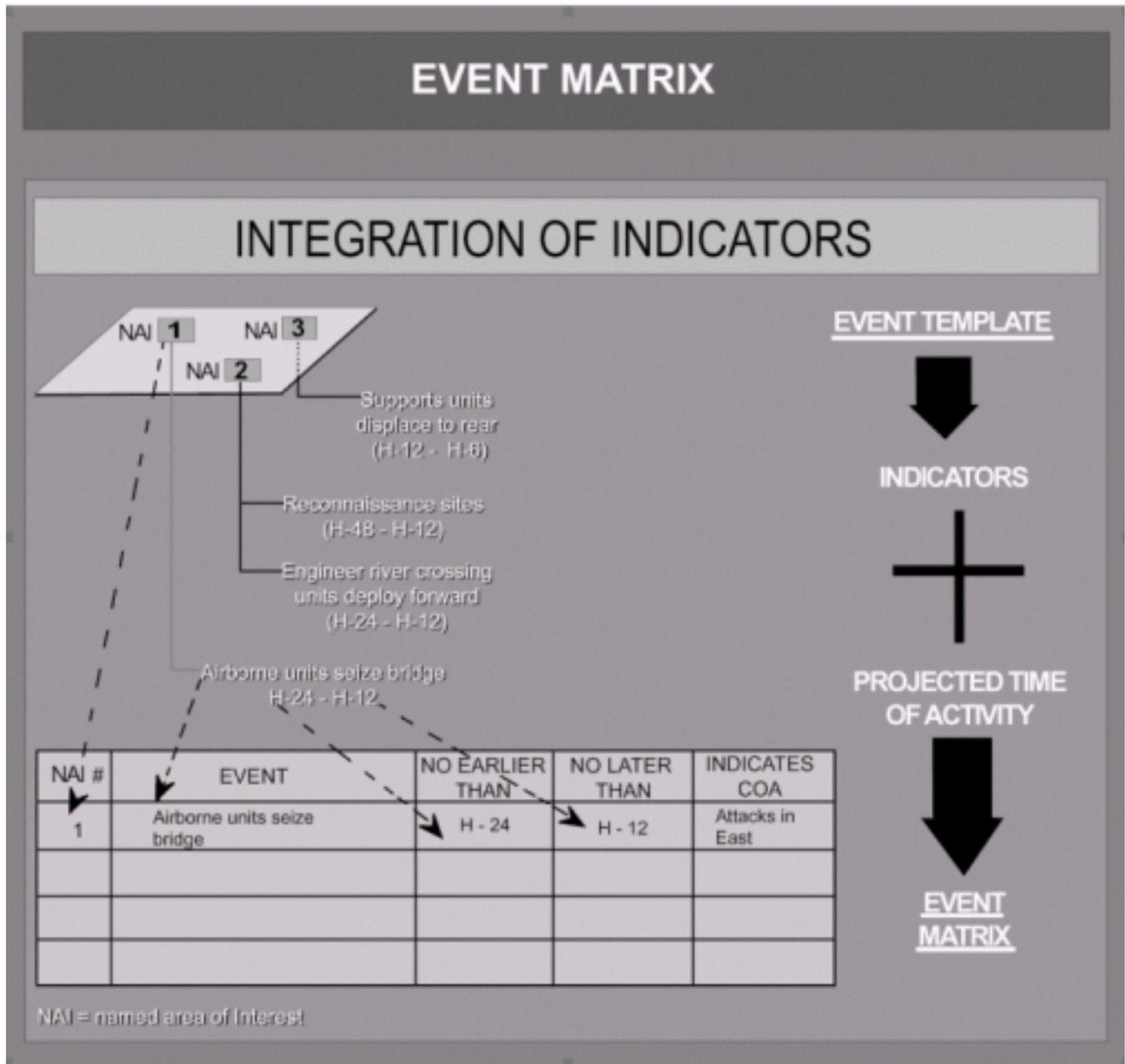
Figure 5.4. Example of a TMD Event Template.



**5.9.2. The Event Matrix.** The event matrix supports the event template by providing details for the type of activity expected in each NAI, times the activity is expected to occur, and activity associated with the COA. Although the primary purpose of the event matrix is to facilitate ISR planning, it can also serve as a useful aid in situation development and wargaming. The event template and event matrix, once completed, form the basis for planning collection strategies, synchronizing intelligence with friendly operations, and preparing the collection plan. In some cases, the event template might be disseminated in the form of a collection graphic to support intelligence planning and collection by other units. A key understanding is that the collection plan, based on the event template and event matrix, will determine the types, quantity, and quality of future information fed into the AIPB process. Hence, the ability to improve the AIPB process and output will depend on the quality of the event template and event matrix. The event template and matrix offer an effective technique to display how the

adversary normally conducts an operation. This allows the description to become more than a “snapshot in time” of the operation being depicted. For example, while it is difficult to depict a mission graphically, the time relationship between various elements and normal composition can easily be described in an event matrix format (see **Figure 5.5.**). The event matrix aids the mission over its duration, during the development of adversary COA and situation templates.

**Figure 5.5. Event Matrix.**



**5.10. Effective Methods for Streamlining the AIPB Process.** Many of the steps of the AIPB process are time intensive. Units tasked with mission execution generally have less time and personnel available

for the complete AIPB process. The following are some effective techniques for abbreviating the AIPB process.

**5.10.1. Work Ahead.** Complete as much ahead of time as possible. Keep base products updated by periodic review—don't wait for receipt of a new mission. Continuously update threat databases as threat doctrine and employment change. Be familiar with the ISR process; think through methods for getting information before, during and after deployment.

**5.10.2. Focus on Essentials.** Determine how much time can be devoted to each step of the AIPB process. Build a time-line that allows proper support to the decision-making process. Decide which products need to be developed and to what degree of detail. Focus on products most important to the mission. Identify the full range of COA—don't develop one COA at the expense of all others. Determine the degree of detail required and then develop all COA to that level of detail. Spend the most time on the priorities established by the commander's intent and needs. The commander may want to focus only on the most likely and most dangerous COA.

**5.10.3. Stay Objective Oriented.** A high quality event template and matrix are two of the primary deliverables of AIPB everything else is a means for producing these essentials.

**5.10.4. The Minimum Essentials.** Develop a good set of threat COA models, event templates and matrices. To save time and materials, combine all threat COA model templates and event templates on a single map overlay, or use sketches as a map substitute. Describe the battlespace effects by working directly from a map or sketch of major terrain features. Identify most likely and most dangerous COA while considering the current situation and commander's intent and then rank remaining COA in order of most likely adoption.

## Chapter 6

### INTEGRATING AIPB INTO AIR FORCE OPERATIONS

**6.1. Overview.** AIPB is integral to achieving PBA and supports military planning and execution activities. At the operational level of war the Aerospace Operations Center (AOC) is the COMAFFOR/JFACC's planning and execution center. At the tactical level, operational planning and execution activities are performed in the various wing and squadron operations centers (i.e., Wing Operations Center (WOC), Squadron Operations Center (SOC), Mission Planning Cell (MPC) and Air Base Defense Operations Center (ADOC)). This chapter discusses how to integrate with the joint force and how to focus the AIPB process on operational activities at these various levels of command.

**6.2. Strategic, Operational, and Tactical Level Perspectives.** The basic AIPB process remains the same, regardless of the level of military operations. Nevertheless, specific AIPB planning considerations may vary considerably between strategic, operational, and tactical level operations due to obvious differences in mission, available resources, and size of their operational areas (OA) and areas of interest (AOI). Strategic level IPB examines the elements of national power: economic, military, political, and informational. The AIPB process discussed in this pamphlet is primarily geared toward supporting the operational level of warfare. Operational level AIPB is concerned with analyzing the operational area, facilitating the flow of friendly aerospace forces to the operating area in a timely manner, sustaining those forces once in place, then integrating tactical capabilities at the decisive time and place to achieve operational and strategic effects. However, the AIPB process is also used to support tactical operations. Tactical operations generally require a greater level of detail over a smaller segment of the battlespace than required at the strategic and operational levels. In particular, the AIPB process should be used to support the force protection requirements of local commanders. At the tactical level the AIPB process is used to create threat situation awareness and understanding of how the adversary fights—all key to effective mission planning.

**6.2.1. Strategic level IPB.** Activities at the strategic level establish national and multi-national military objectives; sequence initiatives; define limits and assess risks for the use of military and other instruments of national power; develop global plans or theater war plans to achieve these objectives; and provide aerospace forces and other capabilities in accordance with national strategy, objectives and goals. Strategic level battlespace may encompass the entire world due to transglobal factors such as international law; the capability of adversary propaganda to influence US public support and world opinion; adversary, allied, or coalition structures; and the capability and availability of national and commercial space-based systems and information technology. The strategic level battlespace environment is analyzed in terms of geographic regions, nations, and climate rather than local geography and weather. Political and economic characteristics of the battlespace assume increased importance at the strategic level. For example, the industrial and technological capabilities of a nation or region will influence the type of military force it fields. Similar factors may influence the ability of a nation to endure a protracted conflict without outside assistance. Political and economic considerations may be the dominant factors influencing adversary strategic COA. At this level, the analysis of the adversary's strategic capabilities will concentrate on considerations such as civil-military relations, national will and morale, ability of the economy to sustain warfare, mobilization of the strategic reserve, and possible intervention by third-party countries. COA models at the strategic level consider the entire spectrum of resources available to the adversary. They identify both military and nonmilitary methods of power projection and influence, specify the theaters of main effort and the forces committed to each, and depict national as well as strategic and theater level objectives.

**6.2.2. Operational Level AIPB.** The size and location of the operational level battlespace depends on such varied factors as the location of adversary political and economic support structures, military support units, force generation capabilities, potential third nation or third-party involvement, logistical and economic infrastructure, political treaties, press coverage, adversary propaganda and potential for information operations. The size of the battlespace may also vary depending on the particular dimension being considered. For example, if the adversary has the capability to conduct and detect computer network attacks then the space or cyberspace dimensions of the battlespace may cover considerably larger geographic areas than those associated with other dimensions. At the operational level, the analysis of the battlespace environment should concentrate on characteristics such as: the capability of road, rail, air and sea transportation networks to support the movement of, and logistical support to, large military units; zones of entry into and through the operational area and AOI; the impact of large geographic features such as mountains, large forests, deserts and archipelagos on military operations; and the seasonal climatic effects on large military formations and their logistic support. In addition to large unit OB, the analysis of the adversary should include his doctrine for command and control, logistical support, release and use of WMD, theater ballistic missile forces, and use of paramilitary forces. Adversary operational COAs are described in terms of operational objectives, large-scale movements, LOCs, and the phasing of operations. Additionally, an adversary's COA may include political, social, religious, informational or economic responses.

**6.2.3. Tactical Level AIPB.** At the tactical level, the size and location of the battlespace are influenced by the physical location of adversary land, air, naval, and other forces that could pose a direct threat to the security of the friendly force or the success of its mission. The extent to which the effects of the battlespace environment are analyzed at the tactical level is largely dependent on the mission and planning time available. At a minimum, tactical level forces should analyze the battlespace environment in terms of: military objectives, avenues of approach, and the effects of adversary threat capabilities, weather and terrain on personnel, military operations, weapons systems, force mobility and force protection. The tactical level evaluation of a military adversary should concentrate on standard AIPB factors, such as composition, disposition, strength, morale, tactics, and training status of specific adversary tactical units or factional groups that could interfere with or impact mission accomplishment. The development, analysis, and description of adversary COA at the tactical level will be based on, and result in, a higher degree of detail than would be necessary at higher levels of aerospace operations.

**6.3. Integrating JIPB and AIPB.** The Intelligence Directorate (J-2) staffs at the Joint Staff, combatant commands, and subordinate joint forces perform multi-dimensional JIPB to support campaign planning, enable commanders and other key personnel to visualize the full spectrum of the battlespace, identify adversary COG, and to evaluate potential adversary and friendly COA. However, JFCs and their component commanders are the key players in planning and conducting intelligence. They must ensure that JIPB becomes "commander's preparation of the battlespace" by fully integrating it into the joint force's overall operational planning. Joint forces will conduct JIPB to prepare for a wide variety of situations across the full range of military operations. Within the context of the joint force's specific mission, the JFC and J-2 staff must apply the term "adversary" broadly, to refer to those organizations, groups, decision makers, or even physical factors that can delay, degrade, or prevent the joint force from accomplishing its mission. Because the JFACC has theater-wide responsibilities, the JFACC's AOI and operating area are usually the same as the JFC's. Thus, AIPB and JIPB are closely related. Primary differences will be in the application of AIPB information and products in Step 4 rather than the battlespace awareness and knowledge generated in Steps 2 and 3.

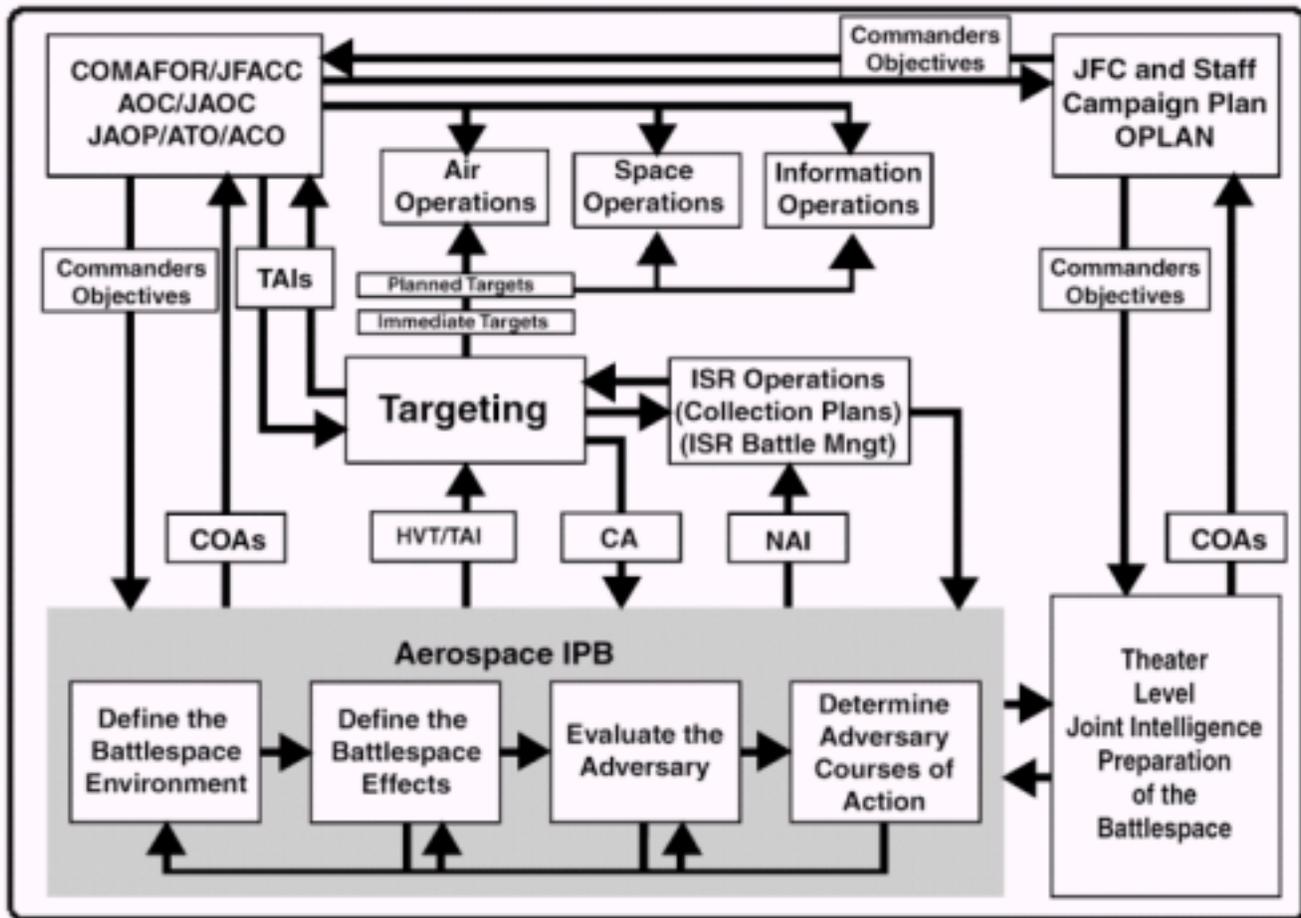
**6.3.1. JIPB and AIPB products.** JIPB and AIPB products generally differ in terms of their relative purpose and focus. The purpose of JIPB is to support the JFC by determining the adversary's probable intent and most likely COA for countering the overall friendly joint mission, whereas each component's IPB is specifically designed to support the individual air, ground, maritime, or special operations missions of the component commands. JIPB focuses on the adversary's known or postulated national and operational level multi-Service or "Joint" strategy, while AIPB concentrates on the capabilities and vulnerabilities of the adversary relative to the aerospace mission. Both JIPB and AIPB utilize a macro-analytic approach that seeks to identify an adversary's strategic vulnerabilities and centers of gravity, whereas specific tactical-level air, land, sea, and special component operations generally requires micro-analysis and a finer degree of detail in order to support their component command operations. From the perspective of the COMAFFOR/JFACC, JIPB and AIPB analyses are intended to support each other while avoiding a duplication of analytic effort.

**6.3.2. Joint Strategy.** Most important, JIPB seeks to create an analytic synergy through the integration of the separate air, land, sea, and special operations component's IPB analyses for each of the adversary's force components. In this way, JIPB provides a methodology for hypothesizing the adversary's most likely joint COA. Once a JIPB analyst has identified a likely COA, the same integrative technique can be used to identify the adversary's most likely joint scheme of maneuver or joint strategy.

**6.4. AIPB Support to Operational-Level Activities.** The AOC is the COMAFFOR/JFACC's planning and execution center. In addition, the AOC is the lowest level at which all aerospace "tools" are blended and synchronized into coherent, theater-wide operations. The aerospace campaign planning process outlined in AFDD 2, *Organization and Employment of Aerospace Power*, reflects the deliberate decision making process and the combat decision making process at the JFACC/AOC level. This chapter will step forward from the basic ideas described in AFDD 2 and AFI 13-109, Vol 3 *Operational Procedures – Aerospace Operations Center* as well as the previous chapters in order to identify the role of AIPB at the AOC. Since the AOC can be tailored to perform a variety of missions and management processes, what follows cannot cover every contingency. However, it should provide an understanding of how AIPB supports PBA and can be integrated into various operational-level planning and execution activities. Thus, it serves as a starting point to develop detailed TTP for specific AIPB mission areas in the future.

**6.4.1. Overview.** [Figure 6.1](#) provides a macro-level overview of the relationships between AIPB and various AOC and joint force activities. As depicted, it readily becomes clear the AIPB process provides information to various activities and receives information from them. Key areas where the JIPB process and AIPB process intersect and influence each other are in providing environment, threat and adversary COA information about battlespace dimensions where the Air Force has unique expertise (e.g., air, space, information). This effort is folded into the JIPB process and in return the air component receives information about the total battlespace and other dimensions from the joint force including other components proficiency.

Figure 6.1. AIPB, JIPB and AOC Integration in Joint Operations.



In the AOC, major areas where AIPB intersects and effects other processes are Plan Development (JAOP and ATO), operational assessment and execution; ISR Operations; and, Targeting. The remainder of this section discusses the interaction of AIPB and these AOC processes.

## 6.5. COMAFFOR/JFACC Planning Activities.

### 6.5.1. Planning Duties and Responsibilities as They Relate to AIPB.

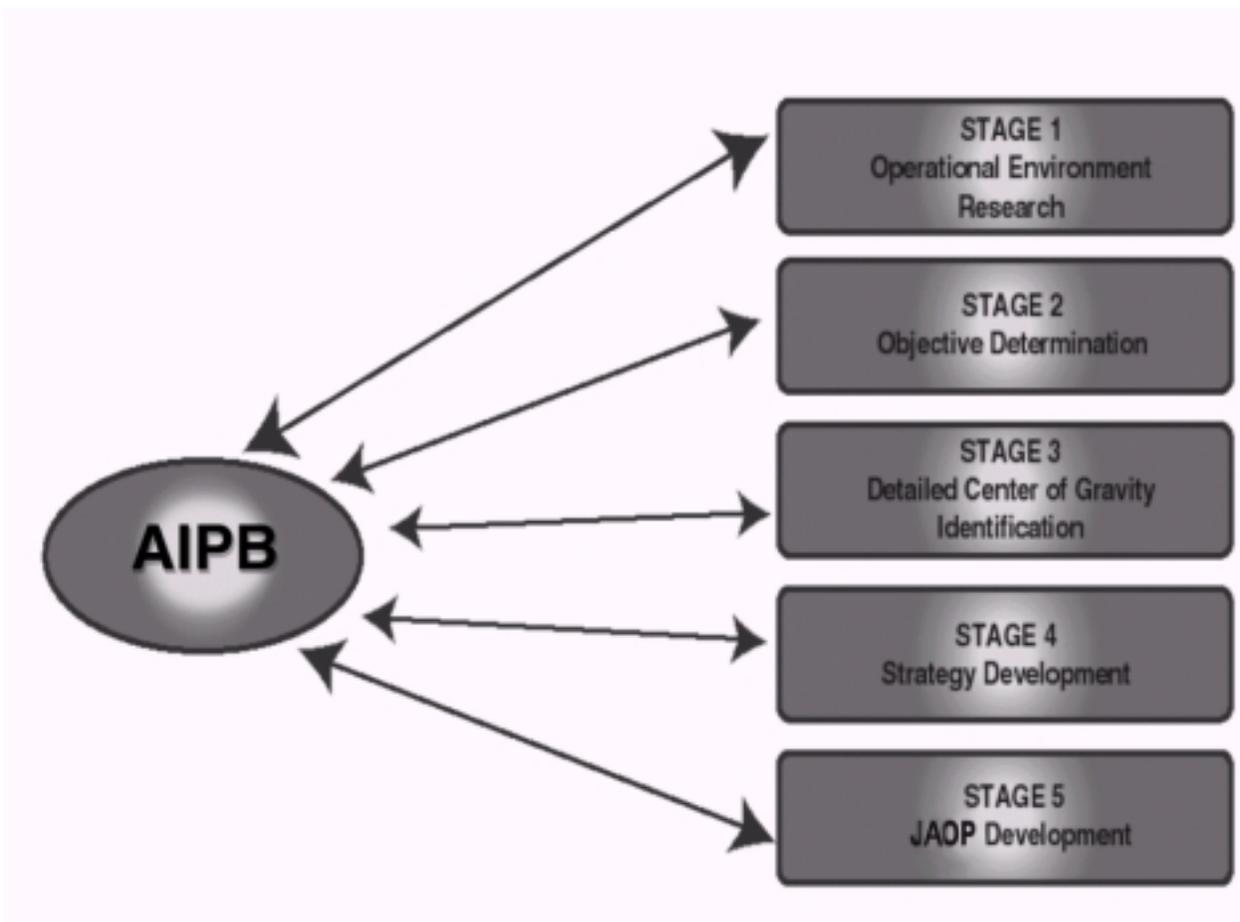
**6.5.1.1. Role of the /COMAFFOR/JFACC .** The COMAFFOR/JFACC will provide achievable and measurable guidance, objectives, and intent for AIPB. He will provide planning expectations and limitations (unique requirements, focus areas, time constraints, resource constraints) and approve Commander's Critical Information Requirements (CCIR).

**6.5.1.2. Role of the Operations and Plans Staff.** The Operations and Plans (A-3 and A-5) staff will incorporate the AIPB process into JAOP and Aerospace Estimate of the Situation builds. They will also evaluate potential friendly COA in light of potential enemy COA and develop appropriate and relevant branches and sequels. They develop CCIR for the commander's approval and identify EEFI with the A-2 staff to be supported by the AIPB process.

**6.5.1.3. Role of the Intelligence Staff.** The Intelligence (A-2) staff will direct the AIPB process and produce the threat portion of the JAOP and Aerospace Estimate of the Situation. Be prepared to conduct Air, Space and Information Warfare IPB for the joint force and ensure the AIPB process is actively conducted during peacetime. The A-2 develops and recommends priority intelligence requirements (PIR) to the commander. He also develops collection requirements (CR) and production requirements (PR) and collection strategies to address CCIR and EEFI.

**6.5.2. The Joint Aerospace Operations Plan: AIPB's support to Strategy Development.** The five stage aerospace campaign planning process outlined in AFDD 2-1, (see [Figure 6.2.](#)) reflects the deliberate decision making process at the COMAFFOR/JFACC level. The JAOP is developed during the concept development and plan development phases of deliberate planning or during the execution-planning phase of crisis action planning. Work on the various stages can be concurrent or sequential, similar to the AIPB process. The AIPB process assists the intelligence staff in preparing their inputs to the JAOP and other associated planning documents to include the Strategic Appreciation and the Air Estimate of the Situation.

**Figure 6.2. The Five-Stage JAOP Planning Process.**



**6.5.2.1. JAOP Stage 1: Operational Environment Research (OER).** The first stage of JAOP development seeks to gain a comprehensive understanding of the entire theater of operations, the adversary, and friendly forces available to accomplish the JFC's objectives. In addition, a complete analysis of friendly and enemy logistics is essential including what is available in theater and what is provided through existing ports, depots, war reserve materiel, and host-nation support. It will determine the selection of bed-down locations for forces, provide a model for planning the expansion of friendly logistics infrastructure and highlight the enemy's critical logistic nodes for future targeting. Other kinds of information researched in this stage include available forces, communications and relationships (US and multi-national), ROE, applicable treaties and agreements, base-use rights, and overflight rights. Treaties and agreements should be on file. Individual country rights and obligations can be identified through the chain of command from the Department of State and the appropriate US embassy.

**6.5.2.1.1. AIPB Steps in JAOP OER Stage.** The first stage of JAOP planning, OER is entirely dependent on thorough results from AIPB Steps 1 through 3.

**6.5.2.1.1.1. AIPB Step 1.** AIPB Step 1 identifies the most important features of the JFACC's battlespace environment, activities within it, and the physical spaces where they exist. This includes a determination of the limits of the battlespace, similar to understanding the environment delineated in the OER process. The scope and level of detail that can be provided by the AIPB process is related to the time available for building the JAOP. The commander and the operations planning staff set the timelines and required focus areas for JAOP construction. These should be spelled out in advance in order to focus on the areas most critical to the JFACC.

**6.5.2.1.1.2. AIPB Step 2.** AIPB Step 2 describes how the battlespace affects both adversary and friendly operations. This helps to meet the OER objective of understanding friendly and adversary capabilities, intentions, objectives and desired end state. AIPB assists in identifying challenges and opportunities afforded by the physical and human dimensions that will have a direct or indirect effect on the types of forces chosen for the plan and how they might be employed. Finally, it is important to realize the intelligence staff alone must not do these processes. Other staff members provide critical information collected in Step 2.

**6.5.2.1.1.3. AIPB Step 3.** During OER military forces are also analyzed. Step 3 assists the A-2 staff in analyzing adversary forces. The COMAFFOR/JFACC special staff, A-3 staff and A-4 staff, focuses on the friendly aspects and requirements of OER (i.e., blue force). For instance, the A-4 staff can identify the friendly logistics nodes and can assist in making generalizations about the enemy logistics nodes, but will rely on intelligence to get detailed information on the enemy's logistical capabilities as well as the actual target data. The A-3 staff will likely research the operational information required in the OER stage, such as identifying available friendly forces, military C2 relationships (US and multi-national), and ROE. When operating in a coalition or allied environment, it may be a combined effort between intelligence and the special staff to assess coalition political and military aspects of the environment. The main point is OER and AIPB are an interrelated process and information may be obtained using multiple channels.

**6.5.2.1.2. Desired End Effect.**

*“The desired end effect of the OER stage is the Strategic Appreciation. This document 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.” (AFDD 2-1)*

**6.5.2.2. JAOP Stage 2: Objective/Task Determination.** The second stage in the JAOP planning process, Objective Determination, results in clear, concise, attainable and measurable air and space objectives that contribute to the accomplishment of the overall campaign strategy. This is considered the most important stage of the JAOP process since it defines exactly what the aerospace commander intends to achieve. When the decision to use military force is made, it is critical that our political leaders define the conditions desired for successful resolution of the war or conflict. Such conditions define the desired end state of the conflict and set the parameters for conflict resolution and termination.

**6.5.2.2.1. AIPB Steps in JAOP Objective Determination Stage.** The second stage of the JAOP planning is called the Objective Determination stage. Friendly objectives help to further focus the AIPB process by pointing it towards what is important for the commander to achieve. AIPB in turn assists in defining friendly objectives. AIPB does this by providing an in-depth analysis of the environment and adversary. Environmental and threat information helps to shape the development of objectives that are realistic and obtainable given the environment and adversary capabilities.

**6.5.2.2.2. Desired End Effect.** The desired end effect of the Objective Determination Stage is a thorough understanding of what we are trying to achieve. A corollary to this is a thorough understanding of what the adversary is trying to achieve. Both taken together begin to paint a picture of the type and nature of military operations that may take place to achieve our objectives.

**6.5.2.3. JAOP Stage 3: Centers of Gravity Identification.** The purpose of this stage is to:

*“...identify COG that can be attacked or disrupted to achieve theater strategic and operational objectives...COG analysis ultimately leads to the identification of vital target sets within the individual COG.” (AFDD 2-1)*

In addition to assessing the enemy’s COG, it is necessary to correctly identify friendly COG to help us pinpoint our own vulnerabilities and determine which essential areas we must defend. This must be done with the help of the entire A-staffs in order to get all the required information.

**6.5.2.3.1. AIPB Steps in JAOP COG Identification Stage.** The third stage of JAOP planning, COG Identification, relies on AIPB Steps 3 and 4. COG identification was a modification to the traditional IPB process designed to better meet the needs of Air Force planning requirements. AIPB Step 3 specifically includes COG Identification as a sub-step when evaluating the adversary. In Steps 2 and 3 COG analysis focuses on strategic and operational COG associated with the broad use of military force or other instruments of national power. AIPB Step 4 attempts to predict the full range of specific adversary courses of action impacting the commander’s mission. By identifying the adversary’s likely objectives and desired end state and how the adversary will probably try achieving them, key elements to the adversary’s plan (i.e., a COA) will become apparent. Those critical elements that enable a given COA are in

fact strategic, operational or tactical centers of gravity. What is not part of the AIPB process is how to identify friendly COG that help pinpoint our own vulnerabilities. However, a reverse AIPB process may assist in this effort. In any event, friendly COG analysis is the responsibility of the operations, logistics and communications staffs with the assistance of the intelligence staff.

**6.5.2.3.2. Desired End Effect.** The desired end effect of the COG Identification stage is to identify friendly COG that must be protected, adversary COG, COG vulnerabilities, and associated target sets that can be attacked to achieve friendly objectives.

**6.5.2.4. JAOP Stage 4: Strategy Development.** The purpose of this stage is to develop and articulate the JFACC strategy for employing the aerospace power at his disposal to achieve objectives in support of the JFC campaign plan. The product of this stage is a clearly defined air strategy statement designed to achieve the JFC's objectives. This involves reviewing the JFC guidance and campaign plan to determine whether theater objectives and strategy anticipate independent, parallel, or supporting air strategy. In this stage alternative friendly COA are developed that will achieve strategic or theater objectives. Alternative friendly COA should be compared to potential adversary COA to determine the optimal friendly strategy and to assess the impact of various adversary reactions to potential friendly plans. If time is available, particular effort should be given to developing adversary COA that are unconventional or involve an asymmetric response. There are few, if any countries in the world today that can match America's full spectrum of aerospace power. As a result, adversaries are likely to counter friendly aerospace strategy with unconventional responses. For example, during the Gulf War Iraq chose to fly a portion of its air force to Iran in an attempt to preserve it. In addition, Iraq countered the air campaign with theater ballistic missiles launched at Israel in an attempt to provoke a response that may have divided the Arab coalition. Consequently, aerospace resources were diverted to counter this response. After alternative COA are compared and contrasted they are presented to the JFACC and/or JFC for selection.

**6.5.2.4.1. Wargaming.** An emerging technique long used by land forces in their decision making process is to compare COA through wargaming. In wargaming the A-2 staff directorate assumes the role of the adversary commander and while the A-3 and A-5 staffs explore COG, strengths, weaknesses, and potential reactions to various COA. It cannot be overemphasized that COG and COA comparison must be a combined staff—A-2/3/4/5 staff function. Any staff (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. **Note: Techniques for wargaming can be found in FM 34-130 (Dec 99 Draft), Chapter 5 and JP 2-01.3, Chapter 3.**

**6.5.2.4.2. AIPB Steps in JAOP Strategy Development Stage.** Step 4 (indeed the entire AIPB process) is expressly geared to supporting strategy development. Step 4 prepares intelligence personnel with the background and products necessary to effectively participate in COA analysis. It helps the planning staff and commander evaluate risks to their plans and helps them to anticipate likely threat reactions and develop appropriate counter measures, if required.

**6.5.2.4.3. Operational Planning Documents.** There are two useful documents that every AIPB analyst should be familiar with: The Strategic Appreciation and Air Estimate of the Situation.

The Strategic Appreciation (See 6.5.2.1.2.) is usually provided by the JFC. It contains information particularly applicable to Steps 1 and 2 of the AIPB process and is usually used as a starting point for the Air Estimate of the Situation. The Air Estimate of the Situation:

*“...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.” (AFDD 2-1).*

The format of the Air Estimate of the Situation provides a guide of what is required from the AIPB analyst.

**6.5.2.4.4. Desired End Effect.** The desired end effect of the Strategy Development stage is a JFACC strategy that most effectively and efficiently achieves JFC objectives taking into account the environment and likely adversary reactions.

#### **6.5.2.5. JAOP Stage 5: JAOP Development.**

*“The product of this stage is the final joint air operations plan that details how joint aerospace employment will support the JFC’s operation or campaign plan.” (AFDD 2-1)*

This is the final step of the JAOP development process and uses the results of the process and products above. It contains the aerospace COA selected by the JFACC/JFC and the relevant friendly and adversary aspects pertaining to it.

**6.5.2.5.1. AIPB Steps in the JAOP Development Stage.** AIPB doesn’t play a formal part in the writing of the JAOP. Information and products produced previously by the AIPB process are simply included in the JAOP as required. These may consist of COG, COA, HVT, TAI and NAI. However, as AIPB is a continuous process now begins the constant reassessment and update of previous efforts, analysis and products.

**6.5.2.5.2. Desired End Effect.** In the final stage, the analysis and products created in earlier stages are consolidated formally into the JAOP, which details how joint aerospace employment supports the JFC’s operation or campaign plan.

**6.5.3. AIPB’s role in ATO Planning and Execution.** The JAOP and AIPB discussion above applies to the use of AIPB in a deliberate or crisis action planning scenario. What follows is a discussion of the use of AIPB in support of planning and execution activities once military operations have commenced. 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.” (AFDD 2-1)*

During operations, the continuous AIPB process provides operations and intelligence personnel a constantly maintained combat intelligence baseline from which to plan operations. During execution, decision support and ISR synchronization products are used to build a comprehensive ISR collection strategy to support PBA. These products tie the ISR cycle to operations and identify if prior intelligence assessments, upon which the plan was based, are still accurate. If not, at a minimum intelligence assessments will need to be updated and potentially, the friendly plan may need to be changed. Deci-

sion support products are also excellent tools for supporting tactical decision-making. They can be used as a triggering mechanism to drive changes to the ATO at key decision points. A decision point is a:

*“...point in space and time where the commander or staff anticipates making a decision concerning a specific friendly course of action.” (JP2-01.3)*

**6.5.3.1. AIPB Support to Ongoing Strategy Development.** The initial aerospace plan will most likely be updated and adjusted once operations begin. AIPB analysts should advise AOC strategists when specific adversary COA are confirmed or denied or when unanticipated COA appear to have been adopted by the adversary. If an unanticipated COA is detected then that COA should be analyzed to determine if it is a serious threat to the current friendly plan. If so, the COA should be examined in detail to determine associated COG and HVT. At this point strategists may determine strategy adjustments are required. If so an abbreviated wargaming exercise may be warranted or helpful. Alternatively, JFC guidance changes may dictate a change to the initial aerospace plan. In this case, strategists and AIPB analysts will repeat the COA analysis and comparison process in order to provide the JFACC with updated options or COA.

**6.5.3.2. Operational Assessment.** During conflict, personnel performing operational assessment monitor, assess, and recommend changes or improvements to major tasks, Measures Of Effectiveness (MOE) and commander's intent produced in the strategy development process. The continuous AIPB process provides the updated intelligence baseline on which to make these assessments. The AIPB process is used to monitor enemy actions and reactions to our strategy, provide information on fundamental changes to the adversary's intentions and associated COA, as well as monitor the status of enemy centers of gravity. In summary, the information requirements of the operational assessment process are often directly associated with key decisions the JFACC will make—which drives the continuous AIPB process. Thus, AIPB is both a key contributor to operational assessment and shaped by it.

**6.5.3.2.1. Using the COA Development Process to Monitor and Assess a MOE.** One of the purposes of operational assessment is to determine if our strategy is achieving the desired effects. Before an operation has begun, AIPB (particularly Steps 2 and 3) can assist the operational assessment process by identifying intelligence gaps and other environmental constraints, which would render some potential MOE difficult or impossible to assess. In addition, desired effects can be articulated in terms of a COA we do not want the adversary to take or one that we do want him to take. For example, an effect we may want to achieve could be: “Halt the adversary's 1st Division north of the Bear River.” The AIPB process could be applied to determine how the adversary would get to the Bear River (a possible COA), what is important to him in getting there (HVT), and how do we know he is getting there (NAI)? In this case our MOE would be the adversary halted north of the Bear River. By incorporating NAI into the collection plan and monitoring them over time we can determine if we have been effective in achieving the desired effect.

**6.5.3.3. Synchronizing ISR Operations with ATO Planning and Execution .** During ATO planning, the continuous AIPB process feeds other processes including target development and ISR operations. These processes combined provide PBA. Orchestrating and synchronizing ISR operations, AIPB, and targeting processes is a key challenge for the JFACC staff and is facilitated through the incorporation of AIPB principles and techniques. Decision support and ISR synchronization products specifically provide this mechanism. Air Force decision support and synchroni-

zation products must incorporate not only NAI information that helps to establish adversary COA, but also requirements for pre-strike evaluation, ATO go/no-go decisions and post-strike BDA. The binding elements of these synchronization and decision support products are time and importance of the decision being made. The lion's share of initial synchronization work is done in the Combat Plans and ISR Divisions and is used by the Combat Operations Division as it adjusts the ATO to the tactical situation.

**6.5.3.4. AIPB's Role in ATO Execution.** ATO monitoring and execution is the responsibility of the AOC's Combat Operations Division. This division is primarily a user of AIPB information and synchronization products produced by other divisions in the AOC. During ATO execution, members in the Combat Operations Division monitor the current situation, ensure ISR collection and reporting assets remain focused to support key operational activities and decisions and make tactical adjustments as required. The Combat Operations Division contributes to updating the AIPB via reporting activities. Due to the Combat Operations Division's focus on and capability to monitor the current tactical situation, it may be the first entity in the AOC to detect significant changes to adversary COA.

**6.5.3.5. Decision Support and ISR Synchronization Products.**

**6.5.3.5.1. The Decision Support Matrix (DSM).** A decision support matrix is a tool that can be used to capture key operational decisions requiring information support before they are made. A DSM captures the decision(s) being supported, the required information to support it, sources of intelligence (or other information such as approval from HHQ) that can support the decision and the latest time information is of value (LTIOV). **Figure 6.3.** is an example of a DSM used to support and synchronize the necessary timing of activities involved in attacking and assessing first echelon SAM sites before deploying high-value surveillance and reconnaissance platforms to their optimum wartime orbit points.

Figure 6.3. Decision Support Matrix.

DECISION SUPPORT MATRIX FOR ATO:				ALPHA		
DTG:	13 May 00			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	NAV/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
	0620Z	0640Z	SAM Site 2	UAV/RC-135	Yes	0645Z
	0630Z	0650Z	SAM Site 3	SOF/RC-135	Yes	0645Z
Divert Package AB	0700Z	0705Z				
Move Sensors Forward	0700Z	0705Z				

**6.5.3.5.2. ISR Planning and Synchronization.** Normally the JFACC is the supported commander for theater ISR. As such he plays a key role in synchronizing ISR operations with overall JFC operations. In concert with the joint force J-2 and J-3 staffs, the joint forces' ISR assets must be able to collect, receive, process, and then produce and disseminate relevant intelligence in time to support joint force decision-making. Operational decision-making occurs at all levels of command and it is no small challenge to meet the requirements of all. In reality, all requirements will not be met due to the low-density and high-demand nature of ISR assets and ISR will be directed against information requirements deemed most critical. **The coordination of ISR with operational decisions and the intelligence cycle is known as intelligence synchronization.** In order to collect and provide in a timely manner all the intelligence required to support friendly operations, an intelligence synchronization matrix (ISM) may be designed. For ISR assets and JFC ISR requirements apportioned and tasked to the JFACC, the ISR Division constructs an intelligence synchronization matrix by establishing intelligence collection deadlines for satisfying each intelligence requirement. The ISR Division bases these deadlines on the decision-making timeline requirements of the JFC, JFACC and other components. This should be done in close coordination with the joint force J-2 staff so that a theater-wide collection strategy and plan is developed incorporating national and other component ISR assets and capabilities. The collection plan factors when information is

needed and the time required to collect, process and disseminate the intelligence as well. The collection strategy should consider such things as in [Table 6.1.](#), Collection Strategy Considerations.

