NATO STANDARD

AIntP-17

JOINT INTELLIGENCE PREPARATION OF THE OPERATING ENVIRONMENT (JIPOE)

Edition A Version 1

OCTOBER 2019

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NORTH ATLANTIC TREATY ORGANIZATION (NATO)
NATO STANDARDIZATION OFFICE (NSO)
NATO LETTER OF PROMULGATION

24 October 2019

1.   The enclosed allied intelligence publication AIntP-17, Edition A, Version 1, JOINT INTELLIGENCE PREPARATION OF THE OPERATING ENVIRONMENT (JIPOE), which has been approved by the nations in the Military Committee Joint Standardization Board, is promulgated herewith. The agreement of nations to use this publication is recorded in STANAG 6527.

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Zoltán GULYÁS
Brigadier General, HUNAF
Director, NATO Standardization Office

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AIntP-17

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I   **Edition A Version 1**

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<u>RECORD OF RESERVATIONS</u>

CHAPTER	RECORD OF RESERVATION BY NATIONS
2	HRV, NLD

Note: The reservations listed on this page include only those that were recorded at time of promulgation and may not be complete. Refer to the NATO Standardization Document Database for the complete list of existing reservations.

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<u>RECORD OF SPECIFIC RESERVATIONS</u>

[nation]	[detail of reservation]
HRV	Limitation/Caveat is applied on Space Domain due to fact that Republic of Croatia is not using the domain and it doesn't apply JIPOE process on the domain. Republic of Croatia is not developing JIPOE capabilities in Space Domain, nor will be able to state that it will develop the JIPOE capabilities in Space Domain in the future.
NLD	The NLD has a different view about the holistic approach as described in Figure 2.2 - Holistic view of the operating environment. This figure suggests that Cyberspace encompasses all of the physical domains of Land, Air & Space, Maritime and envelopes even more. Although Cyberspace has cross-sections with all the physical domains it does not encompass everything of each physical domain. The new suggested figure is a better representation of this situation. (To a somewhat same extent this applies also for the Human factor, as shown in the suggested figure. See attachment on NSDD.)
	Furthermore we have a different view about information environment as described in paragraph 2.2.6. By structuring the information environment in the same layer of sub para's as Land, Air, Space, Maritime and Cyber it is suggested that the information environment is just another domain whilst this is the whole of the environment. The information environment encompasses the Physical, Informational and Cognitive dimension. It is therefore the complete environment. Land, Air, Space and Maritime are the respective domains forming together the physical dimension. Cyberdomain can be found in the physical as well as the informational dimension, but the information environment also encompasses the cognitive dimension.
USA	The United States does not accept terms introduced or revised in this AIntP that have not been correctly introduced or revised IAW AAP-77, NATO Terminology Manual. This reservation will be lifted once the correct procedures are followed for introducing or revising terms.
Note: The reservations listed on this page include only those that were recorded at time of promulgation and may not be complete. Refer to the NATO Standardization Document Database for the complete list of existing reservations.	

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REFERENCES

AAP-03	Production, Maintenance and Management of NATO Standardization Documents
AAP-06	NATO Glossary of Terms and Definitions
AAP-47	Allied Joint Doctrine Development
AJP-01	Allied Joint Doctrine
AJP-2	Allied Joint Doctrine for Intelligence, Counter-Intelligence and Security
AJP-2.1	Allied Joint Doctrine for Intelligence Procedures
AJP-2.2	Allied Joint Doctrine for Counter-Intelligence and Security Procedures
AJP-2.3	Allied Joint Doctrine for Human Intelligence (HUMINT)
AJP-2.4	Allied Joint Doctrine for Signals Intelligence (SIGINT)
AJP-2.6	Allied Joint Doctrine for Imagery Intelligence (IMINT)
AJP-2.7	Allied Joint Doctrine for Joint Intelligence, Surveillance and Reconnaissance
AJP-2.8	Allied Joint Doctrine for Measurement and Signature Intelligence (MASINT)
AJP-2.9	Allied Joint Doctrine for Open Source Intelligence (OSINT)
AJP-3	Allied Joint Doctrine for the Conduct of Operations
AJP-3.1	Allied Joint Doctrine for Maritime Operations
AJP-3.2	Allied Joint Doctrine for Land Operations
AJP-3.3	Allied Joint Doctrine for Air Operations
AJP-3.9	Allied Joint Doctrine for Joint Targeting
AJP-3.11	Allied Joint Doctrine for Meteorological and Oceanographic Support to Joint Forces
AJP-3.17	Allied Joint Doctrine for Geospatial Support
AJP-5	Allied Joint Doctrine for Operational-level planning
COPD	Allied Command Operations Comprehensive Operations Planning Directive COPD Interim

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PREFACE

Context

As the operating environment (OE) becomes more complex, understanding and describing, the OE has also become more complex. Joint intelligence preparation of the operating environment (JIPOE) is the intelligence process and analytical methodology used to produce intelligence assessments, estimates, and other intelligence products in support of the commander's decision-making and operations planning process. JIPOE is a continuous process through which the intelligence staff manages the analysis and development of products that help the commander and staff understand the complex and interconnected aspects of the OE.

The OE is a composite of the conditions, circumstances, and influences that affect the employment of capabilities and bear on the decisions of the commander. The OE is comprised of the physical domains including: land, maritime, air, and space; cyberspace; the information environment; and the relevant actors.

The commander's initial planning guidance may include a description of the OE, a definition of the problem, the operational approach, initial intent, and JIPOE. In support of the commander's initial planning guidance, JIPOE provides input up front to help describe the OE. In addition, JIPOE also generates new intelligence requirements that are transformed by the IRM&CM function and influence collection activities by joint intelligence, surveillance, and reconnaissance (JISR) capabilities. The outcome of the JIPOE process will support the planning process and course of action (COA) selection. Consequently, the JIPOE process must assist commanders in understanding the OE, in anticipating the actor's intent, and thereby enabling the commander to make informed decisions and take appropriate actions.

Scope

This publication provides common agreed principles and processes allowing NATO to conduct the JIPOE in an interoperable manner. Each intelligence staff must determine the appropriate level of detail needed for supporting the planning process at their respective level. This publication focuses on the description of a process with an analytic methodology used at the operational level. Large parts are applicable for other levels as well.

Purpose

The purpose of this publication is to establish a common framework for the Alliance to understand the JIPOE process and integrate it as the intelligence contribution to the respective staff processes.

This publication will improve interoperability by providing intelligence staffs executing the JIPOE process with a common framework to conduct JIPOE. In addition, this document also provides a basis for related training activities.

In establishing a well-defined and comprehensive JIPOE process within NATO, this publication also serves as a basis for the development and refinement of standard operating procedures (SOPs).

Application
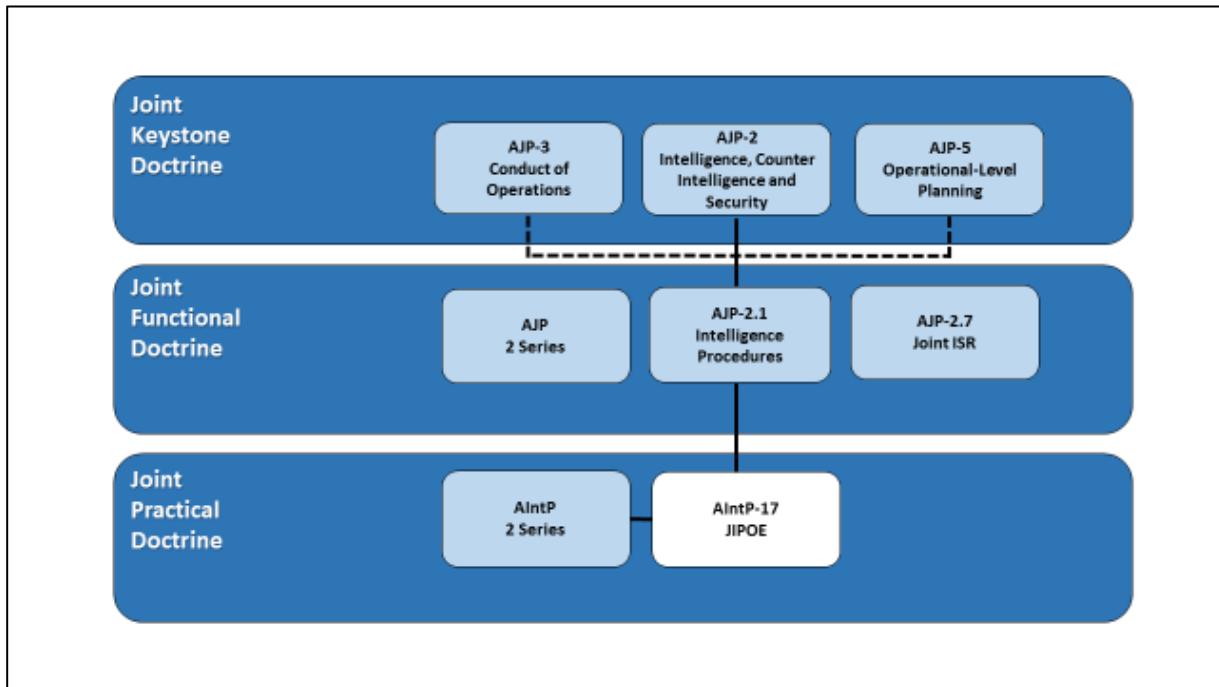
AIntP-17 is intended for NATO forces, NATO headquarters and organizations providing a common baseline for intelligence support to operations planning and execution. Focused primarily at the operational level, the provisions of this document could be applied at all levels of command and by other NATO organizations, member states and partners supporting the achievement of their objectives, missions and activities.

Linkages

AIntP-17 is subordinate to AJP-2.1, *Allied Joint Doctrine for Intelligence Procedures*, which is focused on the intelligence procedures that underpin the planning and delivery of joint intelligence products and the relationship with the joint intelligence, surveillance and reconnaissance (JISR) process. Linkages to other publications include:

▪ AJP-2 series doctrine publications, which describe the specific intelligence collection, processing and management disciplines.

▪ AJP-3, *The Conduct of Operations*, in order to provide coherence with the NATO approach to operations.

▪ AJP-5, *Operational-Level Planning*, in order to provide coherence with the operation planning process (OPP).

The position of the level 3 AIntP-17 publication within the AJP-2 intelligence doctrine series is shown in figure P.1.


Figure P.1 - AIntP-17 within the NATO intelligence doctrine hierarchy.

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CHAPTER 1 OVERVIEW

1.1 INTRODUCTION

a.   JIPOE is the process and the analytical methodology used to describe all relevant aspects of the OE providing commanders and staff with a comprehensive understanding of the OE. JIPOE provides a comprehensive understanding of the OE, identifies an actor's CoGs and vulnerabilities, and enables the development of relevant COAs.

b. The primary focus of JIPOE is to provide predictive intelligence designed to help the commander discern an actor's probable intent and most likely future COA. During each step of the JIPOE process, analysts produce intelligence assessments, estimates, and other intelligence products in support of the commanders' decision-making and operations planning and execution.   The conclusions drawn and the products developed by the intelligence analysts during JIPOE are continually refined throughout the operation.

c. This chapter serves as an overview of the JIPOE process that defines the three-step JIPOE process and explains how the JIPOE process and the applied methodology is synchronized with and supports the OPP. This overview also includes JIPOE principles and fundamentals as well as key planning and resource management considerations that impact the overall effort. The subsequent chapters describe each step of the JIPOE process in more detail.

1.2 THE JIPOE PROCESS

a. As an analytical process, JIPOE is designed to achieve a holistic view of the OE to assess actor capabilities and intentions. The JIPOE process not only provides a baseline understanding of the OE to support planning staff activities, but it also shapes how the commander and staff conceptualize what relevant actors can and will do. As illustrated in Figure 1.1, JIPOE is a continuous process consisting of three sequential steps that ensures a systematic assessment of all relevant aspects of the OE and the relevant actors. The three-step JIPOE process:

(1) Describes and evaluates the OE

(2) Evaluates the actors in the OE

(3) Determines actor COAs

Figure 1.1 - The JIPOE process.

b. JIPOE is a labour intensive process with the outcomes disseminated early in the OPP. To support planning activities, intelligence staffs initiate the JIPOE process in anticipation of receiving a planning directive. However, JIPOE initiation should commence no later than the receipt of the planning directive. JIPOE is conducted both prior to and during an operation, as well as during the planning for follow-on operations. The relevant information available regarding the actor and the OE is continuously integrated into the JIPOE process. The outcomes derived from the JIPOE process support planning activities by identifying, assessing, and estimating the actor's CoGs, critical vulnerabilities, capabilities, limitations, intentions, COAs and their impact on friendly forces and mission accomplishment. JIPOE aims to accomplish the following:

(1) Provide the commander and staff with a continuous comprehensive understanding of the OE and the relevant actors.

(2) Develop a comprehensive joint intelligence estimate that, in turn, informs the operational estimate.

(3) Provide actor COAs against which the commander's plan can be evaluated through war gaming.

(4) Support the formulation of commander's critical information requirements (CCIRs).

(5) Support the development and adjustment of priority intelligence requirements (PIRs).

(6) Identify possible named areas of interest (NAI).

(7) Support other staff functions and processes; e.g., the joint targeting process.

c. **JIPOE and the levels of warfare.** The basic JIPOE process remains the same across the range of operations regardless of the level of warfare. The JIPOE lead staff will integrate the requirements of each level into their process. Specific planning considerations may vary considerably between strategic, operational, and tactical levels due to differences in mission, available resources and size of the operating areas. Strategic-level JIPOE examines the instruments of national power to include diplomatic, informational, military, and economic factors. JIPOE at the operational-level focuses on the area of operations, provides an understanding of the perceptions and decision-making processes of the relevant actors and integrates tactical capabilities. JIPOE support to tactical operations generally requires a greater level of detail over a smaller segment of the OE than is required at the strategic and operational levels.

(1) **JIPOE at the Strategic Level.** At this level, the evaluation of the actor's strategic capabilities will concentrate on considerations such as: cyberspace capabilities, civil-military relations; national ideology; political will; morale; ability of the economy to sustain warfare; mobilization of the strategic reserve; and possible intervention by third party nations. COA models at the strategic level consider the entire range of resources available to the actor to include the mind-set of key personalities and populations, and the financial flows and convergence of threat and illicit networks to fund actor operations.

(2) **JIPOE at the Operational Level.** At the operational level, the analysis of the OE can include considerations such as: sociocultural factors; the location of actor political and economic support structures; military support units; force generation capabilities; potential third nation involvement; logistic and economic infrastructure; political treaties; press coverage; actor information activities and their potential to affect the information environment. The level of detail and scope of the JIPOE outcomes may also vary depending on particular aspects of the OE under consideration. At this level, JIPOE should be tailored to the relevant characteristics of the OE and the commander's CCIRs. In operations involving large-scale operations particularly during the early planning phases, the intelligence staff will focus on order of battle and infrastructure systems and networks.

(3) **JIPOE at the Tactical Level.** At the tactical level, JIPOE is focused on the actor's land, air, maritime, space, and other forces as well as other relevant actors of the OE that could pose a direct threat or immediate opportunity to friendly forces. Tactical level forces should also describe the impact of geographic (natural and human-made) conditions on personnel, operations, weapons, information activities, force mobility, and also describe key resources

and infrastructure as well. JIPOE efforts at the tactical level[1] should still focus on describing both military and non-military aspects of the OE. The development, analysis, and description of actor and relevant actor COAs at the tactical level will be based on and result in a higher degree of detail than would be necessary at higher levels of operations.

d. The degree to which the components of an OE are connected and mutually influencing each other is constantly growing and extending far beyond the borders within the JOA. A basic proven process and method to explain the increasingly complex circumstances in and surrounding an OE is paramount. At each level, analysts need to apply this process to describe an actor's COA. JIPOE as a flexible process and a proven method can fill this need for all levels.

1.3 JIPOE AND THE JOINT INTELLIGENCE ESTIMATE

a. JIPOE produces intelligence from available and relevant data, information, JISR results and other existing intelligence regarding the actors and other relevant aspects of the OE. By identifying known actor capabilities and applying those against the impact of the OE, JIPOE provides a conceptual basis for the commander and staff to visualize and understand relevant aspects of the OE. The JIPOE products describing the relevant aspects and perspectives of the OE, evaluating actor capabilities and CoGs, and estimating an actor's COAs provide the foundation for the intelligence staff's joint intelligence estimate.[2] The three steps of JIPOE process and how they contribute individually to the intelligence estimate is illustrated in Figure 1.2.

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[1] JIPOE on the tactical level is sometimes referred to as the intelligence preparation of the battlespace (IPB). This term is typically associated with land-based operations at the lower tactical levels. IPB describes the same process in order to prepare the operating environment at lower tactical levels. IPB basically follows the same process as JIPOE but is focused on the land domain. IPB products are similar to JIPOE products.

[2] See Annex A for the skillsets required to produce the intelligence estimate.
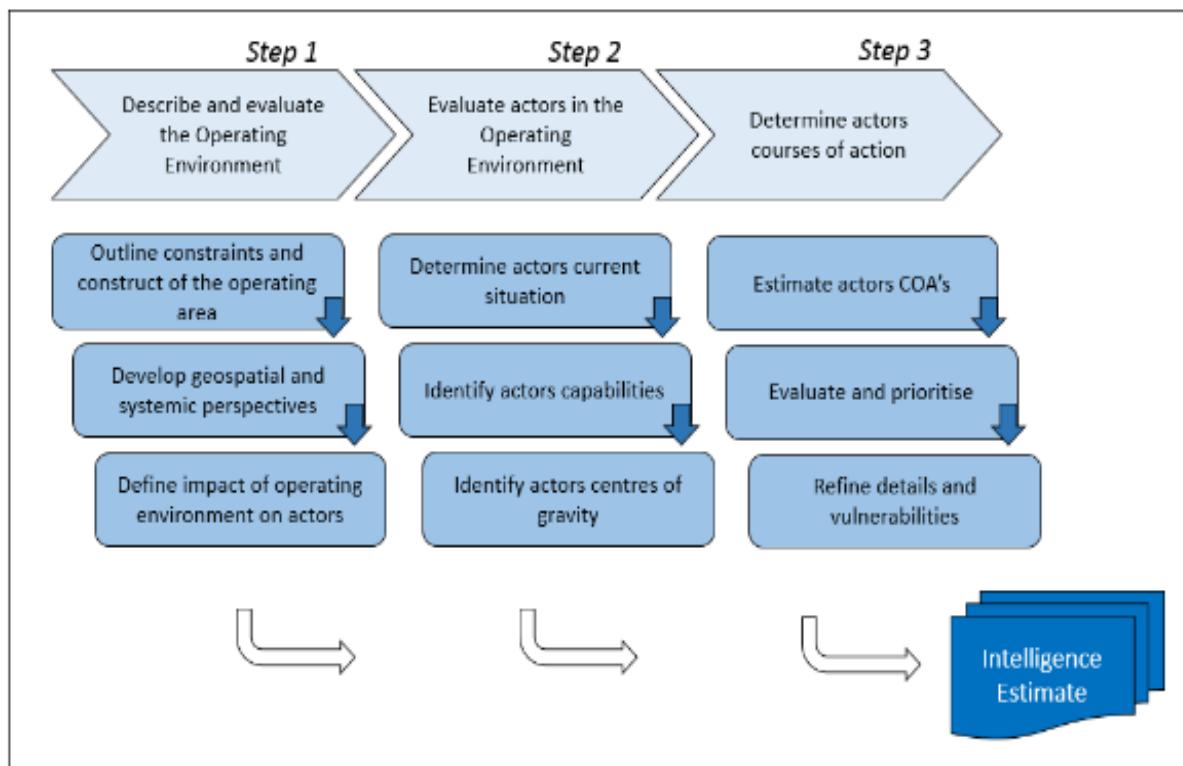
Figure 1.2 - JIPOE and the joint intelligence estimate.

1.4 PRINCIPLES AND FUNDAMENTALS

a. The intelligence staff element at all levels manage the JIPOE effort to support operations planning. Staff elements participate in the JIPOE effort by providing information and data relative to their areas of expertise. However, the commander and subordinate commanders plan and provide the guidance for the intelligence effort. JIPOE, as an intelligence activity, plays a key role in maximizing efficient intelligence operations, determining an acceptable COA, and aids in developing a concept of operations. The key principles and fundamentals for the preparation and conduct of JIPOE are described below.

b. **JIPOE principles**

   (1) **Holistic perspective.** JIPOE analysts should strive to understand all relevant aspects of the OE. This understanding should include not only the actor's disposition, but also the sociocultural nuances of individuals and groups in the OE.

   (2) **Operations synchronization.** The need for intelligence should be anticipated and should always be synchronized with operations planning and execution in order to provide answers to intelligence requirements in time to influence the decisions they are intended to support. As JIPOE outcomes become available and included in the different phases of the OPP, it is vital that these outcomes are strictly synchronized to fit the requirements for each of these different phases.

(3) **Analytical integrity.** Integrity requires adherence to facts and truthfulness with which those facts are interpreted and presented. Intelligence analysts should take active measures to recognize and avoid cognitive biases that may affect their processing.

(4) **Timely prediction.** Commanders require and expect timely intelligence estimates that accurately identify actor intentions, support offensive and/or defensive operations, and predict an actor's future COA in sufficient detail as to be actionable.

(5) **Systemic agility.** Agility is the ability to quickly shift focus and bring to bear the skill sets necessary to address the new situation at hand while simultaneously continuing critical pre-existing work. Intelligence structures, methodologies, databases, products and personnel should be sufficiently agile and flexible to meet changing operational situations, needs, priorities, and opportunities

(6) **Comprehensive collaboration.** Data, information and JISR results are open to alternative interpretations. Intelligence processing is also vulnerable to deception. The preferred means to avoid these obstacles and achieve a higher degree of quality (higher reliability and higher credibility) is to rely on results of different independent high-value collection disciplines and consult with other analysts and experts, possibly in external organizations be it coalition, military, nongovernmental organizations (NGOs), government, industry, or civilian.

c. **JIPOE fundamentals**

(1) The JIPOE process requires continuous identification of intelligence gaps and the submission of intelligence requirements. Planning efforts will not be successful unless there is constant communication and exchange of information between the intelligence staff and operations and planning staff.

(2) To ensure the timely delivery of high quality products, the analyst needs to gather the necessary source and reference materials and foundational documents to include maps, imagery, and analytical tools. The JIPOE process makes extensive use of graphic displays. These graphic displays to include templates, matrices, and overlays are integral to the three-step process. In developing these graphic display type products, JIPOE analysts, working within the bounds set by laws and regulations, are limited only by their intelligence and creativity in visualizing the OE.

(3) Processing data, information and JISR results into JIPOE products may require language proficiency, regional and legal expertise, and cultural knowledge to effectively communicate with the local populations and to understand the OE. JIPOE analysts have to use experts for all capabilities they do not possess.

(4) When conducting the evaluation of an actor, JIPOE analysts need to keep the perspective of the actor in consideration. Critical thinking and analytic methods[3] need to be used to validate assumptions and COAs.

(5) When conducting JIPOE, constant collaboration and the exchange of information between tactical, operational and strategic level intelligence staff elements is paramount. Data, information, JISR results and intelligence used, collected and processed may be of worth for other levels as well.

(6) The intelligence staff element should try to integrate JIPOE products into the formats used by the operations and the planning staff to facilitate the understanding of the commander.

(7) Ensure all relevant information developed during the JIPOE process is sent to all relevant recipients without delay. Getting the right information to the right person at the right time is paramount.

1.5 JIPOE AND THE INTELLIGENCE CYCLE

a. The intelligence cycle is comprised of four phases: direction, collection, processing and dissemination[4] whereby information is obtained, collected, converted into intelligence and made available for users. JIPOE is a dynamic process that is integrated within the basic intelligence process, called the intelligence cycle. The resulting outcomes from the JIPOE process are derived using the same basic intelligence process.