**Table 6.1. ISR Strategy Development.**

Time Critical Targeting/Time Sensitive Targeting
Pre-strike reconnaissance requirements
Post-strike BDA requirements
Other JFC, JFACC and component operations and intelligence requirements
Collection system capabilities and availability
Tasking timelines associated with each collection system or discipline
Collection and processing timelines
Exploitation timelines
Dissemination timelines
Type of target or activity collected against
Location of the NAI and TAIs collected against
Timelines associated with the expected adversary activity
Competing collection requirements

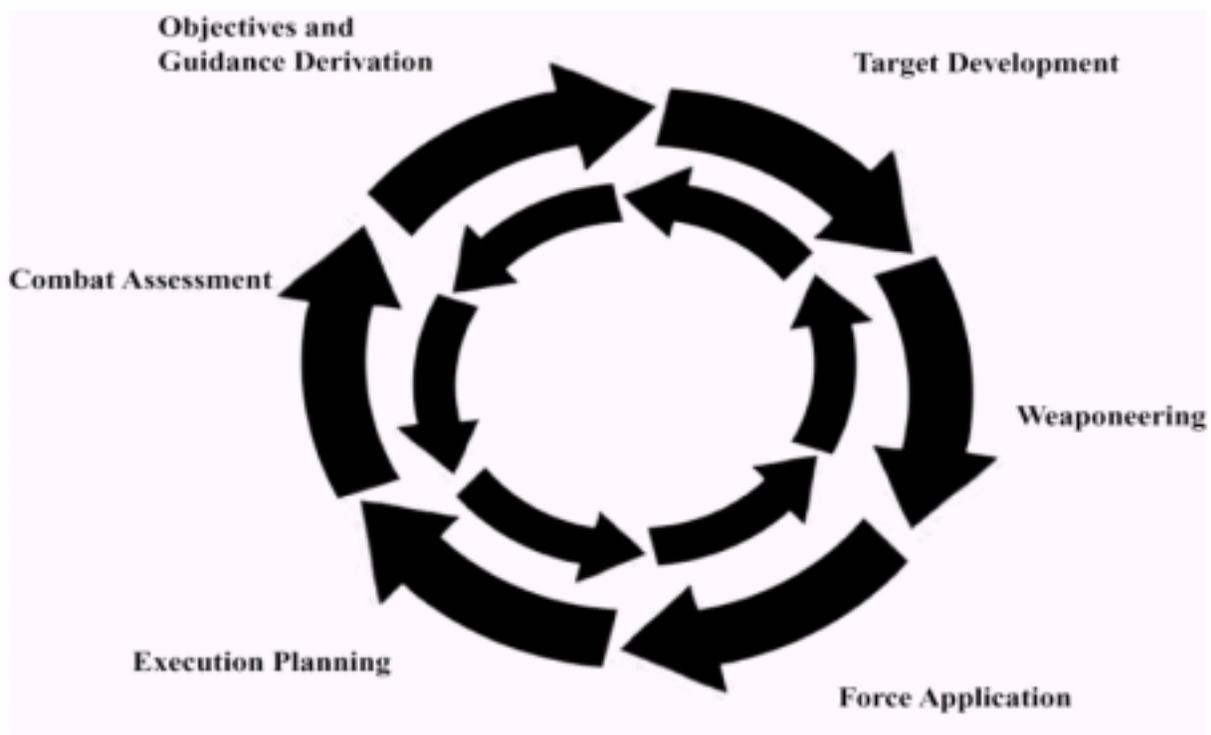
**6.5.3.5.3. The Intelligence Synchronization Matrix (ISM).** The ISM depicts ISR collection strategy. The ISM is built using numerous data sources to include ATO requirements, BDA requirements, joint commander and other component requirements, event matrices, DSMs, etc. These are the information requirements to be supported. Information requirements are listed in order from earliest to latest LTIOV on one axis of the matrix. Intelligence sources that can meet the requirement are then listed on the other axis of the matrix. LTIOVs are then “backed-up” to reflect collection, processing, exploitation and dissemination timelines. From this adjusted list, requirements are then “sourced” to the appropriate collector(s) in accordance with their overall priority.

**6.5.3.5.4. Using and Building the ISM.** The ISM provides the Combat Plans Division a basis for scheduling airborne ISR assets in the ATO and exploitation managers a priority guide to use when exploiting and disseminating information. Finally, it provides ISR battle managers in the Combat Operations Division a full understanding of ISR operations and the supported combat operation/decision to which ISR is tied. Thus, the ISM provides a baseline from which tactical adjustments are made and what the opportunity cost is of a change. The ISM was used extensively in Operation Allied Force to good effect and was a combined JFACC/EUCOM J-2 product and process. The ISM is produced (though not easily for large operations) using a spreadsheet. Currently, the ISM concept is being further developed into the Reconnaissance Surveillance and Target Acquisition Order (RTO) and efforts are underway to automate the ISM/RTO.

**6.5.3.6. AIPB and Targeting.** The relationship between AIPB and Air Force targeting is clearly intertwined. Clearly there are things unique to the targeting process (see [Figure 6.4.](#)) such as weaponeering, force application, Munitions Effectiveness Assessment (MEA) and Battle Damage

Assessment (BDA). In the case of objectives and guidance derivation, AIPB provides a basis for developing guidance by identifying COG, critical capabilities and COA. However, when it comes to combat assessment and target development the line is murkier. Target systems analysis and COA development both provide potential targets for attack. Generally though, AIPB analysts will provide potential targets (HVT) to planners and targeteers who will then make a determination as to whether or not they should be further developed (e.g., weaponeering and collateral damage assessment etc.) and nominated for attack. With regard to combat assessment, both specialties should concentrate on supporting the operational assessment process that among other things seeks to determine if we are achieving our desired effects. Targeteers and AIPB analysts both contribute to the assessment. The whole point of effects-based operations is to focus on what you're trying to achieve and not on what method you use to get there. Finally, combat and bomb damage assessments in almost all cases will be a key input for updating the AIPB. Bottom line: AIPB analysts and targeteers leverage off each other's work and support each other toward the greater goal of achieving the JFACC's objectives.

**Figure 6.4. Targeting Process.**



**6.5.3.7. Time Sensitive Targets (TST).** AIPB and ISR Management play a prominent role in time sensitive/time critical targeting (TST/TCT) by detecting, locating, identifying, tracking and assessing dynamic targets, as well as supporting mission planning, including BDA. Successful employment of both precision and non-precision munitions against mobile targets often requires near-real time (NRT) targeting information facilitated by effective application of AIPB COA analysis at the tactical level and ISR synchronization methods. Particularly crucial is an understanding of the infrastructure supporting fielded military forces provided by the target analysis and AIPB

processes and, when required, highly detailed information about the terrain and weapon system mobility characteristics in order to predict likely operating areas. **Note: A highly detailed IPB methodology relating to the above can be found in the Air Land Sea Applications Center's Multi-Service Procedures, for Theater Missile Defense Intelligence Preparation of the Battlespace, Aug 2001.**

## 6.6. AIPB Support to Tactical Level Activities.

**6.6.1. Overview.** At the tactical level, operational planning and execution activities are performed in the various wing and squadron operations centers. (i.e., Wing Operations Center (WOC), Squadron Operations Center (SOC), Mission Planning Cell (MPC) and Air Base Defense Operations Center (ADOC)). **The challenge for Operations Support Squadron (OSS) and squadron intelligence personnel is not necessarily to invent new AIPB products, but to apply the methodology in a consistent fashion to ensure the battlestaff, aircrew, and force protection personnel have the relevant environment, threat and adversary COA information to plan and execute the mission and to defend friendly forces.** OSS and squadron intelligence personnel should use the AIPB process to develop the unit's combat intelligence baseline and update it continuously throughout the conduct of operations. This chapter deals primarily with air missions. **Note: A detailed methodology for supporting air missions is found in [Attachment 2 \(IPB for Air Operations\)](#).**

### 6.6.2. Unit Level Duties and Responsibilities.

**6.6.2.1. Unit Commander.** The wing or squadron commander provides guidance regarding the unit mission and objectives that form the basis for beginning the AIPB process (Step 1).

**6.6.2.2. OSS Intelligence Flight Commander.** The OSS Intelligence Flight Commander (IFC) coordinates with the Unit Commander to develop mission-tailored requirements for AIPB and ensures OSS and squadron intelligence personnel are trained to use the process. The IFC guides and validates the unit AIPB-derived products, ensuring that they are tailored to unit tasking and supported mission platforms. The IFC also provides Security Forces (SF) with force protection-related intelligence support. In conjunction with the Office of Special Investigations (OSI), the IFC provides SF with all-source intelligence, focused on identifying, understanding, and assessing the environment and the threat to people and resources from home base to the operating location. He ensures AIPB is initiated in peacetime and continuously updated during combat operations and directs the acquisition and incorporation of AIPB materials from HHQ and other production agencies. The OSS IFC ensures coordination with base agencies (such as weather, legal, and medical) for information required to complete the AIPB process and coordination with designated the Defense Force Commander for information and personnel required to complete the AIPB process for Force Protection. He uses AIPB results to develop intelligence situation briefings, displays, evasion recommendations and other mission support products to ensure AIPB information is disseminated to battlestaff, aircrews, mission planning personnel, subordinate and lateral units, higher headquarters and other appropriate agencies as required.

**6.6.2.3. Squadron Intelligence Officer .** The Squadron Intelligence Officer conducts AIPB tailored to unit tasking and uses AIPB results to develop intelligence situation briefings, displays, evasion recommendations and other mission support products.

**6.6.2.4. OSS Weather Flight Commander.** The OSS Weather Flight Commander ensures weather products are integrated into the AIPB process in the form of predictive analysis and unit specific needs, per unit requirements and commander's guidance.

**6.6.2.5. Judge Advocate Officer.** Review law of war and intelligence oversight aspects of proposed plans for the IW Flight Commander.

**6.6.3. Application of the AIPB Process.** The AIPB process is ongoing in peacetime or in crisis, from train-up for expeditionary operations through reconstitution. A substantial portion of the AIPB process can be conducted in garrison, in the normal performance of tasks that support deliberate planning for assigned missions, theater familiarization, or current intelligence analysis.

Unit intelligence personnel can utilize AIPB products produced at the AOC or by intelligence production agencies in order to build the intelligence baseline for the unit. The four-step AIPB methodology is used to focus the analytical effort during preparation for mission execution. This section builds on [Chapter 2-Chapter 5](#), providing a look at unit AIPB considerations.

#### **6.6.3.1. Step 1: Define the Battlespace Environment.**

**6.6.3.1.1. Determine Mission Tasking and Objectives.** In order to conduct a focused and productive AIPB effort, unit personnel must initially determine mission tasking. The type of mission the unit will execute is determined by airframe type and unit Designated Operational Capability (DOC) statement. This information is important because it will help focus the AIPB effort to those issues most relative to the unit mission. For example, when conducting AIPB for a defensive counterair mission, the analyst need not spend much time assessing the impact of terrain on friendly operations (Step 2) or enemy tactical surface-to-air missile capabilities (Step 3). He will, however, spend a considerable amount of time studying the enemy's offensive air capabilities (Step 3) and potential tactical air courses of action for the attack (Step 4). When supporting multi-role aircraft or multiple squadrons with different missions, the AIPB process will most likely be more complex and detailed to cover individual unit or mission requirements. For example, an A-10 unit will require information on adversary ground forces and will be interested in how the terrain is likely to shape the future battle. Once a conflict begins, the analyst can derive specific mission tasking from the air tasking order and conduct AIPB tailored to the supported missions.

#### **6.6.3.1.2. Identify the limits of the Operational Area (OA) and Area of Interest (AOI).**

Prior to hostilities, the analyst conducts AIPB for potential adversary countries based on AEF or OPLAN tasking and current intelligence. During hostilities, at the wing level it may be necessary to define the OA and AOI at multiple levels. At a macro level, the boundaries of the OA are normally specified in the operational order (OPORD) or concept plan (CONPLAN) from the higher headquarters that assigned the JFACC/Commander Air Force Forces (COMAFFOR) or supported commander's mission. Similarly, the AOI will encompass those areas that could potentially impact operations across the OA as a whole. However, once specific mission tasking is handed down and mission planning begins, it is necessary to reduce the OA and AOI to the geographic area pertaining to that mission. At the wing and squadron level this could mean that the OA and AOI are defined differently on different days or even on different missions on the same day. The OA for a CAS mission, for example, includes the area in which enemy and friendly ground forces are engaged and the area from which the enemy can launch fighters and surface-to-air missiles to engage CAS aircraft. The AOI may extend deeper into

enemy territory to cover enemy lines of communication and supply depots that can impact the ground war. Other missions may require larger OA/AOI, such as alert offensive counterair (tasking location unknown) or airborne command and control. The first step in identifying the AO and AOI is to look at specific mission tasking. The ATO may identify Offensive Counter Air (OCA) lanes, target areas, ingress/egress routes, etc. Additional information can be derived from the Airspace Control Order (ACO) and Special Instructions (SPINS). Identifying the OA and AOI for a given mission or unit is important in order to prioritize analytical efforts within the time available.

**6.6.3.1.3. Determine Significant Characteristics of the Battlespace.** Remember, this is a cursory examination of each battlespace dimension to identify those characteristics of possible significance or relevance to the mission. The characteristics of most concern will vary depending on the mission. For example, as noted above, a unit performing DCA may not be concerned about terrain effects, while a CAS unit most likely will. However, both missions will require weather analysis.

**6.6.3.1.4. Identify the amount of planning detail required and feasible within the time available for IPB.** This assessment is extremely important during conflict when time and manning are at a premium.

**6.6.3.1.5. Collect the materials and intelligence required for conducting the remainder of AIPB.** Once the analyst knows the mission tasking and OA, he must gather his resources and prepare for more detailed analysis (Steps 2–4).

**6.6.3.1.6. Review and refine EEFI, and make an initial assessment of intelligence gaps.**

All units maintain, review, and refine standing Essential Elements of Friendly Information (EEFIs). These EEFIs will form the basis for Production Requirements (PRs) for all contingency deployments as required.

**6.6.3.1.7. Desired End Effect.** The desired end effect is: (1) graphical display (such as charts, computer depictions) displaying OA and AOI; (2) lists of battlespace characteristics for further analysis; (3) Production Requirements (PR) sent to higher headquarters (to fill intelligence gaps).

**6.6.3.2. Step 2: Analyze the Battlespace Environment.** At the unit level, this step focuses on the impact of the battlespace environment on unit mission and platform, and includes terrain, weather, demographics, and infrastructure analysis.

**6.6.3.2.1. Terrain Analysis.** Depending on the mission, terrain in the OA may directly impact operations. Consideration of the “lay of the land” influences friendly and enemy selection of ingress/egress routes, landing/drop zones, ISR/C2 orbits, Combat Air Patrol (CAP) locations, SAM and air ambush sites, and Desired Areas for Recovery (DAR). The terrain also impacts aerial navigation, communications, and sensor effectiveness. High terrain impacts low altitude navigation and line-of-sight. LOS effects voice and data link communications, radar operations, and visual acquisition (from both air and ground perspectives.). LOS analysis utilizing intelligence automated tools, such as Improved Many on Many (IMOM), helps the analyst determine locations (on the ground or in the air, for friendly or enemy) for optimizing radar look. From the threat and targeting perspective, surface analysis aids in projecting possible surface-to-surface missile launch and hide sites and SAM operating locations (especially valuable when SAMs are emitting infrequently). Some missions, such as CAS and CSAR, are

more ground-centric and require more detailed surface analysis. Analyzing surface trafficability assists the analyst in identifying possible chokepoints and ground force assembly areas (target rich environments for CAS operations). Surface analysis is helpful for CSAR missions because intelligence analysts and mission planners can determine what pararescue equipment is needed and project survivor actions on the ground. Finally, surface analysis is absolutely essential in developing an evasion plan of action recommendation. Unit-level intelligence analysts are encouraged to obtain Army and Marine IPB products, which provide a great deal of fidelity on surface analysis. While conducting surface analysis, analysts may find it useful to construct plastic overlays for intelligence situation displays. These overlays can highlight significant terrain, possible chokepoints, possible obstacles to ground movement or low altitude flight, etc. Such overlays allow effects to be considered individually and in combination, while minimizing “clutter” on the actual situation display.

**6.6.3.2.2. Weather Analysis.** While intelligence personnel are not responsible for providing weather forecasts, they should know the weather’s impact on friendly and enemy equipment and employment. USAF weather teams, in-garrison and deployed, are the primary source for information and are an essential element of the war fighting team. In most cases, weather information is brought into the mission planning process early on via automated weather broadcast system or on-site briefs. Units must coordinate with weather personnel to integrate their expertise into every phase of the planning, deployment, and execution process. Pre-conflict, analysts should research general weather patterns for the threat country. During hostilities, analysis requires the forecast for the OA during mission execution time. Climatology-based planning materials and long-, medium-, and short-term forecasts are available and must be used to support operations. Military aspects of weather affecting tactical operations include: visibility, winds, precipitation, cloud cover, contrails, illumination, temperature and humidity affect on deployment, bed-down, and mission execution.

**6.6.3.2.2.1. Weather Effects on Military Flight Operations.** Weather is one of the most important considerations when analyzing the air environment. Temperature, moisture, wind, precipitation, pressure differences and obscuration can all affect air operations. Analysis should focus on impact to aircraft, munitions, and friendly or enemy employment. Intelligence planners must coordinate with unit weather personnel to determine weather effects on: performance of enemy and friendly munitions (e.g., chemical weapons); air defense effectiveness; aircraft and pilot capabilities; effectiveness of radar and other electronic equipment given prevailing or long-term weather conditions. Phenomena such as ducting microwave fade or solar activity must be included in any discussion regarding the weather’s effects on military operations. Cloud cover and ceilings may restrict operations by setting low operational ceilings and restricting visibility and target engagement. Extreme temperature and humidity decrease combat range, altitude (particularly rotary wing) and ordnance loads. Weather greatly affects the visual and infrared (IR) spectrums. Clouds, fog, and precipitation reduce visibility. Precipitation and humidity create IR clutter, hindering IR seeker performance. If mission planning for EO/IR or laser-guided air-to-surface munitions, a tactical decision aid (requested from the weather team) can help analysts assess environmental effects on sensors and laser designators. Weather also impacts air-to-air weapons and sensors. Clouds create clutter problems for IR missile seekers, and winds aloft blow chaff, degrading both air and surface radars.

**6.6.3.2.3. Sources of Information.** A good place to start is your MAJCOM Standard Intelligence Document List (SIDL); however, there are many other sources of information to help conduct AIPB. Use unit weather products and personnel, all available analytical reports, GI&S/imagery databases, National Imagery and Mapping Agency (NIMA) products, intelligence databases, charts, atlases, country studies, encyclopedias, CIA World Factbook, INTELINK and Internet sites, Mission Reports (MISREPs), and other pertinent sources of information.

**6.6.3.2.4. Desired End Effect.** The desired end effect includes graphical displays (such as chart overlays or computer depictions—multi media approach is best), graphical line of sight analysis displays/products (such as IMOMs), environmental analysis for evasion recommendations and mission planning.

**6.6.3.3. Step 3: Evaluate the Enemy.** At the unit level, Step 3 focuses on updating or creating tactical threat models and assessing tactical threat capabilities. Remember that the goal is development of adversary models that accurately portray how adversary forces normally execute operations and how they have reacted in similar situations in the past.

**6.6.3.3.1. COG Analysis at the Unit Level.** In some respects, COG analysis at the wing or squadron level is a bit simpler than at the AOC level. While the adversary has tactical level COG, there may be little an individual unit can do to directly engage and defeat those COG. For example, if the adversary's COG for its air defense system is a sector control center, the AOC may plan to engage the center directly with weapons. However, units ingressing/egressing in that sector's AOR may plan to fly beneath the radar coverage in that area to reduce detection and reaction time. The point is that COG do exist at all levels of war. It is necessary to discern them and plan to defeat them.

**6.6.3.3.2. Updating or Creating Tactical Threat Models.** The evaluation begins with a complete review of enemy forces, weapons systems, capabilities, and employment doctrine. Every action by the enemy causes a reaction by friendly forces. What enemy forces do or do not do, and the response from friendly forces factor into planning. Weapons engagement zones, potential ingress/egress routes, marshalling areas, etc., must be accurately identified, analyzed, and factored into mission planning processes to determine the impact on operations. Again, much of the groundwork for the evaluation of the enemy will occur at levels higher than the unit. It's the job of the unit intelligence personnel to tailor the mass of available information regarding the enemy to fit the unit mission and develop methods to receive regular updates to those assessments. Enemy assessments are updated continuously from initial tasking through final redeployment. From the time mission planning begins until the mission is executed, it is highly likely that location, composition, and disposition of specific enemy units have significantly changed. Therefore, when units conduct analysis of enemy forces, they must do so with a view toward the future threat, i.e., the time the mission will take place. This dynamic is key to the very nature of the AIPB process. **If conducted properly, AIPB at the tactical level becomes a tool an analyst can use to portray the threat at the time the mission is executed rather than just regurgitating the current threat.**

**6.6.3.3.3. Use of Threat and Doctrine Templates.** Doctrinal templates can depict how we expect the enemy to organize and equip. As time permits, units may develop templates to depict enemy dispositions, deployment schemes, and employment tactics as they apply to the specific missions within the OA and AOI. In some cases, these templates may be available

from other sources, such as the Defense Intelligence Agency (DIA). Focus on aspects such as command and control, SAM and AAA, and air force hierarchies, missions and geographic organization. Time factor analysis, such as SAM reaction and flyout times and aircraft (alert to launch) reaction times can also be templated, based on the threat country's doctrine. Units must make the judgment call on whether the time spent developing a template adds sufficient value to the AIPB process to justify time spent. Nevertheless, the information, which might normally be depicted graphically by a template, must be conveyed in some fashion to the personnel that require the information.

**6.6.3.3.4. Preferred Tactics and Options.** Analyze the enemy's preferred employment tactics, including individual unit tactics. Like doctrine, much of this information already exists in documents. Reference publications include AFTTP 3-1 Volume 2, *Threat Reference and Countertactics Guide* (and platform specific AFTTP volumes), tactical analysis reports (e.g., European Tactics Analysis Team, Far East Tactics Analysis Team, Southwest Asia Tactics Analysis Team, etc.), and National Security Agency product reports. Since tactics change more quickly than doctrine, analyze the most current information from MISREPs and Daily Intelligence Summaries (DISUMs). Tactics are very specific applications of doctrine. Examples of air tactics include flight formations, engagement geometry, use of countermeasures, and air-to-air missile shot doctrine. Surface-to-Air Missile tactics include cueing, shot doctrine, and High-speed Anti-radiation Missile (HARM) countertactics.

**6.6.3.3.5. Assessing Tactical Threat Capabilities.** Threat evaluation for air operations concentrates on a detailed study of enemy Integrated Air Defense System (IADS) capabilities, performance characteristics, strengths and weaknesses. Each weapon system that can impact mission execution must be thoroughly analyzed. AFTTP 3-1 Volume II and aircraft-specific AFTTP 3-1 volumes provide good base-line threat performance data. Additionally, analysts should also examine the ability of friendly weapon systems to detect and counter each threat.

**6.6.3.3.6. Other Considerations.** AIPB analysts should also consider location and disposition of all friendly forces. AIPB analysts should be aware of other missions and support assets available in order to tailor intelligence support and be apprised the location and disposition of neutral forces. The disposition of enemy forces down to the lowest possible level that can affect the unit mission. Other considerations are in-depth target area analysis, highlighting significance, composition, and potential threats.

**6.6.3.3.7. Sources of Information.** The majority of data regarding enemy OB and capabilities will likely be obtained from the theater Joint Intelligence Center (JIC)/Joint Analysis Center (JAC), theater J2, AOC, or from national agencies. Often, the AIPB processes of other component forces can provide detailed information that will enhance the unit's own analysis. The use of automated intelligence, geodetic, and weather systems will aid this process, enabling units to pull information from key production staffs and push it to the mission planners that require the information. This process must begin as early in the tasking process as possible.

**6.6.3.3.8. Desired End Effect.** Graphic and/or textual products will help the wing or squadron intelligence and operations personnel visualize the adversary's capabilities. In addition to the products mentioned in [Chapter 4](#), at a minimum the following products should be used to support mission planning: (1) Enemy Order of Battle displays. (2) Mission Penetration Analysis. (3) Graphical Threat Analysis Displays (for example IMOMs). (4) Threat Analysis for

Intelligence Situation and Pre-mission briefings, displays, evasion recommendations, and other mission support products.

**6.6.3.4. Step 4: Determine Enemy Courses of Action (COA).** Step 4 identifies, develops and prioritizes adversary courses of action. By combining analysis accomplished in the first three steps, unit intelligence can make an educated guess about potential tactical COA. Units will not typically determine the overall enemy COA, but will analyze the impact of those COA on their missions. The Joint Task Force (JTF) or theater intelligence staff typically makes this determination. The assessment is formed on the basis of intelligence information gathered from national, theater, and service agencies. These courses of action will then influence each component's execution of the overall theater battle plan, and drive the mission taskings that filter down to specific units. The task for units is to assess the impact of the overall courses of action on each specific mission being planned and to estimate tactical courses of action that may be encountered by aircrew along the mission route. Strategic, operational, and tactical level COA affect missions within the OA and AOI. It is the unit's responsibility to precisely tailor its evaluation of the COA, both friendly and enemy, to the mission. Units should be able to determine what COA the enemy is likely to employ to prevent successful execution of the mission. At a minimum, most likely and most dangerous COA must be considered. The question for unit intelligence personnel to answer is "How will the enemy employ his forces in the OA during mission execution?" Identify likely locations of targets, ground and naval forces, and air defenses. Project how the enemy will integrate his assets and what employment tactics he will use. Identify likely or possible weapons engagement zones for both surface-based and airborne defenses. Incorporate anticipated reaction times and command and control delays.

**6.6.3.4.1. Desired End Effect.** List of potential threat courses of action and assimilate data to populate Intelligence Situation and Pre-mission Briefings, displays, evasion recommendations, and other mission support products.

**6.6.3.4.2. Tactical COA Comparison.** A good example of developing tactical courses of action is the wing verification process. In this process crews are required to plan and brief a notional or real mission to demonstrate tactical proficiency. During the preparation phase intelligence personnel assist aircrew in understanding the threats that may be encountered along various potential routes (friendly COA) and how the threat may react to the mission (enemy COA). After this analysis the crew selects its mission route. Squadron intelligence personnel often start the verification brief with a description of expected threats along the route and expected enemy reactions (AIPB Steps 2 and 3). This is followed by the crew briefing, in which the crew briefs its selected route and the rationale behind it (friendly COA selection). After the crew brief, the crew is presented with a number of hypothetical enemy reactions or threats that they must respond to. These hypothetical reactions or threats are simply a list of adversary COA, which must be considered and reacted to, just as one would do in the AIPB process (COA comparison). This action-reaction process between intelligence and operations personnel in mission planning is the essence of wargaming, which AIPB is designed to support.

**6.6.3.4.3. Completing the Cycle.** Once analysts complete an iteration of the AIPB cycle, information must be disseminated to battlestaff, aircrews, mission planning personnel, subordinate, and lateral units, higher headquarters and other appropriate agencies, via briefings and

reports. At this point the continuous AIPB cycle begins anew refining the product by incorporating new all-source information.

**6.6.4. Force Protection IPB (FP IPB).** The Air Force's application of force protection is defined and explained in AFDD 2-4.1, Force Protection. Understanding AFDD 2-4.1, FM 34-130, and **Attachment 6**, IPB for Force Protection of this document is necessary to accomplish FP IPB. FP efforts prevent or mitigate successful hostile actions against Air Force personnel and resources. As such, intelligence is the foundation of every FP effort and thus IPB is as critical to FP as it is to mission planning. Understanding and assessing threats to our forces is the first step in FP planning and selection of appropriate FP measures. The FP IPB provides the framework in which to analyze FP threats and the environment in which Air Force personnel and resources to be protected are located. By applying the FP IPB process, the commander can selectively apply and maximize FP measures by determining the threat's likely COA and understand the operating environment and its effects on friendly and threat forces. Analysts must also ensure that the information gathered by the unit's own Security Forces is incorporated into the IPB product. Since each location is unique, the proper application of IPB may require alteration in focus and thought process to fit local conditions.

**6.6.5. Summary.** AIPB is a comprehensive, continuous process used to support mission planning and decision-making processes by identifying, analyzing, and estimating the capabilities and actions of the enemy. It codifies processes that intelligence analysts currently use and integrates them with products and processes used by all military forces throughout the spectrum of conflict. AIPB also provides a systematic means to estimate and build a picture of the battlespace at a future time when the execution phase of a specific mission will be conducted. **The heart of this analysis is to create a vision of enemy capabilities and intent for the aircrews. This "vision" will drive the selection of routes and tactics that minimize risk, the anticipation of potential threat and target areas, improved target area familiarity, and the selection of friendly COA, should the enemy react as anticipated.** Contingent upon a thorough understanding of the operational art of war, AIPB will improve the capability of intelligence staffs at all levels to identify, collect, and analyze information about the enemy and increase the effectiveness of combat operations through more accurate and timely applications of force. For the unit, this means an improved capability to tailor its perception of the battlespace to its specific mission. The AIPB process will continue to evolve and be refined over time to respond to the needs and capabilities of the service components. Education, training, and experience will ultimately hone the techniques of individual users to maximize the benefits inherent in the AIPB process.

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**Attachment 1****GLOSSARY OF REFERENCES AND SUPPORTING INFORMATION*****References***

- Air Force Doctrine Document 1, Air Force Basic Doctrine, 12 August 1998.
- Air Force Doctrine Document 2, Organization and Employment, 28 September 1998.
- Air Force Doctrine Document 2-1, Air Warfare, 22 January 2000.
- Air Force Doctrine Document 2-4.1, Force Protection, 29 October 1999.
- Air Force Doctrine Document 2-5, Information Operations, 5 August 1998.
- Air Force Instruction 13-1AOC, Vol. 3 Operational Procedures – Aerospace Operations Center, 1 June 1999
- Air Force Pamphlet 14-210, USAF Intelligence Targeting Guide, 1 February 1998.
- ACC Component Level Tactics, Techniques, and Procedures (CTTP), Second Edition, 30 May 1998.
- Airpower Journal, Vol. XII, No. 4, Winter 1998.
- Joint Publication 2-01.3, Joint Tactics, Techniques, and Procedures (JTTP) for Joint Intelligence Preparation of the Battlespace (JIPB), Second Draft, 1 February 1998.
- Joint Publication, 3-56.1, Command and Control for Joint Air Operations, 14 November 1994.
- Joint Publication 2.0, Intelligence Support to Joint Operations, 9 March 2000.
- Joint Publication 1-02, DOD Dictionary Military and Associated Terms, as amended through April 1998.
- ALSA, The Joint Targeting Process and Procedures for Targeting Time-Critical Targets, July 1997.
- ALSA, Theater Missile Defense IPB, March 2000.
- United States Army, Field Manual 34-130, Intelligence Preparation of the Battlefield, Second Draft, January 2000.
- United States Army, Field Manual 34-3, Intelligence Analysis, March 1990.

***Abbreviations and Acronyms***

- AA**—Avenue of Approach
- AAA**—Anti-Aircraft Artillery
- AAO**—Aviation Advisory Operations
- ACE**—Analysis Control Element
- ACO**—Airspace Coordination Order
- ADOC**—Air Base Defense Operations Center
- AEF**—Air Expeditionary Force
- AFCCC**—Air Force Combat Climatology Center

**AFDD**—Air Force Doctrine Document

**AFIPBWG**—Air Force IPB Working Group

**AFSOC**—Air Force Special Operations Command

**AFWA**—Air Force Weather Agency

**AIPB**—Aerospace Intelligence Preparation of the Battlespace

**AOC**—Air Operations Center

**AOI**—Area of Interest

**AOR**—Area of Responsibility

**ASI**—Aerospace Surface Interface

**ATO**—Air Tasking Order

**AWACS**—Airborne Warning and Control System

**A-2 Staff**—Air Intelligence Staff

**A-3 Staff**—Air Operations Staff

**BCD**—Battlefield Coordination Division

**BDA**—Battle Damage Assessment

**BOS**—Battlefield Operating Systems

**C2**—Command and Control

**C3**—Command, Control and Communications

**C4**—Command, Control, Communications and Computers

**C4ISR**—Command, Control, Communications, Computer, Intelligence, Surveillance, and Reconnaissance

**CAF**—Combat Air Forces

**CAP**—Combat Air Patrol, Crisis Action Planning

**CAS**—Close Air Support

**CCD**—Camouflage, Concealment and Deception

**CCIR**—Commander's Critical Information Requirements

**CCT**—Combat Control Team

**CINC**—Commander-in-Chief

**CIS**—Combat Intelligence System

**CIS-AA**—Combat Intelligence System Automatic Associator

**CME**—Coronal Mass Ejection

**COA**—Courses of Action

**COG**—Centers of gravity

**COMAFFOR**—Commander Air Force Forces  
**COMSAT**—Communication Satellite  
**CONPLAN**—Contingency Plan  
**CONUS**—Continental United States  
**CR**—Collection Requirement  
**CRC**—Control and Reporting Center  
**CSAR**—Combat Search and Rescue  
**DAR**—Desired Areas for Recovery  
**DBA**—Dominant Battlespace Awareness  
**DBK**—Dominant Battlespace Knowledge  
**DOC**—Designated Operational Capability  
**DDMP**—Deliberate Decision Making Process  
**DIA**—Defense Intelligence Agency  
**DIRMOBFOR**—Director of Mobility Forces  
**DISUM**—Daily Intelligence Summary  
**DP**—Decision Point  
**DSP**—Defense Support Program  
**EALT**—Earliest Anticipated Launch Time  
**EEFI**—Essential Elements of Friendly Information  
**EHF**—Extremely High Frequency  
**EP**—Electronic Protection  
**EW**—Electronic Warfare  
**FA**—Feasibility Assessment  
**FAARPs**—Forward Area Arming and Refueling Points  
**FEBA**—Forward Edge of Battle Area  
**FID**—Foreign Internal Defense  
**FM**—Field Manual  
**FP**—Force Protection  
**FROSS**—Foreign Reliance on Space Systems  
**GBS**—Global Broadcast System  
**GII**—Global Information Infrastructure  
**GI&S**—Geospatial Information & Services

**GPS**—Global Positioning System

**GTACS**—Ground Theater Air Control System

**HARM**—High-speed Anti-radiation Missile

**HEO**—Highly Elliptical Orbit

**HF**—High Frequency

**HHQ**—Higher Headquarters

**HPT**—High Payoff Target

**HUMINT**—Human Resources Intelligence

**HVT**—High Value Target

**HVTL**—High Value Target List

**IA**—Initial Assessment

**IADS**—Integrated Air Defense System

**IMINT**—Imagery Intelligence

**IO**—Information Operations

**IIW**—Information-In-Warfare

**III**—International Information Infrastructures

**IMOM**—Improved Many-on-Many

**INTSUM**—Intelligence Summary

**IPA**—Intelligence Production Agent/Archive

**IPB**—Intelligence Preparation of the Battlefield/Battlespace

**IR**—Information Requirements

**ISM**—Intelligence Synchronization Matrix

**ISR**—Intelligence, Surveillance and Reconnaissance

**IW**—Information Warfare

**JAOC**—Joint Aerospace Operations Center

**JAOP**—Joint Aerospace Operations Plan

**JASOP**—Joint Air and Space Operations Plan

**JCS**—Joint Chiefs of Staff

**JFC**—Joint Force Commander

**JFACC**—Joint Forces Air Component Commander

**JFSOCC**—Joint Force Special Operations Component Commander

**JIC**—Joint Intelligence Center

**JIPB**—Joint Intelligence Preparation of the Battlespace

**JOA**—Joint Operations Area

**JOC**—Joint Operations Center

**JRA**—Joint Rear Area

**JSCP**—Joint Strategic Capabilities Plan

**JSOTF**—Joint Special Operations Task Force

**JTCB**—Joint Target Coordination Board

**JTF**—Joint Task Force

**JTTP**—Joint Tactics, Techniques, and Procedures

**LEO**—Low Earth Orbit

**LOAC**—Law of Armed Conflict

**LOC**—Line of Communication

**LOS**—Line of Sight

**LTIOV**—Last Time Information is of Value

**MANPADS**—Man-portable Air Defense System

**MASINT**—Measurement and Signature Intelligence

**MAW**—Marine Aviation Wing

**MC**—Mobility Corridor

**MCOO**—Modified Combined Obstacle Overlay

**MEA**—Munitions Effectiveness Assessment

**MEU**—Marine Expeditionary Unit

**MHz**—Megahertz

**MIDB**—Modernized Integrated Data Base

**MISREP**—Mission Report

**MOE**—Measure of Effectiveness

**MOOTW**—Military Operations Other Than War

**MPA**—Mission Planning Agent

**MPC**—Mission Planning Cell

**MTL**—Mission Task List

**MTP**—Mission Task Package

**NAI**—Named Area of Interest

**NBC**—Nuclear, Biological and Chemical

**NEO**—Noncombatant Evacuation Operation

**NII**—National Information Infrastructure

**NIMA**—National Imagery and Mapping Agency

**NMS**—National Military Strategy

**NRT**—Near-Real-Time

**OA**—Operational Area

**OB**—Order of Battle

**OCA**—Offensive Counter Air

**OCOKA**—Observation and fields of fire, Cover and concealment, Obstacles, Key terrain and Avenues of approach

**OER**—Operational Environment Research

**OPLAN**—Operations Plan

**OPORD**—Operations Order

**OPSEC**—Operations Security

**OSI**—Office of Special Investigations

**OSINT**—Open Source Intelligence

**OSS**—Operations Support Squadron

**PAF**—Precision Aerospace Fires

**PAFE**—Preferred Area for Evasion

**PAWS**—Phased Array Warning System

**PBA**—Predictive Battlespace Awareness

**PCA**—Polar Cap Absorption

**PFPS**—Portable Flight Planning System

**PIR**—Priority Intelligence Requirements

**PNP**—Precision Navigation and Positioning

**POE**—Plan of Execution

**POL**—Petroleum, Oil and Lubricant

**PR**—Production Request

**PR/RO**—Personnel Recovery/Recovery Operations

**PRF**—Pulse Repetition Frequency

**PSYOP**—Psychological Operations

**RF**—Radio Frequency

**RFI**—Request For Information

**ROE**—Rules of Engagement  
**RSTA**—Reconnaissance, Surveillance, and Target Acquisition  
**RTS**—Remote Tracking System  
**SAFE**—Selected Area for Evasion  
**SAM**—Specialized Aerospace Mobility  
**SAM**—Surface-to-Air Missile  
**SATCOM**—Satellite Communication  
**SCADA**—Supervisory Control and Data Acquisition System  
**SEAL**—Sea, Air and Land  
**SEU**—Single Event Upset  
**SHF**—Super High Frequency  
**SIGINT**—Signal Intelligence  
**SLOC**—Sea Lines of Communication  
**SO**—Special Operations  
**SOA**—Special Operations Aviation  
**SOC**—Squadron Operations Center  
**SOF - A**—Special Operations Forces - Aviation  
**SOLE**—Special Operations Liaison Element  
**SPINS**—Special Instructions  
**SREF**—Specialized Refueling  
**SSM**—Surface-to-Surface Missile  
**ST**—Special Tactics  
**SWF**—Short Wave Fade  
**TAI**—Target Area of Interest  
**TCT**—Time Critical Targeting  
**THVT**—Type High Value Target  
**TMD**—Theater Missile Defense  
**TST**—Time Sensitive Targeting  
**TTP**—Tactics, Techniques, and Procedures  
**UAV**—Unmanned Aerial Vehicle  
**UHF**—Ultra High Frequency  
**VHF**—Very High Frequency

**WMD**—Weapons of Mass Destruction

**WOC**—Wing Operations Center

### *Terms*

**Aerospace Power**—The projection of military force by or from a vehicle operating above the surface of the earth.

**Air Campaign**—A connected series of operations conducted by air forces to achieve joint force objectives within a given time and area of operations.

**Air Interdiction**—Air operations conducted to destroy, neutralize, or delay the enemy's military potential before it can be brought to bear effectively against friendly forces at such distance from friendly forces that detailed integration of each air mission with the fire and movement of friendly forces is not required.

**Airlift**—Consists of operations to transport and deliver forces and materiel through the air in support of strategic, operational, or tactical objectives.

**Air Superiority**—That degree of dominance in the air battle of one force over another which permits the conduct of operations by the former and its related land, sea and air forces at a given time and place without prohibitive interference by the opposing force.

**Air Supremacy**—That degree of air superiority wherein the opposing air forces are incapable of effective interference.

**Air Tasking Order**—Provides battlespace combat deconfliction and coordination operating instructions to flying units. ATO identifies targets to be hit and when, ordnance loads, air corridors, call signs and communications settings.

**Area of Interest**—The AOI is the 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 that could jeopardize the accomplishment of the mission (JP 1-02).

**Assumptions**—Information used to replace missing facts necessary for command and staff planning, estimating, and decision-making. Assumptions may also be required for facts that change due to the time difference between receipt of the mission and the time of execution, such as threat dispositions. Assumptions should be confirmed or denied by intelligence collection whenever practical.

**Battle Damage Assessment**—Used for timely and accurate estimate of damage resulting from the application of military force, either lethal or non-lethal, against an objective or target.

**Battlespace**—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 aspects of air, sea, space, information and land operations 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 forum for analyzing and selecting courses of action for employing military forces in relation to time, tempo and depth (AFDD 1-1).

**Branch**—A contingency plan (an option built into the basic plan) for changing the disposition, orientation, or direction of movement of the force.

**Centers of Gravity**—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 (AFDD 2).

**Close Air Support**—Air action by fixed- and rotary-wing aircraft against hostile targets which are in close proximity to friendly forces and which require detailed integration of each air mission with the fire and movement of those forces. Also called CAS.

**Combat Search and Rescue**—A specific task performed by rescue forces to affect the recovery of distressed personnel during wartime or contingency operations. Also called CSAR.

**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.

**Communications Security (COMSEC)**—Includes measures and controls taken to deny unauthorized persons information derived from telecommunications while also ensuring telecommunications authenticity. Communications security includes crypto-security, transmission security, emission security, and physical security of communications materials and information.

**Computer Security**—Involves the measures and controls taken to ensure confidentiality, integrity, and availability of information processed and stored by a computer. These include policies, procedures, and the hardware and software tools necessary to protect computer systems and information.

**Core Competency**—The Air Force underlying capability to accomplish power projection.

**Counterair**—A mission conducted to attain and maintain a desired degree of air superiority. Counterair integrates and exploits the mutually beneficial effects of both offensive and defensive operations by fixed- and rotary-wing aircraft, surface-to-air and air-to-air missiles, antiaircraft guns, artillery, and electronic warfare to destroy or neutralize enemy air and missile forces both before and after launch.

**Counterdeception**—The effort to negate, neutralize, diminish the effects of, or gain advantage from a foreign deception operation.

**Counterinformation**—Counterinformation seeks to establish a desired degree of control in information functions that permits friendly forces to operate at a given time or place without prohibitive interference by the opposing force.

**Counterintelligence**—Protects operations, information, systems, technology, facilities, personnel, and other resources from illegal clandestine acts by foreign intelligence services, terrorist groups, and other elements.

**Counterspace**—Those operations conducted with the objective of gaining and maintaining control of activities conducted in or through the space environment.

**Course of Action**—The scheme adopted to accomplish a task or mission. A product of the Joint Operations Planning and Execution System concept development phase.

**Decision Point**—The point in time and space where the commander or staff anticipates making a decision concerning a specific friendly COA. Decision Points identify areas where tactical decisions must be made in order for the commander to retain available options.

**Decision Support Matrix**—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.

**Decision Support Template**—A DST represents a graphic record of wargaming. It depicts decision points, timelines associated with movement of forces and the flow of the operation, and other key items of information required to execute a friendly COA (JP 2-10.3).

**Defensive Counterair Operation**—Operations to detect, identify, intercept, and destroy enemy air and missile forces attempting to attack or penetrate the friendly air environment. Defensive Counterair operations (DCA) are synonymous with air defense operations. DCA encompasses both active and passive measures. It is normally conducted near or over friendly territory and generally reacts to the initiative of enemy forces.

**Defensive Counterinformation**—Those actions that protect information, information systems, and information operations from any Potential adversary. DCI includes such programs as operations security (OPSEC), information assurance, and counterintelligence.

**Doctrinal Templates**—A model based on known or postulated threat doctrine. Doctrinal templates illustrated the disposition and activity of threat forces and assets conducting a particular operation unconstrained by the effects of the battlespace environment. They represent the application of threat doctrine under ideal conditions. Ideally, doctrinal templates depict the threat's normal organization for combat, frontages, depths, boundaries and other control measures, assets available from other commands, objective depths, engagements areas, battle positions, and so forth. Doctrinal templates are usual scaled to allow ready use with geospatial products. (JP 1-02)

**Doctrine**—Fundamental principles by which military forces or elements thereof guide their actions in support of national objectives. It is authoritative but requires judgment in application.

**Dominant Battlespace Awareness**—A level of battlespace awareness, much greater than that possessed by the adversary, that provides commanders with a decisive information advantage enabling them to make informed decisions and to employ weapons and systems more precisely and effectively than the adversary. It is an interactive “picture” of friendly and adversary operations within the operational area and area of interest that improves situational awareness, decreases response time, and makes the battlespace considerably more transparent to those who achieve it. Also known as DBA. (JP 2-01.3)

**Dominant Battlespace Knowledge**—A level of battlespace knowledge, much greater than that possessed by the adversary, regarding the effects of the battlespace environment on friendly and adversary military operations, the status of friendly forces, and the adversary's capabilities, intent, and strategy, required by the commander to predict an adversary's future course of action and scheme of maneuver. Dominant battlespace knowledge enables the commander to know the potential and probably future state of events and to anticipate, and plan countermoves to, adversary actions well in advance. It provides the ability to apply the assessments of experts to various courses of action and options available to all commanders, and is achieved through the application of the intelligence preparation of the battlespace process and the integration of new intelligence collection and analysis technologies. Also know as DBK. (JP 2-01.3)

**Electronic Warfare**—Any military action involving the use of electromagnetic and directed energy to manipulate the electromagnetic spectrum or to attack an adversary. The three major subdivisions within electronic warfare are: electronic attack, electronic protection, and electronic warfare support.

**Event Matrix**—A description of the indicators and activity expected to occur in each NAI. The event matrix supports the event template by providing details on the type of activity expected in each NAI, the times the activity is expected to occur, and the COA the activity will confirm or deny. There is no prescribed format.

**Event Template**—A guide for collection planning. The event template is developed by comparing the analyses depicted on the situation templates for each of the COA the adversary is capable of executing. The event template depicts the NAI where activity (or its lack) will indicate which COA the threat has adopted.

**Geospatial Information & Services**—Services formerly provided by Mapping Charting and Geodesy to include Maps and Charts, geodetic positioning system coordinates and elevation data.

**High Payoff Target**—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 that must be acquired and successfully attacked for the success of the friendly commander's mission. Also called HPT. (JP 1-02)

**High Value Target**—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 (JP 2-01.3).

**Indicators**—Positive or negative evidence of threat activity or any characteristic of the AO which points toward threat vulnerabilities or the adoption or rejection by the threat of a particular capability, or which may influence the commanders selection of a COA. Indicators may result from previous actions or from threat failure to take action.

**Information Assurance**—Those measures that protect and defend information and information systems by ensuring their availability, integrity, authenticity, confidentiality and ability to confirm sources of transmission and data.

**Information Operations**—Overarching integration of actions taken to gain, exploit, defend, and attack information to ultimately achieve information superiority. And, as air operations and space operations infer, Information Operations focuses all efforts towards achieving Air Force, Joint, and/or National Objectives. *DOD 3600.1 - Information Operations are actions taken to access or affect information and information systems, while defending our own.*

**Information Superiority**—That degree of dominance in the information domain which allows friendly forces the ability to collect, control, exploit, and defend information without effective opposition.” (AFDD 2-5) *DOD 3600.1 - The capability to collect, process, and disseminate an uninterrupted flow of information while exploiting or denying an adversary's ability to do the same.*

**Information Warfare**—Information used as a target or as a weapon. It includes any action taken to deny, exploit, corrupt, or destroy an adversary's information and information functions while protecting friendly forces against similar actions and exploiting our own military information functions. Also called IW. *DOD 3600.1 - Information Operations conducted during time of crisis or conflict to achieve or promote specific objectives over a specific adversary or adversaries.*

**Intelligence Preparation of the Battlefield/Battlespace**—A systematic, continuous process of analyzing the threat and environment in a specific geographic area. It is designed to support staff estimates and military decision-making. (FM 34-130)

**Intelligence Requirement**—A requirement for intelligence to fill a gap in the command's knowledge and understanding of the battlespace or threat forces. Intelligence requirements are designed to reduce the uncertainties associated with successful completion of a specific friendly COA; a change in the COA usually leads to a change in intelligence requirements. Intelligence requirements that support decisions which affect the overall mission accomplishment are designated by the commander as priority

intelligence requirements (PIR). Less important intelligence requirements are designated as IR.

**Interdiction**—An action to divert, disrupt, delay, or destroy the enemy's surface military potential before it can be used effectively against friendly forces.

**Joint Doctrine**—Fundamental principles that guide the employment of forces of two or more Services in coordinated action toward a common objective.

**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.

**Joint Force Air Component Commander (JFACC)**—The Joint Force Air Component Commander (JFACC) derives authority from and is normally designated by the Joint Force Commander (JFC). The JFACC's responsibilities are assigned by the JFC (normally these would include, but not be limited to, planning, coordination, allocation, and tasking based on the JFC's apportionment decision). Using the JFC's guidance and authority, and in coordination with other service component commanders and other assigned or supporting commanders, the JFACC will recommend to the JFC the apportionment of air sorties to various missions or geographic areas.

**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. The JFC 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. See also Joint Force.

**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 force commander. Also called JTF. (JP 1-02)

**Logistics**—The science of planning and carrying out the movement and maintenance of forces. In its most comprehensive sense, those aspects of military operations which deal with: a) design and development, acquisition, storage, movement, distribution, maintenance, evacuation, and disposition of materiel; b) movement, evacuation, and hospitalization of personnel; c) acquisition or construction, maintenance, operation, and disposition of facilities; and d) acquisition or furnishing of services.

**Military Deception**—Military deception misleads adversaries, causing them to act in accordance with the originator's objectives. Deception can distract from, or provide cover for, military operations and confusing and dissipating adversary forces.

**Military Operations Other Than War (MOOTW)**—Operations that encompass the use of military capabilities across the range of military operations short of war. These military actions can be applied to complement any combination of the other instruments of national power and occur before, during, and after war. Also called MOOTW. (JP 1-02) [*An umbrella term encompassing a variety of military operations conducted by the Department of Defense that normally complement the other instruments of national power. These military operations are as diverse as providing support and assistance (when consistent with US law) in a nonthreatening environment, and conducting combat not associated with war. Also called MOOTW.*] {Italicized definition in brackets applies only to AFDDs and is offered for clarity.}

**Military Space Forces**—Those national, civil, and commercial space systems and associated infrastructure that establish space power and are employed by the military to achieve national security

objectives. Space forces include space-based systems, ground-based systems for tracking and controlling objects in space and transiting through space, launch systems that deliver space elements, and people who operate, maintain, or support those systems. Terrestrial-based forces operate below 100 kilometers. Space-based forces operate above 100 kilometers.

**Military Strategy**—The art and science of employing the armed forces of a nation to secure the objectives of national policy by the application of force or the threat of force.

**Mobility Corridor**—Areas where a military force will be canalized due to terrain restrictions. They allow military forces to capitalize on the principles of mass and speed and are therefore relatively free of obstacles.

**Modified Combined Obstacle Overlay**—A product used to depict the battlefield's effects on military operations. It is normally based on a product depicting all obstacles to mobility.

**Named Area 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 may also be related to conditions of the battlespace (JP 2-01.3).

**National Command Authorities (NCA)**—The President and the Secretary of Defense or their duly deputized alternates or successors.

**National Strategy**—The art and science of developing and using the political, economic, and psychological powers of a nation, together with its armed forces, during peace and war, to secure national objectives.

**Navigation and Positioning**—Those operations that provide accurate location and time of reference in support of strategic, operational, and tactical missions.

**Offensive Counterair Operation**—An operation mounted to destroy, disrupt, or limit enemy airpower as close to its source as possible. Offensive counterair operations range throughout enemy territory and are generally conducted at the initiative of friendly forces.

**Offensive Counterinformation (OCI)**—Actions taken to control the information environment. OCI operations are designed to limit, degrade, disrupt, or destroy adversary information capabilities and are dependent on having an understanding of an adversary's information capability.

**Operational Area**—That portion of an area of conflict necessary for military operations. OA are geographical areas assigned to commanders for which they have responsibility and in which they have the authority to conduct military operations.

**Operational Level of War**—The level of war at which campaigns and major operations are planned, conducted, and sustained to accomplish strategic objectives within theaters or areas of operations. Activities at this level link tactics and strategy by establishing operational objectives needed to accomplish the strategic objectives, sequencing events to achieve the operational objectives, initiating actions, and applying resources to bring about and sustain these events. These activities imply a broader dimension of time or space than do tactics; they ensure the logistic and administrative support of tactical forces, and provide the means by which tactical successes are exploited to achieve strategic objectives.

**Operational Environment Research**—The process of gaining a comprehensive understanding of the entire theater of operations, the adversary, and friendly forces available to accomplish the Joint Force Commander's objectives. (AFDD 2)

**Order of Battle**—The identification, strength, command structure and disposition of personnel, units and equipment of any military force.

**Parallel Attack**—The near simultaneous attack on large numbers of adversary strategic or operational vulnerabilities.

**Physical Attack**—As an element of an integrated counterinformation effort, physical attack refers to the use of "hard kill" weapons against designated targets. The objective is to affect information or information systems by using a physical weapon. Physical attack disrupts, damages, or destroys an adversary's information system through destructive power.

**Precision Navigation and Positioning**—Provides air, space, and information operations the capability to attack targets in sensitive areas. The ability to locate and deliver accurate firepower through physical attack, for example, greatly reduces the number of aircraft and sorties required for neutralizing or destroying a target.

**Predictive Battlespace Awareness**—PBA is the understanding of the operational environment that allows the commander and staff to correctly anticipate future conditions, assess changing conditions, establish priorities, and exploit emerging opportunities while mitigating the impact of unexpected adversary actions. PBA results from combining AIPB, ISR planning and synchronization, and ISR management into a coherent framework that maximizes the capabilities of ISR assets in all environments.

**Priority Intelligence Requirement**—An intelligence requirement associated with a decision that will affect the overall success of the command's mission. PIR are prioritized and may change in priority over the course of the conduct of the operation. Only the commander designates PIR.

**Psychological Operations**—PSYOP are designed to convey selected information and indicators to foreign leaders and audiences to influence their emotions, motives, objective reasoning, and ultimately their behavior to favor friendly objectives.

**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.

**Reconnaissance, Active**—Active reconnaissance for offensive counter information operations includes ES (electronic warfare support) for IO. ES is the subdivision of electronic warfare involving actions tasked by, or under the direct control of an operational commander to search for, intercept, and locate or localize adversary IO assets for the purpose of immediate threat recognition, targeting, planning, and conduct of future operations. ES provides information required for decisions involving EW and IO operations and other tactical actions such as threat avoidance, targeting, and homing. ES data can be used to produce signals intelligence (SIGINT), provide targeting for electronic or destructive attack.

**Scintillation**—A rapid variation in the phase and/or amplitude of a satellite communications signal caused by discontinuities in the ionosphere.

**Sequel**—Major operations that follow the initial major operation. Plans for sequels are based on the possible outcomes-victory, stalemate, or defeat-of the current operation.

**Serial Attack**—Engaging fielded forces in tactical battles in order to progress toward operational or strategic objectives.

**Situation Template**—Depiction of assumed threat dispositions, based on threat doctrine and effects of the battlespace, if the threat should adopt a particular COA. In effect, they are the doctrinal templates

depicting a particular operation modified to account for the effects of the battlespace environment and the threat's current situation (training and experience levels, logistic status, losses, and dispositions). Normally, the situation template depicts threat unit's two levels of command below the friendly force as well as the expected locations of HVT. Situation templates use time phase lines to indicate movement of forces and the expected flow of the operation. Usually, the situation template depicts a critical point in the COA. Situation templates are one part of a threat COA model. Models may contain more than one situation template.

**Space Control**—Assures the friendly use of the space environment while denying its use to the enemy. Achieved through counterspace missions carried out to gain and maintain control of activities conducted in or through the space environment.

**Space Force Application**—Attacks against terrestrial-based targets carried out by military weapons systems operating in space. (AFDD 2-2)

**Space Force Enhancement**—Those operations conducted from space with the objective of enabling or supporting terrestrial-based forces. (AFDD 2-2)

**Space Power**—The capability to exploit space forces to support national security strategy and achieve national security objectives.

**Space Superiority**—Degree of control necessary to employ, maneuver, and engage space forces while denying the same capability to an adversary.

**Space Support**—Those operations conducted with the objective of sustaining, surging, and reconstituting elements or capabilities of military space systems. Space support consists of spacelift and on-orbit support.

**Special Operations**—Operations conducted by specially organized, trained, and equipped military and paramilitary forces to achieve military, political, economic, or psychological objectives by unconventional military means in hostile, denied, or politically sensitive areas. These operations are conducted during peacetime competition, conflict, and war, independently or in coordination with operations of conventional, nonspecial operations forces. Political-military considerations frequently shape special operations, requiring clandestine, covert, or low visibility techniques, and oversight at the national level. 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.

**Strategic Airlift**—Airlift that operates between the continental United States and a theater or between theaters.

**Strategic Attack**—Military action carried out against an enemy's center(s) of gravity or other vital target sets including: command elements; war production assets; and key supporting infrastructure in order to effect a level of destruction and disintegration of the enemy's military capacity to the point where the enemy no longer retains the ability or will to wage war or carry out aggressive activity.

**Strategic Level of War**—The level of war at which a nation, often as a member of a group of nations, determines national or multi-national (alliance or coalition) security objectives and guidance, and develops and uses national resources to accomplish those objectives. Activities at this level: establish national and multi-national military objectives; sequence initiatives; define limits and assess risks for the use of military and other instruments of national power; develop global plans or theater war plans to achieve these objectives; and provide military forces and other capabilities in accordance with strategic

plans.

**Strategy**—The art and science of developing and using political, economic, psychological, and military forces as necessary during peace and war, to afford the maximum support to policies, in order to increase the probabilities and favorable consequences of victory and to lessen the chances of defeat.

**Suppression of Enemy Air Defenses**—The activity that neutralizes, destroys or temporarily degrades surface-based enemy air defenses by destructive and/or disruptive means.

**Surveillance**—The systematic observation of aerospace, surface or subsurface areas, places, persons, or things, by visual, aural, electronic, photographic, or other means.

**Sustainment**—The Service's ability to maintain operations once forces are engaged (Air Force Executive Guidance, Jan 96). Essentially, sustainment involves the provision of personnel, logistic, and other support required to maintain and prolong operations, or combat until successful accomplishment or revision of the mission or of the national objective.

**Tactical Level of War**—The level of war at which battles and engagements are planned and executed to accomplish military objectives assigned to tactical units or task forces. Activities at this level focus on the ordered arrangement and maneuver of combat elements in relation to each other and to the enemy to achieve combat objectives.

**Tactics**—1) The employment of units in combat. 2) The ordered arrangement and maneuver of units in relation to each other and/or to the enemy in order to use their full potential.

**Theater**—The geographical area outside the continental United States for which a commander of a combatant command has been assigned responsibility.

**Theater Airlift**—1) The airlift assigned to the combatant command (command authority) of a combatant commander, other than USCINCTRANS, which provides air movement and delivery of personnel and equipment directly into objective areas through air landing, airdrop, extraction, or other delivery techniques. 2) The air logistic support of all theater forces, including those engaged in combat operations, to meet specific theater objectives and requirements.

**Threat Model**—A model of the threat force's doctrine and TTP for the conduct of a particular operation. Threat models are based on a study of all available information, structured by the OB factors, of the particular threat force under consideration. They describe and graphically portray threat tactics and employment options. Threat models are normally prepared prior to deployment.

**War**—Open and often prolonged conflict between nations (or organized groups within nations) to achieve national objectives.

**Weather service**—A specialized task performed by air and space forces to provide timely and accurate environmental information to support strategic, operational, and tactical military operations.

## Attachment 2

### AEROSPACE INTELLIGENCE PREPARATION OF THE BATTLESPACE FOR AIR OPERATIONS (AIR WARFARE)

**A2.1. Overview.** This attachment is designed to expand on the information contained in the core pamphlet and informs intelligence personnel about the basic concepts and principles for conducting Aerospace Intelligence Preparation of the Battlespace (AIPB) to support Air Warfare missions. Air Force missions that primarily involve aircraft include counterair, counterland, countersea, strategic attack, combat search and rescue (CSAR), airlift, air refueling, and intelligence, surveillance & reconnaissance (ISR). Given the flexibility and versatility of air operations, air assets can be employed equally effectively at the strategic, operational, and tactical levels of war. Furthermore, parallel operations conducted across all the levels of war either against the adversary's air forces or against the enemy's surface forces-often simultaneously-can dramatically increase AIPB requirements. Therefore, it is essential that the AIPB effort be prioritized to emphasize relevant aspects of battlespace analysis, threat evaluation, and adversary COA development required to provide appropriate support to select mission areas and functions.

**A2.2. AIPB Techniques to Support Select Air Functions.** The use of AIPB must be assessed in the context of the operation envisioned and the command being supported. The most significant factor in applying AIPB for air warfare is to understand the situation at the level that you are operating. For example, at the operational level AIPB analysts evaluating potential adversary threats and COA used to counter an air power threat must include numerous asymmetric options available to an adversary. The threat may include special operations forces (SOF), NBC responses, information warfare, access denial strategies, or various forms of camouflage, concealment, deception (CC&D) and dispersion activities to name a few. An adversary may choose to counter air power with a totally non-air power response. At the tactical level options are more limited once aircraft are in flight, counter activities are usually air defense measures and measures to defend or otherwise make individual targets more difficult to attack (e.g., CC&D). **Note: For the remainder of this annex the term "target" and/or "target area" will be used to refer to any air related activity and/or terminal location that is related to the purpose of the air mission being flown. Thus, "target" may refer to a strike target, a drop zone, a refueling point, the location of a downed pilot, a SOF team insertion point, etc.** All aspects and threats in the battlespace are included that air-power can affect or be effected. This attachment primarily focuses on issues traditionally associated with air warfare: theater air and missile forces, Integrated Air Defense System (IADS) and the target.

**A2.3. Step 1: Define the Battlespace Environment.** Successfully defining the command's battlespace is critical to the outcome of the AIPB process. The succeeding steps of the AIPB process must concentrate on those aspects of the battlespace that may influence the accomplishment of the command's mission and focus on acquiring the intelligence needed to complete AIPB in the degree of detail required for the decision making process. Failure to focus on the relevant characteristics of the battlespace leads to wasted time and effort, which may result in the failure to identify all relevant characteristics causing the commander to be unprepared. The final results of Step 1 include the following: preliminary priority intelligence requirements (PIR), collection requests, establishment of the operational area, area of interest, and an awareness of gaps and required materials necessary to complete AIPB.

**A2.3.1. Analyze the Mission.** As part of the deliberate planning process, the A-staff focuses on gaining a comprehensive understanding of the entire theater of operations, the adversary, and friendly

forces available to accomplish the commander's objectives. Mission analysis is essential to gaining an understanding of the commander's objectives and the flow of an air campaign to forecast intelligence requirements and properly focus and sequence the AIPB effort in relation to operational needs. Important mission characteristics include the type of operation being considered; the purpose of the operation; the amount of time available for planning and execution; the expected duration of the operation; and whether allied or coalition forces will be involved.

**A2.3.2. Identify the Limits of the Operational Area.** Due to its speed and range, aerospace power has the ability to focus on the entire theater's efforts onto a single target or target set, unlike surface forces that typically divide the battlespace into unit operating areas. 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. However, for the purposes of AIPB, there are those features of the environment or activities within it, and the physical space where they exist that may influence available COA or command decisions. Identifying these characteristics for further analysis and identifying the limits of the operational area help to focus the AIPB effort and direct analytical efforts during Steps 2 and 3 of the AIPB process.

**A2.3.3. Determine the Significant Characteristics of the Operational Area (OA).** Examine each characteristic in general terms to identify its significance to the command and air operations. These might include geographical features, population demographics, political and socioeconomic factors, civil and military infrastructure, Rules of Engagement (ROE), adversary conventional and unconventional forces, and environmental conditions. Because air operations are not inhibited by many of the potential constraints listed above, it may be necessary in Step 1 to begin examining other characteristics of the battlespace such as adversary general military capabilities, particularly air, air defense and theater missile capabilities. Initial adversary assessments may include a macro-level assessment of adversary weapons system capabilities, SAM locations, airfield locations and summary Air Order of Battle (AOB), as well as air defense divisions, zones and sectors of responsibility. Identifying the significant characteristics of an operational area help to identify relevant characteristics of the battlespace and establish the limits of the operational area. It also identifies gaps in the common understanding of the operations area, serving as a guide to the type of intelligence and information required for completing the AIPB process.

**A2.3.4. Define Area of Interest (AOI).** Due to the nature of air power, the COMAFFOR/JFACC's AOI will usually be that of the JFC. In addition, the capability to monitor an adversary's ability to affect current or future friendly operations will normally rest with the COMAFFOR/JFACC in his role as the theater ISR coordinator. The air area of interest extends vertically to cover the maximum service ceilings or trajectories of aircraft, unmanned aerial vehicles (UAVs), and missiles. Horizontally, it will extend to cover the maximum range of aircraft, UAVs, and missiles, plus threat airfields, support infrastructure, navigation aids, and missile sites. The area of interest extends to the limits from which intelligence and information must be gathered about the adversary that could affect friendly forces. An effective product for helping determine the AOI is the adversary Air and Missile Force Coverage assessment. This product is a depiction of the ground, sea, and airspace over the area occupied by friendly forces potentially in range of adversary air and missile forces. Adversary capabilities might include short range or medium range ballistic missiles as well as strike aircraft armed with air launched cruise missiles. However, other considerations such as asymmetric threats and political developments in surrounding countries that might influence the accomplishment of the command's mission should also be included as part of a composite product. Another important aspect to determining the AOI is the relationship between time and the AOI. The analyst must consider both the adver-

sary's mobility (air, ground and sea), and the amount of time needed to accomplish the friendly mission.

**A2.3.5. Determine the Full, Multi-Dimensional, Geographic and Non-Geographic Spectrum of the Battlespace.** Military operations are no longer limited to just geographic areas. Therefore, the commander and his staff must move beyond addressing only the physical aspects of the geographic environment to determine the full, multi-dimensional spectrum of the battlespace. The battlespace must incorporate all relevant factors of the environment to successfully apply combat power, protect the force, and accomplish the mission. Certain characteristics of the battlespace may take on added significance based on the type of mission assigned to the commander. Identify characteristics that require further in-depth evaluation of their effects on friendly and threat operations such as terrain, weather, logistical infrastructure, and demographic factors relevant to military operations.

**A2.3.6. Determine the Amount of Battlespace Detail Required and Feasible Within the Time Available.** A thorough understanding of the commander's guidance and objectives, to include the concept of friendly operations, is critical to properly managing resources and time. The time available may not permit the luxury of conducting each step of the AIPB process in great detail. Consequently, focus on those parts of AIPB that are most important in planning and executing the mission. Identifying both the amount of detail required for supporting air operations, and the commander's Priority Intelligence Requirements (PIR) avoid wasting time.

**A2.3.7. Evaluate Existing Databases to Identify Intelligence Gaps and Priorities.** Not all intelligence and information required for performing Step 1 will be in current databases. In nearly every situation, there will be gaps in existing databases. Identifying these gaps early allows you to initiate the collection requests and production requirements to fill them. Specific intelligence required for filling gaps in the command's knowledge of the battlespace environment and threat situation becomes the command's initial intelligence requirements. Identify any gaps that cannot be filled within the time allowed. Ensure you discuss with the commander and the staff, those gaps you do not expect to fill. Formulate reasonable assumptions to fill them, and ensure that any assumptions that have been made are clearly identified as such.

**A2.3.8. Collect the Data Required to Complete the Remainder of AIPB.** In the final sub-step, initiate collection requirements or requests for information (RFI) to fill intelligence gaps required for conducting AIPB. Include collection against all identified significant characteristics of the battlespace, not just the adversary, in priority order. Continuously update the AIPB products as you receive additional intelligence and modify your requirements. Inform the commander if you confirm assumptions made during the initial mission analysis and AIPB process. If any assumptions are denied, re-examine your evaluations and decisions on which they were based. In many cases, gaps will require the support of other intelligence organizations to obtain and analyze the necessary data.

**A2.4. Step 2: Describe the Battlespace Effects.** Due to airpowers diversity and flexibility, the degree of detail required when analyzing the dimensions of the battlespace environment vary depending on the capabilities of both friendly and adversary forces, and the relative importance of each dimension to the specific mission being planned. This allows the commander to quickly choose and exploit select dimensions that best support the friendly mission as well as minimize the impact of those dimensions that may adversely effect friendly operations. The result should be products that depict operationally significant physical characteristics or locations in the battlespace. Operationally significant examples include: (1) Mobile SAM and TMD operating areas, avenues of approach and mobility corridors, key interdiction

points, critical communications nodes, orbital launch locations etc. (2) Weather effects on friendly and adversary operations. (3) Key human factors likely to impact friendly and adversary operations. (4) Total environment's effect on broad COA at the strategic and operational levels of war. (5) Battlespace impact on friendly and adversary weapon systems at the tactical level of war. For air operations, four different dimensions may be involved—aerospace, surface, information and human. The final products of Step 2 vary from simple briefings to complex, computer-based battlespace simulations and visualizations.

**A2.4.1. Analyzing the Air Dimension.** The air dimension of the battlespace is the environment in which military air and counterair operations take place. It is the operating medium for fixed wing and rotary wing aircraft, air defense systems, unmanned aerial vehicles, cruise missiles, and some theater ballistic missile systems. Airpower is inherently flexible and free from many of the concerns of surface forces. Analyze the Air Dimension in four segments: assess, determine and plot known or assessed operating locations and facilities; plot weapon system threat ranges and service ceilings or operating altitudes; evaluate the effects of other dimensions; and, synthesize results into a Modified Combined Obstacle Overlay.

**A2.4.1.1. Analyzing Operating Locations and Facilities.** Assess, determine and plot known or assessed operating locations and facilities. Examples are included in [Table A2.1](#).

**Table A2.1. Operating Locations and Facilities.**

Target characteristics and configuration.
Airfields and associated support infrastructure.
Surface-to-air and surface-to-surface missile launch sites and associated support infrastructure.
Radar sites (early warning, ground control intercept, coastal surveillance, etc.).
Potential aircraft carrier, submarine, and sea launched cruise missile locations and operating areas.
Anti-aircraft artillery (AAA) and MANPAD Locations.
Electronic warfare sites.
Command, control and communications Sites.
Known or assessed combat air patrol (CAP) locations.
Friendly defended asset list and other key friendly operations areas or locations.

A2.4.1.2. Plot weapon system threat ranges and service ceilings or operating altitudes at known or assessed operating locations and facilities identified in [Table A2.1](#).

A2.4.1.3. Evaluate the effects of other dimensions on the above factoring in the effects of: surface features (e.g., terrain masking, vertical obstructions, cover and concealment and cross-country mobility etc.); weather; man-made features and constraints (e.g., hardened aircraft structures, ACO, commercial air corridors, ROE, etc.).

A2.4.1.4. Synthesize results into a Modified Combined Obstacle Overlay (MCOO) for Air depicting likely air Avenues of Approach (AA), significant weather effects, significant surface effects, threat operating locations with their associated weapon system ranges, ceilings and coverage areas.

**A2.4.2. Surface Dimension.**

**A2.4.2.1. Land Dimension.** Analysis of the land portion of the battlespace concentrates on terrain features such as transportation systems (road and bridge information), surface materials, ground water, natural obstacles such as large bodies of water and mountains, the types and distribution of vegetation, and the configuration of surface drainage. Terrain analysis must always consider the effects of weather as well as changes that may result from military action. For example, freezing temperatures can change a nearly impassable muddy road into a high-speed artery by hardening the ground. Likewise, the mobility characteristics of the operating area can be affected by military actions that may reduce built-up areas to rubble or destroy dams and bridges. It is also important to analyze the combined effects of weather on the potential use of weapons of mass destruction in order to take the appropriate defensive measures.

**A2.4.2.2. Sea Dimension.** The sea portion of the battlespace is unique in that it incorporates aspects of the surface, subsurface, and air dimensions of the battlespace. It is the dimension in which all naval operations take place, to include logistical support, sea control, sea denial, power projection, and amphibious operations. The sea and adjacent landmasses (littorals) are often referred to as the maritime environment. Just as the surface affects the aerospace dimension, land affects the sea. The open ocean represents a three-dimensional space with unrestricted room for tactical maneuver in the air, on the surface, and beneath the surface. However, in open ocean areas, distant landmasses may impact naval operations due to the range of an adversary's weapon systems. Littoral or "green water" areas may contain geographic features such as straits or choke points that restrict tactical maneuver or affect weapon or sensor effectiveness. The effects of maritime geography on the battlespace must be examined in all three dimensions (surface, subsurface, and air) in both open-ocean and littoral environments for both the operating area and the AOI.

**A2.4.3. Information Dimension.** The information environment is composed of three elements: information data, information systems, and information functions. It may consist of any medium adversary or friendly forces use to gain, exploit, defend, or attack information. This environment encompasses communications in the electromagnetic spectrum, the transfer of information in cyberspace, or communications through human interaction. Information provides knowledge, influences perceptions, and is often used to automatically control major systems or infrastructures. It can illuminate friendly or adversary perceptions, intentions, and COA. Once information paths are identified, the information that passes through these paths can be assessed for military value and evaluate an adversary's capabilities to disrupt or affect friendly information. This leads to the identification of critical nodes as an information-related step in evaluating the adversary capabilities.

**A2.4.4. Analyze the Human Dimension.** The human dimension includes all aspects of the battlespace environment that affect friendly and adversary COA not already incorporated into the air, space, information, and surface analysis of the physical battlespace. An analysis of these characteristics often indicates the adversary's centers of gravity. Since aerospace power can strike at all levels of war simultaneously, COG are especially significant in the employment of aerospace forces. COG analysis is primarily an analytic framework for evaluating the adversary (Step 3), but is also a useful tool for examining friendly entities within a battlespace. Many non-military factors at the strategic level of war can be examined in the context of COG analysis, but there may be other intangibles associated with these topics that may warrant separate consideration. For example, a state may—wittingly or unwittingly—be host to a number of state-sponsored and non-state sponsored terrorist organizations, each with varying degrees of influence on the host state's domestic politics and economic condition. Or, culture may lead an adversary away from what the analyst would consider more likely COA to less likely COA. Aspects of the human dimension that should be evaluated (though not

exhaustively), include the following: Political Factors, International Relationships; Socio-cultural and Psychological Factors; Economic Elements; Population Demographics; Infrastructure; ROE; and Laws of Armed Conflict.

**A2.4.5. Analyze the Effects of Weather.** Weather is one of the most important considerations when analyzing the physical environment. Phenomena such as temperature, moisture, wind, precipitation, pressure differences and obscuration can all affect operations. Weather affects the battlespace in two ways: it can interact with, and thereby modify, the environmental characteristics of each battlespace dimension; or it can have a direct effect on military operations regardless of battlespace dimension. Therefore, evaluation of the weather is an ongoing process within AIPB. At the AOC, weather conditions should be anticipated for the whole OA and forecasts should be made for the expected duration of the operation. Forecasts longer than four days may not be extremely accurate. Remember that the adversary will usually know predictable weather patterns better because most operations are normally carried out in their environment. Considering the fickle nature of weather, commanders should remain somewhat flexible during campaign planning. Weather analysis is performed for each mission area within the AIPB process and tailored to the mission and its associated weapon systems, communications, and ISR platforms. This process determines the weather's direct effects on aerospace and information operations. The analysis begins with available weather trend information or climatologic-based information for specific operational locations within the operating area. The focus for mission planning is on meteorological parameters over the friendly and adversary AOI. The evaluation is updated as new data is received. Current and forecast weather conditions will impact both friendly and adversary COA. At a minimum, weather is analyzed for the following conditions potentially affecting each phase of aerospace and information operations: (1) visibility, illumination, target acquisition, and intelligence surveillance and reconnaissance (ISR); (2) wind speed and direction; (3) precipitation type and amount; (4) temperature and humidity; and, (5) solar activity.

**A2.4.6. Air Modified Combined Obstacle Overlay.** One way to depict these effects on air operations is to construct an Air MCOO. The Air MCOO is a graphical display (see [Chapter 3, Figure 3.3.](#), Modified Combined Obstacles Overlay) of the significant environmental effects on air operations. It consists of a series of overlays illustrating the impact of each environmental factor on friendly and adversary air operations. It is used as a baseline for the Situation Template and to assess environmental impact on broad enemy and friendly air COA. All militarily significant characteristics of the surface and air environments that may constrain or facilitate air should be graphically portrayed on a modified combined obstacle overlay. Analysis should focus on the impact of the environment and weather on air operations sustainment, operating altitudes and ranges, mission execution, and air engagement and ambush areas. MCOOs may be built for individual battlespace dimensions or a mission-based MCOO may be built combining all relevant factors into a single multi-dimensional product. The Air MCOO could include the items listed in [Table A2.2.](#)

**Table A2.2. Air MCOO Items.**

Air and surface avenues of approach and mobility corridors.
Airfields and support infrastructure.
Air defense sites and operating areas.
Electronic warfare and passive defensive systems.
Air and surface obstacles and service ceilings.
Weapon system ranges.
Likely combat air patrol areas and standoff attack orbits.
Air engagement and ambush areas.
High value assets/defended assets (friendly).
Effects of terrain masking.
Restricted fire areas.
Sea lines of communication.
Potential amphibious landing areas.
Key communications nodes and paths.
Population characteristics.

**A2.4.7. Avenues of Approach.** Avenues of approach are the aerospace, surface, or information routes of an attacking force leading to its objective. The identification of AA are important because many COA will depend upon available AA. Analysis begins at the point of origin, usually a threat airfield, UAV or missile launch site and works toward the enemy objective. Identify AA for reconnaissance, attack and defensive operations. During offensive operations, the evaluation of AA leads to a recommendation on the best AA for air operations planning to meet mission objectives as well as the identification of AA available to the adversary. During the defense, identify AA supporting the adversary's offensive capabilities. Prioritize the AA based on how well each supports the adversary's broad COA. Do not confuse AA with direction of attack or axis of advance, which, to achieve surprise, may not follow AA. The factors listed in [Table A2.3.](#) should be considered to determine air AA.

**Table A2.3. Avenues of Approach Factors.**

Type of air threat, attack profile, and ordnance.
Air threat point of origin and ground control radar positions.
Probable threat objectives.
Potential to support adversary maneuver forces.
Freedom to maneuver in the air avenue.
Protection afforded to the air platform and crew.
Air threat and crew capabilities.

**A2.4.8. Broad Courses of Action (COA).** A broad COA is a generic action(s) the adversary may take to accomplish strategic or operational objectives. These form a general framework for conducting AIPB and assessing enemy capabilities and intent. As you develop your AIPB you will be able to

refine your COA and arrive at specific actions the adversary may take to accomplish his mission. At the same time, articulating the adversary's broad COA early in the AIPB process facilitates the operations staff's development of friendly COA. Examples of broad COA include the Air COA (attack, defend, disperse, evade, harden), Space COA (attack, deny, launch additional assets), or Information COA (attack, defend, gain, exploit).

#### **A2.4.9. Battlespace Impact on Friendly and Adversary Weapon Systems at the Tactical Level.**

It is important to assess not only the environment's impact on friendly and adversary operations, but also its impact on specific weapons. A primary factor in overall capability is weapon system performance, particularly when constrained by the battlespace environment.

### **A2.5. Step 3: Evaluate the Adversary.**

**A2.5.1. Air-Related COG.** Every conflict is unique and must be evaluated in its own terms and circumstances. Historically, COG associated with airpower have included the following: Strategic - the country's aerospace technology and production base, the strength of the country's economy, the education and technical skills of its population; Operational - command and control capabilities, aircrew/system operator production and training, logistics; Tactical -aircrew/operator skill, weapon system capabilities. Remember that by definition a COG is a strength that enables action. Thus, in evaluating air COG, the analyst should be on the look out for those things that truly strengthen a country's ability to equip, field, employ and sustain its air and missile forces.