(1) **Direction.** By identifying known actor capabilities and applying those capabilities against the impact of the OE, JIPOE provides a conceptual basis for the commander to visualize describe and understand the relevant aspects of the OE. JIPOE products develop and adjust the CCIRs and therefore the PIRs. JIPOE products are a main part of the intelligence dialogue between commanders and intelligence staffs.

(2) **Collection.** The development or refinement of IRs resulting from the direction phase will have influence on the collection phase as well. Therefore, JIPOE processes create or refine collection requirements as well. JIPOE templates and matrices can forecast the times when activities are most likely to occur. This will facilitate the sequencing of intelligence requirements and the identification of the most effective time and methods of intelligence collection. Through the adjustments within the intelligence collection plan (ICP), new collection requirements may be issued to enter the joint intelligence, surveillance and reconnaissance (JISR) process.[5]

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[3] See AIntP-18.
[4] See AJP-2, AJP-2.1, AJP-2.7, AIntP-16 and AIntP-18.
[5] See AJP-2.7 and AIntP-14.

(3) **Processing.** During the steps of the JIPOE process, analysts describe the characteristics of the OE and the impact of the OE on the actors**.** Therefore, JIPOE analysts should: collate the available data and information to find what is deemed relevant; evaluate the relevant data and information to assess the quality; analyse the single parts and pieces inside; interpret them; and then integrate them into JIPOE products in order to describe the OE and the actors and their capabilities in the OE; and develop actor COAs. The JIPOE process uses an analytical methodology for optimizing the processing of large amounts of data, information and JISR results. Incoming information and reports can be rapidly incorporated into existing JIPOE graphics, templates and matrices. In this way, JIPOE products serve as a convenient medium for displaying the most up-to-date information and identifying critical information gaps. One of the most important products out of the JIPOE process is the joint intelligence estimate.

(4) **Dissemination.** The intelligence estimate produced by the intelligence staff provides vital information required by the commander's staff to complete their estimates and for subordinate commanders to continue concurrent planning activities. Timely dissemination of the intelligence estimate is paramount to enable operation planning activities. If a written estimate cannot be disseminated in a timely fashion, JIPOE products including: templates, matrices, overlays, graphics and other data sources, should be disseminated to staff elements to effectively integrate them into the operation planning.

(5) **Similarities between JIPOE and the Intelligence Processes**. Incorporating collected information and data into the JIPOE process is a continuous effort. The intelligence staff element continuously evaluates the available intelligence and information databases to determine if the required information is available and sufficient to conduct the remainder of the JIPOE process. There will be gaps in available information and shortfalls in the ability of the intelligence staff to fill these gaps. These gaps and shortfalls must be identified early in the process in order to develop the appropriate intelligence requirements. The intelligence staff submits requirements[6] to fill intelligence gaps to the level of detail required to support the JIPOE effort. If the gaps cannot be filled within the time allowed for JIPOE, the intelligence staff must identify them and inform the higher headquarters staff.

b. In cases where there is a lack of relevant information, it may be necessary for the intelligence staff element to formulate reasonable assumptions regarding the OE based on historical or current facts to fill in the gaps. In such cases, the intelligence staff should ensure that all assumptions regarding the OE are clearly understood and identified during the commander's decision-making process, while at the same time striving to collect the requisite intelligence needed to confirm or deny those assumptions. As additional information and intelligence is received, the intelligence staff updates relevant intelligence products. When this intelligence confirms or contradicts assumptions, the intelligence staff informs commanders and their staffs.

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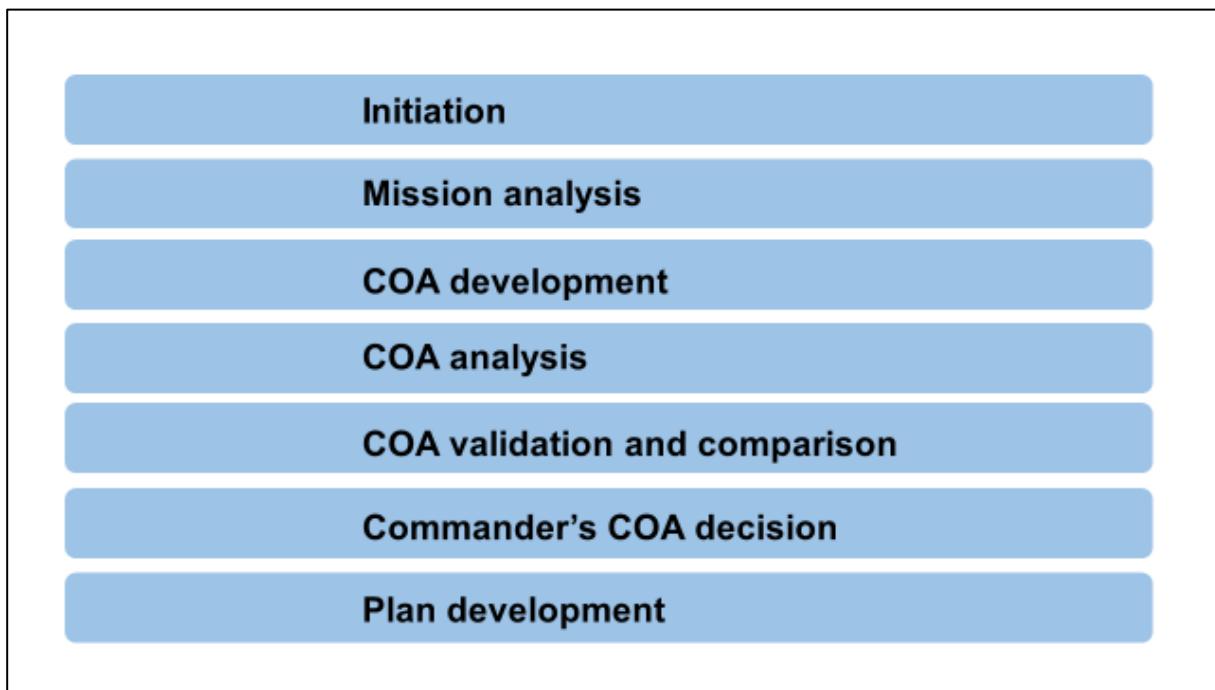
[6] Refer to AIntP-16, *Intelligence Requirements Management and Collection Management*.

If any assumptions are repudiated by new intelligence, the commander and appropriate staff elements should re-examine any evaluations and decisions that were based on those assumptions.
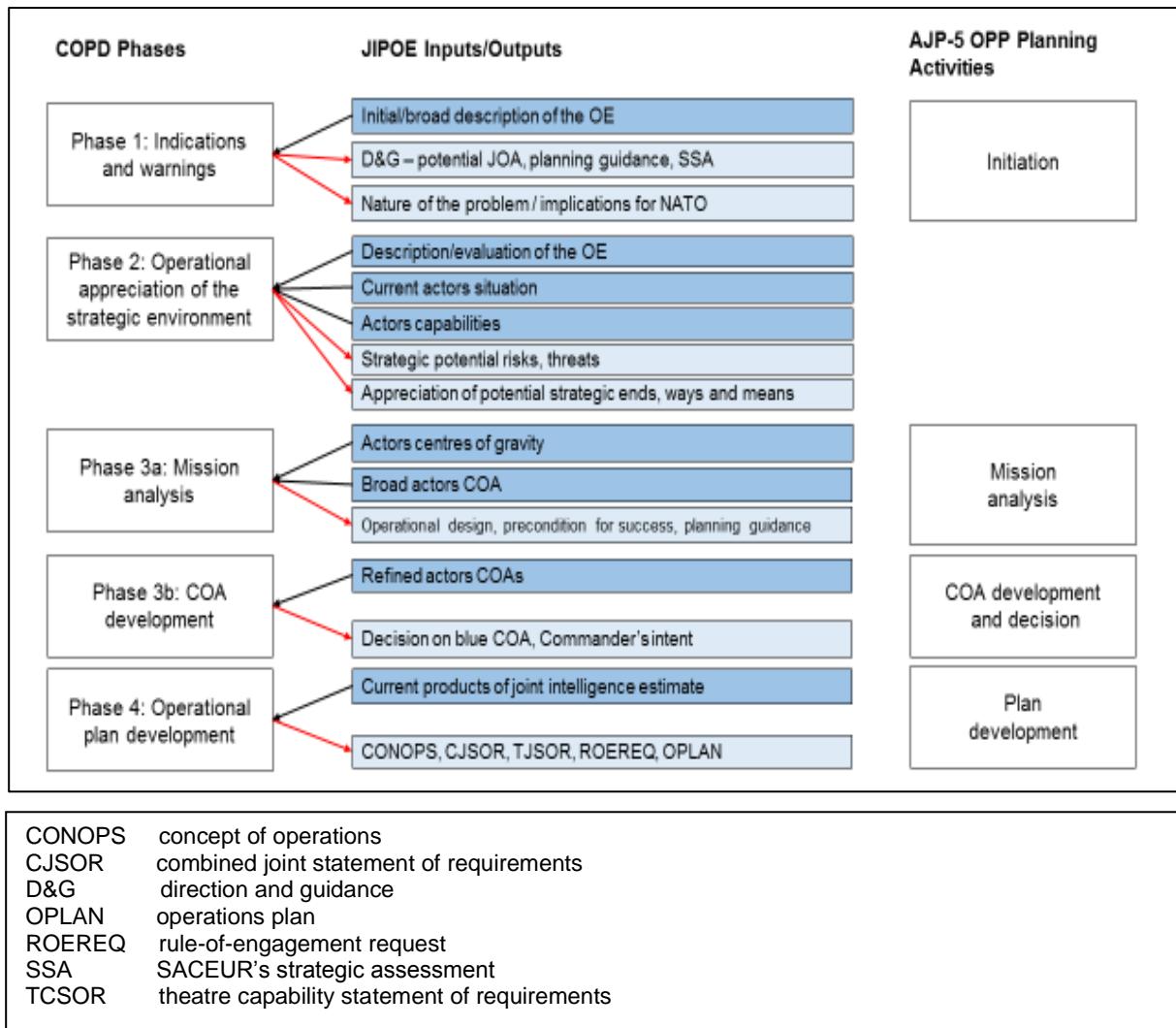
1.6 JIPOE AND THE OPERATIONS PLANNING PROCESS

a. The JIPOE process must be synchronized with the OPP. Operations planning is within Allied Command Operations (ACO) and accomplished in accordance with the Comprehensive Operations Planning Directive (COPD), which is based on MC 133, *NATO's Operations Planning* and AJP-5, *Allied Joint Doctrine for the Planning of Operations*. The sequence of planning activities is listed in Figure 1.3.

Initiation
Mission analysis
COA development
COA analysis
COA validation and comparison
Commander's COA decision
Plan development

Figure 1.3 - The sequence of planning activities.

b. The types of information and intelligence products that need to be exchanged between each of the COPD phases and JIPOE and how these exchanges correlate with each of the planning activities listed above is illustrated in Figure 1.4.

COPD Phases	JIPOE Inputs/Outputs	AJP-5 OPP Planning Activities
Phase 1: Indications and warnings	Initial/broad description of the OE / D&G – potential JOA, planning guidance, SSA / Nature of the problem / implications for NATO	Initiation
Phase 2: Operational appreciation of the strategic environment	Description/evaluation of the OE / Current actors situation / Actors capabilities / Strategic potential risks, threats / Appreciation of potential strategic ends, ways and means	
Phase 3a: Mission analysis	Actors centres of gravity / Broad actors COA / Operational design, precondition for success, planning guidance	Mission analysis
Phase 3b: COA development	Refined actors COAs / Decision on blue COA, Commander's intent	COA development and decision
Phase 4: Operational plan development	Current products of joint intelligence estimate / CONOPS, CJSOR, TJSOR, ROEREQ, OPLAN	Plan development

CONOPS	concept of operations
CJSOR	combined joint statement of requirements
D&G	direction and guidance
OPLAN	operations plan
ROEREQ	rule-of-engagement request
SSA	SACEUR's strategic assessment
TCSOR	theatre capability statement of requirements

Figure 1.4 - Synchronisation of JIPOE with the COPD and OPP.

c. Commanders will interpret and adapt the OPP according to their needs. Therefore, JIPOE should not be specifically bonded to each activity within the OPP. Synchronisation of the JIPOE outcomes with the operations and planning staffs' requirements must be agreed upon as part of the intelligence staff's mission analysis or developed into SOPs. However, an enduring theme is that the JIPOE will inform the OPP from the beginning of the planning process and therefore must be as mature as possible at the outset.

1.7 PLANNING CONSIDERATIONS

a. The initial steps in the planning process for JIPOE is for the intelligence staff to:

(1) **Gain an Initial Appreciation of the Mission**. The higher headquarters may only receive very broad guidance, which may suggest a future operation/mission. In this case, the intelligence staff, during preliminary planning, may have to infer an operation/ mission and command intent.

Therefore, it is imperative for the intelligence staff to engage with the commander to gain an initial appreciation of the operation/mission as it is being drafted by higher headquarters. The intelligence staff should gain the trust and confidence of the commander and establish a close relationship.

(2) **Foster a Shared Understanding of the OE.** JIPOE is a versatile process and can be employed by any level of headquarters for any scale and type of operation/mission. While JIPOE activities are initiated within the indications and warnings phase of the planning process, JIPOE can be adopted for contingency purposes and horizon scanning[7]. Commanders and subordinate commanders must build and foster a shared understanding of the OE central to the situation and promote this understanding continuously amongst their staff elements.[8]

(3) **Identify the Limits of the Commander's Area of Interest.** The OE encompasses all characteristics, factors, aspects, and conditions that must be understood to successfully meet the stated intent. However, not all of these aspects are relative to intelligence responsibilities and functions. Therefore, the commander and the intelligence staff need to identify and establish limits for those aspects of the OE that are deemed relevant to the JIPOE effort. The pertinent physical areas in the OE include the assigned operational areas and associated areas of intelligence interest (AII)[9] and area of intelligence responsibility (AIR)[10].

(4) **Identify the Joint Operations Area (JOA).** If the JOA is not precisely defined by the higher headquarters in the early phases of the JIPOE development, internal decision-making processes should define a proposed JOA based on a collective understanding of the problem. It is essential to obtain an accurate definition of the JOA as soon as possible. Definition of the JOA should include not only geospatial considerations, but cyberspace considerations as well. The parameters of the JOA will likely evolve through the planning process as the details of the force response options emerge and are translated into planning guidance to the joint force headquarters (JHQ). Further delineation of the commander's interests, most commonly along thematic lines, may be provided by the (preliminary) PIRs and CCIRs for any given operation. An early cursory survey of the general characteristics of the JOA enables the JHQ to visualize relevant aspects of the OE and to:

- delineate the AII and AIR;

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[7] Horizon scanning refers to the active, ongoing and systematic monitoring and assessment of a technological, commercial or other type of environment with a view to anticipating the changes that are likely to occur in it. Derived from the Encyclopaedic Dictionary of Public Administration.

[8] Derived from AJP 5.

[9] AII is a geographical area for which a commander requires intelligence on the factors and developments that may affect the outcome of operations.

[10] AIR is the area for which a commander has the responsibility to provide intelligence with the means available.

- determine information and intelligence gaps and collection requirements in all domains;

- develop realistic assumptions; and

- provide guidance and direction to the JIPOE effort.
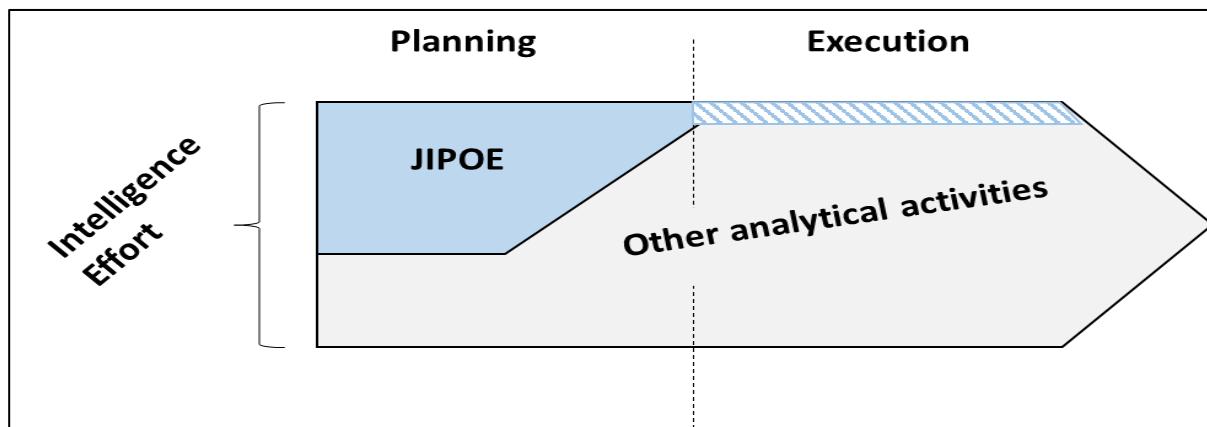
1.8 RESOURCE MANAGEMENT CONSIDERATIONS

a. Given the complexities of developing a holistic view of the OE, JIPOE requires a diverse set of analytical subject matter experts (SMEs) and benefits from a broad array of expertise and synergetic collaborative work. Most notably, the human network analysis[11], CoG analysis, and actor COA development will be far richer and far more likely to accurately reflect the necessary perspectives with the synergised input of SMEs.

b. The intelligence staff plans, prioritises and structures the JIPOE effort by balancing the level of detail required with the amount of time available. The time available for completion of the JIPOE process may not permit each step to be conducted and completed in detail. The intelligence staff needs to reach an agreement with the commander and other staff elements on the level of detail required to support operations planning. The intelligence staff will always be required and expected to provide the outcomes of JIPOE early in the OPP.

c. Resource management considerations include:

(1) Allocation of tasks to the intelligence planning staff. (Is the staff already engaged in other activities relating to another line of effort?)

(2) Allocation and resourcing of the analytical staff. (Are there a sufficient number of analysts?)

(3) Access to information. (What systems, tools, databases, and experts are available and what is the quality/classification levels of information that can be provided?)

(4) Specialist resources/analysts required. (For example: other staff elements; METOC analysts; legal advisors; industry partners; academia; and other external communities of interest)

(5) Capacity of echelons to contribute to JIPOE. (Determine what could be federated to component commands or conducted in collaboration)

(6) Production timeline and synchronization.

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[11] See AIntP-13.

(7) Horizontal and vertical integration. Teams of analysts and collaborative mechanisms need to be established within the command structure to effectively conduct JIPOE to ensure a unity of effort.

d. When initiating JIPOE, the intelligence staff must allocate the appropriate resources to JIPOE and still maintain all other analytical activities that need to be carried out. JIPOE as a part of the overall all-source analytical effort performed by the intelligence staff is illustrated in Figure 1.5. To manage the JIPOE effort effectively, a temporary re-structuring of the intelligence staff may be required. Identifying the amount of detail required to answer PIRs avoids wasting time and resources on developing more detail than necessary on any given step of the process.

Figure 1.5 - JIPOE as part of the overall intelligence activity.

e. Overcoming time limitations requires focusing the JIPOE process on the information that is most important to the commander and subordinate commanders in planning and conducting the operation. As the planning continues and more results are finalised, analytical resources may be diverted away from the JIPOE effort to other tasks. When the plan migrates into the execution phase of the operation, the planning section may still need intermittent support, which may require that the various components of the JIPOE process need to be applied for specific requirements.
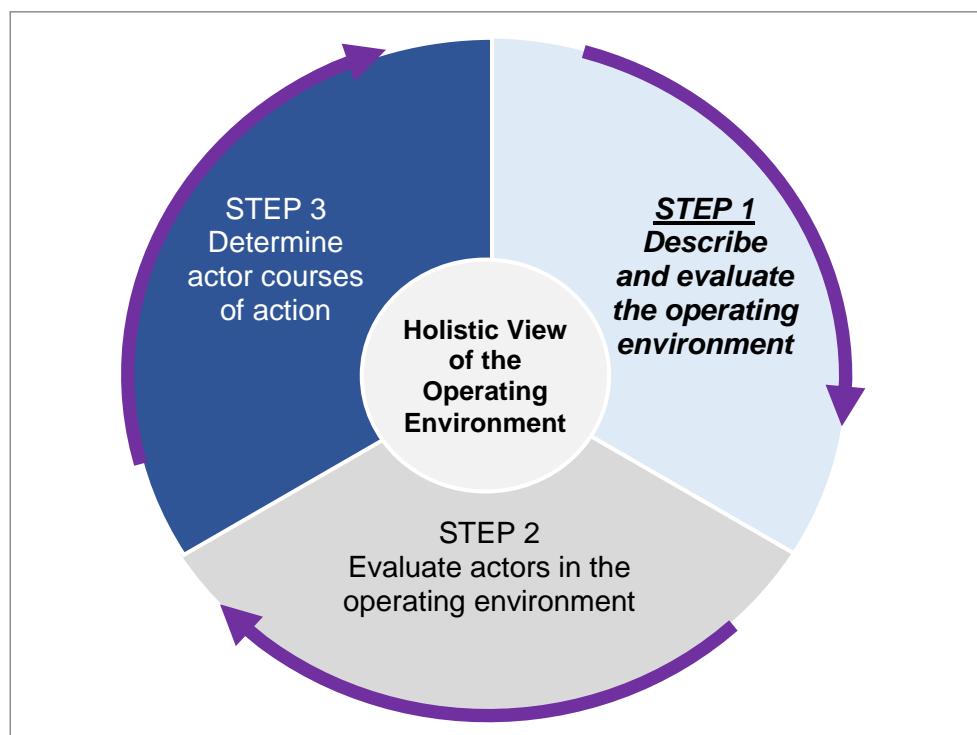
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CHAPTER 2 DESCRIBE AND EVALUATE THE OPERATING ENVIRONMENT

2.1 OVERVIEW

a. Once the physical and cyberspace areas including the areas of influence and interest are clearly defined, JIPOE can now focus on the relevant aspects and significant characteristics within the OE that could have an impact on the operations of own forces as well as on other relevant actors. The first step of the JIPOE process is to describe and evaluate the OE. All aspects of the land, air, space, and maritime physical domains; cyberspace; the information environment; and the relevant actors that might affect accomplishment of the commander's mission must be considered. Failure to focus on the relevant aspects and characteristics of the OE may result in the collection and analysis of unnecessary information and place the force conducting the operation at risk.

Figure 2.1 - JIPOE step 1.
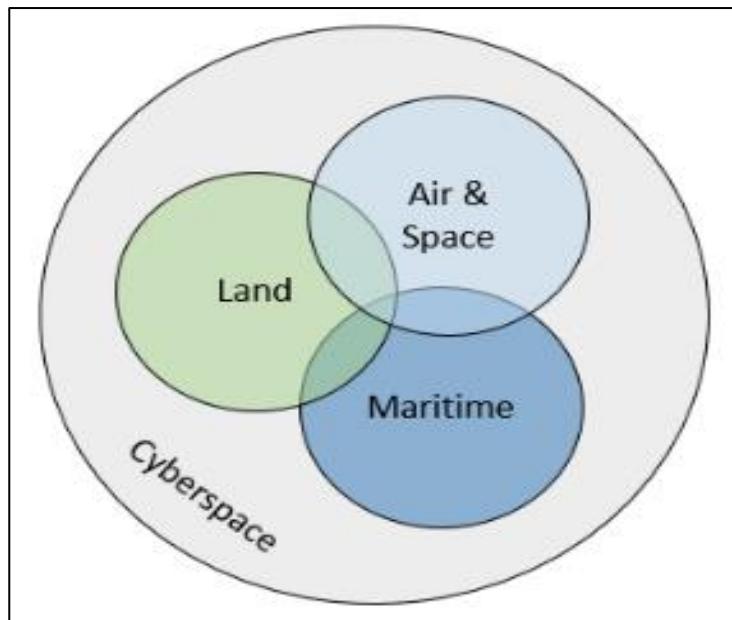
b. The analytical task for step one of the JIPOE process is to develop a geospatially-based perspective of the OE overlaid with a cyberspace perspective. A geospatial/cyberspace perspective supports all views of the OE enabling the analyst to conduct a comprehensive analysis of the relevant physical, nonphysical and locational aspects of the OE. Assessing each aspect of the OE is a three step process that:

(1) describes relevant characteristics within a domain,

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(2) evaluates each domain and its potential impact on operations, and

(3) looks across multiple domains and presents COAs that will create windows of opportunity to exploit and achieve advantage/overmatch of enemy forces. JIPOE analysts must integrate and synchronize multinational, multifunctional, and multi domain capabilities in and across all domains.

c. Once a description and evaluation for each domain is accomplished, the output is typically a graphical appreciation. The main purpose of these graphically based products is to facilitate the understanding of the effects of the environment on the actors. Outputs developed during this step that aid in depicting the impact of geography, METOC factors, demographics, and the information environment may include:

- updated databases,
- overlays,
- diagrams,
- maps,
- charts,
- matrices,
- tables and
- templates.