**A2.5.2. Air-Related Threat Models.** Threat models for air missions can be broken into two basic types, aircraft and air defenses. Aircraft threat models at a minimum should include items such as aircraft type(s), altitude, airspeed, range, spacing, and maneuver activities (including post maneuver follow-on actions). Text should not only include a description of the threat activity portrayed, but supporting or associated equipment and units. Air defense threat models should include, weapon system, weapon system configuration, weapon system capabilities (range, speed, altitude, etc.), engagement processes and post-engagement maneuver or activities. Realistically speaking, threat models depicting aircraft tactics and/or operations are much more difficult to apply to follow-on AIPB products than traditional surface force threat models and provide less predictive power. This is due to the fluidity of the air medium and the addition of the vertical dimension to the threat model, as well as, the scale of aircraft operations area. Generally, threat models are produced to graphically describe and to serve as a starting point for follow-on construction of situation templates. Situation Templates lead to predicting what the adversary may or will do. This does not mean aircraft threat models are not helpful. Air Force Tactical Analysis Team (TAT) reports have long produced graphics of observed threat air tactics and AFTTP 3-1 Volume 2 uses them as a means to effectively communicate. Basic air threat models denoting range, aircraft type and associated weapons and packaging overlaid on top of plots of friendly protected assets, key facilities and units can yield significant insights into what is and is not possible. This provides a more rigorous assessment than guessing.

**A2.5.3. Determine the Current Adversary Air and Air Defense Situation.** The current adversary air and air defense situation is obtained from current threat analysts during contingencies or from various Order of Battle (OB) databases and includes the OB and related logistical, readiness and training factors. OBs of particular interest to the air and air defense analyst include; AOB, MOB, DMOB, EOB, ADA OB and facilities or locations of C2 related to air and IADS forces. In addition, the AIPB analyst must consider threats to air operations associated with ground, SOF and Naval forces.

**A2.5.4. Identify Adversary Capabilities and Vulnerabilities.** Identifying the full spectrum of adversary capabilities is a complex and detailed process beyond the capabilities of a COMAFFOR/JFACC or unit intelligence staff to produce. Most of this work is the responsibility of national and joint intelligence production centers with participation as appropriate by Air Force intelligence units. The list of capabilities to assess that follows is extensive, but remember the analysts job is to pick out from all of this what is most relevant to the unit and its mission and then express them in terms of capability statements that impact planning efforts. The AIPB analyst should look out for any adversary capabilities that can be exploited to friendly advantage. In addition, there are documents that address adversary capabilities. Of particular note is NAIC's *Threat to Air Operations* publications.

**A2.5.4.1. Missions and Objectives.** In evaluating the threat, a good starting point is the mission of the opposing air commander. The mission will generally indicate what the adversary is likely to focus on and for what purpose the acquired capabilities were built. Specific broad missions assigned to air and air defense forces may include national air defense, strategic attack, support to other military services, transportation or any of them in combination. In addition, missions should be labeled as primary or secondary, indicating the probable operational focus. After mission analysis, the air analyst should seek to understand the objectives of the adversary's air and air defense forces (what they hope to do or achieve with their forces). Care should be taken to ensure assessed adversary air and air defense objectives are complimentary to higher level political and military objectives. For example, in the case of air and air defense forces that primarily support surface operations, the analyst should assess objectives in light of primary surface force objectives.

**A2.5.4.2. Air and Air Defense Strategy.** Once the mission and objectives of the air and air defense forces are understood the next step is to gain an understanding of the basic strategy used to carry out the mission. Strategy items to consider include the person and/or organization responsible for the strategy and factors that influence its development, and the principal purpose of the strategy. For example: (1) Is the purpose to protect national leadership and/or to protect vital national assets (i.e., urban areas, economic/military facilities, etc.)? (2) Is the purpose to protect deployed forces and discourage penetration of airspace by hostile air threats? (3) Does it envision weighting the defense along anticipated avenues of approach, vital areas (point) defense, a balanced (barrier defense) of borders, ADIZ, territorial waters, etc., or a combination? (4) Where will the priority for defense be placed? (5) Does it envision early engagement or does it allow penetration to defended areas? (6) If early engagement, will it occur outside the national airspace? (7) What is the attack priority (Fighters, SAMs/ADA)? (8) Does it depend on passive response (i.e., no engagement) such as dispersal of assets, camouflage, or hardened shelters? (9) Does it emphasize independent air operations or is it tied to supporting other services? (10) Is the strategy dependent upon a perception of the relative capability of the threat, for example, would they do something different if the attacker were perceived to be stronger? (11) Does the strategy envision a different response to a surprise attack than to a gradually escalating crisis situation?

**A2.5.5. Assessing Air and Air Defense Force Capabilities:** Once the mission, objectives and strategy are understood it is time to assess air and air defense force capabilities. Major items for consideration include the Command and Control and Intelligence (C3I) system(s), air forces, air defense forces, electronic warfare and other factors.

**A2.5.5.1. Command, Control, Communications, and Intelligence (C3I).** C3I is the element of the air and air defense that puts the "I" in the Integrated Air Defense System. Integration is emphasized to highlight how the equipment and procedures do or do not work together in the air defense

effort and as a result of the adversary's capability. For example, there are very few air forces in the world today that have the C3I infrastructure necessary to do the types and variety of air operations the USAF does on a daily basis. Elements for analysis include unity of command, organization or force structure, authority, airspace management, air traffic control, air battle management, communications, intelligence, and training and proficiency.

**A2.5.5.1.1. Unity of Command.** Identify the air and air defense command structure. Is it a single service, a unified command involving elements of all services or is it a specified command(s) (e.g., an air defense command for air defense and a service command for support to other forces)?

**A2.5.5.1.2. Organization or Force Structure.** How are air and air defense forces organized from National Command Authority (NCA) through individual tactical units? The analyst should also identify forces assigned or allocated at each level, describe command facilities at each level below NCA (include manning levels, equipment, hardening, sustainability), identify air defense data systems at each level and describe capabilities, shortcomings, and foreign assistance.

**A2.5.5.1.3. Authority.** How are Command and Control (C2) authorities delegated? The analyst description should include: identifying air defense authority retained or delegated (i.e., authority to arm weapons, scramble, engage, etc.), how and when are these authorities passed to subordinates as alerts or crises increase, and what authority subordinates can assume in the absence of orders or loss of communication. A general conclusion should be drawn to whether the C2 system is centralized or decentralized.

**A2.5.5.1.4. Airspace Management.** Airspace management is the coordination, integration, regulation and identification of the use or users of airspace of defined dimensions. When analyzing airspace management, analysts should identify the functional or geographical areas of responsibility for command elements (i.e., divisions, sectors, etc.), to include altitude limitations of the specific block of airspace. Determine whether or not the boundaries of these areas are rigid or flexible and how coordination is affected as military and civilian aircraft cross boundaries.

**A2.5.5.1.5. Air Traffic Control.** Air traffic control is a service that is either positive, procedural, or both provided within the national airspace or a combat zone to promote safe, efficient and flexible use of airspace. After an understanding of airspace is organized then the analyst must determine how airspace is controlled. Items for consideration include how civilian and military air traffic is separated, how airspace is assigned (flight corridors etc.), what the requirements are for international commercial air to enter the airspace and how they are entered in the IADS. In a combat zone, how are CAS, interdiction, helicopter, airlift, artillery, SAMs, and ADA controlled; at what level; and who controls them.

**A2.5.5.1.6. Air Battle Management.** In combat scenarios, the analyst also determines how air defense weapons are controlled and how the fighting the air battle is envisioned. Is this specified in written instructions or verbal? General elements for consideration are:

**Table A2.4. Combat Air Battle Management.**

Procedural control of fires (air-to-air, surface-to-air and air-to-surface).
Alert readiness conditions of weapon systems.
Weapons control status (tight, free, hold, positive control, visual ID etc.).
Target and weapons assignment (air-to-air, surface-to-air, and air-to-surface).
Autonomous operations criteria.
Firing doctrine (two AAM/SAM per target, salvo, ripple, etc.).
Integration/C2 between supported surface forces and aircraft.

**A2.5.5.1.7. Communications.** Command and control is at its core an art of warfare, whereas communications lie in the science of warfare. No matter what type of C2 system and procedures are developed, they must be executable within the constraints and opportunities provided by the country's communication systems and architecture. Elements for analyst consideration include methods and systems (coaxial cable, troposcatter, microwave, UHF/VHF radios, satellite, fiber optics, packet switching, frequency hopping, etc.); sources of systems; connectivity and networks (include locations of key nodes); alternate methods and systems; and security, reliability, sustainability (include foreign assistance, and operator proficiency).

**A2.5.5.1.8. Intelligence.** Intelligence in the AIPB context is considered additional information air and air defense systems receive that is not organically produced. It includes IMINT, HUMINT, SIGINT, MASINT or other forms of intelligence that amplify data in the IADS system, providing targeting intelligence and otherwise helping the adversary commander paint a picture of the threat being faced. To assess intelligence information for the C3 system, the analyst should (1) describe the sources of intelligence inputs to both the targeting and IADS process. (2) Identify intelligence collection capabilities, locations, systems and processing facilities. (3) Describe how intelligence dissemination occurs, how long it takes for consumers to request and receive it and how or where it is fused and injected into both the targeting and IADS process. (4) Determine if foreign intelligence or military forces provide early warning, if so, identify and describe how.

**A2.5.5.1.9. Training and Proficiency.** An assessment of training and exercise events helps us to determine **how well C3I can be expected to work**. This type of analysis is most helpful and applies before military operations begin. It also establishes the combat intelligence baseline. Once forces are engaged, proficiency of forces will likely rapidly improve and adjustments will be made in response to experience gained. The focus is to determine and predict capabilities. The AIPB analyst is not trying to describe how training is conducted. The information in [Table A2.5.](#) can be evaluated to derive a qualitative assessment of how proficient the adversary is in air warfare and thereby project capability. When assessing exercises and training events, AIPB analysts should evaluate the exercise and training areas in [Table A2.5.](#)

**Table A2.5. Exercise and Training Events.**

<b>Exercises.</b>
Are joint exercises (fighters, SAM/ADA, EW, ground, naval) conducted? What is the frequency? Describe scenarios.
Are live firing exercises conducted (fighters and SAM/ADA, ATBM)? What is the frequency? Ranges? Describe scenarios. Are the exercises no notice? What are the targets?
Describe the exercise evaluation system.
Describe significant exercises and assess quality.
Is electronic warfare (ECM/ECCM) infused in exercises?
<b>C3I Training.</b>
Quality of facilities, simulation, scenario complexity, adversary lessons learned, if available.
Participation by foreign advisors?

**A2.5.5.2. Air Forces.** When evaluating air forces, analysts should evaluate doctrine, tactics, weapon system capabilities, training and proficiency.

**A2.5.5.2.1. Doctrine and Observed Tactics.** Doctrine and tactics indicate how an adversary intends to employ his forces under ideal circumstances and as a result of historical experience. Doctrine combined with observed tactical execution in actual operations or in exercises is the primary source available from which to assess capabilities. Doctrine provides insight into what and how the adversary expects to do things. Observation of actual operations and exercises provides information on how well he can do it. Items to consider are included in [Table A2.6](#).

**Table A2.6. Doctrine and Observed Tactics.**

<b>General.</b>	
Formations.	
Situational awareness measures and activities.	
Tactics and counter tactics.	
Knowledge of friendly tactics, equipment, and capabilities.	
<b>Air-to-Air.</b>	
Ground-controlled intercepts.	
Pre/post merge maneuvering.	
Sensor use (aircraft radar, infrared sensors, and any other sensors).	
<b>Air-to-Surface.</b>	
Ordnance delivery profiles.	
Ground support coordination measures.	
Naval support coordination measures.	

**A2.5.5.3. Weapon System Capabilities.** Weapon system capabilities are the technical capabilities of the aircraft and their associated weapon systems without regard to operator skill. In other words, what are the maximum and minimum performance limitations resulting from the inherent technical design. They include such things as range, altitude, speed, load capacity, sensor performance, etc. In addition, weapon system capability assessments include **operational capabilities**. Operational capabilities are weapon system capabilities that can be expected due to modification for combat and/or other operational considerations. Operational capabilities are what the AIPB analyst should focus on to brief or disseminate. Factors to be evaluated are included in [Table A2.7](#).

**Table A2.7. Weapon System Capabilities.**

<b>Aircraft.</b>
Range, combat radius, loiter time.
Operational ceiling.
Combat weapons load.
Navigational capability.
Target acquisition capability/aircraft sensor capability.
Self-protection/countermeasure capabilities.
Electronic jamming/electronic countermeasure capabilities.
<b>Air-to-Air and Air-to-Surface Weapons.</b>
Seeker performance.
Missile performance.
Warhead performance.
Aircraft/weapon interface.
Firing rate, caliber, ammunition type.

**A2.5.5.3.1. Training and Proficiency.** The focus is on the expected adversary after assessment of the adversary's robustness of training. Items that should be assessed are included in [Table A2.8.](#)

**Table A2.8. Weapon System Capabilities Training and Proficiency.**

<b>Ground Attack, Intercept and Maneuvering Air Combat Training (MACT).</b>
Characterize and describe maneuvers used (i.e., basic or advance, high/low yo-yo, scissors, barrel roll, high-low-high, etc.).
Are dissimilar aircraft used in intercept and MACT?
How challenging are the attack profiles/maneuvers?
Are section or division tactics used?
Does training include more than 1v1 engagements? (2v1, 2v2, 1vmany, few-versus-many, many-versus-many?)
Does training include robust threats in transit to or from the target area and in the target area?
Does training include transitions (offensive to defensive) or is it limited to role reversals? Is training scripted or is "free play" allowed?
Is training under strict ground control?
Do pilots train with the same GCI sites or controllers?
What intercept tactics are used in training (for example drag, decoy, hook, pincer, sweep, breakaway, etc.?)
<b>Training Facilities.</b>
Air Academy; location, class, or year, number of students, graduation rate, course length, curriculum, foreign advisors (source and number)?
Identify simulator locations, sources, capabilities, frequency of use, etc.
Foreign training? If so what, where, how good?

**A2.5.5.4. Air Defense Forces.** When evaluating air defense forces, analysts should evaluate essentially the same factors as for air forces (for example doctrine and tactics, weapon system capabilities and training and proficiency). The primary difference is the addition of actual radar coverage to the assessment weapon system capabilities.

**A2.5.5.4.1. Doctrine and Observed Tactics.** When evaluating air defense forces the analyst should consider the factors in [Table A2.9](#).

**Table A2.9. Air Defense Forces.**

Fixed site configuration (point or area defense co-location with critical facilities).
Mobile SAM/AAA deployment or employment layout and tactics, including ground and naval forces support and associated units or equipment.
MANPADS deployment or employment layout and tactics.
Shot doctrine and tactics.
Radar employment and tactics.
Autonomous operations.
CC&D measures.
Field maintenance and logistics capabilities and support.

**A2.5.5.4.2. Weapon System Capabilities and Radar Coverage.** Analysts should assess the weapon system capabilities included in [Table A2.10](#).

**Table A2.10. Weapon System Capabilities and Radar Coverage.**

Seeker performance.
Missile performance.
Warhead performance.
Radar performance and range (target acquisition and target tracking radar).
Radar or missile interface.
Firing rate, caliber, ammunition type.
ECM capabilities.

**A2.5.5.4.3. Radar Ranges.** Radar ranges are combined with terrain data to depict actual radar coverage of the operating area and AOI if required. This is normally done with computer automation tools found at both wing and AOC levels. Types of coverage that should be assessed typically include high or medium altitude detection depictions, low altitude detection depictions, specific platform, or depictions of radar cross-section detection. If required, passive detection sensor and SIGINT detection options should also be developed.

**A2.5.5.4.4. Training and Proficiency.** Air defense forces are normally part of an IADS. Thus many of the same factors that were assessed under C3I are assessed here. The difference in this assessment is that the AIPB analyst is looking at how individual crews and sites are likely to perform instead of the C3I system. Elements to assess are included in [Table A2.11](#).

**Table A2.11. Radar Ranges Training and Proficiency.**

<b>Exercises.</b>
Are joint exercises (fighters, SAM/ADA, EW, ground, naval) conducted? What is the frequency? Describe scenarios.
Are live firing exercises conducted (fighters and SAM/ADA, ATBM)? What is the frequency? Ranges? Describe scenarios. Are they no notice? What are the targets?
Describe the exercise evaluation system.
Describe significant exercises and assess quality.
Is electronic warfare (ECM/ECCM) infused in exercises?
<b>Training Facilities.</b>
SAM/ADA, Radar, EW, training locations, course length, curriculum, number of graduates, foreign instructors (source and/or number).
Identify simulator locations, sources, capabilities, and frequency of use.
Foreign training? If so what, where, how good?

**A2.5.5.5. Electronic Warfare.** Another significant air warfare dimension to assess is the adversary's capability to conduct electronic warfare (EW).

*Electronic Warfare is any military action involving the use of electromagnetic and directed energy to manipulate the electromagnetic spectrum or to attack an adversary. This is not limited to radio frequencies but includes optical and infrared regions as well. EW assists air and space forces to gain access and operate without prohibitive interference from adversary systems...Electronic attack limits the adversary commander's use of the electronic spectrum; electronic protection (the defensive aspect of EW) enhances the use of the electronic spectrum for friendly forces; and electronic warfare support enables the commander's accurate estimate of the situation in the operational area. (AFDD 2-5)*

In assessing EW capabilities the analyst should evaluate communications and friendly weapon systems jamming capabilities and sites. This analysis should cover ground, air and naval capabilities as well as C2 arrangements and integration into air and air defense operations.

**A2.5.5.6. Other Factors.** Thus far the capabilities assessments have focused primarily on weapon systems and weapon system operators. Much of it would have its most direct impact on the planning for and execution of tactical air operations. However, air and air defense forces cannot function at their peak performance or sustain combat operations for any length of time without a supporting infrastructure. At the operational level these elements are critically important as they by and large determine the long-term or theater-wide capability of the adversary to conduct air operations.

**A2.5.5.6.1. Air Defense Supply System.** Describe the air defense supply system. Is it a single system servicing all air defense units? Does each Service (Army, Air Force and Navy) provide support for its air defense component (Fighter, surface-to-air missile (SAM), Air Defense Artillery (ADA), Antitactical ballistic missile (ATBM), Radar, EW, etc.)? Is the system centralized or decentralized? Is it automated? If automated, identify and describe the system, its

components and the source. Is the system operated on a push or pull basis? How responsive is the system?

**A2.5.5.6.2. Air Defense Supply Facilities.** Identify and locate air defense supply facilities. Are supply facilities located in each air defense division, region, sector, or defended area? How are supplies distributed from supply facilities to users? Are the supply facilities capable of providing supplies to deployed forces in a fluid combat situation? Are supply centers permanently fixed or are they mobile? Can the logistical tail keep up with deploying forces?

**A2.5.5.6.3. Air Defense Supply Facilities Personnel.** Who operates the supply system—indigenous or foreign personnel? How many supply personnel are foreign? What are the nationalities? Describe their functions/positions. Where are foreign supply personnel located? What restrictions/limitations are placed on their movements/activities?

**A2.5.5.6.4. Air Defense Supply Sources.** What are the sources of air defense supplies (Weapons, equipment, spare parts, ordnance, etc.) Are any indigenously produced? If so, identify and locate. What foreign sources, if any? What is the extent of dependence on foreign supply sources? How reliable are these sources? Identify air defense related ordnance. (1) Air ordnance. What air-to-air missiles are in the inventory? What are the sources? How many are there? Where are they stored? What is the shelf life? (2) Surface-to-air (SA)/ADA/ATBM Ordnance. Identify SA inventory. How many are there? Sources? Where are they stored? What is the shelf life? Identify ADA ordnance by caliber. Sources? How much is there? (3) What are the prescribed peacetime and wartime stock levels of spare parts, ammunition, POL and other critical expendables at airbase, wing/squadron, SAM site, etc.; e.g., 15-day, 30-day? What are the actual levels maintained?

**A2.5.5.6.5. Air Defense Supply Components.** Identify the spare parts and critical components of the Prescribed Load Lists (PLL) maintained for each air defense weapon and system. How many line items are on PLL? How were PLL developed (usage factors or directed)? What items have the highest usage factors? What is the cannibalization policy for air defense equipment? Is it a Service decision? What echelon of command can make the decision to cannibalize? Does the policy differ between peacetime and wartime? What controls are in place?

**A2.5.5.6.6. Production Capability.** Is there an indigenous production, co-production, or assembly capability for aircraft, missiles, radars, launchers, etc.? Locate and describe capability and capacity.

**A2.5.5.6.7. Maintenance Capability.** Identify any domestic or foreign maintenance capability. Identify domestic maintenance facilities. Locate the facilities. Describe any capabilities and limitations. Answer the following questions: what levels of maintenance are performed? How many systems are normally in domestic maintenance facilities at any given time? How many foreign technical assistants are present? Identify countries? Locate. Do these personnel enter combat zones? Are they reliable in crises? Are mobile maintenance teams formed and used? Assess the quality of domestic maintenance at the unit level and at support facilities. Describe surge capability during crises. Describe sortie generation capability at unit level. For foreign maintenance, analyze the following: What levels of maintenance are required out of country? Identify the countries performing maintenance. Are any strings attached to the contracts (for example, support during crises, etc.)? How many items of equipment by type (fight-

ers, SAMs, radar, EW) are sent out of country for maintenance annually? What is normal turn-around time for each item? How are they sent out (i.e., surface or air)?

**A2.5.5.6.8. Operational Readiness (OR).** What is the OR rate for each air defense-related aircraft, SAM system, ADA system, EW, and C3 system? (Consider equipment readiness, personnel, training and logistics/maintenance in the assessment). What wartime OR rate is likely? What is the "flyable" aircraft rate (aircraft less than fully OR)?

**A2.5.5.6.9. Personnel.** Personnel elements to assess are included in [Table A2.12](#).

**Table A2.12. Personnel Elements.**

<b>Estimated Total Committed to Air Defense Function.</b>
Break down by service and function.
How many foreigners by nationality: How many performing operational duties? How many in non-operational duties (training/school, maintenance, advisory, etc.)?
<b>Sources of Air Defense Personnel.</b>
How many are draftees, volunteers, and/or reservists?
What is the period of service for each?
Foreign personnel-mercenaries or government to government agreements; identify countries; what is their period of service; dependents; incentives; locations; duties?
<b>Identify Key Air and Air Defense Personnel in Command.</b>
Wing, battery and squadron levels?
Principal and special staff personnel?
Special projects personnel, training personnel?
<b>Combat Experience.</b>
Percentage of the force with combat experience.
Identify key personnel with combat experience.
Assess quality of combat experience.
<b>Pilots.</b>
Command objective for pilot-to-aircraft ratio: pilot to total aircraft ratio; pilot to operationally assigned aircraft ratio.
Actual pilot-to-combat aircraft ratio (air defense related).
Number of pilots (in air defense functions) by: aircraft type, airbase, squadron, training unit/school.
Foreign pilots (in air defense functions) by: source, aircraft type, airbase, unit, and function.
Number of pilots TDY, in training (foreign or domestic), on special projects and not otherwise present for duty.
Estimated annual pilot attrition and/or acquisition rate.
<b>Air Defense Operators.</b>
Number of operators by functional area (i.e., SAM, ATBM, radar, EW, ADA, etc.).
Operators by system and location.
Estimate annual attrition and/or acquisition rate.
Number of foreign operators by nationality, location, and system.

<b>Technicians.</b>
Total number of technicians by functions (e.g., aircraft/SAM/Radar, ATBM, EW, etc. maintenance, weapons (including laser, DEW, etc.) maintenance, communications maintenance, etc.).
Number of technicians by: function (break out aircraft technicians by airframe), airbase, support facility, training facility, unit.
Number of technicians TDY, in training (foreign or domestic), on special projects and not otherwise present for duty.
Estimated annual tech attrition and/or acquisition rate.
<b>Assess Morale and Loyalty.</b>
Total force.
Officer and/or Enlisted.
Pilot and/or Non-pilot.

**A2.5.6. Summary.** The information the AIPB analyst must derive from all this detail includes relevant capability statements and vulnerabilities and weaknesses. These are then used as a basis for developing air operations plans. Some examples of air related capability statements include (1) Strategic: “The adversary has no capability to produce aircraft and is highly reliant on foreign technicians to maintain and service aircraft.” (2) Operational: “The adversary is capable of conducting sustained 24 hour operations and generating approximately 250 attack sorties per day.” (3) Tactical: “Airfield X is located within 100NM of the front lines and contains the country’s most proficient ground attack pilots and 5th generation aircraft. However, little training emphasis is placed on night or poor weather flying; therefore, ““expect 50 attack sorties per day primarily conducted in day light conditions and during good weather.” To reiterate, the AIPB analysts job is not to build the country study but to determine what it means operationally and select those key aspects that will impact planning and can be exploited to further the commanders objectives and mission.

**A2.6. Step 4: Determine Air and Air Defense Threat Courses of Action (COA).** The main body of the pamphlet discusses Step 4 in detail and developing air/air defense-related COA does not differ much from the fundamentals discussed in it. What follows will be a brief discussion of some potential generic air and air/air-defense related COA and additional items for considerations when developing them.

**A2.6.1. Generic Air COA.** Air Forces have essentially three broad courses of action available to them; attack, defend or avoid. All three can be done simultaneously. How the adversary perceives its situation generally affects which will be chosen and receive the weight of effort. Robust air forces will normally choose to attack, since air forces are most efficiently and effectively employed in the offensive. The adversary who does not see the air situation favorably will probably select one of the latter two. The choice to defend or avoid will most likely be influenced by how the adversary views its requirement for post conflict air forces (future), perceived impact of current friendly operations to COG and critical targets (today), and ability to put forward an effective defense. COA based off one of the three basic themes can be developed using the capabilities and environmental data gathered in Steps 2 and 3.

**A2.6.2. Generic Air Defense COA.** By definition air defense forces will adopt a defensive and/or avoidance COA. Meaningful air defense forces COA should characterize the type of defensive and/or avoidance measures expected. Air defenses can (1) stand in place and fight, which is usually associated with burying and hardening activities. (2) “Go mobile,” which is normally accompanied by rapid set-ups and tear down (shoot and scoot), minimal radar emissions and CC&D activities. (3) Avoid at all costs using many of the same techniques associated with defensive COA.

**A2.6.3. Other Factors.** Air and air defense COA are part of a greater whole. Air and/or air defense COA should not be developed in a vacuum. They should be compared with national and/or strategic COA and objectives and probable COA and objectives of other adversary forces for consistency and plausibility.

### Attachment 3

## AEROSPACE INTELLIGENCE PREPARATION OF THE BATTLESPACE FOR SPACE OPERATIONS

**A3.1. Overview.** The Air Force's application of space power is defined and explained in Air Force Doctrine Document (AFDD) 2-2. Space forces influence operations throughout the range of military operations and at all levels of military activity – strategic, operational, and tactical. Space IPB makes the commander aware of how the adversary uses space systems to enhance warfighting capabilities and how to counter these activities with friendly COA. This attachment will step forward from the basic ideas described in AFDD 2-2 and this document. The thought processes mentioned in this attachment are not all encompassing. As each commander's mission, objectives, and situations are unique; this attachment merely provides a starting point for applying AIPB to meet mission requirements.

**A3.2. Step 1: Define the Battlespace Environment.** When conducting IPB for space operations, it is important to remember the space environment has unique characteristics in which traditional military forces are not used to operating. Military operations in space require thinking beyond the physical forces that influence combat and operations on earth. In this process, the weightless environment, the sun's effects, the earth's atmosphere and the earth's magnetosphere must be taken into consideration. Military operations in space resemble those at sea because no single nation owns space. Consequently, all space-faring nations may exercise free travel throughout it. Also, because spacecraft are dependent upon earthbound ground stations for communications, command and control, the impact of terrestrial events upon space operations must not be ignored.

**A3.2.1. Significant Characteristics of the Battlespace.** As with any form of IPB, we determine those unique environmental characteristics of space that will affect the commander's decisions or affect the COA available to friendly or enemy forces. Additionally, when considering the environmental characteristics of space, the terrestrial environment's characteristics must also be considered. For example, both friendly and enemy space capabilities rely heavily on terrestrial command and control. The terrestrial environment will impact the ability to control and communicate with spacecraft.

**A3.2.1.1. Lack of Political Boundaries.** While we say that space operations are like maritime operations, there are significant differences. Although naval forces and merchant vessels do have freedom to travel the seas, all nations recognize physical boundaries extend a certain distance into the waters surrounding it: customarily 12NM. No vessel may enter a nation's territorial waters without permission. Likewise, no aircraft or space lift vehicle may over-fly a nation's territory without permission. There are no such limitations to overflight by space systems established in orbit. No space-faring nation recognizes any international boundary in space. Similarly, spacecraft have unlimited over flight rights.

**A3.2.1.2. Spacecraft Are Not Affected to the Same Extent as Aircraft by the Earth's Terrain.** Depending on altitude, spacecraft movement is affected by the earth's topography, density, and large mass gravitational effects. These can be managed through proper mission planning and optimized to enhance ISR and other capabilities (communications, warning, etc.). In addition, topography can hamper space derived data reception.

**A3.2.1.3. Physical Space Environment.** Like any other environments (surface, subsurface, air), space has its own physical characteristics that affect space operations. These include:

A3.2.1.3.1. Extremely low air density.

A3.2.1.3.2. Areas of trapped radiation and charged particles in specific orbital locations that influence where spacecraft can safely operate.

A3.2.1.3.3. The Sun's direct and indirect effects on the earth's atmosphere – energy input changes upper atmosphere density, which effects drag to objects in Low Earth Orbit (LEO). Without correction, this results in orbital decay and, potentially, mission termination. Solar discharges and other space weather effects can damage spacecraft components or result in spurious commands that can interrupt spacecraft function. Meteor showers, other celestial events, Aurora, and Ionosphere may all impact signal propagation.

**A3.2.1.4. Other Factors:**

A3.2.1.4.1. Presence of debris (i.e., “space junk”).

A3.2.1.4.2. Terrestrial geography and weather near potential space control and launch sites.

A3.2.1.4.3. Target country infrastructure supporting space operations.

A3.2.1.4.4. Rules of engagement or legal restrictions such as international treaties or agreements (these may be concerned with either terrestrial politics or freedom of action in space).

A3.2.1.4.5. Space Policy and Law: International space policy and agreements limit military operations in space. For example, the Outer Space Treaty of 1967 bans orbiting or stationing nuclear weapons or other weapons of mass destruction in space or installing them on any celestial body.

A3.2.1.5. Space IPB is complicated by the immense size of the operations area and the area of interest. Identifying significant characteristics of the battlespace will help focus analytical efforts, particularly regarding the area of interest.

**A3.2.2. Identify the Limits of the Operations Area (OA).** We know from previous chapters that the OA is the geographical area where the commander conducts military operations to accomplish a specific mission. The OA for space operations is immense. In fact, space bounds every air, land, and sea area of responsibility (AOR) assigned to a combatant commander. In addition, there is no international agreement regarding the specific boundary between air and space. Generally, space can be said to begin at the lowest altitude at which an object can maintain a stable orbit around the earth (approximately 90 NM). However, the limit of an OA should be based on the capabilities of friendly and enemy (or third country) satellites. In this case, consider the orbital characteristics of satellites – what are the maximum orbital altitudes of friendly, enemy, and third country satellites. This could conceivably extend an OA out to a distance of several thousand miles from the earth's surface. In a sense, then, the OA is the area where Blue, Grey, and Red space operations occur.

**A3.2.3. Establish the Limits of the Area of Interest (AOI).** In general, the space AOI will depend upon the limits of enemy and friendly space capabilities. The AOI may include third country territory, as well as enemy territory. To establish an AOI, these kinds of questions should be asked: (1) What is the adversary's space capability? (2) Does he have his own space program? If so, what types of spacecraft does he operate? (3) Does he operate ground stations in third countries? (4) Does the adversary receive space support from other countries or consortia? If so, from what countries and/or consortia does the adversary receive space support? (5) Does the adversary receive data from third country ground stations operated in a fourth country?

**A3.2.4. Evaluate Existing Databases and Identify Intelligence Gaps.** Not all the intelligence and information required to evaluate the effects of each characteristic of the battlespace and each threat force will be in the current database. Early identification of intelligence gaps will permit collection operations for required data before combat operations are initiated. In many cases, gaps will require other intelligence organizations to provide support in obtaining and analyzing the necessary data. Also, any gaps that cannot be filled should be identified. There are a number of sources describing the space environment and space systems. These include but are not limited to:

- A3.2.4.1. Air Force Tactics, Techniques, and Procedures 3-1, Volume 2, Threat Reference Guide and Countertactics (S/UO).
- A3.2.4.2. Air Force Tactics, Techniques, and Procedures 3-1, Volume 28, Tactical Employment Space (S/UO).
- A3.2.4.3. Aircrew Combat Information Guide (S).
- A3.2.4.4. Communications Space Systems (DST-1430S-028-92-SAO (TS/SCI)).
- A3.2.4.5. Electronic Warfare Threat to Space Systems (NAIC-1750-0111-98 (S/UO)).
- A3.2.4.6. ERS Ground Stations World (IAR-97-027 (S/USO)).
- A3.2.4.7. Foreign Reliance On Space Systems (FROSS)—All volumes (CIC-1430-08-95-SAO (TS/SCI)).
- A3.2.4.8. IRS Satellite Network Worldwide (IAR-98-007 (S/NF)).
- A3.2.4.9. Military Employment of Space (NAIC-1440-100-95).
- A3.2.4.10. Satellite Control and Data reception sites- world (IAR-88-005 (S)).
- A3.2.4.11. Space Launch Vehicles of the World (NAIC-1442-0658-98 (S)).
- A3.2.4.12. Space Systems Handbook -CIS (DST-1400H-252-93 (S/NF/WN)).
- A3.2.4.13. Space Systems Handbook -Non-CIS (DST-1400H-253-94 (S/NF/NC/WN)).
- A3.2.4.14. Space Systems Threat Environment (NAIC-1574-727-98 (S)).

**A3.3. Step 2: Describe the Battlespace Effects.** One must consider terrestrial and space “weather” (or, more accurately, natural space environmental phenomena) when considering the battlespace effects. These phenomena must be considered because space systems consist of both terrestrial and space-based components. Space environmental effects, such as solar flares, high-energy particles, space debris, etc. can degrade or negate friendly and adversary space systems and operations. Consideration should be given to the cyclical nature of many of these effects to predict times of possible degradation. Terrestrial weather and environmental effects can also degrade almost all space operations. Certain frequencies can be attenuated by rain and lightning discharges, limiting not only command and control channels, but also communications. Cloud density, smoke, and smog can also limit the ISR capabilities of satellites. The characteristics of satellite orbits also limit some satellite functionality. For example: Geo-stationary satellites can maintain a nearly constant position relative to the surface of the earth. Satellites in LEO or Highly Elliptical Orbits move at extremely high speeds around the Earth. The result being that certain types of space systems may only be available over a theater for approximately 15 minutes every four to six hours. Also, satellite orbits impact the transmission of mission information that supports terrestrial forces.

**A3.3.1. Weather and Space Environment Analysis.** Intelligence analysts rely on assigned weather teams to provide analytical support. Because weather often determines how and when an operation is conducted, weather teams must be brought into all operational planning as early as possible. If time and resources permit, climatology-based terrestrial weather overlays for planning purposes can be obtained from the AF Combat Climatology Center (AFCCC). Space environment products are available from the 55<sup>th</sup> Space Weather Squadron (55 SWXS) or Air Force Weather Agency (AFWA/XOGS). Once deployed, the supporting weather team can prepare similar but less detailed overlays, depending on the availability of data. Weather teams can provide detailed descriptions of the weather's effects on each system and sub-system of a unit's equipment.

**A3.3.2. Military Aspects of Terrestrial Weather.** Terrestrial weather is one of the prime concerns for tactical or theater mobile units. Transportable Remote Tracking Stations (RTS), deployable ground stations and deployed air launched space lift vehicles will be keenly aware of weather limitations. The following elements represent a sampling of conditions.

**A3.3.2.1. Visibility.** Low visibility is beneficial to offensive, covert operations. It conceals operations from ground- and space-based ISR, thus enhancing the possibility of achieving surprise or operating undetected.

**A3.3.2.2. Winds.** Strong winds can hamper the efficiency of directional antenna systems by inducing antenna wobble. Lightweight mobile equipment will have wind loading limitations. Topography will be the greatest controlling factor in site selection with respect to strong winds. Flat open plains will have winds associated with large-scale weather systems. Deep valleys or gorges will have a daily regime of cold air drainage down the valley shortly after sunset. Valley winds can reach 50+Kts or more on a regular basis.

**A3.3.2.3. Precipitation.** Heavy precipitation can absorb the signal in Ka and Ku band communications equipment (such as, Global Broadcast System (GBS) and MILSTAR). Heavy snow and rain cover can reduce the efficiency of many antenna systems as well as degrade the effects of "receive only" Satellite Communications (satcom) systems. Precipitation and associated drainage impact site selection. Setting up transportable equipment near a river with only young tree growth is an invitation for disaster. Old growth trees and vegetation exist where they do for a reason: they are safe from flooding. Tactical systems should stay away from ground susceptible to mud.

**A3.3.2.4. Surface Conditions.** When selecting a site for antenna placement, consider whether the ground is frozen solid or susceptible to settling. Ground that thaws due to metal legs heating in the sun and sinking into the soil will cause a loss of level. Frequent shifts in an antenna's level may accumulate to a point beyond which corrections can be made.

**A3.3.2.5. Cloud Cover.** Cloud cover affects overhead ISR detection and ground operations by eliminating shadows and differential heating of targets (necessary for IR detection). Heavy cloud cover can degrade many target acquisition systems, providing a target a degree of safety. This is of particular concern for warning satellites like the Defense Support Program (DSP) satellites. Cloud cover can reduce IR signatures making missile launch detection difficult.

**A3.3.2.6. Temperature and Humidity.** Extremes of temperature affect lubrication of moving parts and reduce battery power. Humidity changes soluble particulate (salt) to aerosols, which corrode exposed metal surfaces. Sensitive equipment requiring air conditioning may be taken out of service by a heat wave taxing the cooling system. In addition, vertical temperature gradients cause discontinuities in air density that can result in radar anomalous propagation; the radar beam is

refracted from the standard path, which must be compensated for to prevent inaccurate target fixes.

**A3.3.2.7. Atmospheric Turbulence.** Changes in density in the lower atmosphere and turbulent eddies along the path of a laser beam can cause scintillation effects that degrade or refract the beam from a direct line of sight.

**A3.3.2.8. Sun Exposure.** Exposure to the sun will turn some types of plastic into shrunken, brittle fragments. Satellite dishes tracking spacecraft can become “blinded” as they track into the strong RF emissions of the sun. Additionally, sun glint off lakes and ocean surfaces can provide false missile launch indications. Long exposure to UV radiation often makes water-sealed joints brittle and ineffective.

**A3.3.3. Military Aspects of the Space Environment.** While terrestrial weather mainly affects the ground segment of a space system, many space environmental effects impact operations through and within space. Specific systems affected by space “weather” include:

**A3.3.3.1. Satellite Communications.** SATCOM systems use very high, ultra high, super high, and extremely high frequency (VHF, UHF, SHF, and EHF) bands to mitigate the ionospheric effects inherent to HF communications systems. However, strong solar flares, coronal mass ejections (CMEs) and geomagnetic storms (which are enhanced by solar flares and CMEs) still degrade system effectiveness. Scintillation is a rapid variation in the phase and/or amplitude of a SATCOM signal caused by discontinuities in the ionosphere. Scintillation is most severe at high latitudes and at the equator, especially during nighttime hours, and is enhanced significantly during geomagnetic storms. Additionally, if the sun is in the ground station receive antenna reception field, a solar radio burst may cause radio frequency interference, degrading system performance. These communications problems deny satellite controllers positive control of their systems and users of satellite systems the data obtained or transmitted by the satellite. So, all satellites, not just communication satellites, are affected to some degree. Global Positioning System (GPS) down-link signals that pass through regions of strong ionospheric scintillation may experience signal strength fluctuations and phase changes that can cause a locked-in GPS satellite to lose track of it. If a GPS receiver loses lock-on to several satellites at once, the overall precision navigation capability will be degraded.

**A3.3.3.2. HF Operations and Communications.** Disturbances in the ionosphere caused by X-ray or energetic particle radiation emitted during solar flares and CMEs degrade the performance of systems using HF communications. HF systems operating on the sunlit side of the earth may experience short wave fades (SWFs) as a result of solar flares. SWFs, which may persist for several hours, render systems using frequencies from 3 to 30 MHz useless. HF systems transmitting signals north of 55°-north latitude (or south of 55° south latitude) may experience severe signal absorption due to polar cap absorption (PCA) events experienced during significant solar proton storms. HF systems operating through the auroral zones will experience a variety of problems such as absorption and non-great circle propagation. In other words, the HF Signal normally bounces off a spherical shell-like ionosphere in a predictable manner. A disturbed ionosphere has ripples and holes in it, making the bounce not very predictable. Army and Air Force combat forces rely on tactical HF communications networks to exchange plans, instructions, and intelligence information. Command Posts use HF systems to communicate with and provide positive control of Airborne Warning and Control System aircraft and strategic forces. All of these systems are

vulnerable to SWFs, PCA events, and auroral propagation anomalies, denying Commanders access to reliable communications and intelligence information.

**A3.3.3.3. Radar Systems.** The DOD relies on several long-range radar systems to accomplish missile warning and space surveillance, such as PAVE PAWS and Ballistic Missile Early Warning System (BMEWS). Signals from these systems pass through the ionosphere. Variations and perturbations in the ionosphere, caused by solar flares and CMEs, can produce a number of problems. One of the most serious problems for northern-hemisphere radar's looking toward the north is the occurrence of auroral interference. The aurora, which is enhanced by energetic particle bombardment during solar flares, causes intense interference that degrades radar coverage over large geographical regions, masks target returns, produces false targets, and gives false launch indicators. Additionally, if the sun is in the radar receive antenna reception field, a solar radio burst may cause radio frequency interference, degrading system performance.

**A3.3.3.4. Satellite Control and Tracking.** Increased levels of ultraviolet and X-ray radiation (released during solar flares) and charged particle bombardment during geomagnetic storms (caused when energetic particles released during solar flares reach the earth) heat the earth's upper atmosphere. As the atmosphere is heated, it expands. The resulting higher atmospheric density at a satellite's altitude produces increased drag on the satellite. This drag decreases the satellite's altitude and increases its orbital speed. Changes in satellite altitude and speed cause errors in predicted satellite locations. These errors make it difficult for USSPACECOM to maintain its space track catalog and for ground stations to track the satellites when attempting to transmit or receive data from them. These orbital changes also result in satellite controllers making unplanned maneuvers and expending valuable fuel to return the satellite to its original orbit. Difficulty in tracking satellites and other space objects can also be encountered due to anomalous refraction of a space track radar's beam as it passes through the ionosphere. More (or less) bending of a radar beam than predicted can cause errors in an object's apparent azimuth and range.

**A3.3.3.5. Satellite Anomalies.** Satellites in space are constantly exposed to energetic particles. Solar flares cause these particles to vary in energy and number, affecting operations and potentially damaging orbiting satellites. Satellite anomalies may result in the loss of data obtained or transmitted by the satellite or in damage to critical on-board sensors and components, reducing the life span of vital satellite assets. Reduced satellite life spans may necessitate unplanned launches of replacement satellites. In some cases, satellite controllers must make unplanned maneuvers to correct command and control satellite anomalies.

**A3.3.3.6. Spacecraft Charging.** Increases in the number of energetic particles at satellite altitudes cause huge differential charges to build up between the satellite and its surroundings (or between different parts of the satellite). The charge buildup leads to discharging or sparking, which results in problems such as spurious commands to satellite sensors, breakdowns of vehicle thermal coating, or degradation of optical sensors and solar cells.

**A3.3.3.7. Single Event Upset (SEU).** SEUs occur when a single high-energy particle penetrates a satellite. Such a particle is capable of depositing enough charge deep inside the satellite to cause an electrical upset. SEUs cause loss of stored data, software damage, unplanned command and control events, and failure of on-board computers.

**A3.3.3.8. Satellite Disorientation.** Satellite disorientation can occur when energetic particles collide with sensors designed to maintain the satellite's orientation relative to the earth. For exam-

ple, satellites have windows looking up to the stars, which keep them in position. Satellites use a star catalog to identify those stars and keep them facing the right direction. Strong proton events or charged particle storms will send subatomic particles crashing into these windows producing a flash. The satellite may confuse those flashes as stars, which aren't in its star catalog. The satellite begins to fire its thrusters looking for the stars it expects to see to keep its position. As a result the satellite becomes "disoriented."

**A3.3.3.9. Manned Space Flight.** High levels of radiation (X-rays or energetic particles) are a threat to astronauts in space. When outside the protective effect of the earth's magnetic field, radiation from a single intense solar flare could be fatal. Even within the earth's magnetic field, an astronaut caught outside the shuttle would face a radiation health risk especially in high-inclination (above 55°) orbits. Shuttle satellite deployments require favorable "space walk" conditions in case the astronauts are needed to assist the deployment.

**A3.3.4. Weather Effects on Space Operations.** Weather has both direct and indirect effects on space operations. Examples of indirect effects are: (1) Temperature inversions might cause some battle positions to be more at risk to the effects of chemical warfare than others due to their altitude. (2) Local conditions of visibility, such as fog, might make some potential engagement areas more attractive than others. (3) Hot, dry weather might force a unit to consider water sources as key terrain.

A3.3.4.1. The weather's direct effects on personnel, equipment, and operations must also be evaluated. For example: (1) Atmospheric effects hundreds of miles from a Satellite Tracking, Telemetry and Communication site can delay satellite acquisition and transmission of critical commanding data. (2) Launch and space lift ground operations are heavily curtailed by thunderstorms within in the vicinity of the launch base.

A3.3.4.2. Once the critical values have been set, they should be used as gauges to evaluate the effects of local weather on the operations and COA available to both friendly and threat forces.

**A3.3.5. Space Environmental Effects on Military Space Operations.** In the same way, the space environment can have significant effects on military operations. Examples of indirect effects are:

A3.3.5.1. HF communications are designated as the primary means of communication for an operation. As the operation begins, intelligence reports indicate an enemy COA not identified and subordinate commands must be informed of significant changes to the operation. Unfortunately, a solar flare has just erupted and has caused a short wave fade and all HF communications are unusable.

A3.3.5.2. A convoy is traversing a narrow corridor between two known mine fields. Using their GPS receiver, they establish their position and determine which direction to travel to cross between the minefields. However, while they are determining their position, an ionospheric disturbance degrades their global positioning system (GPS) accuracy by 40 meters.

A3.3.5.3. A unit is trying to transmit vital intelligence information using secure SATCOM. Ionospheric scintillation is causing loss of signal lock. Because of the sensitivity of the secure system, it takes 2 hours to get a simple, but critical, message to higher headquarters.

**A3.3.6. Additional Considerations:**

A3.3.6.1. To completely account for the weather's effects on your unit's equipment, you must account for its effects on each system and subsystem. When considering the weather's effects on a

satellite system for example, you must consider its effects on (1) ground station antennas; (2) communications links; and (3) sensors (DSP, Remote Sensing systems, etc.).

A3.3.6.2. In addition, consider the effects of the space environment on each system or subsystem. For instance, in the above example, how the space environment could affect the communications systems, GPS receivers, and target acquisition systems, especially those using GPS for navigation, must be considered.

**A3.4. Step 3: Evaluate the Adversary.** Step 3 determines adversary space centers of gravity (COG), space force capabilities, doctrinal principles, and applicable tactics, techniques, and procedures (TTP) the adversary prefers to employ.

**A3.4.1. Analyze and Identify Adversary Space Centers of Gravity (COG).** COG identification will be significant in the Space IPB process. Here are some things to consider when identifying space COG:

**A3.4.1.1. Example:** The air component commander's primary space objective is to *gain space superiority over the adversary*. The primary target system that you will be concerned with is the adversary's space system. Based on your analysis in the first two steps, you have identified that the adversary owns no satellite systems of his own. However, he does have ground stations within his country that provide him with satellite data. Therefore, these ground stations can be assessed as being a COG. Possible HVT may be space-related command posts or communication nodes.

**A3.4.1.2. Consider Sub-systems Under Each COG.** As cited above, you have identified the terrestrial component of the adversary as a COG. Sub-systems that may be looked at are the information infrastructure, power system, POL infrastructure, and transportation system. These sub-systems can also be considered COG themselves.

**A3.4.1.3. Identify COG in Third Countries.** Suppose that in the above example you determined the adversary also receives data from ground stations located in third, perhaps, neighboring countries. Current rules of engagement may prevent direct military action against sites in third countries. However, the site is still an adversary space COG. In this regard, it may be necessary to consider other means, such as diplomatic pressure, of denying the adversary information from the site.

**A3.4.2. Update or Create Space Threat Models.** We know from previous chapters that once we determine the environment and its effects on both friendly and enemy forces, we must evaluate the military capabilities of the adversary. Remember this evaluation is based on the enemy's doctrine and tactics, techniques, and procedures. Simply put, we evaluate what the enemy is *theoretically* capable of doing; what he can do when not constrained by the operating environment. In addition, a study of adversary doctrine and TTP allows us to identify high value targets. We can do this by answering a series of simple questions related to his dependence on space, his space order of battle, and how he intends to operate in space.

**A3.4.2.1. Space Infrastructure.** A key point to remember when evaluating adversary space capabilities is that space systems consist of several elements: space, terrestrial, and link. The adversary may or may not have capabilities related to each part of the space system. Therefore, we must analyze and assess adversary capabilities as they relate to these elements.

**A3.4.2.1.1. Space Element.** Platforms for which astrodynamics is the primary principle governing movement. Examples include satellites, the space station or the space shuttle.

**A3.4.2.1.2. Terrestrial Element.** The land, sea, or airborne equipment used to communicate with and control the space element. The terrestrial element also included the personnel required to operate and maintain the equipment. Examples include ground stations, shipborne space communication nodes or airborne space communications systems.

**A3.4.2.1.3. Link Element.** The communications between the space element and the terrestrial-based element. An example of the link element is data link operations.

**A3.4.2.2. Determine Enemy's Overall Reliance on Space Systems:** This includes contracted space systems, consortia membership, and indigenous space capabilities. This is further broken out by how an enemy employs these systems in military operations.

**A3.4.2.3. What is the Adversary's Space Doctrine?** How does the adversary conduct a space campaign? What doctrine can be gleaned from his offensive/defensive space training? Is it combined with his ground/sea/air operations? What (if anything) does the adversary consider "out of bounds" when pursuing space supremacy (military satellites are legitimate targets, but not commercial satellites; not attacking third party ground sites, etc.)?

**A3.4.2.4. What is the Adversary's Space Engagement Decision-Making Process?** What political and military steps does the adversary take to determine when/if to employ offensive counterspace? Who decides when/if to employ missile systems? What (if any) political considerations will the adversary take into account when making these decisions (third-party sensitivities, international backlash, etc.)? Once we have determined the adversary's space reliance, we can examine his ability to conduct offensive counterspace operations. These capabilities (both indigenous and third party) include, but are not limited to:

**A3.4.2.5. Predicted Impact to Adversary Operations if Denied Space Assets.** If denied access to space systems or space derived data, what is the impact to the adversary's ability to conduct offensive operations (does it slow down his decision making process, does it limit his offensive/defensive options, etc.)?

**A3.4.3. Determine Current Adversary Space Situation.** In this sub-step we determine the current adversary space situation and ability (both indigenous and third party space support) to conduct command, control, communications, computer, intelligence, surveillance, and reconnaissance (C4ISR) within the AOI. We do this by examining such activities as:

**A3.4.3.1. Satellite Types and Ephemeris Data (Space Order of Battle):** Satellite system data, including capabilities and limitations, is needed to determine the relative overhead threat (overhead imagery, communications, SIGINT, space-based anti-satellites, etc.). Also required is the satellite positional data known as ephemeris data to determine threat timing (when and where will these satellites be a threat to our operations).

**A3.4.3.2. Satellite Capabilities:** What are the adversary's satellite capabilities (SIGINT, IMINT, communications, etc.)? What is the maximum resolution ability of their imagery satellite (can the adversary tell the difference between an F-15 and a C-130)? In what frequency bands (C, S, X, L band, etc.) does the adversary's communications satellite operate?

**A3.4.3.3. Ground Station Locations and Status:** Locations and BE numbers (if available) of all fixed Earth stations used by the adversary (INMARSAT coastal stations, INTELSAT communications sites, passive data reception sites, indigenous command and control, etc.). Locate any mobile

assets (INMARSAT Standard-M terminals, mobile SPOT passive receive systems, etc.). What is their current operating status and crew training/readiness level?

**A3.4.3.4. Satellite C2 Structure:** What are the locations and links and nodes structure for controlling and accessing the adversary's space assets (Satellite Command and Control communications routes and junctions)?

**A3.4.3.5. Space-derived Data Reporting Timeliness and Distribution Structures:** How long does it take the adversary to receive, process and interpret space-derived data, and how does the data get to the decision makers (courier, data-links, telephone, etc.)?

**A3.4.3.6. Third Party Support Agreement Particulars:** Who does the adversary have space support agreements with, and what can/can't the adversaries do with these assets (only civilian communications allowed on third party satellite, imagery can only be used for agricultural support, etc.)?

**A3.4.4. Identify Adversary Space Capabilities.** Once we have determined the adversary's reliance on space, space doctrine, and readiness/training levels, we can assess his actual space capabilities. Consider the following questions when assessing adversary capabilities:

**A3.4.4.1. Can/will the Adversary Exploit Space Environmental Anomalies?** If the adversary can determine space anomalies, will he use it as cover for offensive counterspace (plausible deniability) activities or to mask offensive ground/sea/air activities?

**A3.4.4.2. Does the Adversary Possess, or Have Access to, Fixed/Mobile Satellite RF Jamming or Exploitation Systems?** What are the system's frequencies, power, jamming waveforms, and primary target sets (GPS, DSCS, FLTSATCOM, etc.)? What are the intelligence indicators showing the use of each system (communication dropouts, GPS not working, reports of out-of-garrison deployment, etc.)?

**A3.4.4.3. Retrofit Capability of Current Ground Stations Into RF Jammers.** Does the adversary (or possible third party) have the technical expertise to modify legitimate Earth stations (INTELSAT, SPOT, etc.) under its control into RF jamming platforms?

**A3.4.4.4. Fixed/Mobile and Co-orbital Anti-Satellite Systems (Missile, Laser, RF, and Spacecraft):** What systems does the adversary have (if any) and what are their operational parameters (maximum range, how many shots, line-of-site engagements only, etc.)? What can their anti-satellite systems attack (low, high or both target orbits) and are they hard-kill or soft-kill systems (killing the satellite itself or temporary/permanent mission payload degradation)?

**A3.4.4.5. Satellite Deception Capabilities (Active and Passive):** Can the adversary inject deceptive commanding into our space systems (modify our commanding)? Can the adversary predict friendly satellite activity and use deception techniques to mislead our decision making process (phantom tanks, fake communications, etc.)?

**A3.4.4.6. Special Operations/Terrorist Capabilities Against Friendly Space Assets:** Does the adversary have special operations personnel deployed to take out ground stations and/or key space operations personnel (much of which will not be "in theater")? Does the adversary have ties to terrorist organizations and how does the adversary command these assets?

**A3.5. Step 4: Determine Adversary's Space Courses of Action (COA).** Step 4 identifies and develops likely adversary space operational COA influencing accomplishment of the command's mission. It inte-

grates the results of the previous steps into a meaningful conclusion. Given what the threat normally prefers to do, and the effects of the specific environment in which he is operating now, what are his likely objectives and COA available to him? Hopefully the previous steps have provided enough information to determine: (1) Adversary's space assets and capabilities, how they will be used, and their value to the adversary. (2) Insight into the adversary's decisions making process. (3) Space assets indigenous to adversary. (4) Space products available to adversary and from whom they're obtained (other country, commercial). (5) Adversary's offensive counterspace capabilities (if any). (6) Adversary's ability to "perceive" friendly situational assessment.

**A3.5.1. Identify the Adversary's Likely Space Objectives and Desired End State.** The adversary's likely objectives and desired end state are identified by analyzing the current adversary military and political situation, strategic, and operational capabilities, and the country characteristics of the adversary nation. The adversary's space objectives must be identified prior to assessing their COA. You should use the information gathered during Steps 1-3 to assist your analysis process in identifying the adversary's objectives.

**A3.5.2. Identify the Full Set of Space COA Available to the Adversary.** No matter what method you use to determine enemy COA, it's important to remember the adversary has many options for using space systems for supporting his objectives or attempting to accomplish space superiority. These options include over 500 commercial, other countries, and US space systems. For instance, an adversary could be using GPS as the primary navigation system, but after a successful offensive counterspace operation by friendly forces, the adversary could switch to GLONASS to complete military operations. On the other hand, friendly space assets provide a target rich environment for adversary COA. Possible adversary offensive counterspace operations include jamming and physical negation of ground space assets.

**A3.5.3. Develop Each Space COA in the Amount of Detail Time Allows.** Once the complete set of adversary space COA have been identified, evaluated, and prioritized, then each COA should be developed into as much detail as the situation requires and time allows. The order in which each is developed is based on its priority and the commander's guidance. To ensure completeness, each COA must answer six questions:

**A3.5.3.1. Who** what assets will the adversary employ?

**A3.5.3.2. What** type of space activity is it (Space control, force application, force enhancement, space support)?

**A3.5.3.3. When** will it begin? The earliest time the adversary can adopt the COA under consideration?

**A3.5.3.4. Where** is the direction of enemy operation?

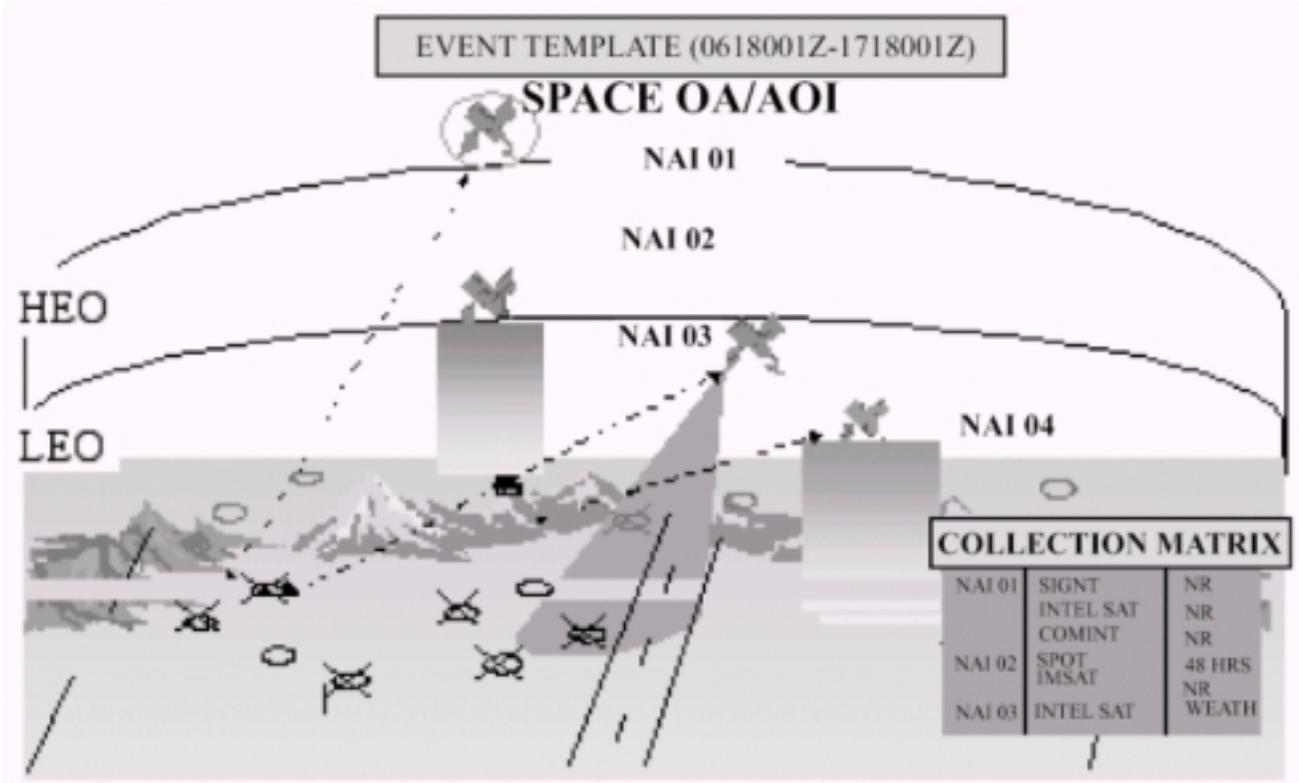
**A3.5.3.5. How** will the adversary employ its space assets or capability?

**A3.5.3.6. Why** is the adversary conducting the space campaign? What are the objectives and end states?

**A3.5.4. Identify Initial Intelligence Collection Requirements.** The identification of initial intelligence collection requirements depends on the prediction of specific activities and the areas in which they are expected to occur and when observed will reveal the COA the adversary has adopted. The areas in which these activities or indicators are expected to place are designated as Named Areas of

Interest (NAI). The NAI and their associated indicators are depicted on the space event template (see [Figure A3.1.](#)) or matrix (see [Figure A3.2.](#)).

**Figure A3.1. Space Event Template.**





## Attachment 4

### AEROSPACE INTELLIGENCE PREPARATION OF THE BATTLESPACE FOR INFORMATION OPERATIONS

**A4.1. Overview:** The Information Dimension is composed of information data, information systems, and information functions any medium adversary or friendly forces use to achieve Information Superiority.

*“Information superiority the degree of dominance that allows friendly forces the ability to collect, control, exploit, and defend information without effective opposition is an Air Force core competency upon which all the other core competencies rely.” (AFDD 2-5)*

The information dimension encompasses communications in the electromagnetic spectrum, transfer of information in cyberspace, and communications through human interaction. Information provides knowledge, influences perceptions, and is often used to automatically control major systems or infrastructures. It can illuminate friendly or adversary perceptions, intentions, and courses of action (COA). Once information paths are identified, the information that passes through these paths can be assessed for military value and evaluate an adversary’s capabilities to disrupt or affect friendly information. This leads to the identification of critical nodes as an information-related step in evaluating the adversary capabilities

**A4.1.1. Information Operations and the Information Environment.** The Air Force’s application of Information Operations (IO) is defined and explained in Air Force Doctrine Document 2-5.

*“Information superiority is not solely the Air Force’s domain, the strategic perspective and global experience gained from operating in the aerospace continuum make airmen uniquely prepared to gain and use information superiority through robust information operations (IO) and execute its two major aspects: information-in-warfare (IIW) and information warfare (IW). IO comprise those actions taken to gain, exploit, defend, or attack information and information systems and include both information-in-warfare and information warfare and are conducted throughout all phases of an operation and across the range of military operations. (AFDD 2-5)*

A comprehension of AFDD 2-5 is required to accomplish IO Aerospace Intelligence Preparation of the Battlespace (IO AIPB). This attachment will step forward from the basic ideas described in AFDD 2-5 and [Chapter 2](#) through [Chapter 5](#) of this pamphlet by adding additional guidelines in the development of the IO AIPB process. The guidance in this attachment is not to be considered all encompassing. As each commander’s mission, objectives, and situations are unique and may differ from others, this attachment provides a boilerplate starting point to develop a detailed IO AIPB process and checklist to meet the mission requirements. A general overview is provided for each step and sub-steps of IO AIPB. The definition of IO in AFDD 2-5 is critical in defining the scope and size of the Information Battlespace. The most important principle is constant awareness of different nations, societies, and cultures, diverse points-of-view. Another country does not have to approach the complexities of IO with the same assumptions and provisions as the USAF or DOD. Every AIPB should identify departures from our method of approaching military problems. IO is no different. As an adversary’s IO environment is described, we should carefully differentiate American military thinking from that of the adversary. Some adversaries will not address information and IO from a military perspective. Nevertheless, many of their methods will either target friendly information or IO and/or defend against our capacity to attack their systems and information infrastructure. The IO battlespace

environment and the framework of IO in the Air Force will be the basis for constant comparison and contrast. Doctrinal elements from the Air Force models can then be overlaid on any adversarial IO programs and models of the adversary's capabilities can be formed.

#### **A4.2. Step 1: Define the IO Battlespace Environment.**

**A4.2.1. Overview.** Step 1 identifies specific features of the IO battlespace environment, activities within it, and the physical space where they exist. The battlespace environment related to Information Operations can encompass the entire cyberspace concept as well as a psychological operation the adversary may target against a single political opponent. So, the battlespace environment must be very specifically targeted and discrete or very multi-faceted and transparent to whom may be affecting the operation. In IO, the key to Step 1 is to delineate this aspect of AIPB and ensure the Intelligence analyst has not overlooked a perspective of IO from both the restrictive and permissive approaches.

**A4.2.2. Desired End Effect.** The desired end effect of Step 1 is to focus the IO AIPB effort on the areas and characteristics of the IO battlespace, which will influence the execution of the command's mission. It also aims to acquire the intelligence needed to complete the IO AIPB in the degree of detail required for the decision making process.

**A4.2.3. How to do it.** Step 1 of the AIPB process involves identifying for further analysis specific features of the dimension or activities within it, and the physical and virtual space where they exist that may influence available COA or the commander's decisions. The primary elements to define the battlespace dimension are in [Chapter 2](#), Step 1: Define the Battlespace Environment. From the six sub-steps, only Steps 2 and 3 are further expanded here for IO.

**A4.2.3.1. Define IO Operational Area (OA).** The IO Operational Area is bound by the limits of the commander's assigned responsibility and authority to conduct offensive information operations against an adversary, throughout the peace-hostility continuum and as adversarial IO extends in, to, or through any virtual or physical domain. Defensive information operations are conducted against known and potential adversaries as they conduct offensive IO against friendly information and information systems. Thus, the IO OA is also defined in terms of the physical and virtual domains from, through, or to which friendly IO are conducted. In other battlespace environments, the OA is usually the geographical area where the commander is assigned the responsibility and authority to conduct military operations. In the IO OA, geography is only one influence on the battlespace. IO can extend beyond conventional military OA into domains previously characterized as non-military.

**A4.2.3.2. IO Area of Interest (AOI).** The AOI is best defined as the physical or virtual domains from which friendly, adversarial, and neutral information originates, through which it is transmitted and/or processed, or to which the information is destined. The AOI will encompass the supported commander's OA and any country or entity that has the ability to use or control information assets within that region. The AOI will be an infinite area due to the availability to affect this commander's mission accomplishment. Non-aligned information must be relevant to either the friendly or adversary forces. Non-aligned information may influence friend and/or foe, intentionally or not (CNN, news of calamity, loss or gain of access to satellites). In IO, the AOI must extend into virtual domains and often outside of the geographic theater of conventional military operations. Defining the Information Infrastructure consists of a number of infrastructures interconnected by a wide range of equipment, including cameras, scanners, keyboards, facsimile machines, computers, switches, compact disks, video and audio tape, cable, wire, satellites,

fiber-optic transmission lines, networks of all types, televisions, monitors, printers, and much more. Global Information Infrastructure (GII), National Information Infrastructure (NII), and Defense Information Infrastructure (DII) interconnection of communications networks, computers, databases, and consumer electronics make vast amounts of information available to users. The friendly and adversary personnel who make decisions and handle the transmitted information constitute a critical component of AOI.

**A4.2.3.3. Legal Challenges of IO in the AOI.** Include legal officers in the IO planning process. Make sure they have the appropriate clearances to give them access to the information they need. There are many legal issues involved in intelligence preparation of the battlespace. High-level reviews may be required, DoD Directive S-3600.1, "Information Operations," 9 December 1996. There are two major issues that are especially noteworthy. The first is the authorities issue. Intelligence collection in cyberspace is conducted under Title 50 of the U.S. Code just as intelligence collection anywhere else would be. Intelligence preparation of the cyber battlespace may however, be part of Computer Network Operations conducted under Title 10 authorities by the warfighter. Depending on which authorities govern different rules come into play.

The second issue is the peacetime attribution issue. A computer network intrusion could be the work of a foreign state, an agent of a foreign state, an agent of a non-governmental entity or group, or an individual acting for purely private purposes. The equipment necessary to launch a computer network attack is readily available and inexpensive, and access to many computer systems can be obtained through the Internet or another network to which access is easily obtained. One major implication is that it may be very difficult to attribute a particular computer network attack to a foreign state, and to characterize its intent and motive. Depending on who the attacker is, dramatically different response agencies may be called upon. Currently, the assumption is that law enforcement will deal with intrusions since most intrusions and attempted intrusions are performed by criminal elements.

In wartime, the attribution issue complicates neutrality. What effect is there in the law of war analysis, and the rules against misusing neutral country status when an information attack appears to arrive from a neutral country? To what extent can the United States respond when attacks appear to come from neutral states? A neutral is a nation that is not involved in the armed conflict. The law of war gives protected status to various classes of actors, including noncombatants, neutrals and others. But in cyberspace the electronic point of origin can be hard to locate. The legal officer should be asked immediately to assess the impact of neutrality issues to avoid wasting time and resources.

**A4.2.4. The End Results of Step 1.** The final product(s) of Step 1 are varied, but completion of this step should include:

A4.2.4.1. Identify the country's level of technological development or endeavors. Is the country a third-world country, modern, western, etc.?

A4.2.4.2. What are the significant characteristics of the IO dimension? Cover all dimensions of the battlespace (aerospace, surface, information, and human).

A4.2.4.3. Where are the IO OA and AOI located? This may differ from the commander's OA/AOI as the IO OA/AOI could expand past the commander's OA/AOI. For example, the adversary may use a national or global information system to gain and exploit information. The infrastruc-

ture for these systems will extend past the commanders OA and AOI. However, it will still affect the commander's operations.

A4.2.4.4. What IO threats are found within the battlespace? Include threats from all components of IW (PSYOP, EW, physical attack, deception, and information attack). List the capabilities the adversary has for each component, for example: (*PSYOP* – airborne assets, audio tools, broadcast facilities, print plants; *EW* – jammers, self-protection equipment; *physical attack* – laser guided munitions, TV guided missiles; *deception* – decoys, dummy systems, props, camouflage; *information attack* – hackers, info weapons, high energy radio frequency guns).

A4.2.4.5. Does the adversary have a defensive counter information capability? Identify the adversary's ability to protect their information, information systems, and communications. Focus on their primary means of collecting and passing information. Provide information on established OPSEC and information assurance programs.

A4.2.4.6. How is information passed from higher headquarters to lower echelon or laterally? Provide a graphical depiction of the adversary's physical links and nodes (national telecommunications network, to include radio, landline, SATCOM (military and civilian), and cellular layout).

A4.2.4.7. What is the military forces' C2 hierarchy? Provide a graphical depiction of the adversary's C2 logical links and nodes (higher headquarters and subordinate units and lateral units).

A4.2.4.8. Does the adversary have an offensive counter-information and/or defensive counter-information IW capability? (Offensive counter-information - PSYOP, EW, deception, Defense counter-information - information assurance, operations security, counter deception, counter intelligence, counter PSYOP, and electronic protect) Is it organized? Identify any organizations responsible for IO activities.

A4.2.4.9. What kind of IIW support function(s) does the adversary have? Identify those functions and how they support the adversary's IIW capabilities. IIW support functions include Intelligence, Surveillance, and Reconnaissance (ISR), global Precision Navigation and Positioning (PNP), and weather services. Identify the types of ISR assets available; collection, processing, dissemination, analyzing and evaluation capabilities; control authority, and command, control and communications (C3) structure. Identify platforms operating in all environments, such as satellites (space), airborne platforms (aerospace), SIGINT sites, shipborne platforms (surface and subsurface), and computer systems (information). Be general in nature, as more specific capabilities will be covered in Step 3, Evaluate the Adversary.

### A4.3. Step 2: Describe the Effects of the Battlespace.

**A4.3.1. Overview.** Step 2 determines how the battlespace dimension affects both adversary and friendly IO activities. It evaluates and integrates the various environmental factors affecting both friendly and adversary operations. Sub-steps included in **Chapter 3: Describe the Battlespace Effects** are the physical environment, effects of weather, human dimension, and the effects on friendly and adversary operations.

**A4.3.2. Desired End Effect.** Analysis of IO activities (gain, exploit, attack, and defend) and a description the effects of the battlespace dimensions have on those activities. Also expresses adversary perspective in a prioritized set of broad COA.

**A4.3.3. How to do it.** For information operations, the information dimension is the primary environment evaluated for battlespace effects. However, the other dimensions (aerospace, surface and human) must also be considered and analyzed in order to make or achieve a comprehensive assessment. IO analysts must consider the fact that not all adversaries or other nation states have developed IO capabilities such as the US. Therefore, mirror imaging must be avoided and the analyst should not assume that all adversaries have developed the same IO capabilities as the US. Identify other effects, such as culture, demographics, personalities, and politics on information operations.

**A4.3.3.1. Information-in-Warfare (Gain and Exploit) Activities.** How does the battlespace affect both the adversary and friendly forces' ability to gain and exploit information? This question must be answered in Step 2. Identification of how the battlespace environment affects the adversary and friendly operations, communications, PNP capabilities, weather services, and other gain and exploit activities is critical. Gain and exploit activities may be one of the most important aspects of IO. These activities set the stage for other IO activities. For example, intelligence collection on faulty information could affect present and future PSYOP or deception campaigns. This could be the deciding factor in gaining and maintaining information superiority. ISR serves as the eyes and ears for major decision-makers. The information collected by these assets can and will persuade the commander to make a decision. ISR also provides the commander and his forces with situational awareness and indications and warnings. The adversary's IO capabilities were identified in Step 1. If analysis confirms the adversary does not have an established PNP capability, concentrate on analyzing the effects to friendly forces' PNP capabilities and likewise to any other IO capabilities.

**A4.3.3.1.1. Gain and Exploit.** Identify how the battlespace dimension affects the adversary and friendly forces gain and exploit activities within the given OA and AOI. Analyze each battlespace domain (aerospace, space, information, surface, and weather) and its effects on identified gain and exploit capabilities. The following essential elements should be identified in this step:

A4.3.3.1.1.1. Identify any natural surface features that can hinder ISR operations such as mountain ranges, forests, hills, waterways, rivers, etc.

A4.3.3.1.1.2. Identify any man-made surface features than can hinder ISR operations. Towers, buildings, power lines, etc.

A4.3.3.1.1.3. How does the natural surface features affect the adversary's intelligence collection capabilities? Identify effects on land-based, air, unmanned vehicles (UAVs), and ship-based intelligence collection assets. Does the natural terrain create blind spots or gaps in coverage for intelligence collection assets? Identify any natural phenomenon that may affect ISR operations (effects on imagery collection assets and signals collection).

A4.3.3.1.1.4. How does the physical terrain affect the overall intelligence process? Identify any barriers that may hinder any part of the intelligence process (collection, processing, analyzing, evaluating, and disseminating).

A4.3.3.1.1.5. How does the terrain affect reconnaissance activity? Identify how the surface feature will affect specific reconnaissance assets (airborne, surface, UAVs, ship-based, land-based, space-based).

A4.3.3.1.1.6. Identify how the weather conditions found in the OA and AOI may affect ISR operations. Does the adversary have an all-weather intelligence collection capability?

Identify any assets that do and do not have all-weather capability. What are the limitations (cloud cover, rain, ground clutter, etc.) of those assets?

A4.3.3.1.1.7. Identify information mediums used by friendly and adversary forces for ISR operations. Identify ISR communications nodes/paths (examples could include radios, landlines, microwave, cell phones or computer networks).

A4.3.3.1.1.8. Identify activities or characteristics that affect access to HUMINT, IMINT, SIGINT, and other collection capabilities.

A4.3.3.1.1.9. How does information technology assist or hinder ISR operations? Does the adversary have advanced information systems? If so, are adversary personnel adequately trained in using the systems?

A4.3.3.1.1.10. Identify friendly and adversary ISR platform and sensor capabilities. Are they dependent on advanced technology? How dependent are they on information systems? How responsive is the ISR capability? What are the required ephemerals, periods of eclipse, and housekeeping schedules? What type of COMSAT (INTELSAT, SPOT, LANDSAT) agreements exists?

A4.3.3.1.1.11. What are friendly and adversary fusion and analysis capability—the ability to combine raw data from different collection platforms to analysis to achieve a balanced and clear understanding of friendly or adversary capabilities and intentions?

**A4.3.3.2. Information Warfare (Attack and Defend) Activities.** How does the battlespace affect both the adversary and friendly forces' ability to attack and defend information? Identify how the battlespace will affect friendly and adversary attack and defend capabilities; such as, PSYOP, deception, OPSEC, electronic warfare, physical attack, and information attack.

**A4.3.3.2.1. Attack and Defend.** Identify how the battlespace dimension affects friendly and adversary forces' attack and defend activities within the given OA and AOI. Cover all components of IW and how each dimension will affect these components.

**A4.3.3.2.1.1. PSYOP/Counter PSYOP.** Psychological operations are planned operations to convey selected information and indicators to adversaries to influence their emotions, motives, objective reasoning, and ultimately the behavior of foreign governments, organizations, groups, and individuals. The purpose of PSYOP is to induce or reinforce adversary attitudes and behavior favorable to the originator's objectives. Effective PSYOP actions depend upon timely and accurate intelligence information. Intelligence participation in PSYOP requires an extensive peacetime or prehostility commitment to AIPB. PSYOP requires a broad array of military, political, social, and economic intelligence on potential adversaries. PSYOP consists of target audience analysis and message dissemination at the strategic, operational, and tactical levels. The following essential elements should be identified in this step:

A4.3.3.2.1.1.1. Identify any natural terrain features that may hinder PSYOP activities such as mountain ranges, forests, hills, waterways, rivers, etc. For instance, friendly forces plan on disseminating PSYOP leaflets to a specific target audience located near the Forward Edge of Battle Area (FEBA); however, surface analysis of IO AIPB reveals that the target audience is located mainly in heavy foliage and forest areas. The leaflets may not be able to penetrate through the wooded areas; therefore, the com-

mander opts for loudspeakers. The analysis of the terrain affected the commander's PSYOP campaign and his decision to employ another campaign; basically changing his COA.

A4.3.3.2.1.1.2. Identify terrain features that affect PSYOP dissemination mediums (audio, visual, and audiovisual means).

A4.3.3.2.1.1.3. Identify any significant natural and/or man-made surface features that may have psychological impacts on either the adversary or friendly forces. For instance, the physical destruction of a man-made monument may affect the morale of troops or dissuade the major decision-makers to take a specific action or actions.

A4.3.3.2.1.1.4. Identify any significant natural and/or man-made surface features that may affect PSYOP consolidation (PSYOP conducted after a conflict in order to reestablish normalcy).

A4.3.3.2.1.1.5. Provide information on fixed and mobile land-based PSYOP mediums, i.e., communication nodes, TV and radio broadcast facilities.

A4.3.3.2.1.1.6. Identify the demographics of the general population within the OA and AOI. Provide data on the ethnic background, religious make-up, literacy rate, education level, and any other pertinent data revealing the basic make-up of the general population.

A4.3.3.2.1.1.7. Provide biographical data on commanders of the opposing force. Include information about their education, military training, religion, political background, personal data, war experience (if any) and any other pertinent data about their personality.

**A4.3.3.2.1.2. Military Deception/Counter Deception.** Deception operations depend on accurate and reliable ISR operations. These deception operations also depend on close cooperation with counterintelligence activities. The key to military deception is anticipating adversary actions and motives.

A4.3.3.2.1.2.1. Identify any natural terrain features that can or have been used for deception. For example, a SAM battalion uses a heavy wooded area for camouflage, concealment, and deception (CCD). Are there any other natural terrain or features that may be used for deception operations? For example, use of a mountain range to prevent radar detection in order to conduct deception operations.

A4.3.3.2.1.2.2. Identify adversary deception tactics and doctrine. For example, past war experiences or past deception employment against their own people or other adversaries.

A4.3.3.2.1.2.3. Identify adversary collection capabilities that may be used to feed military deception messages (land-based SIGINT collection sites, early warning sites, and visual observation posts).

A4.3.3.2.1.2.4. How can the weather conditions affect friendly and adversary deception operations?

**A4.3.3.2.1.3. Electronic Warfare/Electronic Protect.**

A4.3.3.2.1.3.1. How does the terrain affect Electronic Warfare (EW) operations? Identify any significant terrain features that may hinder or aid EW operations (mountain ranges, waterways, forests, and desert regions). Identify line-of-sight (LOS) characteristics of the terrain, including effects on both communications and non-communications emitters. Identify the effects vegetation may have on radio wave absorption and antenna height requirements and the effects of soil types on the electrical grounding of equipment.

A4.3.3.2.1.3.2. Identify any man-made features that may affect EW operations such as locations of high power lines and their interference with radio waves, large vertical objects, such as buildings or cliffs that will influence radio waves. Identify land-based EW sites. Identify adversary EW tactics and doctrine.

A4.3.3.2.1.3.3. How will weather conditions affect friendly and adversary EW operations? Consider:

A4.3.3.2.1.3.3.1. Effects of extreme weather conditions on sensitive electronic equipment (do not overlook high humidity or large amounts of dust in this evaluation).

A4.3.3.2.1.3.3.2. The impact of electrical storms and other electromagnetic phenomenon on EW operations.

A4.3.3.2.1.3.3.3. Effects of high winds or obscuration, such as precipitation or blowing dust, on equipment, antennas, and LOS systems.

A4.3.3.2.1.3.3.4. Weather effects on flight operations of EW aircraft.

A4.3.3.2.1.3.3.5. What types of EW capability do friendly and adversary forces possess? What is the technological capability of the equipment? Consider (1) parametric sophistication, transmitter/receiver characteristics (RF & Pulse Repetition Frequency (PRF) jitter, stagger, etc.; multiple RF & PRF modes; reprogramming capability, war reserve modes; scan type/duration and antenna patterns) and (2) identify the electronic order of battle. Identify early warning, search, acquisition, and track capability. Identify SIGINT detection/analysis capability.

A4.3.3.2.1.3.4. What communication/data link requirements exist within the friendly and adversary forces?

A4.3.3.2.1.3.5. How will the adversary employ airborne EW assets? Provide information on EW tactics and doctrine for both offensive and defensive measures (EW suites, escort, and self-protection).