2.2 DESCRIBE ASPECTS OF THE OPERATING ENVIRONMENT

Understanding the OE requires a comprehensive description that includes the domains and their specific physical areas and environmental factors.

(1) **Domains.** JIPOE descriptions of the OE are conducted within the context of the land, maritime, air and space, physical domains; the cyberspace domain; and the information environment. Since the physical aspects of the OE are not homogenous, various land and maritime areas may require greater or lesser descriptions depending on the relative geographical complexity of the region. How the domains overlap with each other and how cyberspace essentially involves portions of all physical domains is illustrated in Figure 2.2.

Figure 2.2 - Holistic view of the operating environment.

(2) **Physical Areas**. Each domain consists of physical areas that need to be identified and analysed. Physical areas include a defined operating area consisting of the associated areas of influence and interest that is necessary to conduct operations within the OE. The JIPOE effort and outputs at the operational level will require greater detail than JIPOE conducted at the strategic level. Depending on the nature of the mission/operation, the balance of the JIPOE effort may not be equally distributed between the domains.

(3) **Environmental Factors**. Within the OE, there are specific environmental factors the commander and staff must take into account. These considerations include but are not limited to: terrain, topography, hydrology, meteorology, oceanography, and space; surface and subsurface environmental conditions (natural or human-made); distances associated with the deployment and employment of forces; the location of bases and ports; and other supporting infrastructure. METOC and space environmental factors include the entire range of atmospheric (weather) and phenomena, from the sub-bottom of the Earth's oceans to the top of the atmosphere and space environment (space weather).[12] The atmospheric and/or oceanographic environments can interact with and alter the characteristics of each physical domain directly impacting operations throughout the OE. Typical METOC parameters include:

- Visibility
- Winds
- Precipitation
- Cloud cover

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[12] For more information on METOC, see AJP-3.11, *Allied Joint Doctrine for Meteorological and Oceanographic Support to Joint Forces.*

- Temperature and humidity
- Atmospheric pressure
- Sea state

The effective integration of METOC information aids operational planning and enables commanders to anticipate or exploit environmental impacts on planned operations. METOC and geospatial specialists convert the collected environmental information and data into decision aids and prepare mission/execution forecast products as a key part of the JIPOE. Refer to Annex F for examples of weather charts and decision aids.

2.2.1 Land domain

a. Descriptions of the OE's land domain is focused on terrain features. Descriptions also includes infrastructure aspects of the terrain as well as human and information dimensions.

   (1) **Identification and description of terrain features.** The first task for the analyst is to identify and describe terrain features. Terrain features may include:

   - Cross-country mobility
   - Transportation systems to include road and bridge information
   - Vegetation type and distribution
   - Surface drainage and configuration
   - Surface materials to include soil composition
   - Ground water
   - Obstacles
   - Slope
   - METOC conditions

   (2) **Climate and weather aspects.** In addition to the terrain features listed above, terrain analysis must always consider the effects of weather as well as changes that may impact operations. It is also important to analyse the combined effects of wind, temperature, humidity, sunlight, topography, and precipitation and their impact on a system or network.
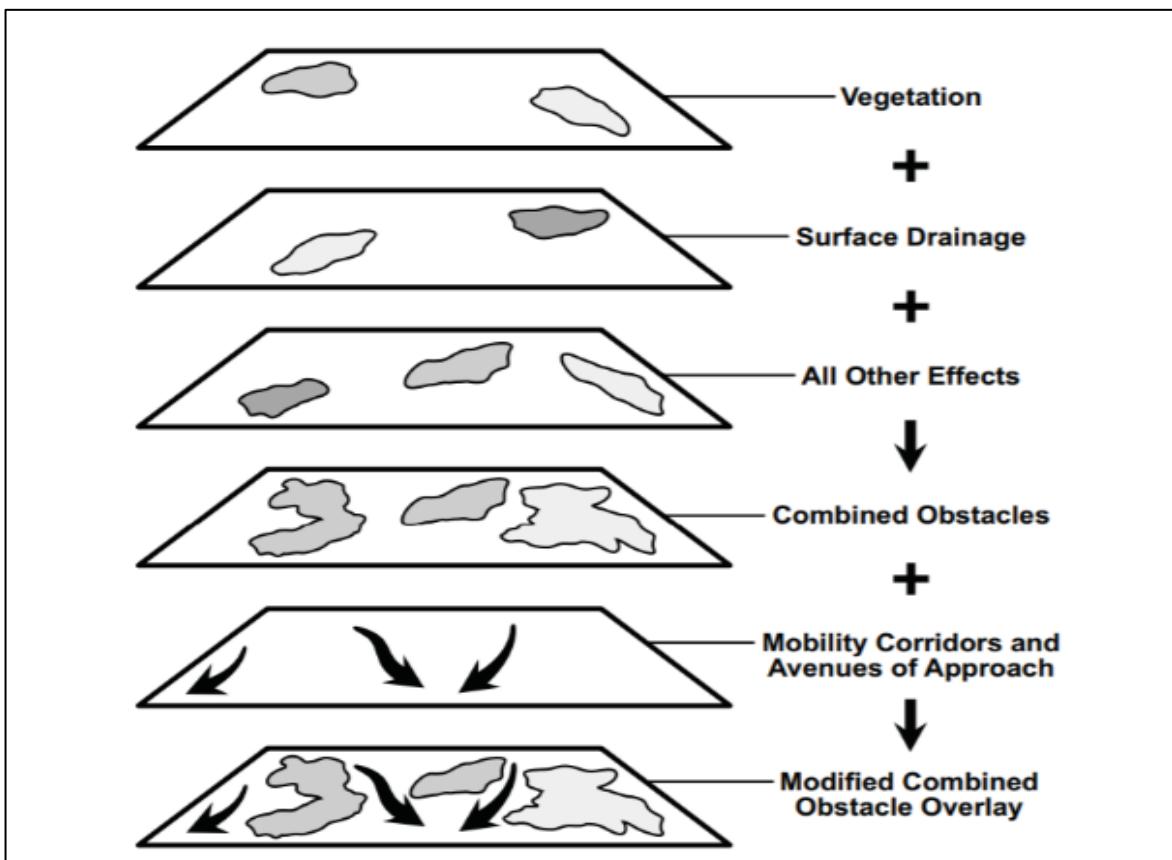
   (3) **Impact of the land domain on operations.** After the analyst has identified key terrain features, the second task for the analyst is determine and evaluate how the land domain will impact operations. Terrain analysis is the means to determine which COAs can best exploit the opportunities the terrain provides and how the terrain affects the actor's available COAs. Key terrain aspects impacting operations include:

   (a) **Observation and fields of fire.** Observation refers to the ability to see (or be seen by) the adversary either visually or through the use of surveillance devices. A "field of fire" refers to the area that a weapon or group of weapons may effectively cover with fire from a given position. Areas that offer good observation and fields of fire generally favor defensive COAs.

Factors that hinder observation and fields of fire include: the height and density of vegetation and buildings; relief features such as hills and defiles; obstructions to specific lines of sight (LOSs); target acquisition and sensor capabilities; and visibility, precipitation, and cloud cover.

(b) **Concealment and cover.** Concealment refers to protection from observation or surveillance and can be provided by features such as woods, underbrush, snowdrifts, tall grass, and cultivated vegetation. Cover refers to protection from direct and indirect fire. Cover can be provided by ditches, caves, tunnels, riverbanks, swales in the ground, shell craters, buildings, walls, and embankments.

(c) **Obstacles.** Obstacles are obstructions designed or employed to disrupt, fix, turn, or block the movement of an opposing force, and to cause the opposing force to commit additional personnel, time, and equipment resources. Obstacles can be natural, man-made, or a combination of both. These can include buildings, steep slopes, rivers, lakes, forests, swamps, jungles, cities, minefields, trenches, and military wire obstacles.

(d) **Key terrain.** Key terrain is any locality, or area, the seizure or retention of which affords a marked advantage to either force. Therefore, it is often selected as a decisive point and a tactical-level or operational-level objective. Certain key terrain, such as an airport or seaport, could be designated as an operational-level objective if it significantly affects the commander's ability to deploy or employ force components.

(e) **Avenues of approach.** An avenue of approach is an air or ground route of an attacking force of a given size leading to its objective or to key terrain in its path. The identification of avenues of approach is an important consideration because all COAs that involve maneuver depend upon available avenues of approach.

(f) **Mobility corridors.** Mobility corridors are areas relatively free of obstacles where a force can capitalize on the principles of mass and speed, but is canalized due to restrictive terrain along both flanks.

(g) **Legal restrictions, conditions and arrangements.** The land domain is subject to international legal arrangements among independent nation states. In some areas, specific parts of the maritime domain are under dispute or even a root cause for constant conflict. The legal characteristics of a certain maritime OE are to be included in the evaluation.

b. **Land domain visualization.** The final step in analysing the land domain is to relate the evaluation of the military aspects of the terrain to the various broad COAs available to the relevant actors. There are two types of overlays that can be used to visualize the land domain.

(1) **Combined obstacle overlay.** To visualize the key terrain aspects, separate obstacle overlays can be combined to form a single product known as a combined obstacle overlay. The combined obstacle overlay can then be used as a baseline to depict areas where mobility can be categorized as either unrestricted, restricted, or severely restricted.

(2) **Modified combined obstacle overlay.** In addition to the restricted and severely restricted areas depicted on a combined obstacle overlay, avenues of approach and mobility corridors can be added resulting in a modified combined obstacle overlay as illustrated in Figure 2.3. This graphic appreciation consists of a series of terrain features, effects, and obstacles that are integrated into a single display providing a comprehensive visualization of the OE.

Figure 2.3 - Constructing a Modified Combined Obstacle Overlay.

c. The outcomes of this evaluation are to be graphically portrayed in a modified combined obstacle overlay or similar type of graphic appreciation. The analyst should be prepared to integrate this product with similar products from other domains. See Annex E for examples of modified combined obstacle overlays.

2.2.2 Maritime domain

a. The maritime domain is comprised of the world's oceans, seas, bays, estuaries, islands, coastal areas, and littorals. In open ocean areas, distant landmasses and supporting shore infrastructure may impact operations primarily due to the range of

an actor's systems and sensors. Littoral areas may contain geographic features such as straits or chokepoints that restrict operations. The analyst should be aware of the legal arrangements that apply to the actors in this domain. Key aspects of the maritime domain include:

- Manoeuvre space and chokepoints

- Natural harbours and anchorages

- Man-made infrastructure

- Sea lines of communication

- Ocean surface characteristics

- Ocean subsurface characteristics

- Littoral characteristics

- Potential carrier-based aviation

- Sea-launched cruise missile locations and operational areas

- Legal restrictions, conditions and arrangements

(1) **Manoeuvre space and chokepoints.** Surface ships compensate for the sea's lack of cover and concealment by utilizing manoeuvre to reduce an actor's ability to locate them at a specific time and place. Confined ocean space limits the ability to manoeuvre a maritime force, thus increasing the likelihood that it can be located and engaged. Chokepoints such as straits or narrows are extremely hazardous areas due to their ability to severely limit tactical manoeuvre.

(2) **Natural harbors and anchorages.** Natural harbors and anchorages may be exploited by friendly or adversary naval forces and should be identified and analyzed. Depending on the surrounding terrain, some natural harbors and anchorages, such as fiords may offer limited cover and concealment for naval combatants and may afford the actor an opportunity to launch unexpected sorties against friendly vessels.

(3) **Human-made infrastructure.** All human-made infrastructure capable of influencing naval operations in the OE should be identified and analyzed. This includes civilian port facilities, naval bases, and airfields, as well as occupied and unoccupied anti-ship missile sites. The capacity of civilian port facilities is particularly important when analyzing adversary and friendly logistic support capabilities.

(4) **Sea lines of communications (SLOCs).** SLOCs should be identified and analyzed with regard to the relative importance to adversary, friendly, and neutral nations in the OE. Potential interdiction areas such as chokepoints along SLOCs should be identified along with the naval bases, coastal defence facilities, and airfields from which such interdiction operations might originate.

(5) **Ocean surface characteristics.** The ocean surface environment varies widely depending on METOC conditions. The METOC specialist evaluates the effects of seasonal METOC variations on maritime surface operations throughout the OE. Key METOC considerations include winds and temperature. Winds and storms provide the mechanism for wave formation, and therefore determine ocean surface roughness or sea state. Sea state is a major factor in determining the feasibility of naval operations and the functionality of maritime weapons platforms. Temperature controls the extent of ice formation and impacts the strength and direction of ocean currents. The presence of ocean ice is a significant seasonal variable that directly affects navigation, port operations, and harbor availability. The presence of ocean currents is also an important real-time variable that directly impacts navigation and naval operations.

(6) **Ocean subsurface characteristics.** The subsurface characteristics of the ocean are crucial to the conduct of submarine, unmanned underwater vehicle, antisubmarine, and mining operations. Sonar capabilities are significantly affected by METOC variables to include the composition of the sea bottom; saline content and water temperatures at various depths; the presence of ocean currents and eddies; and the ambient noise in various areas of the ocean. In addition, sea bottom composition and fathom curves need to be analyzed to determine possible submarine locations.

(7) **Littoral Characteristics.** Characteristics such as beach gradient and composition, coastal terrain features and transportation infrastructure, tides, and currents are critical factors in planning and conducting naval operations. Due to the relatively flat trajectory of naval gunfire, coastal ridgelines running perpendicular to the direction of fire facilitate terrain masking. Amphibious landing sites depend on not only beach gradient and composition, but should also be able to access coastal transportation infrastructure to facilitate the rapid movement inland and the seizure of key terrain. The METOC specialist assesses the effects of the current and the predicted littoral METOC environment on amphibious operations.

(8) **Potential Carrier-Based Aviation and Sea-Launched Cruise Missile (SLCM) Locations and Operational Areas.** If the adversary has an aircraft carrier and/or SLCM capability, bodies of water in the OE should be identified to determine possible deployment locations. Identifying potential SLCM launch locations depends on factors such as target location, SLCM range, and the adversary's launch platform (i.e. surface combatant vice sub surface combatant).

(9) **Legal restrictions, conditions and arrangements.** The maritime domain is subject to international legal arrangements among independent nation states. In some areas, specific parts of the maritime domain are under dispute or even a root cause for constant conflict. The legal characteristics of a certain maritime OE are to be included in the evaluation."

b. **Impact of the maritime domain on operations.** The aspects of the maritime domain should be evaluated to determine how they impact relevant actors and COAs. The evaluation of potential key geography must be based on the degree to which such maritime features control or dominate the OE or provide a marked advantage. The locations of naval bases should be evaluated in relation to their ability to support sea control or amphibious operations. During amphibious operations, the evaluations of the maritime and land domains should be combined to identify amphibious landing areas that not only can be supported from the sea, but also connect with advantageous land avenues of approach leading to key terrain objectives.

c. The outcomes of this evaluation are to be graphically portrayed in a modified combined obstacle overlay or similar type of graphic appreciation. The analyst should prepare to integrate this product with similar products from other domains.

2.2.3   Air domain

a. The air domain is the operating medium for fixed-wing and rotary-wing aircraft, air defence systems, unmanned aircraft systems, cruise missiles, and ballistic and anti-ballistic missile systems, which only operate in the air domain. Aerial avenues of approach are different from maritime and ground avenues. Nevertheless, the air domain is partially influenced by surface characteristics. Additionally, the effects of weather conditions on the air domain are particularly crucial. Key aspects of the air domain include:

- Airfields and support infrastructure.

- Missile launch sites.

- Surface features and service ceilings.

- Air avenues of approach.

- Air operations sustainment.

- Operating altitudes and ranges.

- Military and non-military use of airfields.

- Air engagement and ambush areas.

- Restricted operating zones.

- Presence of civilian aircraft.

(1) **Airfields and Support Infrastructure.** All current and potential airfields within range of identified target areas should be identified and analyzed. In addition to military airfields, the analyst should also include civilian or abandoned airfields capable of being rapidly modified to support air operations. Additionally, potential tactical aircraft landing zones such as stretches of

highway, soccer fields or stadiums, or dirt landing strip locations should be assessed. In addition, terrain should be evaluated to locate potential sites for future air bases, and to determine whether elevation will be a limiting factor to the type of aircraft staging out of a specific airfield. Airfield analysis should include all airfields capable of hosting rotary-wing, fixed-wing, or tiltrotor aircraft. The analysis of current and potential military airfields should consider factors such as:

- Runway length, width, weight-bearing capacity, elevation, lighting, navigation aids, headings, and potential for expansion.

- Proximity to logistic support and lines of communication (LOCs).

- Ramp capacity and their requisite support infrastructure, to include materials handling equipment.

- Availability of food and water.

- Suitability of command and control infrastructure.

- Availability, capacity, and hardness of storage facilities for petroleum, oils, and lubricants.

- Host nation (HN) military or civilian support capabilities.

- Base security required/available.

- Relevant legal requirements to include the law of armed conflict (LOAC).

(2) **Missile launch sites.** Maximum range arcs should be drawn from all known adversary ballistic and cruise missile launch sites. These should include fixed sites as well as garrison locations of mobile missile units. The terrain surrounding mobile missile garrison locations and likely missile operating areas should be analyzed to determine possible pre-surveyed launch, hide, and reload locations. Cross-country movement analysis should be conducted to determine likely operating areas for mobile systems. Likely deployment locations should also be identified for mobile missile units accompanying forward ground forces. Possible hide and reload locations for forward-deployed mobile missiles might include forested areas with good access roads, highway underpasses, warehouses, and possibly urban areas. Critical resources within range of the adversary's potential launch sites should be identified. This, in turn, will facilitate the determination of likely adversary ballistic missile trajectories and launch azimuths.

(3) **Surface features and service ceilings.** The analysis of surface features and service ceilings between the airbase and target area will facilitate the identification and evaluation of air avenues of approach. Terrain is critical to air route planning. Both human-made and natural features can represent obstacles to low-flying aircraft as well as low-flying cruise missiles, especially those using a terrain corridor as an air route. Flight obstacles could include objects or features such as high-tension power lines, bridges, high-rise buildings, dams, towers, or bends in the terrain corridor too sharp for high-performance aircraft to negotiate. Service ceilings are another aspect of the environment that are crucial to route planning. Operations at extreme altitudes in mountain ranges or highland plateaus will often preclude the effective use of rotary-wing aircraft. This may be due to an inability to carry sufficient amounts of ordnance, inadequate environmental support for aircrews, or exceeding the aircraft's operational ceiling.

b. **Impact of the air domain on military operations.** The final step in the process is to evaluate the overall impact of the air domain on adversary and friendly capabilities to conduct offensive and defensive air operations and to support broad COAs such as to attack, defend, reinforce, or retrograde.

(1) **Air avenues of approach.** Air avenues of approach consider non-geographic aspects of the environment, such as overflight restrictions, aircraft performance characteristics, counter-air capabilities, early warning radar coverage, and the locations of air defence envelopes.

(2) **Air operations sustainment.** Air assets must be able to sustain a sortie rate sufficient to accomplish all the objectives of the air portion of a campaign. Critical factors in a force's ability to sustain air operations include:

- air crew availability and training readiness.

- aircraft utilization rates.

- availability of fuel and ordnance.

- effectiveness of force protection measures.

- capability of support infrastructure.

- availability of drop zones or extraction zones.

- capacity of LOCs between airfields.

- logistic support facilities.

The JIPOE analyst must be prepared to address the ways in which these factors will impact sortie rates.

(3) **Operating altitudes and ranges.** Air operations will utilize a wide variety of aircraft performing many types of missions, to include counter-air, air interdiction, close air support, strategic attack, airlift, special operations, intelligence collection, air refueling, and combat search and rescue. In performing these missions, aircraft will have to operate at different altitudes and ranges for different periods of time. The JIPOE analyst must be thoroughly familiar with terrain elevations and seasonal variations in air density in the operational area, as well as with overflight restrictions and adversary air and/or air defence capabilities and envelopes. In this way, the analyst will be able to identify and propose appropriate locations to establish assembly areas, penetration axes, and orbit points.

(4) **Mission execution.** The JIPOE analyst should identify any environmental factors that may assist or hinder the accomplishment of an air mission. These factors may include potential sources of collateral damage; no strike facilities (e.g. religious facilities and hospitals); the use of camouflage, concealment, and deception in the target areas; the location of adversary air defence systems along air avenues of approach; the location of flight obstacles; and weather.

(5) **Air engagement and ambush areas.** Combat air patrol areas, air defence sites, and early warning and passive detection system locations are greatly influenced by terrain. These assets will usually be positioned to maximize optical and radar lines of sight (LOS) and avoid terrain masking. The analyst should be prepared to identify those areas of the OE where air defence systems and terrain features can be integrated to form optimal air engagement areas and ambush sites.

c. All militarily significant characteristics of the surface and air environments that may constrain or facilitate air operations should be graphically portrayed. Analysts should be prepared to integrate this product with similar products from other domains.

2.2.4   Space domain

a. The space domain is the OE for satellites, spaceships, space stations, air defence systems, and ballistic and anti-ballistic missile systems that operate within space. Actors that have access to the space domain are afforded a wide array of options that can be used to leverage and enhance capabilities. Every actor potentially has access to the space domain through the purchase of services. Thus, the monitoring and tracking of relevant actors' assets is necessary for a complete understanding of the OE. Space capabilities have proven to be significant multiplier when integrated into operations. Analysts should be aware of the availability of a space capabilities and assets to support operation and the JIPOE process in the JOA. Space capabilities include global communications; positioning, navigation, and timing (PNT) services; environmental monitoring; and space-based intelligence, surveillance, and reconnaissance. Aspects of the space domain are:

- Orbital mechanics.

- Propagation.

- Orbit density and debris.

- Solar and geomagnetic activity.

- Electromagnetic spectrum dependency.

(1) **Orbital mechanics.** Earth satellites are subject to physical laws that constrain their orbits, and somewhat predictable forces govern their orbital parameters. Thus, a satellite's orbit must be known to allow the JIPOE analysts to determine its impact on supporting operations. These constraints and parameters can be used to predict satellite locations and to assess satellite functions and capabilities based on their association with various types of orbits. Factors that constrain satellite orbits include: inclination and launch location, orbit type and altitude, and orbital plane and launch windows

(2) **Propagation.** Transmissions associated with communication satellite systems, navigation satellite systems, satellite reconnaissance systems, and Earth-sensing satellites are all significantly impacted by atmospheric parameters such as temperature, moisture, and pressure as electromagnetic energy enters the Earth's atmosphere. Atmospheric absorption and scattering impact space asset electromagnetic propagation performance as the energy enters the Earth's atmosphere.

(3) **Density and Debris.** Depending on their relative utility for civil and military applications, some orbits contain greater numbers of satellites than others. This tendency presents a wide range of problems for space operations planners related to launch window planning, satellite positioning, and space control. A related problem to orbital density is the increasing amount of space debris in orbit.

(4) **Solar and Geomagnetic Activity.** Space weather phenomena occur within the space and near-Earth environment and typically originate from solar flares and coronal mass ejections. Solar flares, charged particles, cosmic rays, the Van Allen radiation belts, and other natural phenomena in space can degrade terrestrial radio and satellite communications, degrade radar systems, induce electrical anomalies on spacecraft, and pose a radiation hazard to high-altitude flight and space operators. Electrical grid damage or disruptions can occur during the most intense solar storms. This can impact global positioning satellite accuracy, high-frequency communication, airborne communications relay, and space-based reconnaissance for a period of time in a specific location.

(5) **Electromagnetic Spectrum (EMS) Dependency.** Space-based assets depend on the EMS as their sole medium for transmitting and receiving

signals. The electromagnetic frequencies that most space-based systems use are fixed and cannot be changed after launch.

b. **Impact of the Space Domain on Military Operations.** Space systems are predictable in that they are placed into orbits that maximize their mission capabilities. The limited number of space launch facilities in the world, combined with predictable launch windows for specific orbital planes, facilitate the prediction of pending satellite launches. Once a satellite is tracked and its orbit determined, space operations and intelligence staffs can usually predict its function and future position The path a satellite makes as it passes directly over portions of the Earth can be predicted and displayed on a map as a satellite ground track, assuming the satellite is not maneuvered. This predictability allows JIPOE analysts to warn friendly forces about upcoming gaps in friendly space system coverage or mission capabilities as well as upcoming windows of vulnerability to adversary space systems. Conversely, adversary space forces are able to do the same

c. The predicted ground tracks and surveillance areas of adversary reconnaissance satellites, as well as the locations of space-related infrastructure to include space launch facilities and satellite ground control stations should be depicted on a graphical appreciation. The JIPOE analyst should use this overlay to identify gaps in the adversary's space-based reconnaissance capabilities. In addition, analysts should be prepare to integrate this product with similar products from other domains.

2.2.5 Cyberspace domain.[13]

a. Cyberspace consists of all interconnected networks of information technology, including systems and networks, which are separated or independent. Cyberspace encompasses all forms of digital activities. Each of the physical domains mentioned above has specific characteristics in which cyberspace helps actors apply power or influence the OE. Operations in the OE are increasingly interwoven with or at times can be dependent on cyberspace. Cyberspace goes beyond the Internet and everything connected to it, to include standalone and intermittently connected networks and other digital hardware and systems. Cyberspace encompasses three distinct layers[14]:

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[13] Refer to AJP 3-20, *Doctrine for Cyberspace Operations.*

[14] The physical network layer of cyberspace is comprised of the geographic component and the physical network components. It is the medium where the data travels. The logical network layer consists of those elements of the network that are related to one another outside of the physical network, such as a web server hosted at multiple locations. The cyber-persona is the digital representation of individuals on the network.

- Layer 1: Physical network
- Layer 2: Logical network
- Layer 3: Cyber-persona

(1) **Physical network.** The physical network layer consists of hardware; infrastructure to include wired and wireless, satellite and optical linkages; and nodes/connections to include wired/wireless routers, switches, servers, repeaters, and hosts.

(2) **Logical network.** The logical network layer consists of those elements of the network that are related to one another outside of the physical network. Logical network elements would include a web server hosted at multiple locations and are not necessarily related to specific individuals or physical nodes.

(3) **Cyber-persona.** The cyber-persona layer refers to a digital representation of a user or entity identity in cyberspace. The cyber-persona layer consists of people actually on the network. Some examples of cyber-personas may include email addresses, social networking identities, web forum or chat room aliases, or voice over Internet protocol telephone numbers. A user may have multiple cyber-personas and a cyber-persona may have multiple users. Because cyber-personas may not be tied to a geographic location or physical node, significant intelligence collection and analysis is required to effectively target in this layer of cyberspace.

b. Cyberspace enables command and control for actors as much as it enables offensive and defensive operations. Digital information massively uses the cyberspace to travel. Access to the cyberspace and establishing a presence there greatly enhances an actor's ability to exert influence in the entire OE. It furthermore provides opportunities to circumvent obstacles in specific domains and provides alternatives during planning processes.

c. The outcomes of this evaluation are to be graphically portrayed in a modified combined obstacle overlay or similar type of graphic appreciation. The analyst should be prepared to integrate this product with similar products from other domains.

2.2.6 Information environment

a. **Information environment.** A description of the information environment is paramount for a thorough understanding of the OE. The current state of the information environment, communications means and methods, sources, influencers, cognitive patterns, social-cultural perspectives, historical narrative and many other aspects are intrinsic to the OE. Publicly available information can provide insight into many factors affecting the OE. It can provide baseline information about public perception and immediate identification of events that can be used to: define the OE: help shape COA development; and identify areas where more collection may be needed to fill intelligence gaps. The information

environment is the aggregate of individuals, organisations, and systems that collect, process, disseminate, or act on information and includes cyberspace. Both friendly and adversary forces are aware of the significance and reach of information-related capabilities (IRCs) to gain asymmetric advantage in the information environment.

b. The actors in the information environment include military and civilian leaders, decision makers, individuals, and organisations. Resources include the information itself and the materials and systems employed to collect, analyse, apply, disseminate, and display information and produce information-related products such as reports, orders, and leaflets. Significant characteristics of the information environment can be further evaluated within three distinct dimensions:

- Physical
- Informational
- Cognitive

(1) **The Physical Dimension.** The physical dimension is composed of command and control (C2) and other information systems, key decision makers, and supporting infrastructure that enable individuals and organisations to create effects. It is the dimension where physical platforms and the communications networks that connect them reside. The physical dimension includes, but is not limited to, human beings, C2 facilities, newspapers, books, microwave towers, computer processing units, laptops, smart phones, tablet computers, or any other objects that are subject to empirical measurement. The physical dimension is not confined solely to military or even nation-based systems and processes; it is a diffused network connected across national, economic, and geographical boundaries.

(2) **The Informational Dimension.** The informational dimension encompasses where and how information is collected, processed, stored, disseminated, and protected. It is the dimension where the C2 of military forces is exercised and where the commander's intent is conveyed. Actions in this dimension affect the content and flow of information. The informational dimension is partially shaped by those norms, rules, policies and processes, and heuristics that guide, inform, and potentially bind decision makers within the OE.

(3) **The cognitive dimension.** The cognitive dimension encompasses the minds of those who transmit, receive, and respond to or act on information. It refers to individuals' or groups' information processing, perception, judgment, and decision-making. These elements are influenced by many factors, to include individual and cultural beliefs, norms, vulnerabilities, motivations, emotions, experiences, morals, education, mental health, identities, and ideologies. Defining these influencing factors in a given environment is critical for understanding how to best influence the mindset of the decision maker and create the desired effects. This dimension constitutes the most important component of the information environment.

The analysis of the cognitive dimension is a two-step process that identifies and

assesses all human characteristics that may have an impact on the behaviour of the populace as a whole, the military rank and file, and senior military and civil leaders, and then evaluates the influence these human characteristics have on operations.

c. **Evaluate the Impact of the Information Environment on Operations.** The impact of the information environment should be analysed to consider how significant characteristics affect friendly, neutral, and adversary capabilities and broad COAs. A thorough understanding of the current state of the information environment, local communications means, methods, trusted sources, key influencers, established cognitive patterns, cultural norms, perspectives, historical narrative, system of opposition, and adversary and host nation information-related capabilities is critical to the development of the commander's communication synchronization effort.

The actor's mindset should be evaluated to determine the probable state of morale in both the civil and military population. Morale is a significant factor not only in assessing the overall capability of a military force, but also in evaluating the extent to which the civil populace will support military operations. The degree of regime loyalty should be assessed not only for the populace but also, if possible, for individual leaders. Depending on the situation, factors such as ethnic, religious, political, or class grievances or differences may be exploitable for military information support operations purposes. Psychological profiles on military and political leaders may facilitate understanding an actor's behaviour, evaluating an actor's vulnerability to deception, and assessing the relative probability of an actor adopting various COAs.

The impact of cyberspace should be evaluated by identifying and prioritizing those information systems and networks deemed most critical to the planning and conduct of operations. Depending on the criticality of the system, the effects of data loss or even a short downtime can result in a lingering ripple effect on operations that may last days, weeks, or months. The relative vulnerability of each critical system should also be assessed: first, by evaluating the strengths and weaknesses of each of its cyberspace aspects, and second by identifying any backup systems, "work arounds," or redundant links.

2.3 ANALYTICAL PRODUCTION

The products prepared by the JIPOE analyst during step one are used as a basis for a further human network analysis and COA development described in steps two and three. See Annex E for examples of the modified combined obstacles overlays for each domain.
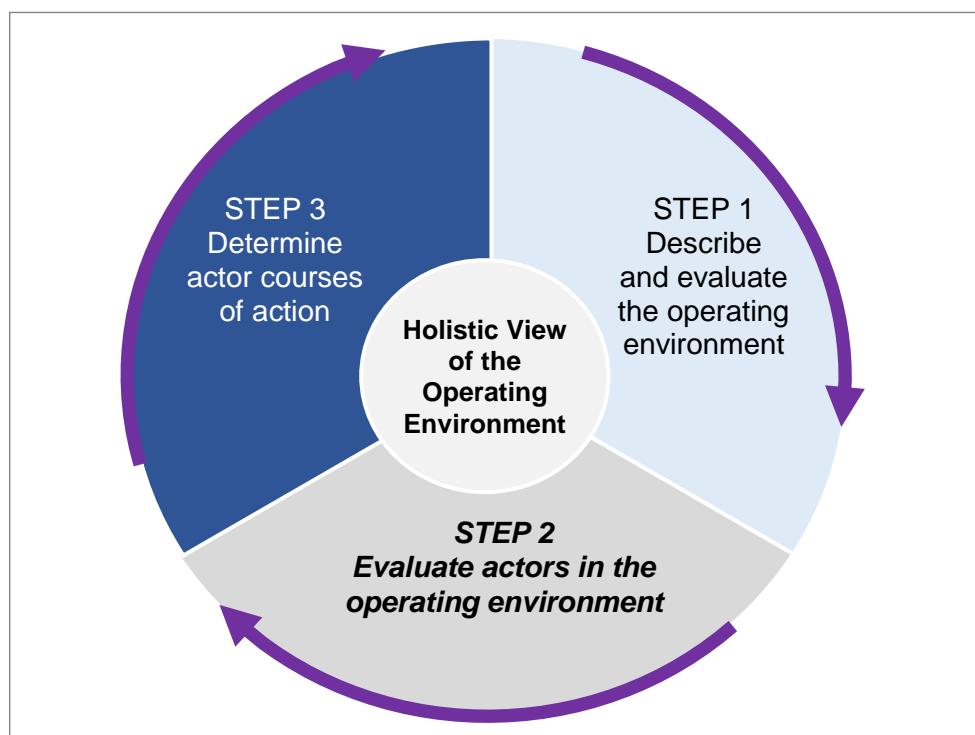
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CHAPTER 3 EVALUATE ACTORS IN THE OPERATING ENVIRONMENT

3.1 OVERVIEW

The second step in the JIPOE process identifies and evaluates the actors to include their capabilities and limitations, their current situation, CoGs, doctrine, patterns of operation, and tactics, techniques and procedures (TTPs). During this step, analyst develop models that portray how actors typically conduct operations and their reactions to specific situations in the past.

Figure 3.1 - JIPOE step 2.

JIPOE analysts need to identify all relevant actors within the OE that may positively or negatively impact the accomplishment of the operation. These actors may include, but are not limited to, adversary forces, the populace or segments of the populace, government, non-governmental and inter-governmental organizations.

3.2 ANALYTICAL METHODOLOGIES

a. In order to identify the relevant actors in the OE, the JIPOE analyst needs to apply an appropriate analytical methodology[15]. Analytical methodologies should aid in determining the actor's doctrinal way of operating and observed patterns of operation or potential deviation from observed patterns under similar conditions. Analytical methodologies are normally completed prior to the operation, and are continuously updated during operations. They can be applied independently but can also be combined to provide a more comprehensive and holistic view of the OE. Analytical methodologies that could aid in determining and evaluating actors include, but are not limited to:

  ▪ Human network analysis and

  ▪ Centres of gravity analysis

b. **Utilizing analytical methodologies**. Analytical methodologies that could be used to support human network analysis include:

  ▪ Political, military, economic, social, informational and infrastructural (PMESII) and

  ▪ Area, structures, capabilities, organizations, people and events (ASCOPE).

c. **PMESII.** PMESII is used to describe the OE with six interconnected factors.[16] The six PMESII factors include:

  (1) **Political**: Political factor includes: advisors, governors, mayors, political interest groups, cabinet officials, courts, and policy documents.

  (2) **Military**: Military factor includes: individual leaders at all levels, plans and orders, defence ministry, command and control (C2) headquarters, air defence systems, artillery maintenance facilities, ammunition storage points, and key terrain.

  (3) **Economic**: Economic factor includes: banks, corporations, trade unions, contracting firms, market places, shipping and distribution facilities, smugglers, automated teller machines, commercial depots, organized crime activities, agriculture, and internet-based companies.

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[15] See AIntP-13, *Human Network Analysis and Support to Targeting (HNAT),* for more detail on analytical methodologies
[16] See also AJP-01, *Allied Joint Doctrine*, and AJP-2, *Allied Joint Doctrine for Intelligence, Counterintelligence and Security*, for more detail on PMESII.

(4) **Social**: Social factor includes: ethnic groups, clans, social media groups of interest, tribes, religious groups, unions, associations, sports clubs, schools, cultural centres, health and welfare facilities.

(5) **Informational**: Informational factor includes: plans and orders, newspapers, newsletters, information ministry, television networks, computer networks, information technology centres, intelligence agencies, leaflets, postal facilities, radio stations, national or influential specialty magazines or periodicals, social media applications, and other existing information infrastructure and mass communication capabilities.

(6) **Infrastructural**: Infrastructural factor includes: nuclear power plants, hydroelectric dams, gas pipelines, aqueducts, waterways, pumping stations, rail yards, airports, port facilities, relevant factories, hospitals, schools, civil defence shelters, garbage disposal systems, highways, bridges, tunnels, dykes, sewage systems, storm drains, global system for mobile communication (GSM) masts, and server parks.

d. The relevance of PMESII factors and characteristics will depend upon the specific situation associated with each operation. Some of the characteristics that may be considered significant during a sustained humanitarian relief operation may receive far less emphasis during combat operations against a single conventional adversary. Therefore, a tailored approach is imperative for the analyst. The methodology allows for adaptation to the specific operation and situation within the OE. Based on the mission analysis, JIPOE analysts will need to decide on how to best optimize their use of time and intelligence resources. This may involve decisions on what part of the methodology they need to place the most emphasis as well as the application and internal sequencing of the methodology itself.

e. **ASCOPE.** ASCOPE is an additional analytical methodology consisting of six factors that should be considered when conducting JIPOE. ASCOPE is typically used in conjunction with the PMESII. ASCOPE is leveraged by the intelligence staff at any level to view the environment from the perspective of the populace. ASCOPE places emphasis on the cultural and human part of the environment. PMESII findings can be augmented with an ASCOPE-directed view of the same data, creating a more accurate and complete understanding of the OE. ASCOPE factors are:

(1) **Area:** Area factor includes: districts, market places, picnic areas, irrigation networks, parks, squares, cities, and rural areas.

(2) **Structure:** Structure factor includes: prisons, police headquarters, banks, churches, courts, roads, cell towers, municipal buildings, supermarkets, and tollbooths.

(3) **Capability:** Capability factor includes; dispute resolution, recruiting, access, means of justice, maintenance, financing, governance, policing, and disaster relief.

(4) **Organization:** Organization factor includes: government organizations (GOs), NGOs, HN forces, bankers, religious leaders, builders, and criminal organizations.

(5) **People:** People factor includes: governors, HN security forces, bankers, gangs, and contractors.

(6) **Event:** Event factor includes: elections, kinetic events, drought, weddings, funerals, and festivals.

f. The JIPOE analysts can use PMESII/ASCOPE for the identification and analysis of friendly, adversary, neutral, or other actors.   Understanding the changing interactions of these actors with each other and how their relationships and interdependencies change over time helps understand the OE.

g. **PMESII/ASCOPE Matrix.** Combining PMESII and ASCOPE into a PMESII/ASCOPE matrix helps to get an understanding of the OE centered on human networks. PMESII provides a strategic perspective on the OE whereas the ASCOPE is focused on the tactical perspective. The PMESII/ASCOPE matrix shown in figure 3.2 is populated with representative types of information based on the PMESII and ASCOPE factors.

	P Political	M Military	E Economic	S Social	I Information	I Infrastructure
A Areas	Areas - Political (District Boundary, Party affiliation areas)	Areas - Military (Coalition / LN bases, historic ambush/IED sites)	Areas - Economic (bazaars, shops, markets)	Areas - Social (parks and other meeting areas)	Areas -Information (Radio/TV/newspapers /where people gather for word-of-mouth)	Areas = Infrastructure (Irrigation networks, water tables, medical coverage)
S Structures	Structures - Political (town halls, government offices)	Structures - Military / Police (police HQ, Military HHQ locations)	Structures - Economic (banks, markets, storage facilities)	Structures - Social (Churches, restaurants, and/or bars)	Structures - Information (Cell / Radio / TV towers, print shops)	Structures - Infrastructure (roads, bridges, power lines, walls, dams)
C Capabilities	Capabilities - Political (Dispute resolution, Insurgent capabilities)	Capabilities - Military (security posture, strengths and weaknesses)	Capabilities - Economic (access to banks, ability to withstand natural disasters)	Capabilities - Social (Strength of local & national ties)	Capabilities - Info (Literacy rate, availability of media / phone service)	Capabilities - Infrastructure (Ability to build / maintain roads, walls, dams)
O Organizations	Organizations - Political (Political parties and other power brokers, UN.)	Organizations - Military (What units of military, police, insurgent are present)	Organizations - Economic (Banks, large land holders, big businesses)	Organizations - Social (tribes, clans, families, youth groups, NGOs /IGOs)	Organizations - Info (NEWS groups, influential people who pass word)	Organizations - Infrastructure (Government ministries, construction companies)
P People	People - Political (Governors, councils, elders)	People - Military (Leaders from coalition and insurgent forces)	People - Economic (Bankers, landholders, merchants)	People - Social (Religious leaders, influential families	People - Info (Media owners, mullahs, heads of powerful families)	People - Infrastructure Builders, contractors, development councils)
E Events	Events - Political (elections, council meetings)	Events - Military (lethal/nonlethal events, loss of leadership, operations, anniversaries)	Events - Economic (drought, harvest, business open/close)	Events - Social (holidays, weddings, religious days)	Events - Info (IO campaigns, project openings)	Events - Infrastructure (road / bridge construction, well digging, scheduled maintenance)

Figure 3.2 - PMESII/ASCOPE matrix.

3.3 CONDUCT A NETWORK ANALYSIS

a. Visualizing and describing the interaction between actors and their relationship to other nodes like regions, natural resources, municipalities, equipment, and software, contributes to a holistic view of the OE. A network perspective is based on a node-link analysis. This perspective helps the commander and staff visualize potential or actual strengths weaknesses, interdependencies key nodes and CoGs. This visualization along with other factors will contribute to the development and analysis of COAs.

To describe and to display how each actor interrelates with other actors by using a network perspective helps intelligence analysts to understand the OE in a more focused manner. The network perspective will make it easier to present the interrelationships of actors and is therefore a useful tool to provide better understanding to commanders and staffs as well
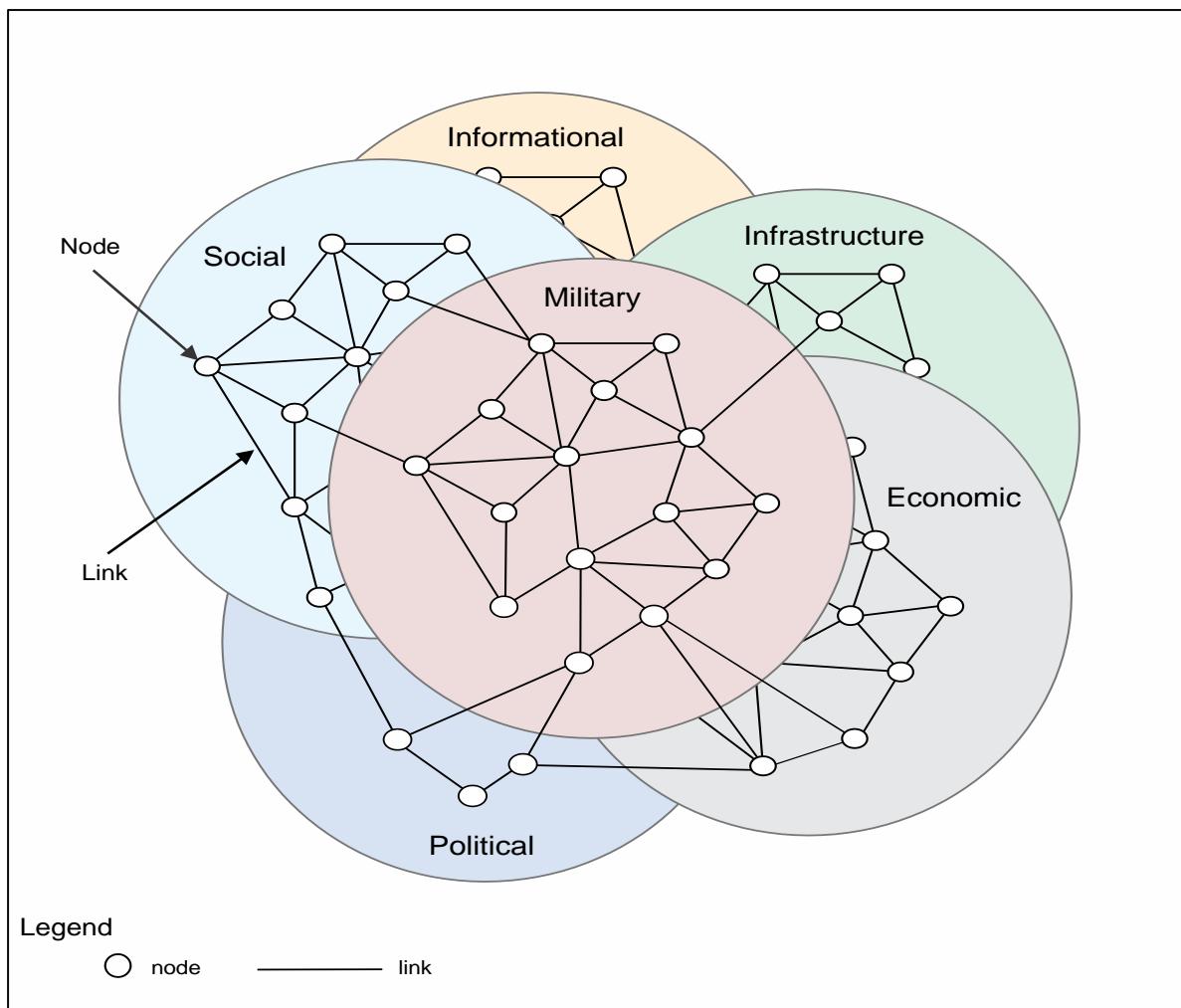
b. **Nodes and links.** A network within the OE consists of interconnected nodes and links.

(1) **Nodes.** Nodes represent the elements within a system that can be specifically targeted for action, such as people, organizations, governments, facilities,

rights-of-way, virtual locations, companies, natural resources, knowledge, municipalities, software, equipment, or law.