A4.3.3.2.1.3.6. Identify how EW assets (land, air, ship, and sea) utilize the communications infrastructure. Identify C3 capabilities and decision-makers.

**A4.3.3.2.1.4. Physical Attack.** Identify the physical/spatial properties of the friendly and adversary forces, and territorial infrastructure. Identify any nodal analysis capability and the communications infrastructure (i.e., variety or types of communications systems, major switching nodes, multi-mode nexus points, geographical constraints, gorge crossing bridges, underwater cables, troposcatter over high or rough terrain, maintenance and

life-cycle support, power supply/source, the kinds of information carried on one communications path, but not another).

A4.3.3.2.1.4.1. What is a target's susceptibility to attack and the probability of success? Are there alternate target(s) that may produce the desired results?

A4.3.3.2.1.4.2. Does the adversary have an air-intercept capability? Identify the adversary's air-to-air tactics and doctrine. Include engagement tactics, end-of-game maneuvers, and countermeasures.

A4.3.3.2.1.4.3. Does the enemy have computer-based targeting data? How does the adversary use technology and/or information systems for targeting?

A4.3.3.2.1.4.4. How does the adversary use ISR for targeting?

A4.3.3.2.1.4.5. Does the adversary have an all-weather attack capability? Identify any limitations; such as guidance systems, radar limitations, and fusing.

A4.3.3.2.1.4.6. How does the surface dimension affect target acquisition and target tracking capabilities?

A4.3.3.2.1.4.7. How does the adversary use space assets (possibly including commercial systems) for physical attack activities?

#### **A4.3.3.2.1.5. Information Attack.**

A4.3.3.2.1.5.1. How does the surface dimension affect friendly and adversary information attack activities?

A4.3.3.2.1.5.1.1. Identify any natural features that may affect information attack activities. For instance, mountain ranges, heavy vegetation, and hills.

A4.3.3.2.1.5.1.2. Identify any man-made features that may affect friendly and adversary information attack activities. For example, towers, buildings, and power lines.

A4.3.3.2.1.5.2. Identify weather phenomenon that may affect information attack activities.

A4.3.3.2.1.5.3. How friendly and adversary forces use space for information attack? Describe any space effects on information attack activities.

A4.3.3.2.1.5.4. Identify communications infrastructure (local, national, regional, global). Does the adversary have digital communications capabilities or lease capabilities?

A4.3.3.2.1.5.5. What are the physical and spatial characteristics of the information infrastructure? Such as, physical laydown, major switching nodes, multi-mode nexus points, maintenance and life-cycle support, equipment nomenclatures, power supply/source, signals parametrics, physical system points of entry, connectivity to IO domains, and use and location of defensive measures (firewalls, crypto).

**A4.3.3.2.1.6. OPSEC.** Operations Security is the process of denying adversaries critical information about friendly capabilities and intentions that the adversary needs for effective decision-making. OPSEC does this by identifying, controlling, and protecting indicators

associated with planning and conducting operations and other activities. Without the knowledge of friendly actions, adversary leaders cannot make the proper decisions necessary to significantly degrade US mission effectiveness. Critical information is information about friendly activities, intentions, capabilities, or limitations that adversary needs in order to gain a military, political, diplomatic, or technical advantage. Such information, if released to an adversary prematurely, may prevent or forestall mission accomplishment, reduce mission effectiveness, or cause loss of lives and/or damage to friendly resources. Critical information usually involves a few key items of friendly activities or intentions that might significantly degrade mission effectiveness. Critical information may also be derived from bits and pieces of related information. Consider the following factors that affect the operations security environment and identify those actions that can be observed by potential adversaries including (1) communication organizations, (2) maintenance and logistics organizations, (3) financial organizations, (4) medical organizations, (5) operations support organizations (6) Security organizations, (7) internal and foreign intelligence organizations, (8) Counterintelligence organizations, and (9) general knowledge (OSINT, INTERNET).

**A4.3.3.2.1.7. Information Assurance (IA).** The goal of information assurance is to protect and defend information and information systems by ensuring their availability, integrity, authenticity, confidentiality, and non-repudiation (ability to confirm source of transmission and data). Information assurance includes the protection of information systems against unauthorized access or information corruption. It encompasses computer security, communications security, and those measures necessary to protect, detect, react to and recover from such threats. Consider the following factors that affect the IA environment and identification of information and information systems that can be observed/exploited including (1) communication organizations, (2) maintenance and logistics organizations, (3) financial organizations, (4) medical organizations, (5) operations support organizations, (6) security organizations, (7) internal and foreign intelligence organizations, (8) Counterintelligence organizations and (9) General knowledge (OSINT, INTERNET). Identify equipment design and usage, encrypted/unencrypted including (1) telephone/radio communications, (2) computers–firewalls/gateways, denial capabilities, and (3) base switches and associated components.

**A4.3.3.2.1.8. Counterintelligence.**

A4.3.3.2.1.8.1. Identify activities or characteristics that affect the access to HUMINT, IMINT, SIGINT, OSINT and other collection capabilities.

A4.3.3.2.1.8.2. Identify the locations that best support collection coverage by threat collection systems. Consider assets that are ground based (observation or equipment positions), airborne (standoff positions or orbits), and shipborne.

A4.3.3.2.1.8.3. Identify approach routes for each type of system. Consider the unique needs of each type. For example, concealed and covered infiltration routes and landing zones for search and rescue units, and high speed air avenues of approach (AA) for airborne IMINT systems.

A4.3.3.2.1.8.4. Identify the areas within the OA that offer friendly forces concealment from threat collection systems.

A4.3.3.2.1.8.5. Identify populated areas that facilitate special or clandestine HUMINT operations.

A4.3.3.2.1.8.6. Identify the friendly units, locations, and information vulnerable to collection through the capture of prisoners of war.

A4.3.3.2.1.8.7. Determine the effect of weather upon collection systems.

A4.3.3.2.1.8.8. Identify political, legal, and morale constraints upon collection efforts. For example, are there unique legal or religious circumstances that might inhibit collection operations?

A4.3.3.2.1.8.9. Identify the effect of local culture upon collection. For example, HUMINT collection efforts might be ineffective against a closed, ethnically distinct community.

**A4.3.4. End Results of Step 2.** The completion of Step 2 should include:

A4.3.4.1. How the physical dimension affects adversary and friendly gain, exploit, attack and defend activities. Provide graphical depictions of the physical dimension characteristics that may affect friendly and adversary IO activities. Provide a description and explanation of how the physical dimension affects these activities.

A4.3.4.2. How the information dimension affects adversary and friendly gain, exploit, attack, and defend activities. Provide graphical depictions of information dimension that may affect friendly and adversary IO activities. Include demographic charts, graphs, telecommunications network, and information infrastructures. Give a description and explanation of how the information dimension affects these activities.

A4.3.4.3. How the space dimension affects adversary and friendly gain, exploit, attack, and defend activities. Explain how the adversary's use of the space dimension affects both the friendly and their own IO activities.

A4.3.4.4. How the aerospace dimension affects adversary and friendly gain exploit, attack, and defend activities. Provide graphical depictions of obstacles, weather conditions, and threats on the aerospace dimension affects on the adversary and friendly IO capabilities.

A4.3.4.5. How the weather affects adversary and friendly gain, exploit, attack, and defend activities. Provide graphs, charts, and other visual aids depicting weather trends, climate, wind velocity, and precipitation.

**A4.4. Step 3: Evaluate the Adversary.**

**A4.4.1. Overview.** Step 3 determines adversary IO force capabilities, doctrinal principles, and tactics, techniques, and procedures (TTP) the adversary prefers to employ. For example, evaluating the threat for information warfare is complicated because many factors of traditional concepts of deterrence do not apply. Technical tools available to trace the source of an attack with a high level of accuracy may isolate a geographic location, a particular system, or even a specific computer terminal; however, the person operating the terminal is an unknown. Incidents may be a terrorist group, a nation-state, a set up, or simply an individual acting alone.

**A4.4.2. Desired End Effect.** The desired end effect of Step 3 is to know the adversary IO force capability given the current situation: describe threat's motives and intent; assess our vulnerabilities and

protect against any IO activities the adversary may attempt; describe what the threat is capable of doing and plot out the adversary's options and probable activities with his air, space, surface or subsurface assets to interfere with the US IO systems.

**A4.4.3. How to do it.** Key pieces of information are required for AIPB analysts to determine the appropriate threat for IO. Sub-steps from **Chapter 4**, Evaluate the Adversary, of this pamphlet are: (1) Analyze and identify adversary COG, (2) Create or update threat and other models, (3) Determine the current adversary situation, and (4) Identify adversary capabilities and vulnerabilities.

**A4.4.3.1. Analyze and Identify Adversary COG.** COG identification is significant in the AIPB for IW process. A COG is defined as: *“That characteristic, capability, or locality from which a military force, nation, or alliance derives its freedom of action, physical strength, or will to fight.”* COG can also be considered as target systems when planning for physical attack. COG determination requires knowledge of the adversary's capabilities, commander's objectives, level and phase of conflict, and physical and virtual relationships. Identification of the adversary's COG will also assist in developing High Value Targets (HVT). Ideally, friendly forces will attack the adversary's COG. Therefore, from a counter-information aspect HVT may be part of the attacked COG. Here are some examples to consider when identifying IW COG:

A4.4.3.1.1. The air component commander's primary objective is to *gain air superiority over the OA*. The primary target system that you will be concerned with is the adversary's air defense system. Based on your analysis in the first two steps, you have identified that the adversary's air defense C3 is centrally controlled. Therefore, the *leadership* can be assessed as being a COG. Possible HVT may include the leadership's command post, communication nodes, or the leader's command staff. In this example you considered your commander's operational objective, the level of operations, and relationship between the leadership and fighting forces.

A4.4.3.1.2. Consider sub-systems under each COG. As cited above, you have identified the leadership of the adversary's air defense system as a COG. Sub-systems that may be looked at are the information infrastructure, power system, POL infrastructure, and transportation system. These sub-systems may also be considered COG.

A4.4.3.1.3. Identify friendly COG. Consider defensive counter information activities. If you know the adversary's threat you will be able to identify the friendly vulnerabilities to those threats. In order to identify friendly COG you should have knowledge of the adversary's objectives. For instance, the adversary's objective is to conduct PSYOP and deception against the general populace through mass media. You know that public opinion has a strong influence on political and military actions; therefore, public opinion could be considered as a COG.

**A4.4.3.2. Update or Create IO Threat or Other Models.** The construction of threat models involves in-depth analyses requiring data from national and tactical information sources. The threats to the information infrastructure are genuine, worldwide in origin, technically multifaceted and growing. Originated from individuals and groups motivated by military, political, social, cultural, ethnic, religious, personal and/or industrial gain. The globalization of networked communications creates vulnerabilities due to increased access to our infrastructure from locations throughout the world. Threats against computer systems and networks vary by the level of hostility (peacetime, conflict, or war), by technical capabilities and by motivation. Boundaries between these groups are indistinct, and it is often difficult to discern the origins of any particular incident

or responsible threat to target. Threat models describe and graphically display how adversary military forces prefer to conduct IW under ideal conditions. Threat models consist of three elements: (1) doctrinal templates, (2) description of preferred TTPs, options and follow on activities and (3) identification of HVT. They are based on the adversary's normal or doctrinal organization, equipment, and TTPs. Threat models result from a detailed study of the adversary force. Even after deployment, the adversary must continue to be evaluated and the threat models updated as required. Adversary capabilities are identified in terms of broad COA and supporting operations the adversary can take that may impact the accomplishment of the adversary mission. Analysts should not evaluate adversary capabilities by mirror imaging U.S. doctrine or TTPs. Ideally, threat models are created during peacetime.

**A4.4.3.2.1. Doctrinal Templates.** Doctrinal templates are constructed through an analysis of the adversary's written doctrine (if available), intelligence database holdings, and an evaluation of the adversary's past operations and exercises. Determine how the adversary organizes for IW operations and how it deploys and employs forces.

**A4.4.3.2.2. Adversary TTPs.** While building threat models, this step textually and sometimes graphically describes the deployment and employment patterns, disposition, tactics, training, logistics and other relevant factors depicted by the doctrinal template. In most cases, Air Force TTP products are available for various countries. However, IPB for IW products may have to be constructed from scratch. The construction of threat models involves in-depth analyses requiring data from national and tactical information sources.

**A4.4.3.2.3. Identification of HVT.** HVT are assets that the adversary commander requires for the successful completion of his mission. IW HVT may not always be tangible. For instance, a Commander's mind-set or decision-making capabilities may be a HVT. The Commander's decisions may be influenced, exploited or manipulated based on the information received. Some IW HVT to consider are (1) the Commander, (2) the Commander's staff, (3) computer network servers, (4) communications nodes, and (5) ISR assets. A determination should be made on how the adversary might react to the loss of each identified HVT. This includes consideration of the adversary's ability to substitute other assets, as well as the likelihood of adopting alternate options to the operation. As key assets are identified, they should be grouped into categories used to develop target sets. Once a set of HVT has been identified, they are rank ordered with regard to their relative worth to the adversary's operation and recorded as part of the threat model. The value of HVT usually varies with time over the course of an operation.

**A4.4.3.2.4. Other Models.** Other models may also be used to yield insights on how the adversary will conduct an activity and its critical components. One of the most commonly used in the Air Force is nodal analysis. Nodal analysis is an in-depth study of the interconnections between system elements and surrounding systems. Nodal analysis seeks to discover those "key nodes" within the system that, if removed, cause it to fail. Nodal analysis is often used when evaluating electrical power and communications systems.

**A4.4.3.3. Determine the Current Adversary Situation.** After examining the adversary's IW doctrine, it is necessary to place it in context of the real world. The current adversary situation is the result of the current intelligence process. Current intelligence analysis involves examining all available intelligence sources, methods and databases in an effort to analyze and determine the current adversary situation. This analytic effort primarily focuses on Order of Battle factors for

each adversary threat deployed with the AOI, or that are otherwise capable of interfering with the friendly mission. IPB for IW analysts do not conduct current intelligence activities: they use the results of current intelligence to identify probable adversary actions given the current situation. The current adversary OB should include a list of offensive and defensive counter-information tools, equipment and threats. Possible offensive counter-information threats include (1) Information systems used for computer network attacks, (2) information protect software, (3) firewalls, (4) hacker organizations and tools, (5) PSYOP airborne platforms, and (6) radio broadcast facilities. Keys to identifying IO attacks:

**A4.4.3.3.1. Tactical Data Networks:** (1) Unknown packets in data flow, (2) symbology not on top of video, (3) net cycle time increasing even though number of stations and/or contacts have not increased (4) synchronization signal failures, (5) commands to remote systems are garbled or not received.

**A4.4.3.3.2. Voice Networks:** (1) Unknown voice(s) on the net, (2) new station entering with incorrect authorization, (3) contradictory commands, (4) station challenging other stations way too often, (5) abrupt or contradictory changes in warning and/or weapons status.

**A4.4.3.3.3. Telephone Networks:** (1) Calls arriving at wrong extension, (2) multiple parties on the line, (3) lines are dead, (4) constant busy signals, (5) long distance operators are busy, (6) no power to the system.

**A4.4.3.3.4. ADP Systems:** (1) Multiple login failures over distinct periods of time, (2) corruption of files that were known to be good, (3) data transfer without operator action, (4) new files without operator action, (5) machines slowing as if being multi-tasked, (6) IP addresses or files changed without System Administrator knowledge, (7) unknown data packets in the pipe, (8) user data files missing, (9) user passwords invalid, (10) AV software detects virus with no insertion of floppy or download, (11) no power available to the system.

**A4.4.3.4. Identify Adversary IO Capabilities and Vulnerabilities.** The number of potential adversaries that can develop the means to wage an asymmetrical IW against the US is large. Identifying the adversary size, background, motive, economic support, beliefs and organizational structure is a monumental task. The commercial sector has replaced government as the dominant player in the development, manufacture, purchasing, and operation of information systems. As a result, the intelligence analyst has lost much of its predictive analysis ability to deal with the threat's capabilities. Off the shelf communications, imagery purchases and global Internet access are just a few examples of the changes and options available to many countries and terrorist organizations. Adversary IO threat capabilities can be formed as statements to support the mission, for example (1) "The adversary has the capability to conduct IO." (2) "The adversary has the capability to disseminate PSYOP messages through air assets." (3) "The adversary has the capability to conduct camouflage, concealment, and deception operations." (4) "The adversary has an established information warfare organization." (5) "The adversary has a defensive counter information capability."

**A4.4.4. End Results of Step 3.** The following information should be included in the final products upon the completion of this step: (1) List of IO COG for both friendly and adversary forces. (2) Identification of the adversary's IO doctrine (if any). (3) The description of the adversary's TTP. (4) List of the adversary IO HVT. (5) Listing of equipment relevant to IO activities, and (6) graphical depiction of the adversary current order-of-battle and national level organization, including IO assets.

#### **A4.5. Step 4: Determine Adversary IO Courses of Action**

**A4.5.1. Overview.** Step 4 develops the threat COA for IO where the AIPB analyst must breakdown each step of the IO analytical framework and dissect each area in detail. Building the COA, developing HVT into the synchronized plan of the entire operation can be done only if this amount of time and effort is placed into the AIPB process for IO. Therefore, when developing estimates it is necessary to ensure that confidence levels are clearly identified.

**A4.5.2. Desired End Effect.** Intelligence support is a requirement for each operating system no matter if the unit is conducting offensive, defensive, or stability operations. Intelligence support is further tailored to support each operating system's specific requirements to achieve the mission or operation directed by the commander and planned by the staff. Therefore, intelligence clearly supports CA, PSYOP, OPSEC, EW, CNO, physical security, counterintelligence, physical destruction, and deception. All specific adversary COA influencing the friendly command's mission need to be identified, as well as Named Area of Interest (NAI) and high pay off targets (HPTs).

**A4.5.3. How to do it.** The key to defining an IO mission must be in how it assists in achieving Information Superiority. Information Superiority dictates that IO must contribute to the influencing of the enemy commander, as well as the definitions for attack and defend IW. Not all PSYOP, EW, security, OPSEC operations influence the enemy commander as the intent of the operation. When determining adversary IW operation objectives, desired end states, and COA, these elements may or may not stand alone but may be listed as supporting elements to the more classical military operations and objectives of land, sea, and air. As such, information warfare analysts must work as part of the analytical process determining the course of actions for land, sea, and air operations. Determining the adversary COA consists of eight sub steps: (1) identify the adversary's likely IW objectives and desired end state. (2) Identify the full set of IO COA available to the adversary. (3) Evaluate and prioritize each IO COA. (4) Develop each IO COA in the amount of detail time allows. (5) Identify initial IO collection requirements. (6) Identify associated IO COG and initial target nominations.

**A4.5.3.1. Identify the Adversary's Likely IO Objectives and Desired End State.** The adversary's likely objectives and desired end state are identified by analyzing the current adversary military and political situation, strategic, and operational capabilities, and the country characteristics of the adversary nation. The adversary's IO objectives must be identified prior to assessing their COA. An assessment of the adversary's objectives must be comprehensive and cover the various levels of operations. For example, the adversary's national-level or National Command Authority (NCA) objectives should be listed in order to get an idea of other objectives, to include IO objectives. The national level objectives will normally drive the objectives for other levels, such as theater and component levels.

**A4.5.3.2. Identify the Full Set of IO COA Available to the Adversary.** To ensure consideration, the full set of COA available to the enemy, evaluate the following:

A4.5.3.2.1. The COA the adversary's doctrine believes appropriate to the current situation and the likely objectives you have identified. This requires an understanding of the threat's decision-making process as well as an appreciation for how he perceives the current situation. Also take into consideration the threat's perception of a situation based on friendly IO activities. For example, what are the COA in response to friendly deception or PSYOP actions? How are their counter activities to friendly IO activities?

A4.5.3.2.2. The adversary's COA that could significantly influence the friendly commander's mission, even if the threat's doctrine considers them not feasible or "sub-optimum" under current conditions. Consider any indirect COA that the threat is capable of executing. This is where you will identify specific adversary objectives countering your specific mission (OA). For instance, if you are working at the AOC you will identify the adversary's air operation objectives and their offensive and defensive IO objectives. Air operations objectives should be identified in the air operations AIPB process. However, you should be familiar with the air objectives in order to identify possible offensive and defensive IO COA.

A4.5.3.2.3. The adversary's COA indicated by recent activities and events. To avoid surprise from an unanticipated COA, consider all possible explanations for the threat's activity in terms of possible COA.

**A4.5.3.3. Evaluate and Prioritize Each IO COA.** The full set of identified IO adversary COA are evaluated and ranked according to their likely order of adoption. The purpose of the prioritized list of IO COA is to provide the COMAFFOR/JFACC and staff with a starting point for the development of an operational plan. It takes into consideration the most likely COA and the most dangerous to the friendly force for mission accomplishment. Each COA developed should meet five criteria: (1) suitability, (2) feasibility, (3) acceptability, (4) uniqueness, and (5) consistency with doctrine.

**A4.5.3.4. Develop Each IO COA in the Amount of Detail Time Allows.** Once the complete set of adversary IO COA have been identified, evaluated, and prioritized then each IO COA should be developed into as much detail as the situation requires and time allows. The order in which each is developed is based on its priority and the commander's guidance. To ensure completeness, each IO COA must answer six questions:

**Who** – what assets will the adversary employ?

**What** – is the type of IO activity? (Gain, exploit, attack, or defend)?

**When** – will it begin? This is the earliest time the adversary can adopt the COA under consideration?

**Where** – is the direction of IO attack, exploitation and point of defense?

**How** – will the adversary employ its IO assets?

**Why** – is the adversary conducting the IO campaign? What are the objectives and end states?

**A4.5.3.5. Identify Initial IO Collection Requirements.** The identification of initial intelligence collection requirements depends on the prediction of specific activities and the areas in which they are expected to occur, and when observed, will reveal the IO COA the adversary has adopted. The areas in which these activities or indicators are expected to take place are designated as NAI. The NAI and their associated indicators are depicted on the event template or matrix.

**A4.5.3.5.1. IO Event Template.** The differences between the NAI, and time-phased lines (TPL) associated with each COA form the basis of the event template. The event template is a guide for collection, reconnaissance, and surveillance planning. It depicts where to collect the information that will indicate which COA the adversary has adopted.

A4.5.3.5.1.1. Each COA should be evaluated to identify its associated NAI. It is important to wargame execution of the COA and note places where activity must occur if that COA

is adopted. Particular attention must be paid to times and places in which the threat's HVT employ or enter areas where they can be easily acquired and engaged. These areas will evolve into NAI in support of targeting. Consideration should also be made regarding those places the threat is expected to take certain actions or make certain decisions.

A4.5.3.5.1.2. An NAI can be a specific point, a route, or an area. It can match obvious natural terrain features or arbitrary features, such as TPLs or engagement areas. NAI should be made large enough to encompass the activity that serves as the indicator of the threat's COA.

A4.5.3.5.1.3. The NAI and indicators associated with each COA should be compared and contrasted with each other and any differences identified. Emphasis should be placed on the differences that will provide the most reliable indications of adoption of each unique COA. The selected NAI should be marked on the event template.

A4.5.3.5.1.4. The initial event template focuses only on identifying which of the predicted COA the threat has adopted. Later, it will be updated and further refined to support friendly decisions identified during staff wargaming.

**A4.5.3.5.2. IO Event Matrix.** The event matrix supports the event template by providing details on the type of activity expected in each NAI, the times the NAI is expected to be active, and its relationship to other events in the battlespace. Its primary use is in planning intelligence collection; however, it also serves as an aid to situation development. The events associated with each NAI on the event template should be examined and restated in the form of indicators. The indicators can then be entered into the event matrix along with the times they are likely to occur. By using the TPLs from the situation template or the description of the COA, the expected times in the event matrix can be established. If there is a latest-time-information-of-value (LTIOV) timeline, based on the expected flow of events, it should be recorded into the event matrix as a guide for the collection manager.

**A4.5.3.6. Identify Associated IO COG and Initial Target Nominations.** After identifying the set of potential threat COA and establishing initial collection requirements, the final requirement is to identify as many targets as possible for attack operations. Identifying HPTs revolves around predicting specific points, areas, and activities which, when observed from established collection requirements, will reveal IO targets for attack operations assets. The areas where these critical assets are expected to be located are called HPTs.

**A4.6. Summary.** IO AIPB must be revisited and re-accomplished each time significant or new information is received. IO is difficult to distinguish from normal operations that already occur. The lines between force protection, OPSEC, physical security, ISSO duties, security, civil-military relations, counter propaganda, command directed information, physical destruction and EW as already executed as IO (to reach information superiority) is subtle. CA, PSYOP, EW, etc. accomplish many of the issues already outlined as IO tasks.

## Attachment 5

### AEROSPACE INTELLIGENCE PREPARATION OF THE BATTLESPACE FOR SPECIAL OPERATIONS FORCES

#### A5.1. Overview.

**A5.1.1. Special Operations Aviation.** This chapter establishes a general approach for conducting Aerospace Intelligence Preparation of the Battlespace (AIPB) for Air Force Special Operations Forces (AFSOF). AFSOF includes fixed wing, rotary wing, and special tactics weapon systems. In addition, US Army Special Operations Aviation (SOA) is often included under the broad umbrella of Special Operations Forces Aviation (SOF-A). The purpose of this attachment is to identify the steps of the IPB process, what tasks to perform, and why they are important for SOA. **Note: A detailed description of how to perform these tasks is contained in the Air Force Special Operations Command (AFSOC) IPB Tactics, Techniques, and Procedures manual (AFSOC IPB TTP).**

**A5.1.2. Specialized Mission Profiles.** SOF assets operate within different mission parameters when compared to other Air Force assets. The typical mission profile places SOF-A aircrews at slower speeds, in lower altitudes, for longer periods of time than conventional forces. Special tactics (ST) teams may operate on the ground for extended periods beyond the forward edge of the battlefield, often behind enemy lines, in austere conditions and locations. SOF-A often deploy as small elements rather than as full-sized units with accompanying support. For SOF-A, one or two aircraft deploying to support a mission is not uncommon. Essential to successful planning for SOF-A aircrews and special tactics teams is an accurate assessment of the physical environment; terrain, air, space, and water within the Operations Area (OA) utilizing detailed imagery and geodetic products. Analysis of the effects of weather in each of these areas is also required. This information is combined with a detailed analysis of the enemy to derive most likely and most dangerous courses of action (COA) for the enemy commander. These results are what yield the most complete picture of the battlespace for SOF-A mission planners, and give the SOF-A commander the information required to make a decision for or against mission execution.

**A5.1.3. Purpose.** The purpose of conducting IPB for SOF-A is to identify, describe, and assess key elements in the battlespace, determine their effects on enemy and friendly operations and develop an integrated picture on which to base future decisions and planning considerations. To this end, SOF-A units require information on the environment, and forces operating within the battlespace, at the highest level of detail. For enemy and friendly forces, this requires data on the location and disposition of units down to the squad level.

**A5.1.4. SOF-A IPB Planning.** SOF-A relies on a very small cadre of specially trained operations and support personnel to plan and execute assigned missions. The planning staff responsible for conducting this analysis will be composed of personnel representing operations (air and special tactics), intelligence, plans, tactics, weather, security forces, logistics, maintenance, and medical services.

#### A5.2. Step 1: Define the Battlespace Environment.

**A5.2.1. Mission Profiles.** Planning for Special Operations Forces Aviation (SOF-A) and Special Tactics (ST) operations will include the full range of missions; Aerospace Surface Interface (ASI), Aviation Advisory Operations (AAO), Information Warfare (IW), Personnel Recovery/Recovery

Operations (PR/RO), Precision Aerospace Fires (PAF), Psychological Operations (PSYOPS), Specialized Aerospace Mobility (SAM), and Specialized Refueling (SREF).

**A5.2.2. In Garrison Planning.** IPB is a continuous process. Analysis of the environment and the opponent begins long before any contingency, as part of the regular, daily functions of every intelligence entity at every level of organization. A substantial portion of the IPB process can be conducted in garrison, in the normal performance of tasks that support deliberate planning for assigned missions. While in garrison there may not be an established planning staff as described in paragraph **A5.4.**, but all of those functions will be gathering information and performing at least some of the analysis required as part of the IPB process. While in garrison, the planning staff will:

A5.2.2.1. Identify significant characteristics of the environment using all available analytical reports; Geospatial Information and Services (GI&S) and imagery databases; intelligence databases; climatology and all other pertinent sources of information.

A5.2.2.2. Identify the Operations Area (OA) and Area of Interest (AOI) based on the Theater CINC's definition and guidance.

A5.2.2.3. Establish the limits of operations within the AOI.

A5.2.2.4. Identify the amount of planning detail required and feasible within the time available for IPB.

A5.2.2.5. Collect the material and intelligence required for conducting the remainder of IPB.

A5.2.2.6. Identify and obtain country clearance information.

A5.2.2.7. Develop Essential Elements of Friendly Information (EEFIs).

A5.2.2.8. Develop initial Requests for Information (RFI) and Production Requirements (PR).

**A5.2.3. Minimum Planning Requirements.** At a minimum, the planning staff will assess the geography, terrain, and weather conditions of the area; population demographics; political and socio-economic factors; infrastructures; rules of engagement; and threat force capabilities and doctrine. The result will be a "big-picture," snapshot view of the theater of operations.

**A5.2.4. Deployment Planning Requirements.** When tasked for deployment, the planning staff will: (1) Review all tasking messages. (2) Prepare and conduct pre-deployment briefings. (3) Prepare intelligence briefings. (4) Prepare Crisis Action Team briefings. (5) Review climatology and weather forecasts and conduct weather briefings. (6) Review medical requirements for deploying forces. (7) Review Rules of Engagement. (8) Prepare en-route threat assessment. (9) Review terrain, geography, and other details of the deployment location.

**A5.2.5. Mission Tasking.** The OA and AOI are specified in the Joint Task Force mission tasking. Based on tasking, the planning staff will determine bed-down base requirements, route of flight to bed-down location from home base, intermediate staging base locations, forward staging base locations, and force protection requirements (see **Attachment 6**, IPB for Force Protection).

**A5.2.6. Time Planning Factors.** The planning staff must continue to refine and update all assessments and databases within the time restrictions imposed by the situation. As intelligence gaps are identified, requirements are rolled over into the collection and surveillance plan for execution. All SOF-A units must maintain and review standing EEFIs. These EEFIs will form the basis for PRs for all contingency deployments as required.

**A5.2.7. Covert Operations Requirements.** Proper analysis of the battlespace environment enables SOF-A mission planners to develop ingress/egress routes that avoid contact with enemy forces. Unlike conventional Army and Air Force units that seek to engage enemy forces, a primary consideration for most SOF missions is to avoid all contact with enemy forces - thereby minimizing the likelihood of mission compromise. Avoidance is key for the protection of aircraft, crew, and customers; Special Forces (SF), Sea, Air, and Land forces (SEAL), and Special Tactics Teams (STT).

**A5.2.8. Pre-mission Planning Factors.** Orders of battle (OB) and disposition of forces, maintained on mission planning displays and automated databases, are included in the intelligence briefings prior to deployment. The planning staff, through coordination with appropriate agencies, must identify potential engagement areas, battle positions, avenues of approach, and specific locations of weapon systems and associated systems assets, and command and control links and nodes. During pre-deployment and immediately after arrival at the bed-down location, SOF-A planners assess mission tasking with respect to operations within the OA and AOI.

### **A5.3. Step 2: Analyze the Battlespace Environment.**

**A5.3.1. Battlespace Effects.** The planning staff will utilize threat databases, National Imagery and Mapping Agency (NIMA) products, GI&S products, imagery, and other resources as available to determine key aspects of the battlespace environment as they apply to each unique mission. To the maximum extent possible, planners will pull existing products created by service components, theater production agencies, and national agencies that can support the specialized SOF missions.

**A5.3.2. Hybrid Template Development.** SOF may effectively assess the battlespace environment using a hybrid template adapted from the Army analysis template, Observation, Concealment and cover, Obstacles, Key terrain, and Avenues of approach (OCOKA). Adding to this template the environments of air, space, water, and information, SOF-A/ST planners can more fully develop the battlespace in relation to its assigned missions.

#### **A5.3.3. Environment Analysis.**

**A5.3.3.1. Observation:** The ability to see the threat either visually or through the use of surveillance equipment.

A5.3.3.1.1. Identify areas, routes, and locations that minimize or eliminate contact with enemy forces.

A5.3.3.1.2. Identify most likely positions for enemy forces and equipment locations.

A5.3.3.1.3. Identify potential engagement areas.

**A5.3.3.2. Concealment and Cover:** Protection from enemy observation provided by woods, underbrush, snowdrifts, tall grass, surface formations, cultivated vegetation and real time weather such as fog, clouds, etc.

A5.3.3.2.1. Identify unrestricted, restricted, and severely restricted areas for movement, staging areas, and Landing Zone/Drop Zone (LZ/DZ) locations.

A5.3.3.2.2. Identify likely routes of flight to maximize terrain masking and minimize weather impacts.

**A5.3.3.3. Obstacles:** Any natural or manmade terrain features that stop, impede, or divert military movement.

A5.3.3.3.1. Identify natural obstructions; rapidly rising terrain features, mountains, tall trees, swamps, steep slopes, etc.

A5.3.3.3.2. Identify man-made obstructions such as balloons, wires, towers, bridges, mine fields, inhabited areas, roads, etc.

**A5.3.3.4. Key Terrain:** Any locality or area, the seizure, retention, or control of which affords a marked advantage to either combatant.

A5.3.3.4.1. Evaluate the terrain as it impacts SOF missions within the OA and AOI.

A5.3.3.4.2. Identify and integrate key terrain features and incorporate into mission planning process; road junctions, populated areas, level clearing in rough terrain, bridges over unfordable rivers, etc.

**A5.3.3.5. Avenues of Approach:** An avenue of approach is a route used by an attacking force of a given size leading to its objective or to key terrain in its path.

A5.3.3.5.1. Identify avenues of approach for tactical, transport, strategic, reconnaissance, rotary-wing, space, waterborne and other craft.

A5.3.3.5.2. Identify restricted airspace (coordinate with unit airspace managers), terrain, and water areas.

A5.3.3.5.3. Identify national authentication procedures (coordinate with unit communications flight).

A5.3.3.5.4. Identify civil air routes, shipping routes, as required (coordinate with civilian and military agencies).

A5.3.3.5.5. Determine enemy ground avenues of approach, infiltration lanes, reconnaissance unit routes, etc. that will affect SOF ingress/egress routes, staging areas, LZ/DZ, and other potential operation areas.

A5.3.3.5.6. Analyze avenues of approach to determine routes that avoid enemy contact.

**A5.3.4. Weather Analysis.** USAF weather teams in-garrison and deployed, are an essential element of the war fighting team. SOF planners must integrate weather analysis into every phase of the planning, deployment, and execution process. Climatology-based planning materials and long, medium, and short-term forecasts are available and must be used to support SOF operations. Two critical sub-tasks to analyze weather are (1) the analysis of military aspects of weather and (2) evaluation of the weather's effects on military operations.

**A5.3.4.1. Military Aspects of Weather.** Analyze such items as visibility, winds, precipitation, cloud cover, and temperature and humidity to determine effects on deployment, bed-down, and operations of SOF.

**A5.3.4.2. Weather's Effects on Military Operations.** Intelligence planners must coordinate with unit weather personnel to determine weather effects on:

A5.3.4.2.1. The characteristics of enemy and friendly munitions (e.g., chemical weapons) air defense effectiveness, aircraft capability, etc.

A5.3.4.2.2. The effectiveness of enemy and friendly personnel, equipment, types of operations based on operational weather thresholds.

A5.3.4.2.3. The effectiveness of radar and other electronic equipment.

**A5.3.4.3. Other Weather Characteristics.** There may be other characteristics of the battlespace that are not addressed in the analysis of surface, air, space, water, and weather analysis. Due to the specialized and unconventional nature of SOF missions, a careful analysis must include assessments of logistics infrastructure, population demographics, economics, and politics.

**A5.3.5. Infrastructure, Demographic Analysis.** There are other characteristics of the battlespace that are not addressed in the analysis of surface, air, space, water, and weather analysis. These characteristics generally represent man's impacts on the environment, and include infrastructures, demographics, economics, and politics. Due to the specialized and unconventional nature of SOF-A missions, a careful analysis must include assessments of these characteristics as the environment has shaped them. Population centers, and communications networks, centers of economic activity, political structures, and religious structures are just some of the elements that must be analyzed to determine strengths and weaknesses which factor into the COA available to the enemy commander.

#### **A5.4. Step 3: Evaluate the Enemy.**

**A5.4.1. Tactical Considerations.** Because SOF-A operates throughout the spectrum of conflict and the OA, missions will often be executed in territory controlled by the enemy or in areas not well defined by lines of battle. Intelligence must focus not only on analyzing the enemy's current capabilities, but also the enemy's future capabilities and intent. Every action by the enemy causes a reaction by friendly forces. What enemy forces do or do not do, and the response from friendly forces factors into planning. This analysis begins with a complete review of enemy forces, weapons systems, capabilities, and employment doctrine. Direct engagement zones, lines and avenues of approach and retreat, and marshalling areas, etc., must be accurately identified, analyzed, and factored into mission planning processes to determine their impact on SOF operations and limitations. Enemy assessments are updated continuously from initial tasking through final redeployment.

**A5.4.2. Mission Planning Cycle.** Any analysis of enemy capabilities and dispositions must be considered in light of the mission planning cycle. At the time mission planning begins until the mission is executed, it is highly possible that location, composition, and disposition of specific enemy units has significantly changed. Therefore, when planners conduct analysis of enemy forces, they must do so with a view toward the future threat, i.e., the time the mission will take place.

**A5.4.3. Cultural Planning Factors.** Analysis of cultural aspects of the environment is an essential task within the broad function of analyzing the enemy. Unique cultural characteristics may significantly impact operations and must be factored into the deployment and mission planning processes. Understanding regional customs, law, religious observances, and communication/language provides a significant source of information for exploitation and use by SOF planners.

**A5.4.4. Reachback Requirements.** SOF-A units are not configured with large support staffs. The majority of data regarding enemy OB and capabilities will likely be obtained from the theater SOC, JIC/JAC, J2, Air Operations Center (AOC), or through reachback to national agencies. Planners must maintain lateral contact with the intelligence and weather staffs of ground, naval, and in some cases combined special operations forces. Often, the IPB processes of other component forces will provide detailed information that will impact SOF-A mission execution. The use of automated intelligence and weather systems will aid this process, enabling SOF planners to pull information from key production staffs and push it to the mission planners that require the information. This process must begin

as early in the tasking process as possible. Often, the IPB processes of other component forces will provide detailed information that will impact mission execution. The use of automated intelligence and weather systems will aid this process, enabling planners to pull information from key production staffs and push it to the mission planners that require the information. This process must begin as early in the tasking process as possible. In fact, maintenance of a baseline OB is a key in-garrison function for intelligence at all levels from unit through the national agencies.

**A5.4.5. Required Planning Tasks.** The planning staff, utilizing push/pull technology, performs the following tasks:

A5.4.5.1. Identify Orders of Battle (OB) for enemy forces. SOF-A planners must maintain up to date OB for adversary ground, air, naval, electronic, missile, space and information. These OB must be plotted to the lowest possible echelon.

A5.4.5.2. Identify OB for friendly forces. SOF-A planners need to be aware of the location and disposition of all friendly forces, and have an awareness of projected operations to prevent interference with SOF-A mission planning.

A5.4.5.3. Identify OB for neutral forces. The location and disposition of neutral forces can have a detrimental impact on planned missions, therefore it is imperative that SOF-A planners maintain up to date OB files on any neutral forces that could interfere or be affected by planned missions.

A5.4.5.4. Detail the disposition of enemy forces down to lowest possible level.

A5.4.5.5. Detail the disposition of friendly forces down to lowest possible level.

A5.4.5.6. Identify locations and dispositions of nonbelligerent population; civilian, police, paramilitary, etc.

A5.4.5.7. Identify locations and dispositions of elements sympathetic to the enemy, terrorist organizations, third party supporters, etc.

A5.4.5.8. Assess strength and weaknesses of each identified force.

A5.4.5.9. Assess impact of capabilities on SOF-A missions, including anticipated reactions to detection and/or discovery.

A5.4.5.10. Assess impact of weather on friendly and enemy forces and systems.

**A5.4.6. Required IPB Products.** Decision support templates, matrices, and graphic overlays are created and used by other services and different echelons throughout the theater (ref. JP 2-01.3 "JTTP for Joint Intelligence Preparation of the Battlespace"). SOF intelligence personnel may tap into these products to save valuable time and rely on the expertise of dedicated analytical staffs within the theater and national intelligence agencies.

**A5.4.6.1. Available US Army IPB Products.** Army products, produced by the Analysis Control Element (ACE) at Corps, Division, Brigade, and Battalion, are a source of significant intelligence data for use by SOF. This information, combined with assessments from the Battlefield Coordination Division (BCD) located in the Air Operations Center (AOC), G2/S2 and G3/S3, will significantly enhance SOF's view of the battlespace and the disposition of forces. Specific products include but are not limited to: (1) Modified Combined Obstacle Overlays (MCOO) for air, land, maritime, and electromagnetic, (2) orbit types and points, (3) doctrinal and situation templates, (4) situation matrices, (5) time, event, and weather matrices, and (6) Avenues of Approach overlays.