(2) **Links.** Links are the technical, human, social, functional, and organizational relationships between nodes, such as the command or supervisory arrangements that connect a superior to a subordinate; the relationship of a vehicle to a fuel source; or the ideology that connects a propagandist to a group of terrorists.
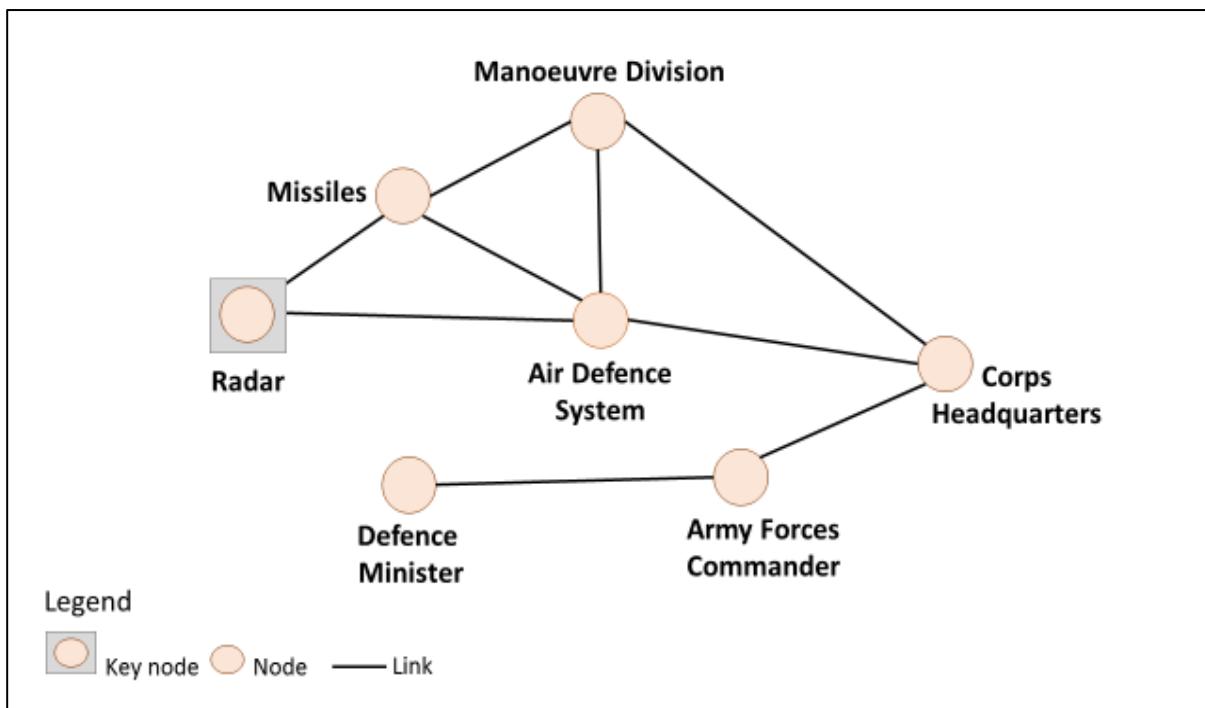
Nodes and links are symbolic representations meant to simplify the complexity of the real world. They are useful in identifying CoGs and behavioral patterns the commander may wish to influence or change. The links between the nodes are representative of the interdependencies that allow the network to work and behave in a specific way, both internally and towards other systems as shown in figure 3.3.

Related functional groupings of nodes and links have both horizontal and vertical aspects. Their relevance often depends on the required scale (breadth and depth) of the analysis as determined by the commander's needs. The OE in a specific operation can encompass an entire geographic region composed of many nation states. The network analysis would focus on factors and aspects relevant to the CCIRs and "drill down" to more detailed aspects of the PIRs, SIRs and EEIs as required. Nodes and links are not always relevant to the CCIRs. Analysts should develop their understanding in sufficient detail to decide between the relevant and irrelevant factors, aspects, nodes, and potential key nodes that are needed to satisfy the respective intelligence requirement.

Figure 3.3 - Network analysis of the OE

An example of an actor's air defence system with its relevant nodes and links is illustrated in figure 3.4. The air defence system and with its associated radar and missiles are linked to each other and to the divisions´ and corps headquarters by their role and ability to protect these nodes from air attack. If the system's radars are vulnerable to friendly anti-radiation missiles, then using this advantage to attack and destroy the air defence radars eliminates the electromagnetic relationship (link) between the radars and the air defence missile, degrading the air defence system's ability to function effectively. This reduces the level of air defence protection for the manoeuvre divisions and makes them more susceptible to attack. It may not be necessary to engage all nodes in the air defence system in order to degrade its primary function. In this example, analysts designate the air defence radars as a key node – a node that is critical to the functioning of the air defence system.

Figure 3.4 – Example of an actor's air defence system.

c. **Determine and Analyze Links between Nodes.** Links depict relationships, interdependencies, and directions of influence among nodes and are derived from collected and processed data, information and JISR results. The preferred tools to determine links between nodes include:

(1) Association Matrix
(2) Entity Matrix

The analyst should create an association matrix and subsequently develop an entity matrix. These tools will provide the input for the eventual development of a network analysis diagram. The benefit of graphically portraying node-link relationships is that the potential impact of actions directed against certain nodes can become more evident.

(1) **Association matrix.** An example of an association matrix shown in figure 3.5 enables the analyst to organize relationship data and characterize the links that exist (or are suspected to exist) among nodes. When constructing the association matrix, relevant nodes are plotted along a diagonal axis. An association between two nodes is indicated at the intersection of the horizontal and vertical axes and characterized as confirmed or suspected, depending on locally established criteria.
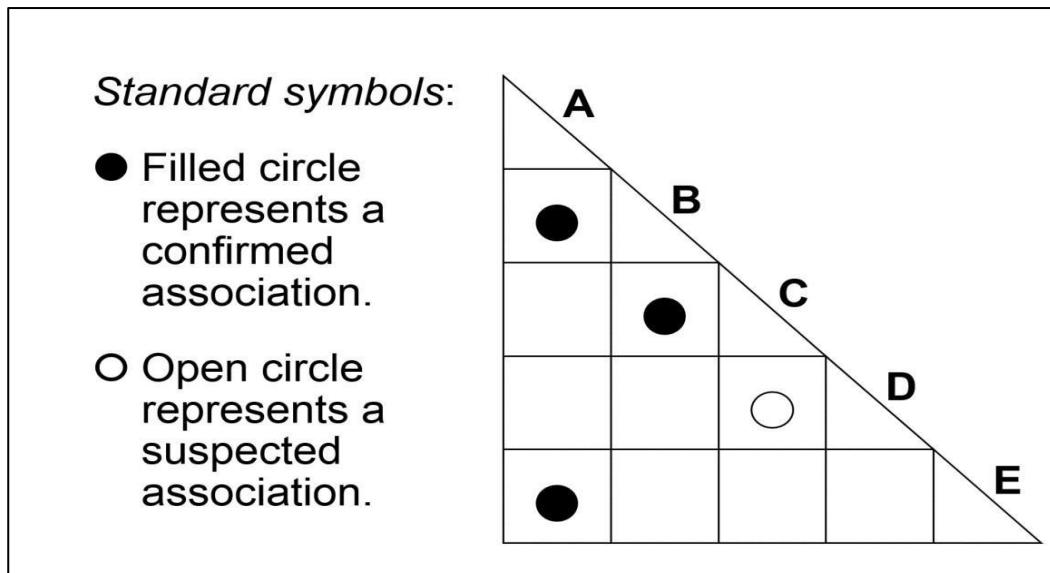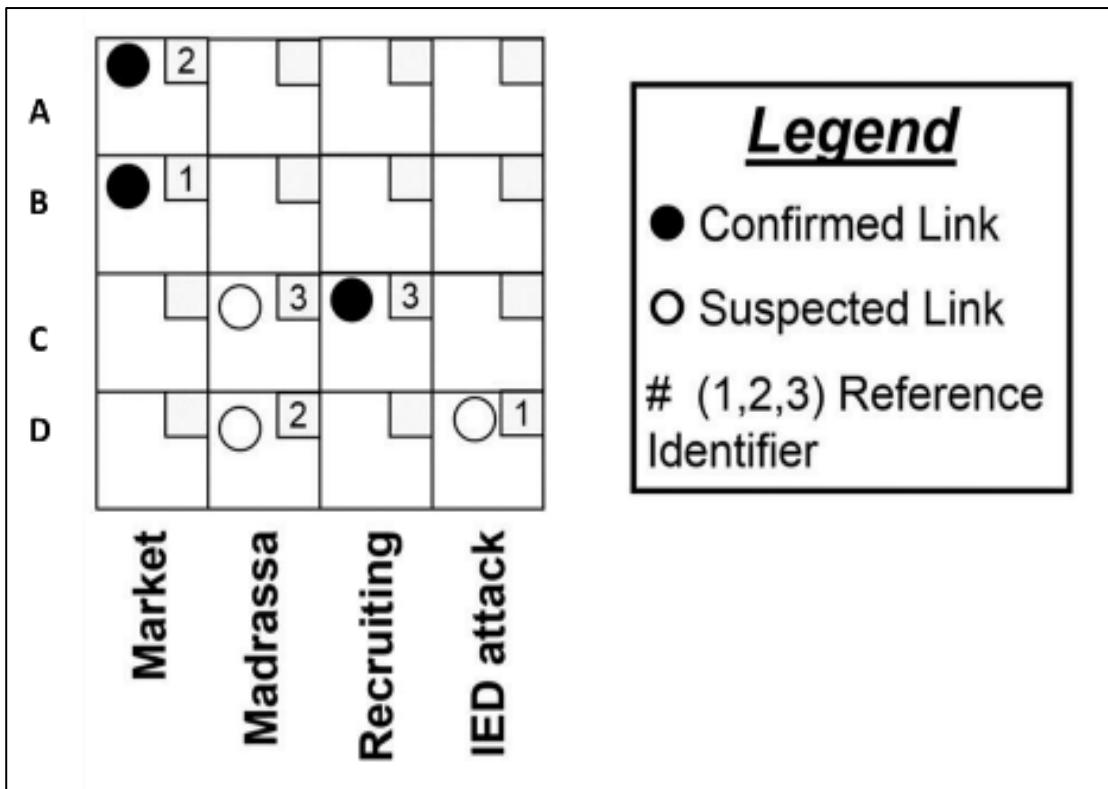
Figure 3.5 - Example of an association matrix.

The number and nature of links between a node and other nodes can indicate the importance of the node to the larger functional grouping. The strength or intensity of a single link also could be relevant to determining the importance of the functional relationship between nodes and the overall significance to the larger network. Therefore, both the number and strength of links to a node or set of nodes can be indicators of key nodes and a potential CoG. Due to the potential complexity of systems relationships, graphic visualization techniques such as association matrix facilitate network analysis.

(2) **Entity matrix.** The entity matrix graphically depicts relationships among a set of entities, which may be people, organizations, communities, or computers. These links, or relationships, are properties of the system and can represent several different forms of interaction, including kinship, role-based, interactive and affective relationships. Links typically represent directions of influence among nodes rather than a linear progression. An example of an entity matrix is depicted in figure 3.6.
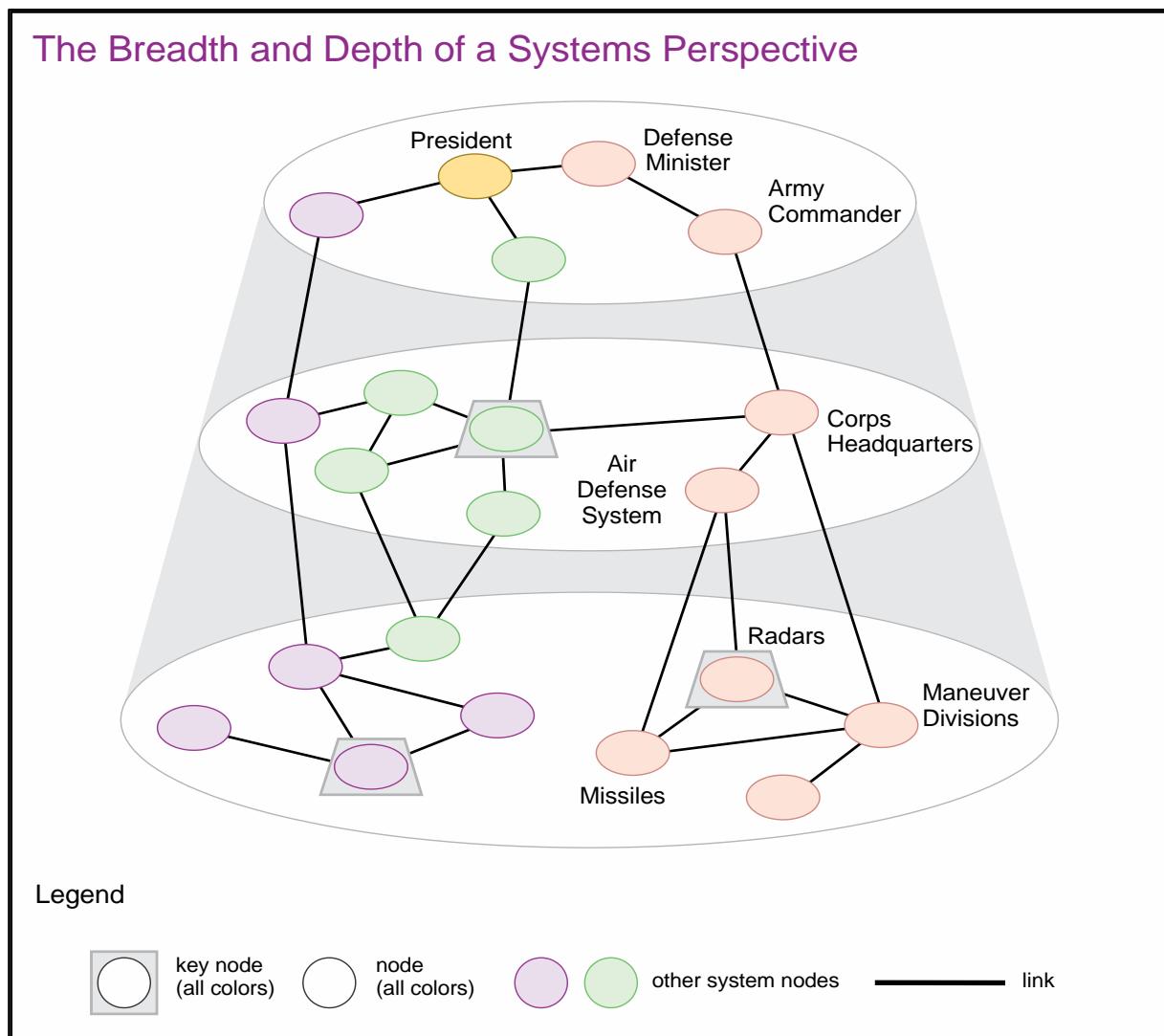
Figure 3.6 - Example of an entity matrix.

d. **Network analysis diagram.** Following the construction of the entity matrix, the JIPOE analyst can now prepare an initial draft of the network analysis diagram. Analysts will use the outcomes of the previous processes that have identified nodes and links to construct a chart similar to the one shown in figure 3.7. This example maps out the networks that have surfaced by grouping the related nodes and links. Confirmed groupings of nodes and links can now be identified as networks. Certain nodes may have links to more than one network.

General guidelines when constructing a network analysis diagram include:

(1) Nodes are represented by circles or ovals and color-coded to depict association with a specific network. The size of a node may vary to depict its relative centrality within the network if a determination can be made at this point.

(2) Links are represented by lines between nodes. Solid lines indicate confirmed relationships and dashed lines indicate suspected relationships. Arrows may be used to characterize the relationship (e.g., subordination, flow of information). To the extent possible, nodes and links should be positioned to minimize the crossing of links.

(3) If the number and strength of links to a node or set of nodes can be established the node could be designated as a key node in the potential CoG.

Figure 3.7 - Example of a network analysis diagram.

3.4   IDENTIFY KEY NODES WITHIN THE NETWORK
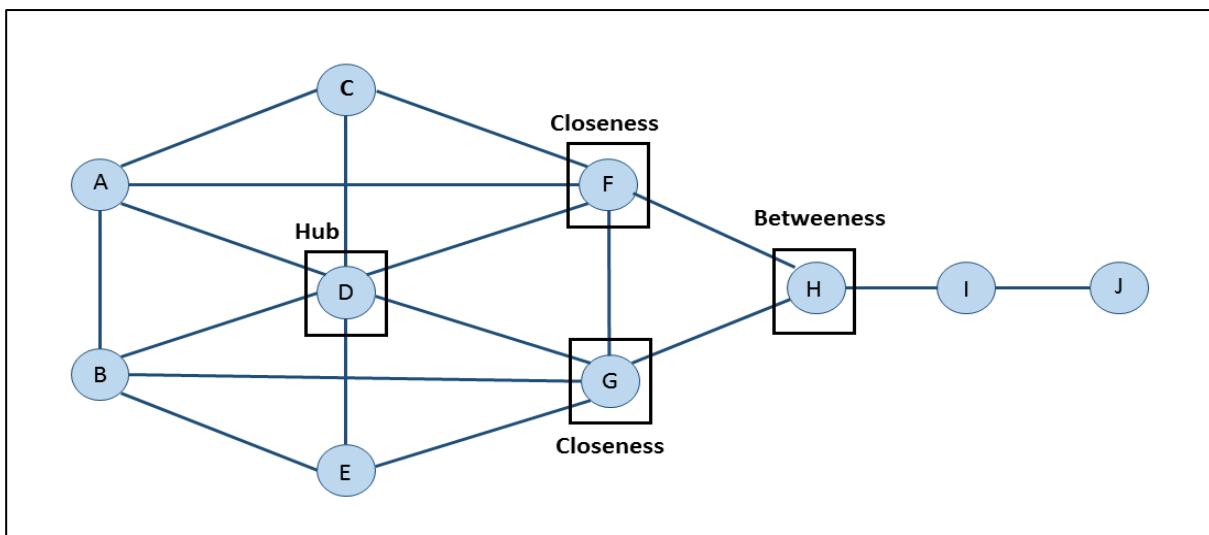
a. Key nodes exist in every major network and are critical to the functioning of their associated nodes. The identification of potential key nodes is facilitated through an analysis of node centrality (i.e., how individual entities fit within the network). Key nodes often are linked to, or resident in, multiple networks.   Weakening or eliminating a key node should cause its related group of nodes and links to function less effectively or not at all. Conversely, strengthening the same key node could enhance the performance of the network.

b. Node centrality can highlight possible positions of importance, influence, or prominence, and patterns of connections. A node's relative centrality is determined by analyzing three measurable characteristics:

   ▪ Degree.
   ▪ Closeness.

▪ Betweeness.

(1) **Degree.** The JIPOE analyst examines a node's centrality in terms of its direct links with other nodes (i.e., its local position in the network). As indicated in Figure 3-9, node D has the highest number of direct links to other nodes (high degree of centrality), and is an example of what may be termed a "Hub"[17]. A network centralized around a well-connected hub may be efficient but can fail abruptly if that hub is disabled or removed. In this example, node D likely would be designated a key node. Nodes with low-degree centrality (few direct links) are sometimes described as peripheral nodes (e.g., nodes I and J in figure 3.6). Although they have relatively low centrality scores, peripheral nodes can nevertheless play significant roles as resource gatherers or sources of fresh information from outside the main network.

(2) **Closeness.** The JIPOE analyst examines a node's overall position in a network. (i.e., its global position). The difference between degree and closeness is an important distinction because an individual entity may have many direct contacts, but those contacts may not be well connected to the network as a whole. Consequently, although an individual may have a high level of degree centrality, power and influence might only be exerted locally, not throughout the entire network. Closeness is calculated by adding the number of hops between a node and all others in a network (e.g., adding the number of hops from node A to node B, node A to node C, and node A to node D). A lower score indicates that an individual needs fewer hops to reach others in the network, and is therefore "closer" to others in the network. For example, nodes F and G in Figure 3.8 have fewer direct links than node D, but have shorter paths to the other nodes. Nodes with high closeness centrality are in excellent positions to monitor the overall activity flow within the network.

(3) **Betweeness.** Analysts measure the number of times a node lies along the shortest path between two others. For exchange of information or services, a node with high betweeness may serve as an intermediary. For example, in Figure 3.8, node H would occupy one of the most important locations in the network by serving as the only link between nodes I, J, and the remainder of the network. Node H is an example of a broker node and (assuming nodes I and J were sufficiently important to the network as a whole) it might also be designated as a key node. The elimination of an intermediary node can fragment a network into several subcomponents.

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[17] A "hub" refers to a node that has the highest number of direct links to other nodes.
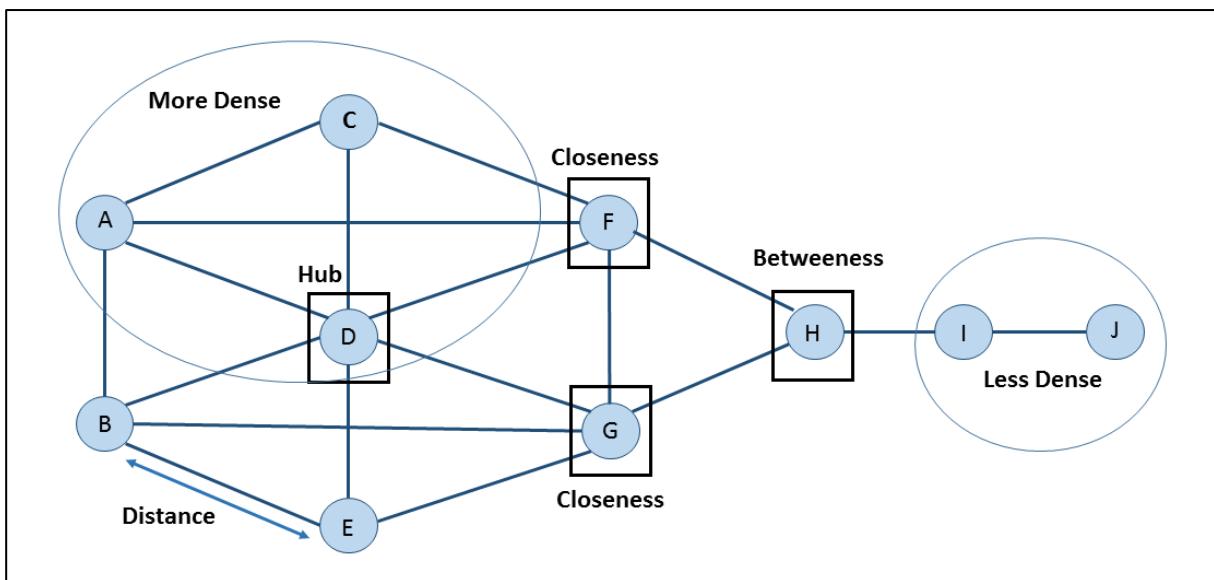
Figure 3.8 - Measures of node centrality.