**A5.4.6.2. Available US Navy IPB Products.** The formal IPB process is fairly new to US Navy intelligence personnel and planners, as it is to the USAF. However, it must be stressed that intelligence personnel in all services and in joint operations have conducted some form of IPB for years – it was just not incorporated into a formal methodology. Hence, US Navy products from the Combat Intelligence Center, both afloat and ashore, will provide significant information on surface/subsurface environments that can affect SOF-A missions. Similar to the US Army, significant resources are devoted by the Navy to meteorology and hydrography. Both are key elements in defining the battlespace. Planners must also identify significant information that may be available from Marine Expeditionary Units (MEU) and Marine Air Wings (MAW). The theater annexes to this document describe some of the naval elements, which may be tapped for information critical to conducting a proper IPB process. Specific information may include: (1) mined areas, both afloat and within beach areas; (2) coastal patrol areas and tactics; (3) shore batteries and their employment; (4) hydrography; (5) tide and current patterns; (6) beach and littoral soil composition.

**A5.4.6.3. Available US Air Force IPB Products.** The A2 staff within the AOC will conduct AIPB for the JFACC, with support from functional staffs (operations, weather, logistics, etc.) at that level. In addition, there will likely be all or part of an Air Intelligence Squadron (AIS) dedicated to analysis of the battlespace for the theater. It is essential to have a complete understanding of the A2's view of theater air operations, both current and future, and to maintain effective, timely linkages with the A2 for continuous information flow and intelligence feeds. A Special Operations Liaison Element (SOLE) is located in the AOC and provides coordination with Combat Plans and Combat Operations divisions for Air/Integrated Tasking Order (ATO/ITO) input, airspace control, deconfliction, and prevention of fratricide. When fully manned, the SOLE includes intelligence representatives whose primary function is to enable and promote the smooth flow of information between the AOC A2 and the intelligence personnel at the SOF-A units, the JSOTF, and the JSOACC. The planning staff may use the SOLE to coordinate mission requirements. All theaters differ, but the annexes to this document describe various resources that may be used to develop the air picture within the IPB process. Some specific information to look for that is primarily maintained at the AOC includes: (1) Air related OB, (2) Electronic Warfare data, (3) Airspace coordination data, (4) Suppression of Enemy Air Defense (SEAD) coordination and tasking, and (5) Single Prioritized Integrated Target List (SPITL).

**A5.4.6.4. Theater IPB Products.** JIC/JAC intelligence products may be accessed and incorporated into mission planning as appropriate-while in-garrison and when deployed. These organizations produce a wide range of analytical products that may provide greater depth to the SOF assessment of force disposition, and capabilities of the environment.

**A5.4.7. Use of Threat and Doctrine Templates.** SOF-A may use threat and doctrine templates to depict enemy dispositions, deployment schemes, and employment tactics as they apply to the specific mission within the OA and AOI. In particular, air defense threat rings or bubbles, radar shadow predictions, improved many-on-many (IMOM) runs and similar products all can become part of a threat or doctrine template when a proper analysis of present operations and future trends (the core of the IPB process) is conducted. Army-developed templates may provide a wealth of information regarding likely ground force dispositions and movements. Important to remember, the IPB process must provide not only a look at the present but also an educated factually based estimate of the future situation. For SOF-A in particular, given the 96-hour lead time required for proper mission planning, it is not enough to analyze where the enemy is or has been. You must be able to predict with a fair degree of

authority where he will be in the future. If formal, stylized threat and doctrinal templates are not available, or cannot be developed due to shortages of personnel or time, the information normally depicted in such a template must be conveyed to the commander and mission planners through verbal or written reports.

**A5.4.8. Available Automated Intelligence Support.** SOF-A intelligence personnel may employ a variety of automated intelligence systems to augment the analysis gained from theater sources in order to tailor the IPB process to specific mission requirements:

**A5.4.8.1. Improved Many on Many (IMOM).** IMOM graphically displays threat engagement envelopes based on radar signal strength, terrain masking, and jamming, allowing mission planners to create “what-if” scenarios via threat analysis from selected radar systems.

**A5.4.8.2. Combat Intelligence System-Automatic Associator (CIS-AA).** Being replaced with TBMCS, CIS-AA performs the automated and semi-automated correlation of multi-source and multi-intelligence air, land, and naval information to create and maintain a current in-depth, strategic and tactical picture of the battlespace.

**A5.4.8.3. Tactical Information Broadcast System (TIBS).** TIBS is a computer aided communications system used to provide near-real-time (NRT) hostile threat data, linking producers to consumers and allowing user data queries.

**A5.4.8.4. Joint Deployable Intelligence Support System (JDISS).** This joint-level/high security system allows message receipt, transmission, and manipulation and/or annotation using organic software applications.

**A5.4.8.5. Combat Intelligence System (CIS).** CIS used as a unit level push/pull mechanism to provide intelligence on enemy OB, target imagery, and threat system parametric data to the SOF Planning and Rehearsal System (SOPARS).

**A5.4.8.6. Portable Flight Planning System (PFPS).** PFPS mission planning and mapping software architecture utilizing CDs to load theater and worldwide flight and airdrop data allowing operators to plan routes of flight and integrate with threat data.

**A5.4.8.7. SOF Warlord Notebook.** Warlord Notebook allows interoperability with all SOCOM components, and their respective mission planning systems, as well as being interoperable with conventional Air Force Intelligence Systems (Combat Intelligence System / Theater Battle Management Core System), Army Intelligence Systems, and Navy Intelligence Systems. The system will allow SOF intelligence personnel to be fully mobile with a dial-up capability. The system will exploit the reachback capability of units to their home stations.

**A5.4.8.8. Open Source.** Access via the Internet can give access to such information such as a tourist map that suffice when even the most expensive systems cannot provide information about a location in a remote location.

#### **A5.5. Step 4: Determine Enemy Courses of Action (COA).**

**A5.5.1. Use of Established Adversary COA.** The Joint Task Force (JTF) Commander or theater CINC and his staff determine the overall enemy COA based on a huge, ongoing IPB process. Gathering intelligence and information from service components, national agencies, and many other sources is a mammoth task with the goal of providing the JTF commander or theater CINC with the best possible view of the battlespace. The assessments that follow from this conduct of the IPB process pro-

vide key information for subordinate units. Each unit and element must then analyze the impact of those COA on its specific mission(s). Obviously, no theater-generated product is going to provide all the answers required by a particular SOF-A planning cell; IPB *must* be conducted at all levels. SOF-A intelligence personnel must cull the intelligence they require to make a proper analysis of the situation in light of the mission and be specific in their requests for information required to complete the picture of the battlespace. No single intelligence summary or OB template is going to provide the analyst at the unit level all of the answers; IPB is a continuous process of gathering, analyzing, and predicting future activity *as it applies to the mission*.

**A5.5.1.1. Dissemination of JTF COA Assessments.** The Joint Force Special Operations Component Commander (JFSOCC) or Joint Special Operations Task Force (JSOTF) commander receives the general COA assessment provided by the CINC or JTF and makes a determination of the impact on each service component as it affects special operations. This information is then disseminated to SOF components.

**A5.5.1.2. Impact of Adversary COA on SOF Mission Planning.** The task for planners is to assess the impact of the overall courses of action on each specific mission being planned. There will be strategic level, operational level, and tactical level COA that affect SOF missions within the AO and AOI. It is the responsibility of SOF mission planners to evaluate how each of these COA affects SOF tasking.

**A5.5.2. COA Impact.** Determining how COA affect individual SOF missions will be accomplished by carefully assessing how the battlespace environment changes during the execution of specific COA. Mission planners must identify where the enemy is located at any given time and where, based on likely COA, he is likely to be at the time of mission execution, ideally 72-hours or more after planning begins.

**A5.5.2.1. COA Impact on Mission Planning.** SOF-A planners must assess how the changing battlespace will impact the execution of specific missions regarding routes of flight, the selection of landing zones and drop zones, the routes of travel, and the selection and use of selected/preferred areas for evasion (SAFE/PAFE). A good IPB process will provide the commander the best opportunity to make a go/no-go decision based on supportable evidence. Within the SOF-A mission planning process, a properly conducted backbrief is the best example of good IPB at work. The “What if?” gaming that should occur at the backbrief provides the key environment for describing the various COA, prioritizing them in terms of most likely and most dangerous, and providing the commander with the best picture of the battlespace as it will likely appear at mission execution.

**A5.5.2.1.1. Impact on Route Planning.** Routes of flight must stay clear of mission-limiting lines of advance or retreat, concentrations, encampments, and assembly areas of enemy and friendly forces. Weapon system engagement zones must be plotted accurately and their future locations forecasted to minimize/eliminate exposure during mission execution. For SO, routes of flight may well have to be planned to avoid *any* populated areas, network nodes, or other concentrations of manmade origin.

**A5.5.2.1.2. Impact on LZ/DZ Planning.** The LZ/DZ selection is determined by the customer and validated as feasible by planners. Validation is based upon what the battlespace will look like at the time of mission execution. This requires detailed OB down to the lowest possible level; movements of friendly and enemy forces, detection probabilities, and locations of

threat systems. SOF-A will not land aircraft or drop troops and supplies in areas held by enemy forces. Nor will they jeopardize friendly units by utilizing LZ/DZ that draw undue attention to them.

**A5.5.2.1.3. Impact on Covert Operations.** Routes of travel must minimize exposure to areas/LOCs that are used by enemy and/or friendly forces at present or in the future. Routes must also avoid threat engagement zones, collection assets (personnel and automated systems), and other systems that can identify the location and operation of SOF assets. Detection of SOF by any force undermines the unique requirements for stealth and potentially compromises the entire mission.

**A5.5.2.1.4. Impact on SAFE/PAFE Selection.** Identification and selection of SAFE/PAFE are contingent upon the absence of enemy troops, weapons systems, and surveillance/collection capabilities in a given area. As the battlespace changes, enemy and friendly forces may use the same criteria to select areas for counterattack, conventional re-supply, staging areas, or to hide high value targets (HVT) from detection. SOF planners must base SAFE area selection criteria on the need for access from mission route, proximity to enemy and friendly forces, potential for mission compromise, recovery capability, and survivability for the evader.

**A5.5.3. Operational and Tactical Impact.** At the operational and tactical level, enemy COA in a specific objective area will have the greatest impact on mission execution. Multiple COA from both enemy and friendly operations could affect each mission. Planners must devote the greatest amount of effort to evaluating the impact of COA at the tactical level and prioritizing these COA in order to budget the available time for intelligence analysis. Stay focused on the mission! If a theater-developed enemy COA for some future period states that the enemy is likely to continue on offense, that is no assurance that during a particular SO mission, at a particular time in place, the enemy will not be in a purely defensive posture. The IPB process, and development of COA, must be tailored to the specific mission at hand.

## **A5.6. Intelligence Support to Mission Planning.**

**A5.6.1. SOF-A IPB Integration.** Information and products pulled from national, theater, and service components, as well as information derived from unit debriefings, provides SOF mission planners with key inputs for developing as complete a picture of the total battlespace as possible. The fusion of data and information from these systems will continue to shape and refine the view of the enemy and its capability to carry out operations against friendly force. At a minimum, the planning staff will utilize the above systems and information to:

A5.6.1.1. Maintain current situation displays (ground force dispositions, routes of flight for air forces, coordination with Air Defense Artillery (ADA), etc.).

A5.6.1.2. Maintain close coordination with theater SOC J2/J3 and above to keep an up-to-date OB picture.

A5.6.1.3. Maintain close contact with Army and Navy SOF and other supported forces for coordinating missions; include the supported force's organic intelligence assets as a source for developing information.

A5.6.1.4. Analyze and update threats.

A5.6.1.5. Evaluate enemy tactics, techniques, and procedures.

A5.6.1.6. Identify SEAD support requirements.

A5.6.1.7. Continue IMOM analysis.

A5.6.1.8. Identify enemy space operations capability.

A5.6.1.9. Assess impact of surveillance, communications, imaging, and other related space-based technologies on SOF.

A5.6.1.10. Determine impact of weather on enemy and friendly operations.

**A5.6.2. Deliberate Planning.** Joint Pub 3-05.5 defines deliberate planning as “planning for a hypothetical situation involving the deployment and employment of apportioned forces and resources projected to be available. Deliberate mission planning relies on assumptions regarding the political and military situation that will exist when the plan is implemented.” It is usually associated with peacetime planning for operations plan (OPLAN) or contingency plan (CONPLAN) tasking. It can also be conducted during a lengthy crisis situation or for a theater campaign plan during wartime. IPB is a daily, ongoing process for deliberate planning at all levels. Reviewing daily message traffic, reading intelligence analysis publications, or researching the Internet are all a part of the continuous nature of IPB. Any intelligence derived from this daily process can be used to update the battlespace picture. For example, an article in the theater intelligence summary (INTSUM) reports the target country in one a particular unit’s OPLAN has just received a new surface-to-air missile. The site coordinates are listed in the report. That site can be plotted and when combined with planned mission routes, a determination of that system’s effects on the mission can be made. After reporting this to the staff, it is determined that these missions need to be re-planned. This is a quick example of the third step of IPB - evaluating the threat, and an example of how deliberate planning requires periodic updates. In order for intelligence personnel to fully support deliberate planning, it is imperative that they have a thorough understanding of deliberate planning and where they fit into the process. Joint Pubs 3-05.5 and 3-05.3, Doctrine for Special Operations Operational Procedures should be read, studied, and understood by everyone in SOF-A intelligence.

**A5.6.2.1. Tasking.** As part of inprocessing and orientation to a new unit, intelligence personnel should learn the primary OPLAN tasking and what missions have been assigned and preplanned. But how did these missions get to the new unit? Where did they originate? What is intelligence’s part in the process? The missions that a unit eventually plans begin with broad concepts at the national level and are then narrowed into objectives and guidance. Guidance for a particular area of responsibility (AOR) or theater is then passed to that command. The theater combatant commander or joint force commander (JFC) refines the national objectives and guidance into specific OPLANS. Target development begins with the OPLAN’s specific objectives and guidance as well as the commander’s intent. The various component commanders to the joint target coordination board (JTCCB) nominate targets. The JTCCB checks the nominations against the commander’s objectives to see if they meet the criteria and, if approved, are then deconflicted with other approved targets before being included in the target nomination list. The JTCCB sends a mission-tasking letter (MTL) to the theater SOC or JFSOCC tasking them to conduct a feasibility assessment (FA) for each mission. The SOC/JFSOCC then designates the appropriate subordinate component to be the mission-planning agent (MPA) and to conduct a feasibility assessment (FA) of the mission. At the same time, the SOC/JFSOCC tasks supporting agencies to conduct an initial assessment (IA) on the feasibility of the MPA’s infiltration and extraction. The theater Army Special Forces component or the Navy special warfare component is usually the MPA, while the the-

ater AFSOC component is usually the primary support agent. In addition, an Intelligence Production Agent (IPA) such as the theater joint intelligence/analysis center is tasked to support the FA and IA, as required.

**A5.6.2.2. Mission Planning.** Once a particular SOF-A unit has the IA tasking, they must determine if they can even get the MPA to the LZ/DZ. After all, there is no use in various agencies wasting time and effort conducting detailed mission planning and production if infiltration or extraction is not possible. Intelligence is a key participant in this process. The IA is an initial look at the mission and in-house library data may support it. However, if the data is insufficient to provide a complete assessment, requests for information or imagery may be required. This is the IPB process in its most basic form, using immediately available information to derive the best picture of the battlespace in a limited amount of time. Supervisors and flight commanders must be able to evaluate their unit's capabilities and practice "quick and dirty" analysis.

**A5.6.2.2.1. Define the Battlespace Environment.** The overall AOI and AO are determined by higher command. The AI extends from home base, through operational bases, into the Joint Special Operations Area, and on to the Target Area of Interest (TAI). It includes areas or countries that may provide military, political, economic, psychological, or social aid to the target forces. While there is an overall AO, each mission can also be considered to have its own AO. The mission's AO will include infiltration and extraction routes and corridors, primary and alternate LZ/Dz., and the area within which enemy locations are close enough to pose a threat to the mission.

**A5.6.2.2.2. Describe the Battlespace Effects on Operations.** A first step in determining effects of the battlespace is to assess the terrain factors. This is not a task to be conducted in a vacuum. As previously stated, other components within the theater and at national level may well have already made a start on this part of the process. The key for SOF-A intelligence personnel is not to reinvent the wheel, but to know where to go to get this information, then tailor it to the mission. Terrain factors to assess in determining the effects of the battlespace included in [Table A5.1](#). The second step listed in the table is determining the effect of the battlespace to assess avenues of approach (AA) factors. Third, assigned or attached weather personnel must assess weather factors as they apply to the mission. Conditions that affect flight in general and aircraft systems in particular must be addressed. Do not overlook factors that affect target acquisition and night vision capabilities. Close coordination between intelligence and weather personnel is a must when combining all the elements of developing the battlespace effects into an understandable picture. Likewise, intelligence personnel will likely have to closely coordinate with tactics planners to determine battlespace effects on the weapon system of choice. The combination of quality analysis by weather, tactics, and intelligence personnel is the key to a successful conduct of the IPB process, particularly the development of the battlespace effects on operations. Most of this info will require coordination/assistance from Ops types at the AOC and other locations.

**Table A5.1. Determining Effects of the Battlespace.**

<b>Terrain Factors</b>
Identify potential battle positions.
Assess potential engagement areas; “danger areas” that optimize ADA fields of fire.
Areas that mask threat radar, surface to air missiles (SAM), and ADA.
Areas that provide good terrain background (ground clutter) effects.
Terrain shadowing effects.
Potential locations for LZs, DZs, pickup zones, forward area refueling and rearming points (FARRP), and forward assembly areas (Include all potential zones of entry and infiltration corridors. Do not overlook waterborne access routes).
Identify sources of food and potable water.
Evaluate slopes as obstacles to fast rope assault operations.
Identify low-level flight corridors.
<b>Avenues of Approach</b>
Obstacles to flight such as power lines, towers, or rapidly rising terrain features.
Areas where birds gather
Contaminated areas or manmade obstacles
Areas that give threat systems distinct advantages in covering air AAs
Concealed and covered routes into potential battle positions
Routes that provide for ease of navigation
Potential safe areas for downed pilots (also evaluate infiltration corridors)
<b>Weather Factors</b>
Effects on airborne operations (surface and altitude winds)
Effects on low-level flight
Effects of tides and sea conditions on waterborne operations
Density altitude effects on performance and payload
Weather effects on threat air defense systems
Effects of wind speed and turbulence on flight operations, especially in close terrain
How wind speed and turbulence will affect target acquisition
Weather effects on target acquisition systems (e.g., laser or infrared [IR])
Restricting effects of low ceilings in air AAs
Conditions that may cause “white out” or “brown out”
Probability of icing
Precipitation effects on FAARP activities

**A5.6.2.3. Evaluate the Enemy.** This step is generally associated with traditional intelligence analysis. Planners are used to seeing charts plotted with all sorts of OB, IMOM products, imagery, etc. Much of the OB data available for deliberate planning depicts the in-garrison location of enemy units. As part of a well-grounded IPB process, intelligence analysts must consider where opposing forces will be located should the mission be executed. Intelligence estimates produced by theater/national production agencies should include analysis on the target country's doctrine. There may be doctrinal charts, templates, or matrices that will assist in determining how the enemy deploys and operates in given situations. From those products, intelligence personnel supporting the mission planning process must refine and update the information to assess the enemy's most likely and most dangerous dispositions and operations during mission execution. Key factors to include in such an assessment, tailored to the SOF-A mission might be included in [Table A5.2](#).

**Table A5.2. SOF-A Mission Key Factors.**

Units supported by ADA assets
Types of ADA and their capabilities
Maximum and minimum ranges
Maximum and minimum engagement altitudes
Minimum engagement times
Type of fusing systems in use
Effectiveness against countermeasures
Type radar associated with each system
Number of firing units per radar
Range capability of radar versus weapon system
Minimum altitude restrictions on radar
Ability of radar detectors to detect radar
Other threats such as lasers or artillery fire zones
Artificial illumination effects on target acquisition and night vision devices
Identify external support to the enemy - consider the probability of military intervention by third-party nations
Identify the enemy's desired end state
Evaluate the groups and subgroups supporting the enemy
Identify discord within the enemy
Identify any groups that may have been misled about the enemy's desired end state
Evaluate organizational structures or patterns within the enemy

**A5.6.2.4. Determine COA.** It is not the mission support agent's task to analyze what the enemy is going to do across the theater. COA at that level will be determined by higher command and published in theater/national estimates. However, COA must be evaluated and refined to fit the particular mission. Again, an opposing force at theater level may be on the offensive, but that does not mean the force surrounding a key target for SO will not be prepared to conduct an organized, supported defense-in depth! Intelligence planners assess and be prepared to provide multiple COA

based on the most likely and most dangerous effects on the mission. Some COA assessments are included in [Table A5.3](#).

**Table A5.3. COA Assessment.**

Identify likely enemy approaches to your engagement areas and battle positions
Identify enemy units along flight paths; consider their reactions and develop the appropriate situation templates
Develop situation templates for enemy actions within the engagement area; include reactions to aviation
Determine where radar or weapon systems are masked by terrain
Identify areas with the least amount of ADA coverage
Include ADA range fans
Assess likely enemy reactions to downed aircraft and evading aircrew or discovery of personnel on the ground (ST teams, SOF ground forces)

**A5.6.2.5. Special Operations Mission Planning Folder.** Once the mission is deemed feasible and the target is validated, the JFC sends a mission tasking package (MTP) to the JFSOCC tasking the development of a Special Operations Mission Planning Folder (SOMPF). The JFSOCC sends a request to the JFC for production of a target intelligence package. The MPA begins development of the plan of execution (POE) while the supporting agent develops a mission support plan (MSP). At this point, more detailed mission planning will be conducted. Products, charts, overlays, etc. that were used during the IA will still be of use. In addition, requests for information and imagery that were not submitted during the IA because there was not enough time can now be submitted. The IPB process may, in fact, indicate additional requirements for information and analysis as time goes on and more detail is input. The MPA is responsible for putting the SOMPF together. It includes the MTL, FA, TIP, MSP, and POE. It is sent to the JFSOCC for approval and once it is approved, it is maintained and updated periodically. The IPB process is not over, however. Remember that it is a continuous process and the four steps often overlap.

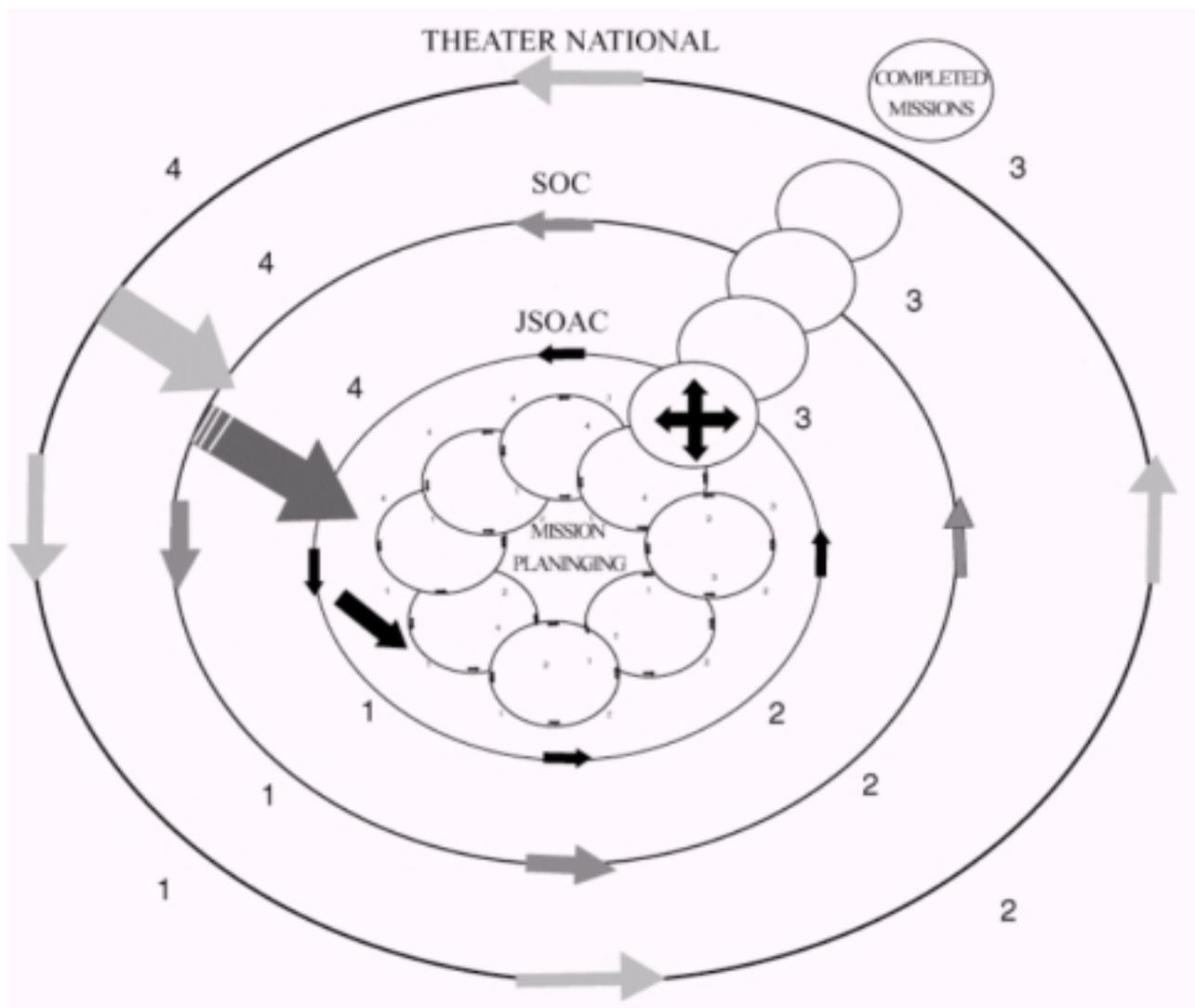
**A5.6.3. Time-Sensitive Planning.** When the term mission planning is discussed time-sensitive planning is the type that most often comes to mind. Joint Pub 3-05.5 states “Time-sensitive planning refers to planning for the deployment and employment of allocated forces and resources that occurs in response to an actual situation.” It is used across the spectrum of conflict from small-scale operations to major theater war. As with deliberate planning, intelligence personnel must have a thorough understanding of time-sensitive planning and where they fit into the process. Chapter IV of Joint Pub 3-05.5 provides a full description for intelligence personnel to review. This section discusses intelligence support and IPB for time-sensitive planning.

**A5.6.3.1. Tasking.** A special operations mission normally requires 96 hours to plan and this is the time period most often discussed. There are many instances however when the situation does not allow for the full planning period. In those cases, commanders provide guidance on how to modify mission-planning procedures and still complete required tasks in the time allowed. For now, we’ll focus on the complete 96-hour cycle. The JFC starts the process by transmitting a Mission Tasking Order (TASKORD) to the JFSOCC 96 hours before the earliest anticipated launch time (EALT). The TASKORD may be for a mission that was planned during the deliberate planning cycle, referred to as a preplanned mission, or it may task a new mission. The JFSOCC quickly reviews

the TASKORD for feasibility and then transmits a TASKORD to the MPA, supporting agent or agencies, and the IPA. The TASKORD gives these agencies direct liaison authorized (DIRL-AUTH), which allows them to coordinate with each other in an effort to facilitate planning. If it is a preplanned mission, the IPA updates the TIP. If it is a new mission, the IPA provides the agencies with all available intelligence. In either case, the IPA should respond within 12 hours of receiving the TASKORD. The MPA begins proposed COA development while coordinating with the supporting agent on infiltration and extraction options. The theater AFSOC component or Joint Special Operations Air Component (JSOAC) is usually the supporting agency for air support. In many instances, intelligence will be asked if the mission can be supported, and it is a properly conducted IPB process that allows the senior intelligence representative to make a credible, well-grounded estimate of the enemy's capabilities and likely COA. IPB is only as good as the people who are using the process; good training and regularly exercising the analytical process establish the credibility of the intelligence function for the commander who must make the final go/no-go decision. At 72 hours prior to EALT, the MPA sends the proposed COA to the JFSOCC with information copies to the supporting agencies. The MPA simultaneously sends an Air Support Request (AIR-SUPREQ) to the supporting agency with an information copy to the JFSOCC. The JFSOCC reviews the proposed COA and AIRSUPREQ and can approve, change, or disapprove them. If approved, the JFSOCC sends a COA approval to the MPA with information copies to the supporting agencies. This review and the subsequent transmission of the COA approval should take place within eight hours of receiving the proposed COA.

**A5.6.3.2. Mission Planning.** Initial mission planning for the JSOAC usually begins with receipt of the information copy of the TASKORD. Enough information is included to indicate whether the MPA will require air support. The planning staff knows that an AIRSUPREQ is on the way and that a great deal is riding on whether air infiltration and extraction is feasible. Intelligence will be intimately involved with the decision on feasibility. If the JSOAC is tasked to be the supporting agency, a Support Confirmation (SPTCONF) must be transmitted to the MPA with an information copy to the JFSOCC 48 hours prior to EALT. The type of platform is determined, a crew or team is assigned, and detailed planning begins. This process is carried out for every mission. IPB never stops throughout this process. IPB's four steps as described in the deliberate planning section can be used here as well. **Figure A5.1.** shows the continuous nature of IPB. Circles are used to represent the ongoing, dynamic nature of IPB. The first circle represents IPB conducted at the national/theater level. Estimates, messages, responses to requests for intelligence (RRI), etc., indicated by the large green arrow, are disseminated to the JFSOCC. The second circle represents the JFSOCC who is also conducting the IPB process. Messages, reports, etc., indicated by the large purple arrow, are disseminated to the service components to include the JSOAC. The third arrow represents IPB conducted at the JSOAC. Briefings, analysis, OB, etc., indicated by the large black arrow, are passed to aircrews and teams planning each individual mission. Each of the small circles represents an individual mission. IPB for each mission continues until information from the debriefing is disseminated back into the process, as indicated by the four arrows in black. When the debriefing is completed and information from that mission is disseminated via a mission report (MISREP), that mission is completed.

Figure A5.1. The Continuous Nature of IPB.



**A5.6.3.3. Debriefings.** The mission debrief is an important part of the mission planning cycle and IPB. Information derived from an aircrew or special tactics team is an essential part of the sixth phase of time-sensitive planning combat assessment. Planners need to know if mission objectives have been met. Debriefs can also feed data back into the IPB process. Weather over an objective area can be fed back into step 2. Threat observations can be used in step 3 or even step 4. This information will be extremely time-sensitive in nature. Debriefing information from the first missions of the night can affect ongoing missions or missions yet to be executed.

**A5.7. Summary.** IPB is a comprehensive, continuous process used to support the commander's campaign planning and decision making process by identifying, analyzing, and estimating the capabilities and actions of the enemy. It codifies processes that SOF planners currently use and integrates them with products and processes used by all military forces throughout the spectrum of conflict. IPB also provides a systematic means to estimate and build a picture of the battlespace at a future time, 72-96 hours away, when the execution phase of a specific operation will be conducted. Contingent upon a thorough understanding of the operational art of war, IPB will improve the capability of intelligence staffs to identify,

collect, and analyze information about the enemy and increase the effectiveness of combat operations through more accurate and timely applications of force. The IPB process will continue to evolve and be refined over time to respond to the needs and capabilities of the service components. Education, training, and experience will ultimately hone the techniques of individual users to maximize the benefits inherent in the IPB process.

**Attachment 6****AEROSPACE INTELLIGENCE PREPARATION OF THE BATTLESPACE FOR FORCE PROTECTION**

**A6.1. Overview.** The Air Force's application of Force Protection (FP) is defined and explained in Air Force Doctrine Document 2-4.1, Force Protection. Understanding AFDD 2-4.1, FM 34-130, Intelligence Preparation of the Battlefield and this document is necessary to accomplish FP IPB. Using AFDD 2-4.1 as the starting point, this section will provide additional guidelines for intelligence support to FP operations. It is intended to serve as a guide for using IPB in support of base-level FP operations. The section should not be considered all encompassing. Rather, it is a guide for applying the fundamental IPB process to any FP situation. Since each location is unique, the proper application of IPB may require alteration in focus and thought processes to fit local conditions. The analyst has to apply the IPB process as appropriate.

**A6.1.1. Force Protection.** FP efforts prevent or mitigate successful hostile actions against Air Force personnel and resources. As such, intelligence is the foundation of every FP effort. Identifying, understanding and assessing threats to our forces is the first step in FP planning and the selection of appropriate FP measures. The FP IPB provides the framework in which to analyze FP threats and the environment in which Air Force personnel and resources to be protected are located. By applying the Force Protection IPB process, the commander can selectively apply and maximize FP measures by determining the threat's likely COA and understand the operating environment and its effects on friendly and threat forces.

**A6.1.2. FP IPB Process.** FP IPB is a systematic process consisting of four steps: (Step 1) define the battlespace environment, (Step 2) describe the battlespace effects, (Step 3) evaluating FP threats and (Step 4) determining FP threat COA. The FP IPB process is also continuous. It should begin prior to and during the command's FP planning for an operation and continued during the conduct of the operation. As new information or activity occurs, it is interjected back into the process and products are updated.

**A6.1.3. Step 1. Define the Battlespace Environment.** This step identifies for further analysis specific features of the environment and activities within it that may influence available COA or the commander's decisions as it relates to force protection. Focus on those areas and characteristics of the battlespace that may influence the command's FP mission. Step 1 provides the analyst with an understanding of his FP Operations Area, and provides focus for the remaining IPB steps. To define the battlespace environment, the analyst must (1) Identify significant characteristics of the battlespace, which influence friendly FP efforts and threat operations. (2) Identify the limits of the command's OA for conducting FP operations. (3) Establish the limits of the FP Area of Interest (AOI). (4) Identify the amount of detail required and feasible within the time available to conduct the FP IPB process. (5) Evaluate existing databases and identify intelligence gaps, requiring collection requirements or requests for information. (6) Collect the material and intelligence required to conduct the remaining FP IPB steps.

**A6.1.3.1. Identify Significant Characteristics of the Battlespace Which Influence Friendly FP Efforts and Threat Operations.** Certain characteristics may exist in the battlespace that could affect FP operations and threat COA. The analyst needs to identify any characteristics that may have such an impact. A thorough analysis is not required at this point, only an understanding in general

terms. At minimum, the following elements should be assessed as to their applicability to FP operations:

A6.1.3.1.1. Geography, terrain and weather of the area.

A6.1.3.1.2. Population demographics such as population densities, ethnic groups, income groups, religious groups.

A6.1.3.1.3. Socio-economic factors such as religious and political beliefs.

A6.1.3.1.4. Infrastructures such as transportation and communications networks.

A6.1.3.1.5. Political factors such as Status of Forces Agreements, Rules of Engagement, and international treaties or agreements.

A6.1.3.1.6. Force Protection threats such as unconventional and conventional threats, terrorism, crime, environmental hazards, WMD threats, and civil unrest.

A6.1.3.1.7. Host nation, coalition and joint forces that may contribute directly or indirectly to FP efforts.

A6.1.3.1.8. Activities that require FP measures such as AF and other friendly assets (resources, personnel, etc.) that if attacked, could directly or indirectly threaten our ability to accomplish the mission.

**A6.1.3.2. Identify the Limits of the Command's OA for Conducting FP Operations.** Identifies the key geographic area where the commander is assigned the responsibility and authority to conduct FP operations. This focuses the analytical process in the remaining steps. Higher headquarters may assign the FP Operational Area, if not, the OA should be based on the commander's intent and desired end state. Ideally, the limits of the OA should encompass the maximum effective range of all potential threat standoff and direct-fire weapons that local forces could defend against.

**A6.1.3.3. Establish the Limits of the Area of Interest.** The AOI should include geographical areas from which information and intelligence are required to permit planning or successful conduct of the FP operation. Because time is needed to process information and to plan and synchronize operations, the FP AOI is generally larger than the OA. The dimensions of the AOI are based on the threat's ability to project power or move forces into the OA, the threat's maneuver time, and the time required for friendly forces to react.

**A6.1.3.4. Identify the Amount of Detail Required and Feasible Within the Time Available.** The time available for conducting the FP IPB process may not permit the luxury of conducting the remaining steps in detail. Overcoming time limitations requires a focus on those parts of the IPB process that are most important to the commander in planning and executing the FP mission.

**A6.1.3.5. Evaluate Existing Databases and Identify Intelligence Gaps.** Not all required information or intelligence will be in current intelligence holdings. Intelligence gaps should be identified and prioritized to focus collections. When gaps cannot be satisfied, formulate reasonable assumptions to fill them.

**A6.1.3.6. Collect the Material and Intelligence Required to Conduct the Remainder of IPB.**

Initiate organic collections or submit requests to higher headquarters to fill gaps to the level of detail required for the FP IPB. Develop a priority order for this information based on the commander's intent. Continuously update IPB products as additional information is received.

**A6.1.4. Step 2. Describe the Battlespace Effects.** Step 2 determines how the battlespace affects friendly FP efforts and threat operations. The evaluation begins with an analysis of the existing and projected conditions of the battlespace environment. It allows the commander to choose and exploit the terrain (and associated weather, politics, economics, etc.) that best supports the friendly FP mission. Further, it identifies a set of threat COA available within a given geographic area. To describe the battlespace effects: (1) conduct an analysis of the terrain, weather and other characteristics; (2) describe the battlespace effects on threat and friendly capabilities and broad COA.

**A6.1.4.1. Conduct Terrain Analysis.** The function of terrain analysis is to reduce uncertainties regarding the effects of natural and man-made features on friendly FP and threat operations. Focus on the military aspects of the terrain, known collectively as observation and fields of fire, concealment and cover, obstacles, key terrain, and avenues of approach (OCOKA). Analyze and evaluate the military aspects of the terrain through a map analysis supplemented by personal reconnaissance. Identify gaps that a map reconnaissance cannot satisfy and plan reconnaissance to cover these gaps. Focus this reconnaissance on the areas of greatest importance to the commander and the FP mission. For detailed analysis see section 6.1. above, and FM 34-130.

**A6.1.4.1.1. Observation and Fields of Fire (FOF).** Observation identifies the influence of terrain on reconnaissance, surveillance, and target acquisition capabilities. FOF is the effect of terrain on weapon effectiveness. Analyze observation from the perspective of electronic and optical line of sight (LOS), as well as unaided visual observation. Analyze FOF for all flat trajectory and indirect fire weapons. An ideal FOF for direct fire weapons is an open area in which the threat can be seen and on which there is no protection from fire from those weapons out to the weapon's maximum effective range. For indirect fire weapons, consider the nature of the terrain in the target area and the amount of protection it provides from those weapons. Consideration of this type should also be given to such weapons as tactical ballistic missiles and improvised terrorist devices.

A6.1.4.1.1.1. Prepare terrain factor overlays to aid in evaluating observation and fields of fire. These would include vegetation and building height/density; relief features (including micro-relief features such as defiles), friendly and threat target acquisition, and sensor capabilities as well as specific lines of sight.

A6.1.4.1.1.2. Combine the analysis of factors limiting observation and FOF into a single product (overlay). Identify areas of poor observation and fields of fire. Show areas where an activity is vulnerable to observation by intelligence collection systems or engagement by threat forces. To complete this analysis, identify areas that offer positions that over watch vulnerable areas. This helps to identify defensible terrain, potential friendly defensive positions, and locations for intelligence collectors, specific system and equipment positions, potential engagement areas and locations where maneuvering forces are vulnerable to observation and fires.

**A6.1.4.1.2. Concealment and Cover.** Concealment is protection from air and ground observation. Cover is protection from the effects of fire. Evaluate concealment and cover in the

same manner as for observation and fields of fire, using the terrain factors overlays. Combine analysis of each factor into a single product (overlay) to depict areas that offer concealment and cover. Use results of evaluation to identify and evaluate avenues of approach, defensible terrain and potential battle positions and potential assembly and dispersal areas.

**A6.1.4.1.3. Obstacles.** Obstacles are natural and man-made terrain features that stop, impede, or divert movement. When evaluating obstacles, the analyst must base the analysis on the type of threat force being considered. Identify and prepare the following terrain factor overlays to aid in evaluating obstacles: (1) vegetation (tree spacing and trunk diameter); (2) surface drainage (stream width, depth, velocity, bank slope, and height); (3) surface materials (soil types and conditions that affect mobility); (4) surface configuration (slopes that affect mobility); (5) obstacles (existing and reinforcing); (6) transportation systems (bridge classification and road characteristics); and (7) effects of actual or projected weather such as heavy precipitation or snow cover.