3.5   EVALUATE THE IMPACT OF THE NETWORK ANALYSIS ON OPERATIONS

Network analysis facilitates the identification of significant information about a group of entities and their interactions with others that might otherwise go unnoticed. For example, a network analysis can uncover positions of power within a network, show the basic subgroups that account for a network's structure, find individuals or groups whose removal would greatly alter the network, and measure network change over time. The impact of a network is evaluated in terms of network density and distance as illustrated in Figure 3.9.
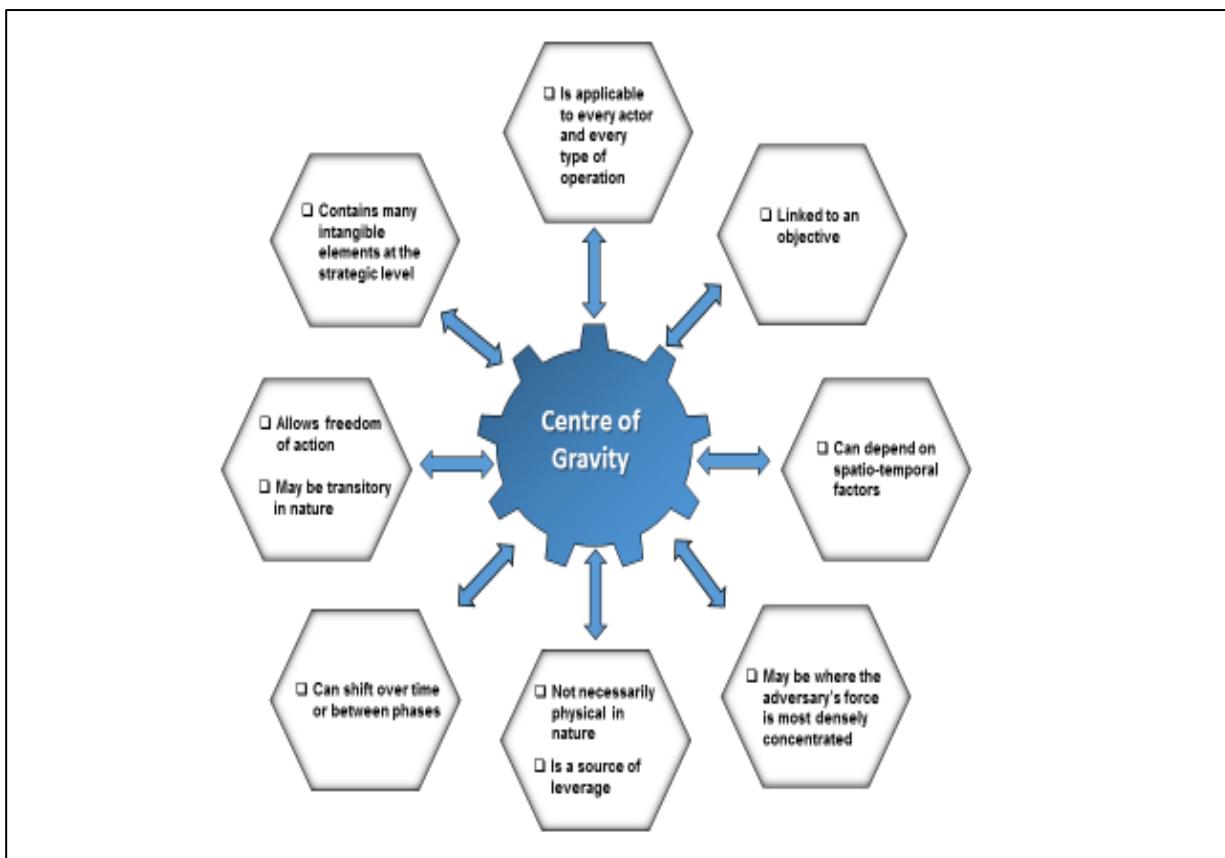
(1) **Density**. Network density examines how well connected a network is by comparing the number of ties actually present in a network to the total number of ties possible. When a network is highly interconnected, fewer constraints exist for the individuals within it. A network with low interconnectivity may indicate that there are clear divisions within a network or that the distribution of power or information is highly uneven and tightly controlled.

(2) **Distance**. Network distance measures the number of hops between any two nodes in a network. Evaluating network distance aids in understanding how information and influence flow through a network and determining a network's cohesiveness. Larger distances can inhibit the dissemination of information because each hop diminishes the probability of successful interaction. In political, social, and possibly military networks, larger distances may also decrease the ability of individuals to influence others.
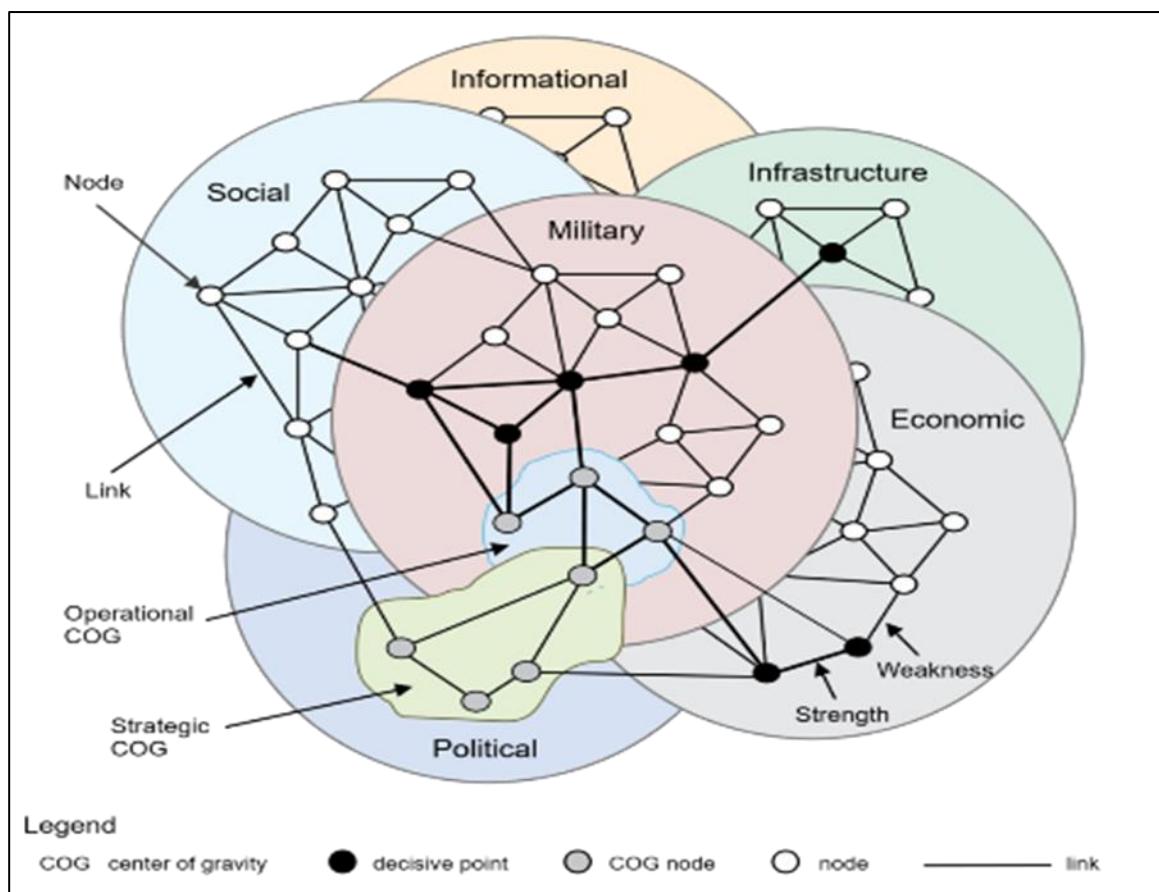
Figure 3.9 - Measures of node centrality with density/distance factors.

3.6   DETERMINE CENTRES OF GRAVITY AND DECISIVE CONDITIONS

a. Based on the network analysis completed earlier in the JIPOE process, JIPOE analysts are able to identify the actor's CoGs. A CoG is the actor's source of power and is essential for an actor's ability to influence the OE. The actor relies on it for resources, recruiting, support, freedom of action and movement, continued will power, and moral justification. If the CoG is under pressure or damaged by another actor, the entire network will be affected. A CoG is always linked to the actor's objective.   If, at some point, the actor's objective changes, the CoG does not necessarily change as well. Taking away an actor's access to a CoG or impeding the function of a CoG will always affect the network. However, a resilient actor may be able to revert to a different source of power once the original identified CoG is no longer available or effective.

b. Analysts continuously assess characteristics to determine from which elements the actor derives freedom of action, physical strength or the will to fight. The various characteristics associated with an actor's CoG are outlined in figure 3.10.

Figure 3.10 - Characteristics of a CoG.
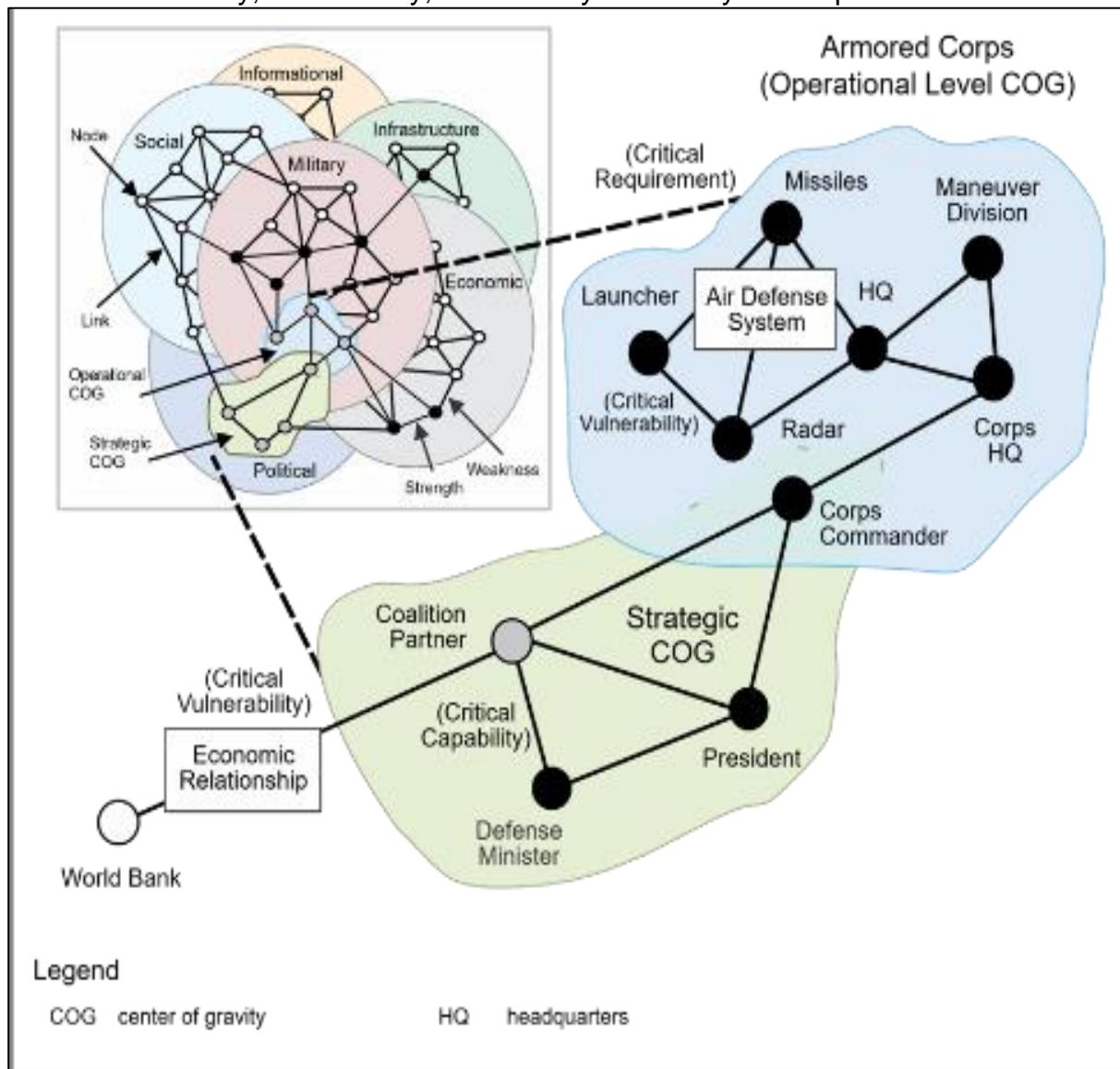
c. The most effective method for analysts to identify an actor's CoGs is to visualize related nodes in different networks. For example, the leader of an adversary nation could be a CoG in the military and political network as well as a key node in the nation's social network. Analysts also can visualize a CoG as a combination of nodes and links to analyse what elements within this network protect, sustain, integrate, or enable its various elements or components. In this context, a CoG might be composed of nodes and links entirely within a single network. A CoG can also be composed of a set nodes and links that might encompass key nodes of one or more networks with decisive points as illustrated in Figure 3.11.

Figure 3.11- Network analysis with CoGs.

d. A CoG typically will not be a single node in the system, but will consist of a set of nodes and their respective links. However, a single node might be considered a CoG as an exception. For example, when the adversary senior military leader is also the political leader and the nature of the adversary's political and military systems is such that the leader's demise would cause support for the conflict by other leaders in these systems to collapse.

e. A proper analysis of an actor's critical factors must be based on the best available knowledge of how actors organize, fight, think, make decisions, and on their physical and psychological strengths and weaknesses. Analysts must understand an actor's capabilities and vulnerabilities, and factors that might influence an actor to abandon or change strategic objectives. Analysts must also envision how friendly forces and actions appear from the actor's viewpoint. Otherwise, analyst may ascribe to actors particular attitudes, values, and reactions that mirror their own.

f. The JIPOE analyst determines an actor's CoGs based on the three factors: critical capabilities; critical requirements; and critical vulnerabilities.

(1) **Critical capabilities** are those abilities that are considered crucial enablers for a CoG to function and are essential to the accomplishment of the actor's specified or assumed objective(s).

(2) **Critical requirements** are the conditions, resources, and means that enable a critical capability to become fully operational.

(3) **Critical vulnerabilities** are those aspects or components of critical requirements that are deficient, or vulnerable to direct or indirect attack in a manner achieving decisive or significant results. However, in identifying critical vulnerabilities, analysts must also compare their criticality with their accessibility, vulnerability, redundancy and ability to recuperate.

Figure 3.12 - Critical Factors Analysis.

g. Analysts use a network perspective to identify the critical factors associated with each actor's CoG. The critical capabilities, critical requirements, and critical

vulnerabilities that are associated with two of the actor's CoGs is illustrated in Figure 3.12.

h. **Decisive condition.** A decisive condition is a combination of circumstances, effects, or a specific key event, critical factor, or function that when achieved allows actors to gain a marked advantage over an opponent or contribute materially to achieving an objective. This can greatly influence the outcome of an action. Decisive conditions can be physical in nature such as: gaining access to a constricted sea lane; a hill; a town; an adversary's weapons of mass destruction (WMD) or chemical, biological, radiological, and nuclear (CBRN) capabilities; or an air base. They could include other elements such as command posts, critical land borders, airspace, or communications and/or intelligence nodes. In some cases, specific key events also may be decisive conditions, such as attainment of air or maritime superiority, commitment of the adversary's reserve, or the opening of a supply route during humanitarian operations.

(1) The most important decisive condition can be determined from analysis of critical factors. As part of the node-link network analysis, understanding a CoG's critical capabilities, requirements, and vulnerabilities can reveal decisive conditions.

(2) analysts should identify and study potential decisive conditions and determine which of them offer the best opportunity to influence the actor's CoGs.

3.7 DESCRIBE THE CURRENT SITUATION

a. The current situation provides an understanding of the present context, including all actors and all PMESII factors of the OE. At the operational level, it will consist of several displays and descriptions of all relevant perspectives of each actor, including desired end states, modus operandi, capacities, support and training level and all other relevant OE-elements, to include the impact of politics, social and economic considerations. Intelligence processing (collation, evaluation, analysis, integration, interpretation)[18] is done to extract relevant information to explain the current situation, its dynamic, and changes from the historic situation. The analyst will need to consider the following factors in assessing the current situation of the actors:

- Composition
- Disposition
- Capabilities
- TTPs
- Logistics
- Combat effectiveness
- C2 systems
- Personalities
- Potential COAs

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[18] See AIntP-18.

b. Additional information and data that may contribute to the current situational awareness to include:

- Ideology
- Safe havens
- Freedom of movement
- Intelligence
- Finance
- Social/culture
- Support

c. **Current situation overlay.** Current information pertaining to the composition and disposition of actors will be maintained on the intelligence staff's current situation overlay. In some situations, when dealing with asymmetric threats, traditional enemy-overlays may not be sufficient. Current situation overlays should be tailored to the unique characteristics and circumstances as it relates to the factors.

3.8 ASSESS ACTOR CAPABILITIES AND VULNERABILITIES

a. **Actor Capabilities.** Actor capabilities are expressed in terms of the broad COAs and supporting operations that the actor can take to interfere with the accomplishment of the mission. In conventional operations, these broad actions are generally defined as offense, defence, reinforcement, and retrograde. Each of these broad COAs may be divided into a variety of more specific COAs. Actors' capabilities are determined by comparing the current situation with each of the hypotheses for alternative futures already constructed. When time or some other factor is assessed to be a critical element in an actors' capability, it should be explicitly stated in the overall capability statement.

b. **Actor Vulnerabilities.** Actors' capabilities that fall short of requirements reflected in previous patterns of operation or doctrine should be identified as vulnerabilities, while capabilities that meet or exceed requirements are listed as strengths.

c. The intelligence staff should disseminate the presentations and assessments on actor capabilities, strengths, and weaknesses to the other staff elements as soon as possible. The joint intelligence estimate is the appropriate mechanism for disseminating this type of evaluation. However, in order to facilitate operational planning, the evaluation may be disseminated by any means and in any form deemed appropriate by the commander.

3.9 JIPOE METHODS AND TOOLS
Methods and tools used by the JIPOE analyst during step two are used as a basis for further processing in step three. Methods and tools that are typically associated with step 2 of the JIPOE process may include:

- Nodes and links diagram

- PMESII/ASCOPE matrix
- Association matrix
- Entity matrix
- Network analysis diagram
- Measures of node centrality diagram
- Measures of node centrality including density/distance diagram
- CoG analysis
- Network analysis with CoGs
- Analyzing critical factors

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CHAPTER 4 DEVELOP AND EVALUATE ACTOR COURSES OF ACTION

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4.1 OVERVIEW

The third step of the JIPOE process builds on steps one and two to develop a detailed understanding of the actors' and other relevant actors' probable intent and future strategy. Step three provides a methodology to determine, evaluate and prioritize a set of potential COAs in order to identify the COA the actor is most likely to adopt.   During this step, analysts will initiate new intelligence collection requirements that will provide indications as to which COA the actor has adopted
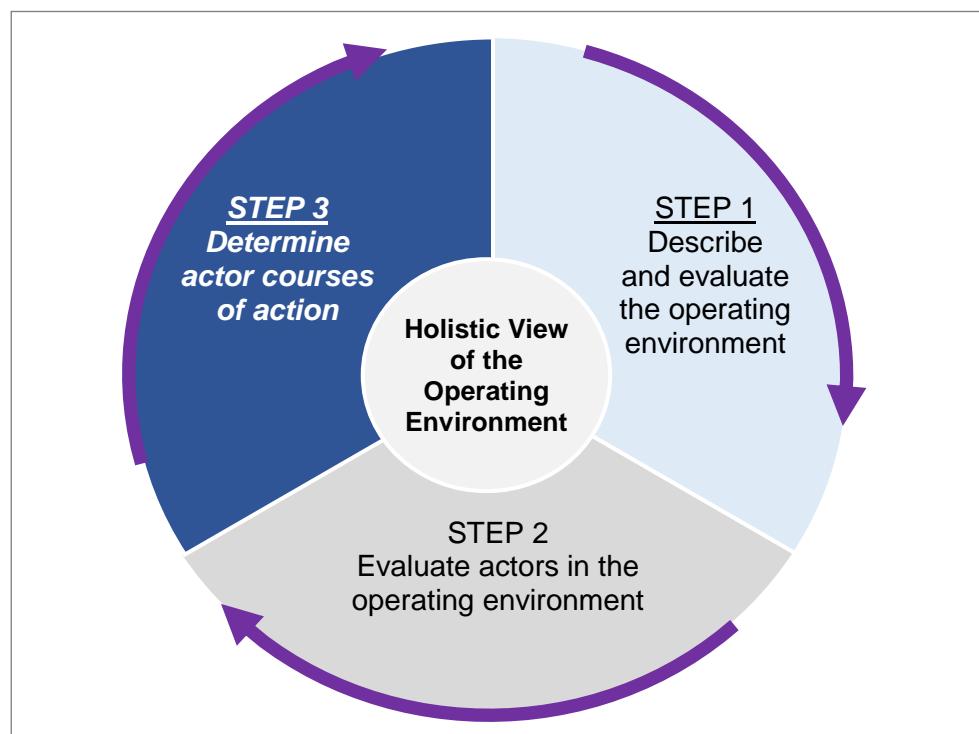
Figure 4.1 - JIPOE Step 3.

4.2 IDENTIFY ACTOR END STATES, STRATEGY AND OBJECTIVES

The likely objectives and desired end state of the actor are identified by analysing the current situation with regard to PMESII factors, capabilities, sociocultural characteristics and potential interaction with other relevant actors. Each COA will lead towards an end state beneficial to the actor. The JIPOE should identify likely objectives for all actors capable of influencing force protection and mission accomplishment. If information is insufficient to confirm actor objectives, the analyst will propose likely actor objectives and identify them as assumptions[19] in order to continue with the process. Military objectives and military means to ends may not

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[19] Initiating new IRs will be considered to confirm or disprove the assumptions.

be the appropriate filters to assess actor objectives and end states. Information dominance, electoral gain, financial or criminal gain, may also be reached through non-military means.

4.3 DEVELOP POTENTIAL COURSES OF ACTION[20]

a. **COA Criteria.** During this step, a consolidated list of all potential COAs is constructed. At a minimum, this will include the most likely and the most dangerous COA that the actor's doctrine or behavioural pattern of activities indicate are appropriate to the current situation and accomplishment of objectives. This set should further include all COAs that could significantly influence the friendly mission, as well as all COAs indicated by recent activities or events. Each identified COA should meet the following criteria:

(1) **Suitability.** A COA must have the potential to achieve the actor's likely objective or attain the desired end state given the current situation in the JOA.

(2) **Feasibility.** The actor 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 actor may take to overcome shortfalls are considered.[21]

(3) **Acceptability.** The amount of risk associated with the COA should not exceed the level of risk acceptable to the actor. The analyst should determine the actor's level of risk acceptance by analysing aspects such as: past actor activity, current capabilities, interactions amongst actors relevant to the COA, and psychological profiles of leadership.[22]

(4) **Exclusivity.** Each COA must be significantly different from the others; otherwise it would be considered a variation rather than a distinctly different COA. Factors contributing to the uniqueness of a COA may include its effect on the friendly COA, use of reserves, location of the main effort, scheme of manoeuvre, and use of aspects of the information environment, as well as the human environment.

(5) **Consistency.** The COA should be consistent with the actor's doctrine, previous behavioural patterns and observed practices and activities. Analysts should exercise caution to guard against an actor's attempt to achieve surprise through deception. However, the availability of new technology or an act of desperation

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[20] For further detail on the course of action development process see Allied Joint Doctrine for Operational-level planning (AJP -5)

[21] For example, an actor may make up for insufficient force ratios by conducting an economy of force operation in another sector. Analysis should anticipate innovative or seemingly radical measures the actor may adopt.

[22] In some instances an opponent may be willing to tolerate a higher level of risk than normal, particularly if a risky COA is the only means of accomplishing the objective.

may also drive an actor to deviate from past doctrine or previous activities. The challenge for the analyst is to anticipate these occurrences.

b. **COA Refinement.** Each COA is refined into more specific and detailed COAs by adding details such as the timing, phasing, sequence of activities, main and supporting efforts, and decisive conditions. Factors that may lead to the adoption of "wildcard" COAs should be considered. These factors may include:

(1) The actor's perception of friendly force capabilities, vulnerabilities, dispositions, and intentions, and an actor's sense of urgency.

(2) Immature decision-making processes. The actor's decision process could be based on incomplete information, unprofessional leadership behaviour, infighting or desperation.

(3) Other actors' actions and reactions within the OE that could affect the actor's decision-making and capabilities.

(4) Potential actor's purposeful use of misinformation to influence friendly assessment and COAs.

4.4 EVALUATE AND PRIORITIZE EACH COURSE OF ACTION

COA evaluation. The refined set of COAs is then evaluated and ranked according to the likely order of adoption. The purpose of the prioritized list is to provide commanders and their staffs with a starting point for the development of a plan that takes into consideration the most likely COA as well as the COAs that would otherwise significantly jeopardize force protection or mission accomplishment.

a. COAs are estimates of an actor's intentions. The actions associated with a friendly COA may cause the actor to adapt a specific COA or change to a different COA all together. Therefore, the actor's reaction to changes in friendly force behaviour as well as relevant actors' actions should be continuously collected on and analysed to determine if the actor has altered a COA. This, in turn, may require a reprioritisation of the initial list of COAs and result in the staff developing branch plans. Analysts should guard against analytical bias and mirror imaging to accept abnormal levels and types of actor activity as normal. In addition, analysts should identify and focus in greater detail on those actor preparations not yet completed that are essential to conduct a specific COA.

b. During COA development the analyst should be constantly on guard against possible actor deception efforts. The actor may deliberately adopt a less than optimal COA in order to maximize surprise. Additionally, the actor may gradually increase preparations for a specific COA over a lengthy period of time, thereby psychologically conditioning all other actors in the OE to accept a level and type of activity, previously considered to be abnormal, as a new norm.

c. Finally, the analyst should understand that the actor's information/intelligence capabilities may not present the same picture of the OE to the actor. This can be in part due to a difference in the dataset or due to cultural norming, training and education in a completely different manner.

d. **COA prioritization.** At this point in the JIPOE process, the following criteria should be used to rank the actor COAs on a scale of likelihood to occur:

   (1) Analyse each COA to identify its strengths and weaknesses, CoGs, and decisive conditions.

   (2) Evaluate how well each COA meets the criteria of suitability, feasibility, acceptability, exclusiveness, and completeness. The analyst should consider these criteria in the context of the actor's culture and mind set.

   (3) Compare each COA and determine which one offers the greatest advantages to the actor while minimizing risk to one's own or affiliated capabilities.

   (4) Consider the possibility that the actor may choose the second or third most likely COA while attempting a deception operation portraying adoption of the best COA. Aim to distinguish on this option by focusing on adoption of COAs best suited to the actor's tactics, techniques and procedures.

   (5) Analyse the actor's current dispositions and recent activity to determine if there are indications that one of the COAs has already been adopted.

4.5 ANALYSE EACH COURSE OF ACTION

a. Each COA should be developed in the order of its probability of adoption and should include the following JIPOE components:

   - Situation template
   - Description of the COA
   - High value target (HVT) list

b. **COA development task 1: Develop a situation template.** Situation templates are graphic depictions of expected actor resource dispositions at a specific time and place relative to the COA. A situation template is a snapshot in time capturing the actor's resource disposition based on the actor's own beliefs, perceptions and capabilities as well as those of other actors. A situation template for a specific COA is constructed by integrating a geospatial perspective situation template (see figure 4.2) along with a network perspective situation template (see figure 4.3).
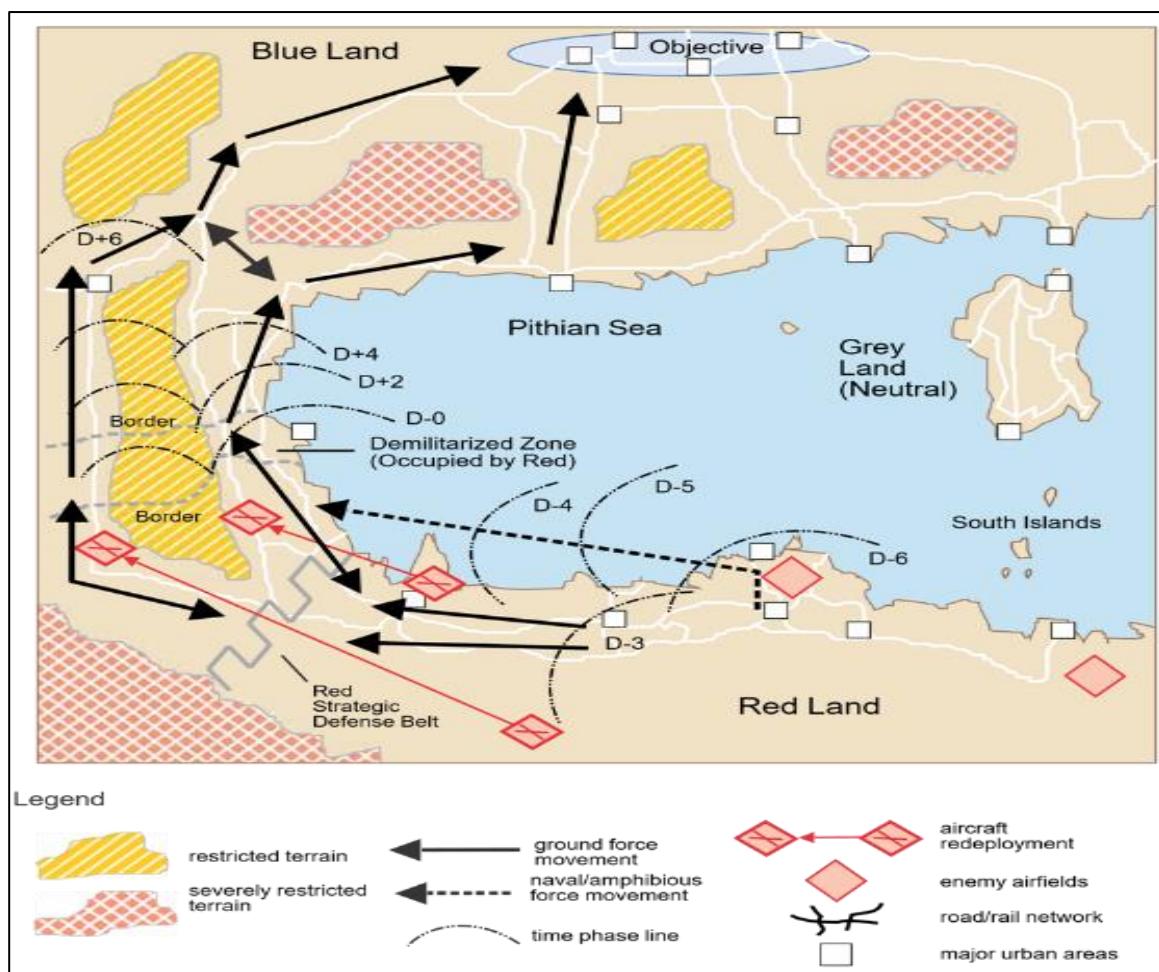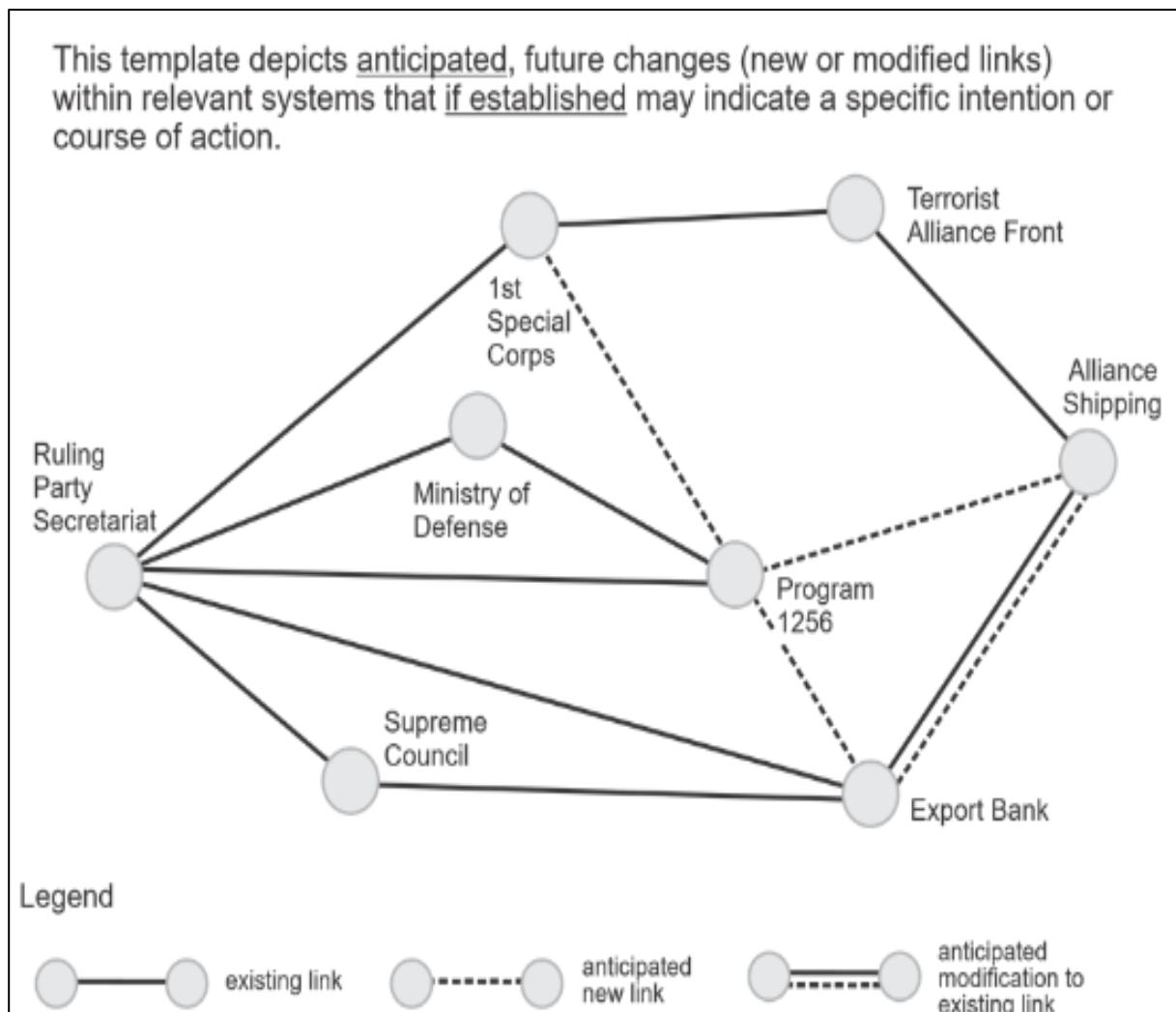
Figure 4.2 – Example of geospatial perspective situation template.
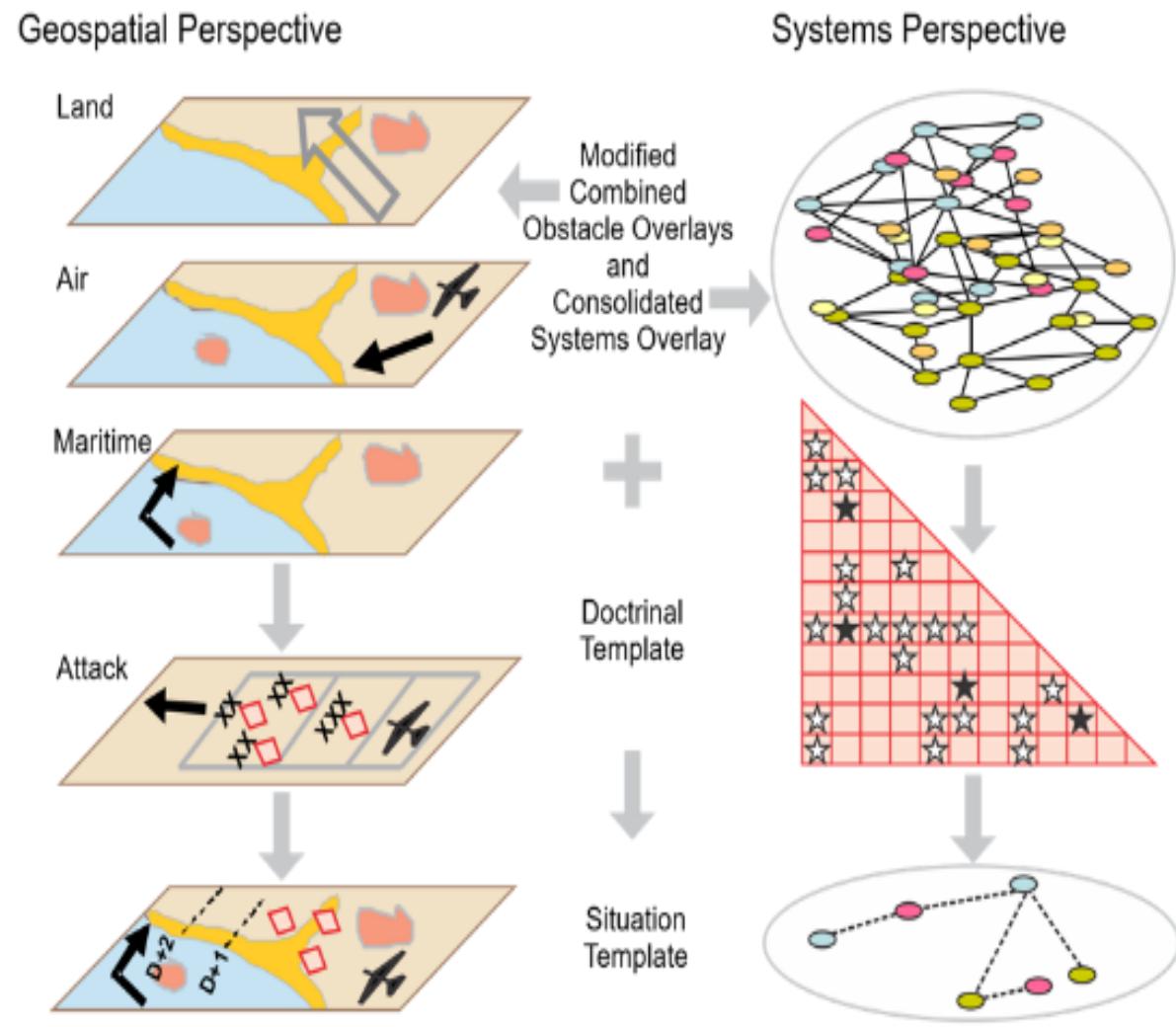
(1) **Geospatial perspective situation template.** Based on the actor's behavioural patterns, the analyst can depict the actor's dispositions on the geospatial perspective situation template to account for the impact of the OE.

(2) **Network perspective situation template.** In developing this template, the analyst needs to start with positioning the actor within a system perspective. The next step is to extract from the consolidated systems overlay the parts of the system that are relevant to the COA. This then delivers the modified association matrix for a specific COA. Based on the nature of the relationships between the actor and other nodes, as depicted by the node-links analysis, the analyst can then plot the anticipated node-link changes on a network perspective situation template.

This template depicts <u>anticipated</u>, future changes (new or modified links) within relevant systems that <u>if established</u> may indicate a specific intention or course of action.

Terrorist Alliance Front

1st Special Corps

Alliance Shipping

Ruling Party Secretariat

Ministry of Defense

Program 1256

Supreme Council

Export Bank

Legend

existing link

anticipated new link

anticipated modification to existing link

Figure 4.3 - Example of a network perspective situation template.

(3) **Constructing a situation template.** A situation template is constructed by combining a geospatial perspective situation template, a systems perspective situation template, and a doctrinal template. The situation template consolidates the geospatial and systems perspectives relative to a specific COA. The right hand column of Figure 4.4 depicts how to build a situation template from a systems perspective. The left hand column shows how to construct a situation template for an operation from a geospatial perspective that is based on a series of modified combined obstacle overlays depicting the actor's preferred tactics. Geospatial specialists will assist this process with their GIS-systems and knowledge.

The modified combined obstacle overlays and consolidated systems overlay are integrated with a doctrinal template to form a situation template unique to a specific course of action.

Geospatial Perspective | Systems Perspective

Land

Air

Maritime

Modified Combined Obstacle Overlays and Consolidated Systems Overlay

Attack

Doctrinal Template

Situation Template

Figure 4.4 – Constructing a situation template for a specific COA.

(4) **Constructing a situation matrix.** In addition to a graphically based situation template (Figure 4.4), a situation matrix can be constructed to clearly delineate the phasing, groupings and sequencing of numerous activities. Constructing a situation matrix is not exclusive to military actors and will help to bring across the intentions and activities of any actor to the commander and planning staff. The situation matrix will also help highlight where decisions need to be made by the actor. An example of a situation matrix is illustrated in figure 4.5.

Type Operation	Time								
	D-7	D-6	D-5	D-4	D-3	D-2	D-1	D	D+1
Air	4354th and 4326 Air Wings deploy to demilitarized zone [DMZ] South Airfield.								
				12th Mobile Missile Brigade deploys to alternate positions.					
Maritime		2/3 of Red Fleet redeploys to temporary DMZ naval facility.			Red Fleet screens maritime approaches to DMZ.		Red Fleet commences sea denial operations in the West Pithian Sea.		
Ground	Improvements to transportation infrastructure in DMZ.								
				4th, 5th, 18th Mech Corps move to DMZ.					
Space	Space Launch Vehicle-III with co-orbital antisatellite (ASAT) erected at Launch Site 34 at Red Land Space and Missile Center.						ASAT launch		
Electronic Warfare	430th Radio Brigade continues to jam Radio Free Pithia broadcasts.					430th Radio Brigade commences jamming activity against Blue DMZ units.			
Cyberspace	Virus attacks against Blue Land logistic systems.								
					Red Land implements new systems security procedures.				

Figure 4.5 - Example of a situation matrix.

c. **COA development task 2: Describe the COA.** Each COA includes a description of the expected activities of the actor depicted on the situation template. This will usually consist of a description that addresses the timings of the COA, location of the main effort, supporting operations, and phase lines associated with the specific COA. The assumed critical decisions that the actor will make during the implementation of the COA are described in terms of their location in time and space or on the conditions that need to be in place for a decision to be required (decision points). A detailed description for each COA should include:
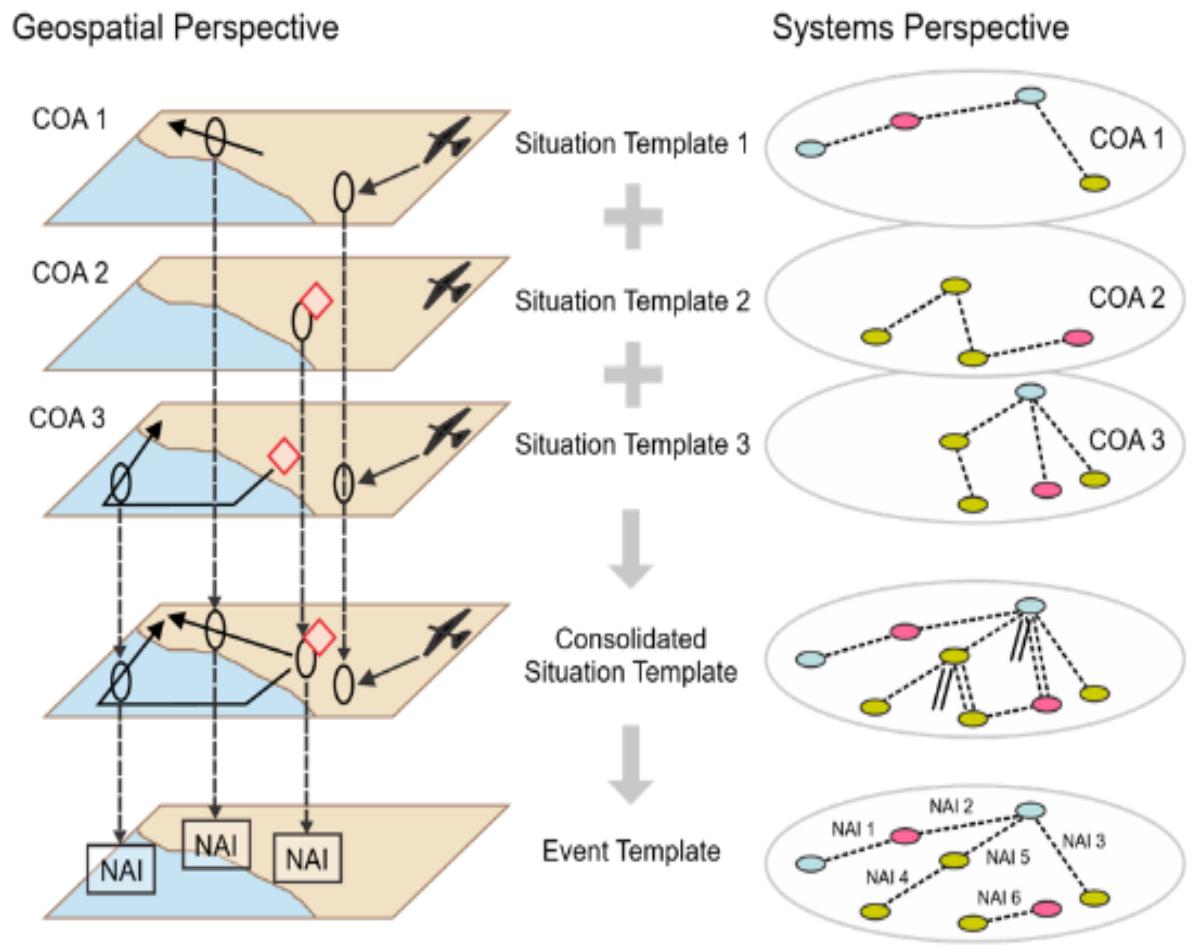
- Objectives leading to the desired end state;
- Scheme of manoeuvre and disposition of resources and capabilities;
- Type and location of activity; and the

- ▪ Assessed time activities will commence.

d. **COA development task 3: Identify HVTs relative to the COA.** An HVT is a target identified as critical to an actor or organization for achieving its goal. The decisive conditions identified during CoG analysis, and the HVTs associated with the COA, should be refined and re-evaluated. The relative worth of each HVT may vary depending on the specific situation or moment in time and over the duration of the COA's execution. HVTs can be annotated on the situation template or maintained on a separate list and overlay.