A6.1.4.1.3.1. Combine the effects of individual obstacles into an integrated, cumulative evaluation graphic product (Combined Obstacle Overlay). This graphic depicts areas of the terrain classified as unrestricted, restricted, and severely restricted in terms of their effect on mobility. The analysts must remember that terrain mobility classifications are not absolute but reflect the relative effect of terrain on the maneuver of combat formations, as opposed to simply moving through a piece of terrain.

**A6.1.4.1.3.1.1. Unrestricted.** Unrestricted terrain is free of any restriction to movement and allows wide maneuver and unlimited travel supported by developed road networks. Nothing needs to be done to enhance mobility. For vehicles, this terrain is typically flat to moderately sloping with scattered or widely spaced obstacles such as trees and rocks.

**A6.1.4.1.3.1.2. Restricted.** Restricted terrain is terrain that hinders movement to some degree. Little effort is needed to enhance mobility but forces have difficulty maintaining preferred speeds, moving in combat formation or transitioning from one formation to another. Further, this terrain may slow movement by requiring zigzagging or frequent detours. For vehicles, it typically consists of moderate to steep slopes or moderate to densely spaced obstacles as trees, rocks, or buildings. For dismounted forces, it may be swamps or rugged terrain.

**A6.1.4.1.3.1.3. Severely Restricted.** Severely Restricted Terrain is terrain that severely hinders or slows movement in combat formation unless some effort is made to enhance mobility such as employing engineer assets or deviating from doctrinal tactics. For vehicles, steep slopes and large or densely spaced obstacles with little or no supporting roads characterize severely restricted terrain. This type terrain does not imply that movement through that area is impossible, only that it is impractical.

A6.1.4.1.3.2. Evaluate obstacles to identify mobility corridors, defensible terrain and avenues of approach. Determine the effect of each obstacle on mobility of the evaluated force.

**A6.1.4.1.4. Key Terrain.** Key terrain is any feature or area, the seizure or control of which, offers a marked tactical advantage. Evaluate key terrain by assessing the impact upon the outcome of the battle if seized by either force. Evaluate the other four aspects (observation and

fields of fire, cover and concealment, obstacles, and avenues of approach) first and integrate the results into the identification and evaluation of key terrain.

**A6.1.4.1.5. Avenues of Approach (AA).** AAs are routes that a force may use to reach key terrain or an objective. Identify AA that support the threat's offensive capabilities and AA that support the movement and commitment of friendly reserves. To develop AAs, use the results of evaluating obstacles to:

**A6.1.4.1.5.1. Identify Mobility Corridors (MC).** Mobility Corridors are areas where a force will be canalized due to terrain constrictions. It is relatively free of obstacles and allows forces to capitalize on the principles of speed and mass. Evaluate the Combined Obstacle Overlay to identify MCs wide enough to permit maneuver in tactical formations. The best MCs use unrestricted terrain that provides enough space for the considered force to move in its preferred doctrinal formations while avoiding major obstacles.

**A6.1.4.1.5.2. Categorize Mobility Corridors.** Once identified, categorize MCs by size or type of force they will accommodate.

**A6.1.4.1.5.3. Group Mobility Corridors to Form AA.** AA will show the general area through which a force can move. Identify AA for a force one echelon below the friendly command. Depict AA using arrows that encompass the mobility corridors that constitute the avenue.

**A6.1.4.1.5.4. Evaluate Avenues of Approach.** Considerations when evaluating AA are: (1) access to key terrain and adjacent avenues; (2) the degree of canalization and ease of movement; (3) concealment and cover (force protection from both fires and intelligence collection), and (4) observation and fields of fire. Also consider sustainability (LOC support), and directness to the objective.

**A6.1.4.1.5.5. Prioritize Avenues of Approach.** Prioritize the AA based on how well each supports maneuver. Focus on results rather than on the factors of analysis.

**A6.1.4.1.6. Evaluate the Terrain's Effects on Military Operations.** Relate the analysis to the terrain's effects on the broad COA available to threat and friendly forces. Identify areas that favor, disfavor, or do not affect each broad COA. Evaluate the terrain's effects on defensive and offensive COA by identifying the areas along each AA best suited for use as potential: (1) Engagement areas and ambush sites (identify areas where maneuvering forces are vulnerable to fires). (2) Battle positions (identify concealed and covered positions that offer observation and fields of fire into potential engagement areas). (3) Immediate or intermediate objectives (identify areas or terrain features that dominate the AA or assigned objective areas, usually correspond to areas already identified as key terrain). (4) Assembly and dispersal areas. (5) Observation posts, and (6) Specific system or asset locations.

A6.1.4.1.7. Disseminate the results of terrain analysis through use of a Modified Combined Obstacle Overlay (MCOO). Starting with the combined obstacle overlay, add; (1) cross-country mobility classifications (restricted/severely restricted), (2) AA and MCs, (3) counter-mobility obstacle systems (only those known to exist), (4) defensible terrain (identify terrain along each AA that allows potential battle positions or possible defensive sectors), (5) engagement areas; and (6) key terrain (areas or terrain features which dominate AA or objective areas).

**A6.1.4.2. Conduct A Weather Analysis.** Analyze weather in the OA to determine its effects on friendly and threat operations. The tactical environment requires that weather and terrain be considered simultaneously and developed as an integrated product. Evaluate indirect effects by modifying terrain analysis products to show the effects of weather. Evaluate direct effects on personnel, specific types of equipment, and types of military operations. Set critical values for the direct effect of each factor. The following military aspects of the weather should be considered:

**A6.1.4.2.1. Visibility.** Consider light data and the times associated with Beginning Morning Nautical Twilight, sunrise, sunset, Ending Evening Nautical Twilight, moonrise, and moonset. Low visibility is beneficial to offensive operations by concealing the movement of forces. It is detrimental to FP operations because command and control and unit cohesion become difficult to maintain; reconnaissance and surveillance operations are impeded and target acquisition is less accurate.

**A6.1.4.2.2. Winds.** Consider wind speed and direction. Winds of sufficient speed can reduce the combat effectiveness of a force downwind as the result of blowing dust, smoke, sand, or precipitation. The upwind force usually has better visibility. Nuclear, Biological, and Chemical operations usually favor the upwind force. Strong winds and wind turbulence limit airborne, air assault, and aviation operations. High winds near the ground may inhibit maneuver.

**A6.1.4.2.3. Precipitation.** Precipitation affects soil traffic, visibility, and the functioning of many Electro-optical systems. Heavy snow can reduce the efficiency of many vehicles.

**A6.1.4.2.4. Cloud Cover.** Cloud-cover affects ground operations by reducing illumination and visibility, by unnaturally enhancing the effects of artificial illumination, or by limiting the solar heating of targets.

**A6.1.4.2.5. Temperature and Humidity.** Temperature and humidity have a direct impact on personnel and equipment performance. Extremes of temperature and humidity reduce personnel and equipment capabilities and may require the use of special shelters or equipment.

**A6.1.4.3. Conduct an Analysis of Other Characteristics of the Battlespace.** This includes all aspects of the battlespace environment that affects friendly or threat COA not previously incorporated into the terrain and weather analysis. As with terrain and weather, the evaluation of other characteristics of the battlespace is not complete until they are expressed in terms of their effects on friendly FP efforts and threat COA. Other characteristics that may influence FP operations include:

**A6.1.4.3.1. Logistics Infrastructure.** This may include land use patterns, sources of potable water, bulk fuel storage and transport systems, canals and waterways, communications systems, transportation means and systems, natural resources, industries, and power production facilities.

**A6.1.4.3.2. Population Demographics.** This may include living conditions, cultural distinctions, religious and political affiliations, political grievances, and income levels.

**A6.1.4.3.3. Politics.** This may include government systems, treaties, agreements, Status Of Forces Agreements and official and unofficial legal restrictions.

**A6.1.4.4. Describe Battlefield Effects on Threat and Friendly Capabilities and Broad COA.**

Focus on how the total environment (terrain, weather, and other characteristics) affects the COA available to both friendly and threat forces. Express evaluation in terms of COA, not detailed descriptions of analytical factors that led to the conclusions.

**A6.1.5. Step 3. Evaluate the FP Threat.** Threat evaluation provides a detailed study of threat forces—their composition and organization, tactical doctrine, weapons, equipment and supporting systems. This step determines the preferred doctrinal principles and Tactics, Techniques and Procedures (TTP) and capabilities of applicable threat forces identified in Step 1. The goal is to develop threat models that accurately portray how threat forces normally execute operations and to determine threat capabilities, given the current situation. Evaluating FP threats requires the analysts to (1) create or update threat models, and (2) determine threat capabilities.

**A6.1.5.1. Create or Update Threat Models.** Threat models depict how threat forces prefer to conduct operations under ideal conditions and are based on the threat's normal or "doctrinal" organization, equipment, doctrine, and TTPs. Threat models include doctrinal templates, a description of tactics and options, and the identification of HVT.

**A6.1.5.1.1. Doctrinal Templates.** Doctrinal templates illustrate the deployment pattern and disposition preferred by the threat when unconstrained by the effects of the battlefield environment. They are best shown by scaled graphic depictions of threat dispositions for a particular type of operation. Construct doctrinal templates through an analysis of the intelligence holdings and an evaluation of the threat's past operations. Determine how the threat normally organizes for an operation and how he deploys and employs his force and various Battlefield Operating System (BOS) assets. Look for patterns in task organization of forces, timing, distances, relative locations, groupings, or use of the terrain and weather. Portray the threat's normal organization for combat, typical supporting elements available from higher commands, frontages, depths, boundaries, engagement areas, objective depths, and other control measures.

**A6.1.5.1.2. Description of Tactics and Options.** This is a description of the operations of units or elements portrayed on the template, and the activities of the identified assets. It contains a listing or description of the options available to the threat should the operations fail or subsequent operations if it succeeds. The description should address typical timelines and phases of the operation, points where enemy forces transition from one formation to another, and how each BOS contributes to the operation's success. Describe the actions of the supporting BOS in enough detail to allow the later identification of HVT. Like the template, develop the description of the threat's tactics and options from an evaluation of his doctrine and past or current operations. Include a description of the branches (contingency plans for changing the disposition, orientation or direction of movement of force) and sequels (major operations that follow an initial major operation) normally available to or preferred by the threat should the operation succeed or fail. Start with the scheme of maneuver, then examine how each BOS "fits in" or provides support. Time event charts can describe how the threat normally conducts an operation. Marginal notations on the graphic template are an effective technique, especially when the notes are tagged to key events or positions on the template.

**A6.1.5.1.3. Identification of HVT.** Identify HVT by evaluating your intelligence holdings, the doctrinal template, its supporting narrative, and by using your tactical judgement. Develop

the initial list of HVT by thinking through the operation under consideration and by evaluating how each BOS support it. Rank order them based on their relative worth to the threat's operation and record them as part of the threat model (an HVT's value usually varies over the course of an operation). HVT may originate from the following BOS categories: (1) Command, control, and communications. (2) Fire support (includes target acquisition assets, ammunition, aircraft, fire direction control, etc.). (3) Maneuver and Engineering support assets. (4) Intelligence, Reconnaissance, Surveillance, and target acquisition systems. (5) Nuclear, biological and chemical assets. (6) Electronic warfare assets. (7) Ammunition and munitions stocks. (8) Maintenance. (9) Line of Communications (LOC) (roads, bridges, etc.).

**A6.1.5.1.4. Identify Threat Capabilities.** Identify threat capabilities (broad COA and supporting operations) that the threat can take to influence the execution of the friendly mission. Construct this information in the form of statements. Use all-sources intelligence to evaluate the threat's current situation (focus on the effects each incident or fact has on threat capabilities). Identify additional threat strengths or vulnerabilities caused by the current situation. Also, consider the threat's ability to operate in darkness or adverse weather, the threats training levels and the time element for maneuver when evaluating capabilities (state it explicitly).

**A6.1.6. Step 4. Determine Threat Courses of Action.** Identify the most likely threat COA that can affect accomplishment of the friendly mission. Develop as many threat COA as time and the mission allow. Identify those areas and activities that, when observed, will reveal which COA the threat commander or leader has chosen. Elements in determining threat COA include: (1) Identify the threat's likely objectives and desired End State; (2) Identify the full set of coa available to the threat; (3) Evaluate and prioritize each coa; (4) Develop each coa in the amount of detail time allows and identify initial collection requirements; (5) Identify initial collection requirements.

**A6.1.6.1. Identify the Threat's Likely Objectives and Desired End State.** Begin with the threat at least one level above your own and identify the likely objectives and desired end states. Work down through each level of command to two echelons below your own. Ensure each echelon's objectives will accomplish the likely objectives and the desired end state of its parent commands.

**A6.1.6.2. Identify the Full Set of COA Available to the Threat.** At a minimum, consider the COA the threat's doctrine believes appropriate to the current situation and the likely objectives you have identified. Those threat COA that could significantly influence the command's FP mission, and the threat COA indicated by recent activities and events.

**A6.1.6.3. Evaluate and Prioritize Each COA.** Use judgment to rank order all identified threat COA in their most likely order of adoption. Modify the list as needed to account for changes in the current situation. At a minimum, determine the most dangerous and most probable COA.

**A6.1.6.4. Develop Each COA in the Amount of Detail Time Allows.** To ensure it is complete, each COA must answer the following five questions: what—type of operation, when—the time the action will begin, where—the location and objectives that make up the COA, how—the method by which the threat will employ its assets, and why—the objective or end state the threat intends to accomplish. Develop all COA that will influence the friendly FP mission, and those areas and activities that, when observed, will reveal which COA the adversary has chosen. The situation template is a doctrinal template with terrain and weather constraints applied. Use the situation

template to depict graphically expected threat dispositions for each possible threat COA identified. Be sure the situation template identifies the most critical point in the operation.

**A6.1.6.5. Identify Initial Collection Requirements.** The identification of initial intelligence collection requirements depends on the prediction of specific activities and the areas in which they are expected to occur, and when observed, reveal the COA a threat force has adopted.

A6.1.6.5.1. The areas in which these activities or indicators are expected to take place are designated Named Areas of Interest (NAI). The Event Template depicts these NAI. As such, the Event Template guides collection, reconnaissance, and surveillance efforts within the FP Operational Area.

A6.1.6.5.2. Each COA should be evaluated to identify its associated NAI. It is important to wargame execution of the COA and note places where activity must occur if that COA is adopted. Particular attention must be paid to times and places in which the threat's HVT employ or enter areas where they can be easily acquired and neutralized.

A6.1.6.5.3. An NAI can be a specific point, route, or an area. NAI should be made large enough to encompass the activity that serves as the indicator of the threat's COA.

A6.1.6.5.4. The NAI and indicators of each COA should be compared and contrasted with each other and any differences identified. Emphasis should be placed on the differences that will provide the most reliable indications of adoption of each unique COA. The selected NAI should be marked on the event template.

## Attachment 7

### AEROSPACE INTELLIGENCE PREPARATION OF THE BATTLESPACE FOR THEATER MISSILE DEFENSE

**A7.1. Executive Summary.** The following is from the Executive Summary of the Multiservice Tactics, Techniques and Procedures for Theater Missile Defense (TMD) Intelligence Preparation of the Battlespace (IPB). For complete information for TMD IPB, see ALSA Center, Theater Missile Defense IPB (Draft), March 2000.

**A7.2. Overview.** Theater Missile Defense Intelligence Preparation of the Battlespace is a systematic, continuous process of analyzing the adversary theater missile (TM) force and environment in a specific geographic area and the battlespace around it. Applying the TMD IPB process helps the commander and staff selectively apply and maximize combat power at critical points in time and space in the battlespace by determining the likely adversary TM force courses of action (COA) and their associated branches and sequels, and describing the environment within which TM forces are operating. Applied properly, TMD IPB provides for the timely and effective suppression and/or destruction of a TM force while minimizing the use of friendly assets for the TMD mission. This provides the commander and staff with a cost-effective method for providing force protection from an adversary's TM force. This publication was developed using the IPB foundation in United States Army Field Manual 34-130 *Intelligence Preparation Of The Battlefield*, Defense Intelligence Agency Defense Intelligence Reference Document NAIC-1061-0789-97 *Theater Missile Defense Intelligence Preparation of the Battlespace Methodology (U)*, and Joint Chiefs of Staff Publication 2-01.3 *Joint Intelligence Preparation Of The Battlespace (JIPB) (DRAFT)*. A large number of adversary countries possess or are trying to acquire TMs for prestige and/or military purposes. TMs have the potential to give adversaries military advantages against United States (US) and allied forces. The TM threat these adversaries present is a complex multi-dimensional intelligence problem. The TMD IPB tactics, techniques, and procedures (TTP) concept decomposes and correlates the "who and what (equipment and units), where (infrastructure), when, why, and how (operations)" to develop potential adversary TM COA. Typically TM forces are equipped, organized, trained, and employed differently. Many of these differences are relatively minor, while some are more dramatic. TMD IPB uses templating to standardize the process of analyzing adversary TM forces. Templates can be in the form of text, tables, forms, or graphics. Templates in this TTP are intended to provide a starting framework for analysis and development. They are not meant to be all encompassing and should be adapted for a particular geographic area or situation. Theater Missile Preparation of the Battlespace

**A7.3. TMD IPB Process.** TMD IPB is a continuous process, consisting of four major iterative and parallel steps: Step 1: Define the battlespace environment (Focus). Step 2: Define the battlespace effects (Influences). Step 3: Evaluate the TM Force (Operational Model). Step 4: Determine TM COA (Integrate).

**A7.3.1. Step 1.** This step focuses the initial intelligence collection efforts and the remaining steps of the TMD IPB process. It identifies battlespace characteristics that require in-depth evaluation of their effects on adversary TM force operations, such as terrain, weather, logistical infrastructure, and demographics. The initial effort is oriented on defining the limits of the area of operations (the geographic region where TMD operations will be prosecuted) and area of interest (the area from which information and intelligence are required). Defining the significant characteristics of the battlespace environment aids in identifying and filling current intelligence data gaps.

**A7.3.2. Step 2.** This step evaluates the environment's effects on adversary TM force operations. The TMD IPB identifies how the environment influences (limitations and opportunities) potential TM force operations. The environment assessment examines terrain, weather, and other battlespace characteristics (i.e., adversary TM force infrastructure) and their effects on TM force operations. Regardless of the subject or means of presentation, TMD IPB is designed to integrate the effects of the battlespace environment on TM force operations. For TMD IPB, this integration typically results in terrain analysis designating the most probable adversary TM force operations areas.

**A7.3.3. Step 3.** This step examines in detail how the adversary TM force normally organizes for combat and conducts operations under ideal conditions. The evaluation is portrayed in a threat model of the TM force that includes doctrinal templates that depict how the TM force operates when unconstrained by the effects of the battlespace environment. TM force threat models are depicted graphically (doctrinal templates) supplemented by high value target matrices and simple narratives.

**A7.3.4. Step 4.** This step integrates the results of the previous steps into a meaningful conclusion. Given what the adversary TM force normally prefers to do, and the effects of the environment in which it is currently operating, what are the likely objectives and COA available to the TM force? The TMD IPB develops TM force COA models that depict the TM force's available COA. This is accomplished by creating event templates and matrices that focus intelligence collection on identifying which COA the TM force will execute.

**A7.4. Summary.** Automated intelligence and terrain analysis tools greatly assist the TMD IPB process. Currently, several core intelligence systems are being developed and fielded which will greatly enhance the TMD IPB process. Continued emphasis on automated TMD IPB techniques is essential to solve the threat TM problem. However, equally important is the emphasis that must be placed on development of the intelligence data needed for the TMD IPB. It is critical to begin the TMD IPB process during the readiness phase; with well-developed intelligence databases, in order to successfully impact US and allied TMD operations.

## Attachment 8

### CENTERS OF GRAVITY ANALYSIS

**A8.0. Overview.** The following information for Centers of Gravity analysis is from the Joint Doctrine Air Campaign Course, Air Campaign Planning Handbook, July 1998, The Air Campaign Planning Process, Stage III, Center of Gravity Identification.

**Centers of gravity** – “*That characteristic, capability, or locality from which a military force, nation or alliance derives its freedom of action, physical strength, or will to fight. It exists at the strategic, operational, and tactical levels of war.*” (JP 0-1, Basic National Defense Doctrine).

“*Direct attack of the enemy’s strategic centers of gravity (by air, missile, special operations, and other deep-ranging capabilities) is closely linked to the joint theater campaign. Such attacks may be part of that campaign (as in Operation DESERT STORM), or comprise a joint campaign of their own (as in the Combined Bomber Offensive against Germany), closely coordinated with and affected by theater campaigns.*” (JP 1, Joint Warfare of the Armed Forces of the United States).

**A8.1. Framework of the Five stage Process.** Stage I, Operational Environment Research, almost naturally flows into a more detailed, in-depth study of yourself and your adversary known as centers of gravity (COG) analysis. This analysis should provide you with as clear a picture as possible of how an adversary functions; of his strengths, and of his possible vulnerabilities to dislocation and exploitation by air power. At the same time, the analysis should also point out your own vital strengths and their critical vulnerabilities to be defended. Clausewitz was the first to apply the term “*centers of gravity*” to warfare. He described a center of gravity as, “the hub of all power and movement, on which everything depends.” Other writers have used terms such as “vital centers,” “key nodes,” “decisive points,” or “critical vulnerabilities” to approach the same concept. They were partly right. The “hub of power and movement” itself is the “center of gravity.” Take the “hub” away and the enemy system ceases to function or the enemy ceases to act against you. That “hub” has certain characteristics, *among them critical vulnerabilities*. (Remember that a center of gravity is a *source of power*; it is *not* a weakness. However, this does not preclude it, or certain portions or characteristics of it, from being *vulnerable* to attack. Like Achilles in Greek mythology or Samson in the Bible, a thing may be immensely strong and still be critically vulnerable in some exploitable way.) While these vulnerabilities are *not the centers of gravity themselves* (they are characteristics of it), COG analysis seeks to find them and identify ways to exploit them. Analysis of the “hub” and its vulnerabilities yields “key nodes” or “decisive points” within it, many of which will become targets. Successfully attacking those targets should decisively affect the center of gravity. Centers of gravity can take many forms. In the Pacific Theater during World War II, for example, the entire Japanese national self-concept was bound up in the person of the Emperor. The Japanese endured unbelievable sacrifice to keep him on the throne and only surrendered when the Emperor himself became convinced—through the impact of the atomic bombings—that his people had sacrificed enough. In this case, the COG was an individual, the Emperor himself, although he was not a target of direct attack. During Vietnam, the will of American leadership to continue the war was a strategic center of gravity and it was made vulnerable through manipulation of public opinion by the North Vietnamese and opponents of the war at home. During Desert Storm, a component of Iraqi fielded forces—the Republican Guard—was both a strategic and an operational COG. This force provided Saddam Hussein with his most potent regional strike force in the theater (operational level) and kept him in power back home (strategic level).

**A8.2. Centers of gravity exist at all three levels of war.** The critical capabilities of a higher-level COG often *become* COG at the lower levels. For example, during World War II the Wehrmacht/Luftwaffe team was a strategic COG for the German war effort. That team's "flexibility"—its ability to impose shock, dislocation, and friction on its opponents—was its "source of power" and an *operational-level* COG. Take away that flexibility and the Wehrmacht was not nearly as formidable. For the Germans in North Africa in 1942, that operational COG had a critical vulnerability: its limited supply of petroleum, oil, and lubricants (POL). Similarly, at the tactical level in the battle of El Alamein, the German tactical flexibility was a COG, POL enabled it, and the shortage of POL was a critical vulnerability. The POL shortage forced the Germans into a static defensive posture. Instead of dictating terms to the Allies, as they had up to El Alamein, the Germans ceded the initiative and were defeated. Surface forces inevitably focus on tactical and operational centers of gravity—usually only those immediately in front of them. It is in their nature: they fight in a linear battlespace. In most cases, they must fight their way through enemy surface forces in order to reach strategic COG. Airpower, on the other hand, regardless of its parent service, has the inherent capability to rapidly and precisely strike centers of gravity, at all levels of war, wherever they exist, simultaneously. The questions for the campaign planner are, "which do I try to affect to achieve the objectives, how do I affect them, to what extent, and when?" The answers come from comprehensive centers of gravity analysis.

**A8.3. Types of attack.** As campaign planners, your COG analysis should yield an understanding of which enemy systems are critical to his resistance of your will, which of these are vulnerable to attack, and which are feasible to attack. "Attack," encompasses assault by physical (e.g., bombs, infantry) and non-physical means (e.g., computer attack) and, of course, does not always imply physical destruction of a COG or its components. Centers of gravity may be attacked directly, indirectly, or tangentially (or in some combination of the three). *Direct attack*, as its name implies, involves *attacking the COG itself or engaging it in decisive combat*. *Indirect attack* involves *causing the same or similar effect by attacking a COG's supporting or related elements*. For example, if an individual national leader is identified as a COG, direct attack on his/her person might accomplish the objective of ending the war. If, however, such an attack is not allowed national policy or the law of armed conflict, then you might have the *same effect* by attacking the leader's ability to communicate with the components of his system. *Tangential attack* is something rather different. The intent of a tangential attack is to *force reliance on a limited, more exploitable element of a system by directly or indirectly attacking another COG or COG*. *The more exploitable element then becomes a center of gravity*. For example, during Desert Storm the Iraqis had a significant secure fiber-optic telecommunication system. The destruction of critical nodes within this system forced the Iraqis to use alternate methods to communicate—radio and courier. These methods were less efficient, but—more importantly—were susceptible to exploitation by friendly forces through monitoring and electronic combat. In most cases, the process of identifying and analyzing a COG can be summed up in the following steps:

A8.3.1. Conduct Operational Environment Research.

A8.3.2. Receive or derive the overall political and military objectives.

A8.3.3. Analyze the enemy system for potential centers of gravity.

A8.3.4. Determine if the candidate COG are critical to the enemy strategy.

A8.3.5. Determine if the identified COG have characteristics that are vulnerable to direct attack. If not, examine for possible indirect or tangential attack.

A8.3.6. Determine if the methods of influencing the COG are feasible. Consider such issues as the number and quality of friendly forces, rules of engagement, the level of conflict, projected losses, etc.

A8.3.7. Use the objectives and COG analysis results to develop friendly strategies/courses of action.

A8.3.8. Refine the products of Steps 1-6 into an executable campaign plan. From this point, the process proceeds beyond the scope of the JDACC process.

A8.3.9. Execute the plan and affect the COG as part of the military operation.

A8.3.10. Assess the success of the attack and study the overall impact on the enemy's strategy (operational assessment). Assess enemy reaction to our attack and determine if follow-up attacks are required or if a new COG should be sought.

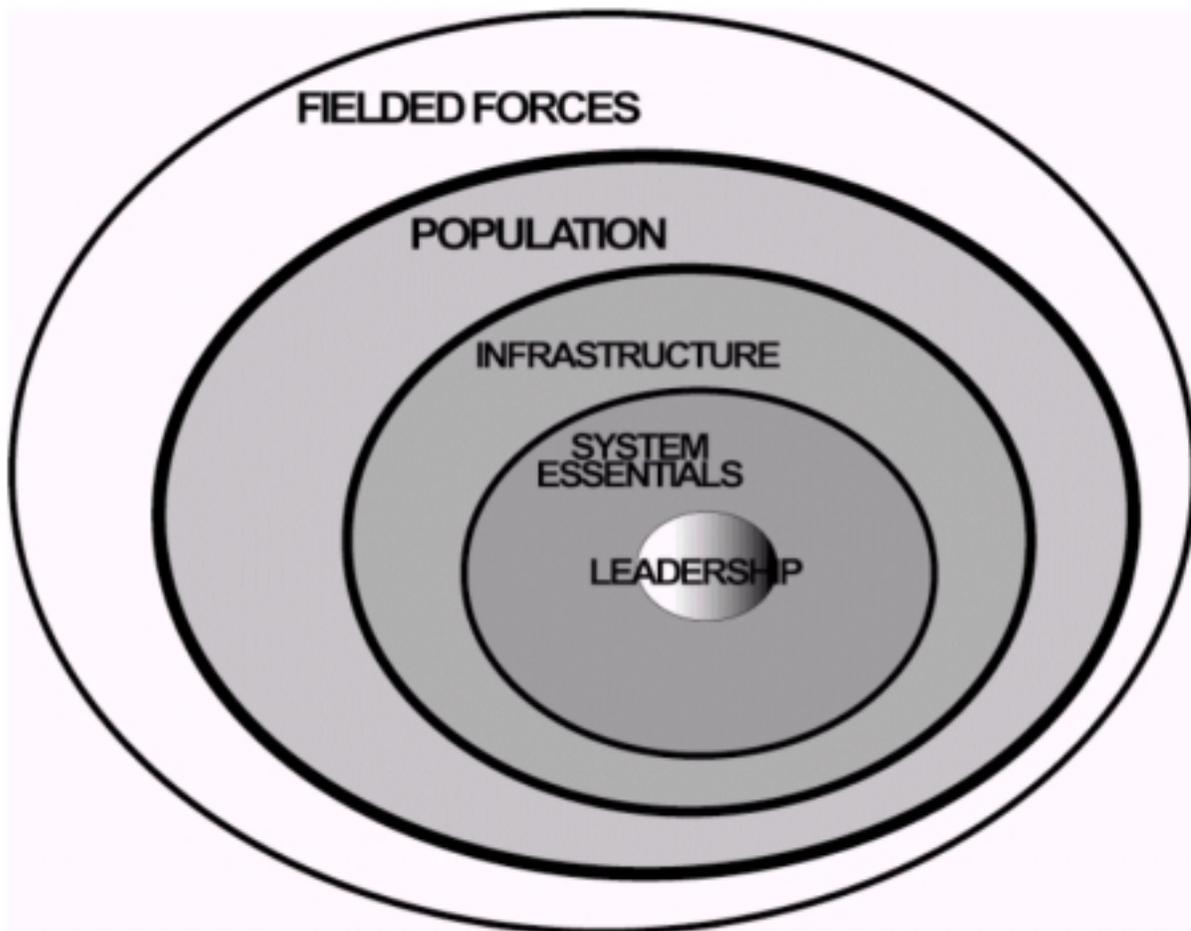
A8.3.11. It is important to remember that COG analysis is not crisis-dependent. It can be performed at any time and should yield substantially the same results. Also remember that the process is *iterative* and information that becomes available once COG analysis is "complete" may force you to re-evaluate centers of gravity.

**A8.4. Conceptual Models.** There are a number of conceptual tools to help you perform centers of gravity analysis. *Country X as a Candidate for Air Attack* (See Joint Doctrine Air Campaign Course, Air Campaign Planning Handbook, July 1998, Section II, page 54) is one format tool that can aid in centers of gravity analysis. It provides a systematic method for identifying and analyzing centers of gravity. This tool has proven useful as a means not only of identifying *enemy* centers of gravity, but also in helping *prioritize* the associated target sets. The tool is equally useful for determining *friendly* centers of gravity—those essential areas that we must defend. In short, it is one method for translating conceptual air objectives into real-world target sets that we can apply air and space power against.

**A8.4.1. Strategic Ring Model.** Colonel (Ret.) John Warden's *Strategic Ring Model* is another conceptual analysis tool. The five rings are not sacrosanct; you can use more or fewer rings to suit your particular situation. However, *Organizing all possible centers of gravity within an enemy system into categories can be a valuable planning aid.* In analyzing a country, the centers of gravity within these rings can be further classified using similar methodology. For example, offensive air capability (within the fielded military forces ring) might be further classified—using a ring-type method—to identify types of airfields and their associated critical elements such as command/control, maintenance, logistics, POL at the airfields, etc. In this manner it is possible to analyze potential target systems in great detail. Additionally, centers of gravity identified in one ring may also exist within other rings. (Or, to put it another way, the centers of gravity may *span* several rings.) This is an important consideration *because the identification of a center of gravity that exists in other rings implies certain synergies can be achieved by attacking the associated targets.* For example, the enemy's air center of gravity may lie in offensive aircraft or missiles (fielded military forces), in support personnel (population ring), the location and number of operational and support facilities (infrastructure ring), in logistics (organic essentials ring), or in command and control (the leadership). There is a physical relationship implied by the classification of rings as they are depicted. In most cases, before surface forces can attack the inner rings, they must penetrate the fielded forces; hence fielded forces are depicted as the outer-most ring. An army must defeat the forces opposing it before most other vital COG can be attacked. The same is true for any influence that might be wielded upon the leadership or the population of a country. As airman, however, we can attack any or all of these categories simultaneously or in sequence (whichever yields the desired effect), with only the necessary (often local)

level of air superiority. Air power can often do this *without* defeating the surface forces and is unique in this respect.

**Figure A8.1. Strategic Ring Model**



**A8.4.1.1. Leadership.** Leadership is shown at the center because it controls all of the other rings. The enemy's leadership is usually a center of gravity worthy of attack if and when it can be reached. Keep in mind, however, that an elected leader is different than a king, who is different than a dictator, who is different than a junta. The loss of President Roosevelt had little military impact on World War II, especially when compared to the death of Hitler, or the fall of Mussolini. The Japanese laid down their arms only when their Emperor admitted defeat. Saddam Hussein remained in power despite military operations designed to influence him and his people, proving that affecting a leader can be very difficult even when deliberately planned for. Each situation is different and must be thought through carefully during analysis and planning. If you choose to attack leadership directly, there are two critical things you will require: (1) up-to-date HUMINT and other intelligence on the leader's location and (2) accurate intelligence estimates of the likely consequences attendant to removal of the leader. Acquiring such information or making such estimates will prove difficult in the types of closed, security-obsessed regimes the US and its allies will likely face in the foreseeable future. The three elements of command—*information gathering,*

*decision-making, and communication*—can be attacked separately or as a whole. The decision-making element is usually the key, for without it the other two are virtually useless. Unfortunately, the decision-making element may be the most difficult to reach by direct attack. Normally, the other two elements offer the best targeting possibilities. Remember that results may not be evident for some time unless the enemy is under severe pressure (the assessment of command degradation is a difficult intelligence task). Many subordinate units will continue to operate, but they will do so—if your attacks have been effective—in an uncoordinated and less effective manner. A concerted attack on the enemy's command system is generally worthwhile, in order to impose friction and dislocation.

**A8.4.1.2. Caveat.** There are two significant dangers for planners associated with using the strategic ring model. Both derive from the Air Force's historic tendency to regard warfare as little more than an exercise in servicing targets. The belief, still evident in some circles today, is, in essence, "victory equals destruction of x number of targets; destroy these and the enemy will be unable to continue the war." The intellectual culture of the Air Force has helped perpetuate this belief. Young officers have been valued primarily for their technical skills and have not been encouraged to study war seriously in its historical and psychological aspects. This has led many in the Air Force to ignore the fact that *war is an interactive process*, involving two or more sets of intelligent actors. The outcome in war has never been as cut-and-dried or linear as the answer to an engineering equation, but many in the Air Force have regarded it as such. There is a great deal more that motivates an enemy's resistance than can be expressed in a catalog of targets. The essence of COG analysis is to *understand what the enemy draws his power from and find ways to deny him that power*. The first danger is this: by dividing an enemy state or actor into five arbitrary categories, Warden's methodology may lead unwary planners into the incorrect assumption that the five rings themselves are COG, applicable in all planning situations. This assumption usually leads to COG analysis becoming a mechanical exercise, in which a list of targets the planners already have in mind is arbitrarily divided among the five categories. This approach takes planners right back to "(x targets) x (y damage) = victory" and does not truly search out the enemy's sources of moral or physical strength or freedom of action. True COG may span several rings, or may not be well expressed in the ring structure at all (as in the case of vital alliances with external powers). Planners must always guard against a mechanistic approach, especially when using tools that encourage it, like the five rings. This applies equally to analysis of friendly centers of gravity. The other danger associated with using Warden's methodology is that it may lead planners to overlook the importance of interconnections between COG or between sub-elements within COG. They may also overlook important connections to powers, forces, or actors *outside* the enemy system. These are often where critical vulnerabilities are to be found. Planners must carefully examine the way the enemy system as a whole operates and not assume that its constituent parts operate in isolation. An enemy actor, be it a nation, a force, a political clique, or whatever, is much more like a human being (organic, social, intelligent, self-willed, greater than the sum of its parts) than it is like a machine (or a math problem). Again, this applies equally well to friendly COG analysis.

**A8.4.2. Other Models.** The Strategic Ring Model and Country X are only two of many analytical models available for evaluating enemy strengths and vulnerabilities. They are just among the simplest to use (and easiest to present). Another is Jason Barlow's National Elements of Value Model.<sup>19</sup> In this model, friendly and enemy systems are analyzed within the framework of seven categories: (1) leadership, (2) industry, (3) armed forces, (4) population, (5) transportation, (6) communication, and (7) alliances. The model has some of the disadvantages of Warden's strategic rings, but has the advantage

of emphasizing the “interlinking and variable lines of influence” between and within the seven categories. Staff or national-level intelligence experts can help you find and use more sophisticated and detailed tools. One of these, among the most useful available is nodal analysis. Unfortunately, the details are well beyond the scope of this pamphlet. Nodal analysis is a very in-depth study of the *interconnections between system elements* and between a system and surrounding systems, which seeks to discover those “key nodes” within the system that, if removed, cause it to fail. If time and resources permit, you should attempt to conduct nodal analysis before choosing specific targets within a system. To use nodal analysis effectively, you must know the *effect* you wish to have upon the system and *how that effect supports higher-level objectives*. National-level agencies can help you with this process. Whatever tools you use, they should help you produce a structured picture of all enemy and friendly centers of gravity. Using the air objectives from Stage II and perhaps a broad indication of strategy from the JFC as a filter, select those centers of gravity that can be exploited with air and space power to accomplish campaign objectives and derive appropriate target sets from them. *At this stage you are not selecting individual targets, but broad categories or sets of targets that represent critical vulnerabilities within your chosen COG*. Leave the details of individual target selection and development until Stage V.

**A8.5. Independent COG Analysis.** Remember that this is a dynamic process. New information may force you to change which center of gravity or target set you’ve decided to affect. The NCA or JFC may change an objective or rule out a strategy. When this occurs, the logic of having a complete, unbiased center of gravity analysis to begin with stands out. Changes in objectives and strategies can then be incorporated without the need to re-accomplish the entire analysis. An independent, thorough, and objective COG analysis is ideal if you have lots of time and information resources at your disposal. Intelligence analysis is crucial throughout the process to extract the information most useful for defeating the enemy. “Intelligence should be timely, objective, responsive, complete, accurate and relevant.” As in Stage I, J2, J3, and J4 are key players during this stage with major contributions from intelligence targeteers for enemy COG. Logistics and operations will help with assessments of friendly COG. It may be useful to ascertain *what the enemy is defending*. He may have gone through the same process of determining his own COG and their vulnerabilities, and will try to defend what he perceives as vulnerable.

**A8.5.1. Parallel Attack.** Centers of gravity should be attacked as systems. Airpower is unique in its ability to affect every facet of a COG. If POL is the COG, it can be attacked from the point where it comes out of the ground all the way to the point where it goes into a combat vehicle (or into an enemy leader’s electrical generator). There may also be key elements in a COG target set that look like they could bring down the COG if attacked independently, but which should be attacked in parallel with other elements (resources permitting) in order to stress the entire target system. This has the added benefit of reducing the impact of errors in your analysis caused by fog and friction, and further reduces the enemy’s reconstitution potential. Hedge your bets by attacking as much of the system as you can afford—until you achieve your objective.

**A8.5.2. COG and Targets.** Also note that *COG analysis does not lead to an exhaustive list of targets*. There are some targets, often unrelated to enemy COG and their critical vulnerabilities, that must be struck, either to enable attacks elsewhere within the enemy system or to defend your own centers of gravity. An example of an enabling attack might be suppressing enemy air defenses (in a case where those defenses were not themselves identified as a COG) in order to strike a COG-associated target set deep in the enemy’s country. An example of a defensively motivated attack would be Coalition efforts to suppress SCUD launches during Desert Storm. The SCUDs themselves represented a

minuscule part of Iraq's military capability, but they were used to strike at one of *our* COG: the US-Arab Coalition. Of course, attacking such targets diverts resources from attacks on enemy COG, which have the potential to cause cascading enemy deterioration. Nonetheless, such attacks are often necessary. An intelligent enemy will attempt to cause you virtual attrition by forcing you to divert resources from attacks on his COG. Anticipate this during planning by doing a thorough analysis of your *own* centers of gravity.

**A8.5.3. Friendly Centers of Gravity.** Do in-depth COG analysis for your own side, but *from the enemy's perspective*. This will tell you what to defend and may affect decisions about what to attack. Your analysis of enemy capabilities should tell you what friendly assets and capabilities the enemy can successfully attack and help you identify what types of defense are necessary. Often, the best defense is a good offense. Strike his capability to strike you before he uses it, but remember that each such attack may be stealing resources you could otherwise use to attack his COG. Of course, if the enemy cannot attack a friendly center of gravity, don't waste resources defending it, but *don't underestimate the enemy either!* Remember the principle of the offensive: defense may keep you from losing, but offense is needed to win.

**A8.6. Summary.** Centers of gravity are those things from which an actor in a conflict derives his power or freedom of action. We analyze them in order to determine critical vulnerabilities within them that will yield the most effective use of air and space weapons in achieving a campaign's operational and strategic objectives.