4.6 DEVELOP INTELLIGENCE REQUIREMENTS AND COLLECTION STRATEGIES
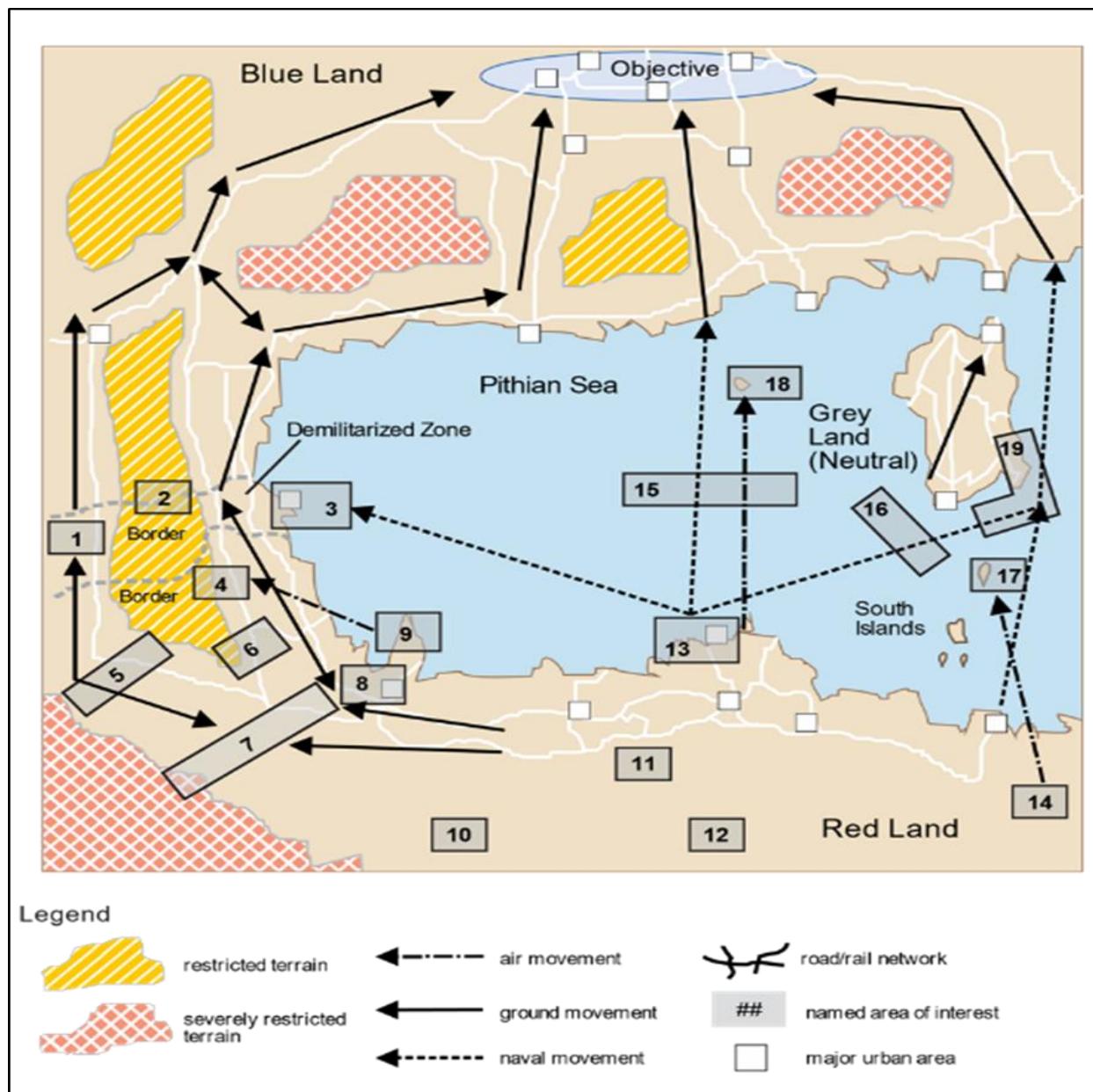
a. To drive the JIPOE process, analysts must be able to process newly acquired information on a continual basis. The identification of intelligence requirements, based on the COAs, is closely linked to the timings, locations and detectable events and activities that reveal which COA the actor has adopted.

b. To satisfy information requirements to include essential elements of information, analysts must also identify indicators that could fill a gap in the command's knowledge of the adversary activities and other relevant aspects of the OE. The ability to focus the optimal employment of available collection capabilities against indicators of activity occurring throughout the OE relies heavily on predictive assessments. Anticipated locations where indicators of events and activities are likely to be detected are portrayed as NAIs. An NAI can be a specific point, route, area, or network node or link. In case the expected indicator(s) of a particular COA cannot be plotted on a map, the analyst should provide the timings or conditions under which it can be observed.

c. The NAIs and their associated indicators can be depicted on an:

(1) event template and an

(2) event matrix

d. **The event template.** The event template is a graphical appreciation that is developed by comparing the analyses depicted on the situation templates (both geospatial and from a systems perspective) for each of the COAs that the actor is capable of executing. The purpose of this comparison is to identify those NAIs that are unique to the adoption of a specific COA or a limited set of COAs. Conversely, those areas, events and activities that are common to all COAs are eliminated from consideration because they do not differentiate the adoption of one COA over another.

The situation templates for each course of action (COA) are combined into a consolidated situation template. Events/links that are common to more than one COA are eliminated. The remaining events/links should be unique to a specific COA and are designated as named areas of interest (NAIs).

Geospatial Perspective

Systems Perspective

Figure 4.6 - Constructing an event template.

Once the NAIs are identified for all the COAs, they can be consolidated and depicted on the event template. NAIs can match obvious geographic features or arbitrary features such as timed phase lines or engagement areas. They should be large enough to encompass the geospatial activity or network link that serves as the indicator of the actor's COA. An example of an event template is illustrated in Figure 4.7 where the analyst has identified 19 NAIs in the OE.

Figure 4.7- Example of an event template.

e. **The event matrix.** 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 COAs with which the activity is associated.

f. **Wargaming and developing a commander's decision support template.** Wargaming is the preferred means to foresee the action, reaction, and counteraction dynamics between friendly and adversary COAs. It may also reveal gaps in understanding the adversary and other relevant aspects of the OE that help to refine information requirements. Wargaming provides an opportunity to test the validity of an actor's CoGs that were identified by the JIPOE analyst in step 2 of the JIPOE process. Actions taken against the actor's CoGs during the wargame should

cause a change in the COA. If this does not occur, the JIPOE analyst may need to revise the CoGs and critical factors analysis.

NAI	Event	Time		Indicate COA
		Earliest	Latest	
1	Laying of minefields and construction of obstacles in depth in the demilitarized zone (DMZ).	D-10	D-0	Defend
2	Improvements to transportation infrastructure in northern DMZ.	D-10	D-1	Attack (in West)
3	Presence of additional surface combatants and minelayers at DMZ port.	D-7	D-3	Reinforce
4	Deployment of additional combat aircraft at forward airfield.	D-7	D-1	Reinforce
5	Northward movement of red corps size force.	D-3	D-1	Attack (in West)
6	Northern movement of two more corps.	D-3	D-1	Attack (in West)
7	Occupation of red strategic defence belt by second echelon units.	D-2	D-1	Retrograde
8	Presence of red surface combatants and minelayers.	D-3	D-1	Retrograde
9	Deployment of additional combat aircraft near red strategic defence belt.	D-7	D-1	Retrograde
10	Departure of mobile missile units from garrison and local dispersal areas.	D-3	D-1	Attack
11	Concentration of additional aircraft at rear airfield.	D-2	D-1	Defend
12	Presence of intermediate-range ballistic missiles on or near launch pad.	D-3	D-1	Attack
13	Departure of surface combatants and amphibious support ships from port.	D-6	D-4	Attack
14	Concentration of additional combat aircraft.	D-2	D-1	Defend
15	Northward transit of amphibious task force.	D-6	D-3	Attack(in Centre)
16	Eastward transit of amphibious task force.	D-6	D-4	Attack (in East)
17	Deployment of additional combat aircraft.	D-3	D-1	Attack (in East)
18	Deployment of additional combat aircraft.	D-3	D-1	Attack(in Centre)
19	Northward transit of amphibious task force.	D-5	D-4	Attack (in East)

Legend

COA course of action   NAI   named area of interest

Figure 4.8 - Example of an event matrix.

g. The JIPOE analysts in collaboration with other staff elements may consider developing a decision support template. This graphical appreciation essentially combines the joint intelligence estimate and operations estimate. It is constructed

by the combining the event template prepared by the JIPOE analyst in step 3 with data developed during the wargame. The decision support template identifies key decision points where action by commander may be required.

4.7 JIPOE SUPPORT TO THE ASSESSMENT PROCESS

a. Throughout the JIPOE process, the JIPOE analyst will produce a high volume of JIPOE products and components. These products and components provide a baseline in time of the situation in the JOA. As various operations and activities are conducted throughout the JOA, the OE over time will be prone to change. JIPOE outcomes, especially from a network perspective, are useful to track and evaluate any changes in the OE. Following the initial results from the JIPOE process, changes occurring within the OE can be documented and used to measure mission progress.

b. NATO intelligence reports, summaries, and assessments will be used to detect changes in the OE. Over time, this may adapt assessments of actors' capabilities and intentions. This, in turn, will impact the resulting linkages between them. The commander and staff may adopt the JIPOE outcomes in their reports to higher commands or staff internally as a measurement of effectiveness related to mission accomplishment. The commander may therefore decide to task the intelligence staff to report updated JIPOE products and components. The intelligence staff accordingly needs to configure their analysis capability to periodically update their estimates.In addition, the intelligence chain should be instructed to comment and assess based on JIPOE outcomes.

4.8 JIPOE PRODUCTS AND COMPONENTS

a. JIPOE products and components prepared by the JIPOE analyst during step 2 are used as a basis for further processing in step 3**.** Regardless of the choice of graphical representation, the end product should relay to the commander and planning staff what will happen when, in what sequence, by what element and where according to the COA. The JIPOE products and components that are typically associated with step 3 of the JIPOE include:

- Network perspective/geospatial perspective situation templates
- Doctrine template
- Situation template
- Situation matrix
- Event template
- Event matrix
- Decision support template

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ANNEX A   JIPOE ANALYTICAL SKILLSETS

JIPOE Analytical Skillsets.

Introduction. Conducting JIPOE requires both functional and regional subject matter expertise. CoG analysis and COA development will be far richer and far more likely to accurately reflect adversary perspectives with the cumulative input of functional and regional experts. Analytical skillsets should include:

(1) **All source order of battle and military analysis.** This skill is required to fuse single source intelligence into a comprehensive assessment of actor composition, disposition, and intent to produce the actor portion of the JIPOE. This analyst templates actor doctrine and past military operations and is a key contributor to the COA development process.

(2) **All source infrastructure analysis.** This skill is required to develop or contribute to the PMESII systems analysis of the infrastructure, economic, and information environments, and to contribute to the assessments of the physical domains, primarily the land, sea, and air.

(3) **All source leadership analysis.** This skill is required to develop a systems estimate of the nodes and links within defence and political leadership, and the extrinsic links to the actor's sources of influence. This contributes to the political analysis in the PMESII systems analysis, and contributes to the military, economic, and social systems analysis.

(4) **Political analysis.** Strategic assessments of the political systems within the AII develop the political systems estimate.

(5) **Social cultural analysis.** This skill is required to elaborate the human environment dimensions of the OE, including the social portion of the PMESII analysis (including aspects of law and governance) and is uniquely critical to understanding human systems and forecasting popular reactions in the COA development.

(6) **Economic analysis.** This skill is required to elaborate the economic section of the PMESII, but also elaborates key linkages in the infrastructure, social, and political sections of the document.

(7) **Geo-spatial analysis.** This skill is required to construct the digital and visual layers of information portrayed in the physical domains, but can also contribute to building PMESII layers for both planning and targeting

(8) **Identity intelligence analysis (I2).** I2 results from the fusion of identity attributes (biologic, biographic, behavioural, and reputational information

related to individuals) and other information and intelligence associated with those attributes collected across all intelligence disciplines.

(9) **Senior analyst.** This skill is required to manage production tasking, but also to guide and integrate the collaborative processes of intelligence staff's CoG analysis and COA development. The senior analyst should either have cross over skills or work very closely with the intelligence planner.

(10) **Collection manager.** Depending on the nature of the crisis and on available intelligence resources, a collection manager may be assigned to the JIPOE team and forward collection requirements directly from the planning staff into the intelligence cycle.

ANNEX B   JIPOE PROCESS WORKFLOW

Introduction. This document describes an overall workflow to perform the JIPOE process. This may have to be modified depending of the specific operation at hand, but is intended to be a reasonable starting point. The JIPOE process is described with a logical order, but in reality the information developed in later steps may affect results from earlier ones, so the execution has to be very iterative in its nature. During all steps within the JIPOE process, it is necessary to continuously identify intelligence gaps. For the success of any planning effort it is vital to maintain constant communication between intelligence staff and "blue"-force planners.

a. **Step 1 - Describe and evaluate the operating environment (OE).** During step 1 it is necessary to determine the level of detail required and what is feasible with the existing resources in the given timeframe.

  (1) Outline constraints and construct of the OE
    ▪ Conduct JIPOE task analyses
    ▪ Identify JOA
    ▪ Identify AII

  (2) Develop geospatial and systemic perspectives
    ▪ Describe and evaluate all domains in order to develop a holistic understanding.
    ▪ Develop initial MCOO
    ▪ Develop initial systems analysis
    ▪ Identify significant characteristics of the OE throughout the domains
    ▪ Compare significant characteristics with constraints and construct of the OE in order to develop key characteristics

  (3) Define impact of OE on actors
    ▪ Identify the effects of the key characteristics of the OE
    ▪ Refine MCOO to visualise the impact of the OE

b. **Step 2 - Evaluate actors in the operating environment.** Determine current situation for adversary and other relevant actors Create models of relevant actors. This analytic effort should focus on the factors for each domain that are capable of interfering with the friendly mission.

  (1) The current situation is based on an assessment of the following factors:
    ▪ Composition

- Disposition
- Capabilities
- Tactics Techniques Procedures (TTPs)
- Logistics
- Effectiveness
- Command and Control Systems (C2)
- Personalities

(2) Any other data that may contribute to the current situational awareness:
- Ideology
- Safe havens
- Freedom of movement
- Intelligence
- Finance
- Social/Culture
- Support

(3) Develop systems analysis of relevant systems

(4) Develop initial understanding of potential HVT's

(5) Identify actor's capabilities and vulnerabilities (e.g. using SWOT analysis). The framework below is not exhaustive but can provide some initial guidance:
- Means
- Goals/Ends
- Opportunities
- Intent
- Refine potential understanding of HVT

(6) Identify centres of gravity for adversary and other relevant actors
- *(Use methodology IAW AJP-5, Annex B)*
- Identify critical nodes in actor's system
- Finalise list of HVTs for each actor
- Develop a specific operational framework for each actor (*Use methodology IAW AJP-5, Chapter 3: Operations Design and COPD, Chapter 4, Section 4-27: The Operational Design*)

c. **Step 3 - Determine actors' courses of action**
   (Use methodology IAW AJP-5, Chapter 4, Section 4 – 7 and COPD, Chapter 4, Phase 3b)

(1)　Estimate COA's for adversary and other relevant actors
- Define COA boundaries
- Create COAs (minimum most likely and most dangerous COA)

(2)　Evaluate and prioritise COA's
- Establish logical, consistent methodology for comparison
- Compare and prioritise COA's
- Conduct wargaming of COA's against "blue" force planning
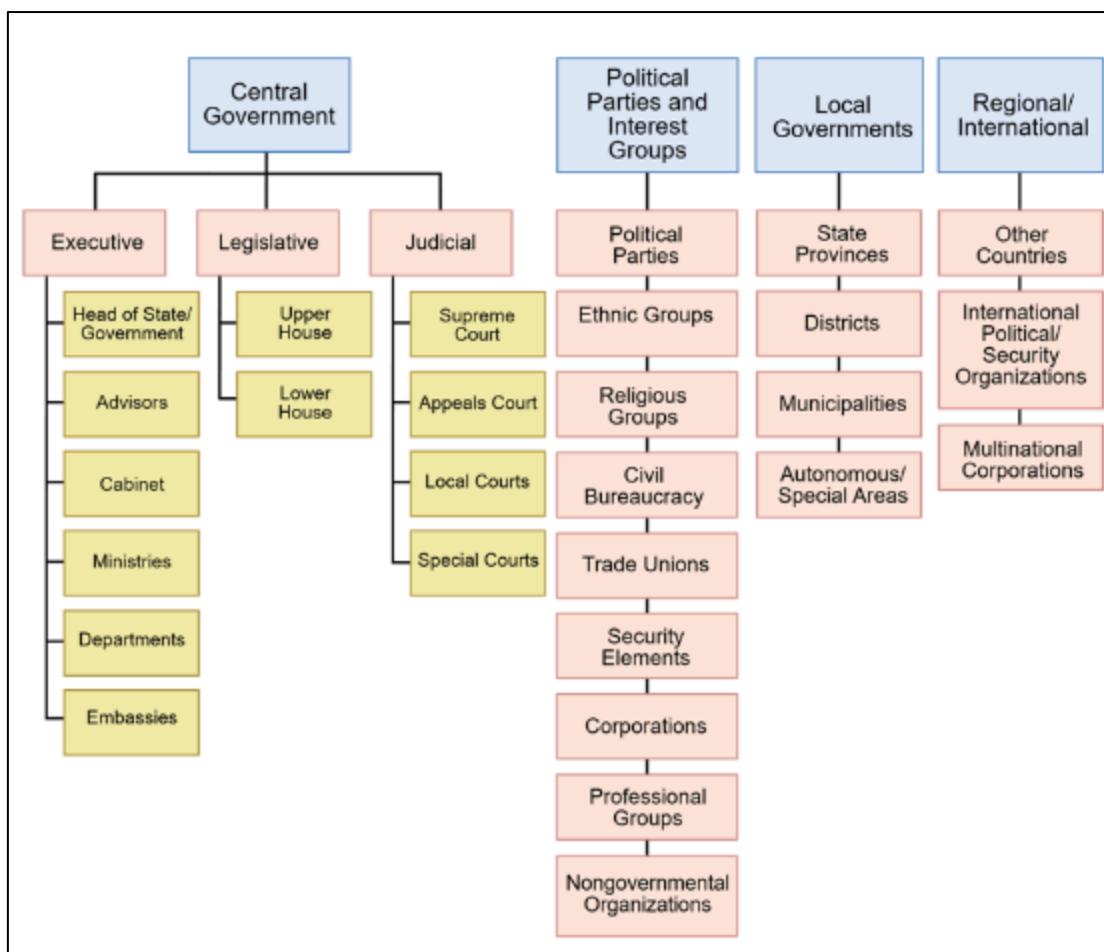
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ANNEX C   STRUCTURING OF PMESII FACTORS

Introduction. This appendix contains six charts that describe and structure the PMESII factors. The composition of relevant factors will vary with different regions and operations. Some factors will be transnational rather than purely nation-state in nature. Awareness of these variations from operation to operation will help the commander to avoid undesired effects.

a. **Political factor.** The political factor describes the central and local governments, political organisations (including political parties and interest groups), and regional/international actors who receive and process political system demand. Considerations include:

   (1) The predominant political ideology and what and who constitutes its major defining policies.

   (2) Sense of national identity to include strengths or weaknesses.

   (3) The constitutional and legal basis for government.

   (4) Assessment of the quality of governance.

   (5) Separation of powers from religion and state.

   (6) Degree of centralization of power between the military and state.

   (7) The role ethnic and religious groups play in government.

   (8) Strength of political influence on the military.

   (9) Toleration and/or presence of opposition groups.

   (10) Characterization of political relationships with regional neighbours to include points of friction.

Figure C.1- Structuring the political factor.

b. **Military factor.** The analyst describes the military factor in regards to national objectives, protection of the government, and regional population. Considerations include:

(1) Military role in the development of national strategy.

(2) Potential and realized threats (external and internal).

(3) Characterization of military and civilian relationship.

(4) Role of demographics in military leadership.

(5) Factors regarding the development and maintenance of a military.

(6) Influences (positive and negative) affecting combat readiness.

Leadership	Armed Forces	Internal Security	Military-Industrial Complex	Sustainment
Commander in Chief	Army	Intelligence Apparatus	National Arms Production	Resources
National Military Committee	Navy/Marine Corps	Elite Security Forces	Foreign Arms Trade	Storage and Distribution
National Defense Staff	Air Force	Law Enforcement	Spare Parts/Maintenance	Education and Training
Service Chiefs/Leaders	Strategic Forces/Weapons of Mass Destruction	Paramilitary	R&D	Recruitment
Headquarters Elements	Special Forces		OT&E	
Command and Control Networks	Reserve Forces			

Legend

OT&E   operational test and evaluation   R&D   research and development

Figure C.2 – Structuring the military factor.

c. **Economic factor.** The analyst describes the economic factor in regards to the sum total of production, distribution, and consumption of all goods and services within a nation. Considerations include:

(1) Type of economic system (capitalism, social, other).

(2) Major industrial engines of the economy (manufacturing textile/apparel, vehicle, or machine tools).

(3) Agriculture base.

(4) Economic relationship with other countries and with international trade (imports, exports, and the balance of payments).

(5) Health of domestic markets.

(6) Opportunities available for people to borrow money or own businesses.

(7) Relationship with the country to foreign investors and the international community for foreign aid and debt relief.

(8) Labour force to include skilled and fully employed.

(9) Factors regarding the informal economy (terrorist financing, narcotics trade,

trafficking in humans, unregulated labour, and smuggling).

(10) Impact of corruption, accountability, and transparency on the economic system.

(11) Sources of economic tension.

Figure C.3 – Structuring the economic factor.

d. **Social factor.** The goal of the analyst is to describe the social factor in order to identify and evaluate social interactions and relationships. Considerations include:

(1) Cohesion of socio-religious groups.

(2) Causes of societal pressures and discontent.

(3) Impact of immigration and emigration.

(4) Availability of food and medical supplies.

(5) Educational and economic opportunities.

(6) Role of intergovernmental organizations (IGOs) and NGOs.

(7) Types and extent of crime.

(8) Presence and impact of separatist and terrorist groups.

(9) Cultural differences among population.

(10) Tolerance for religious freedom.
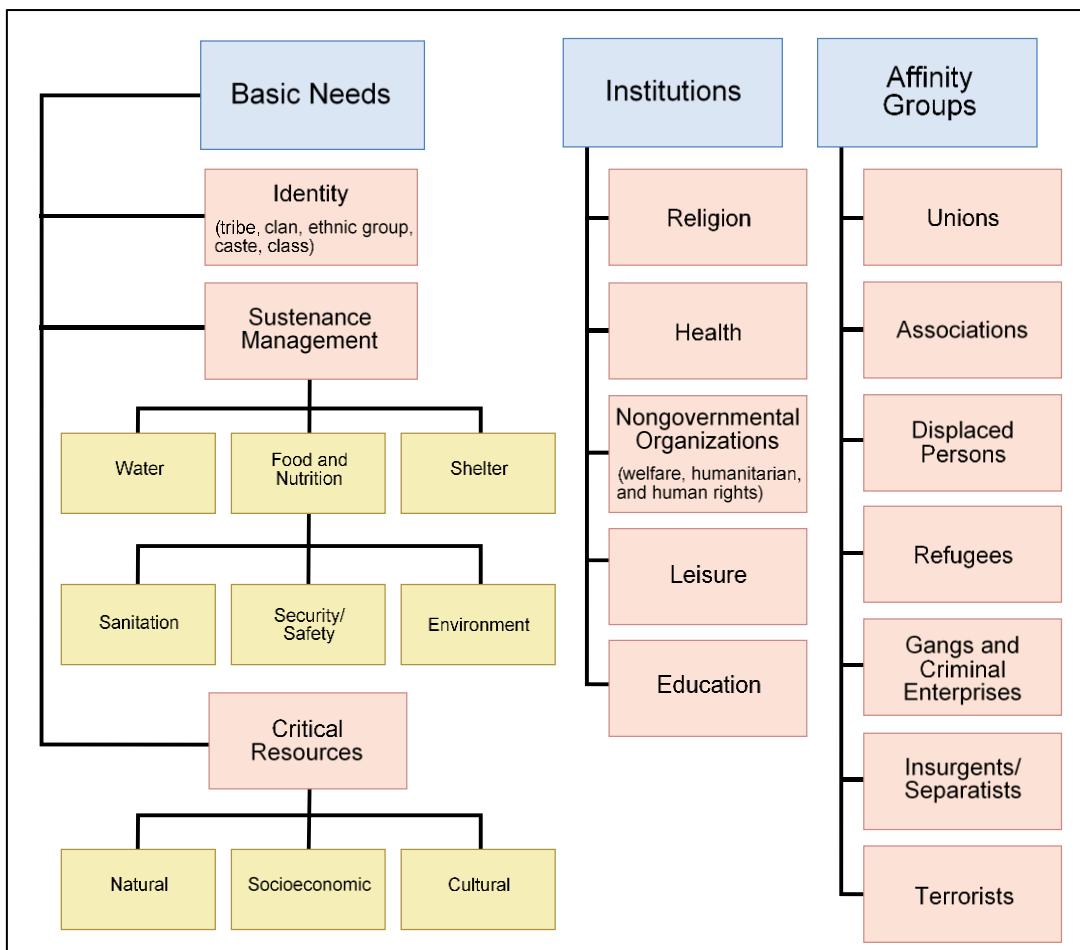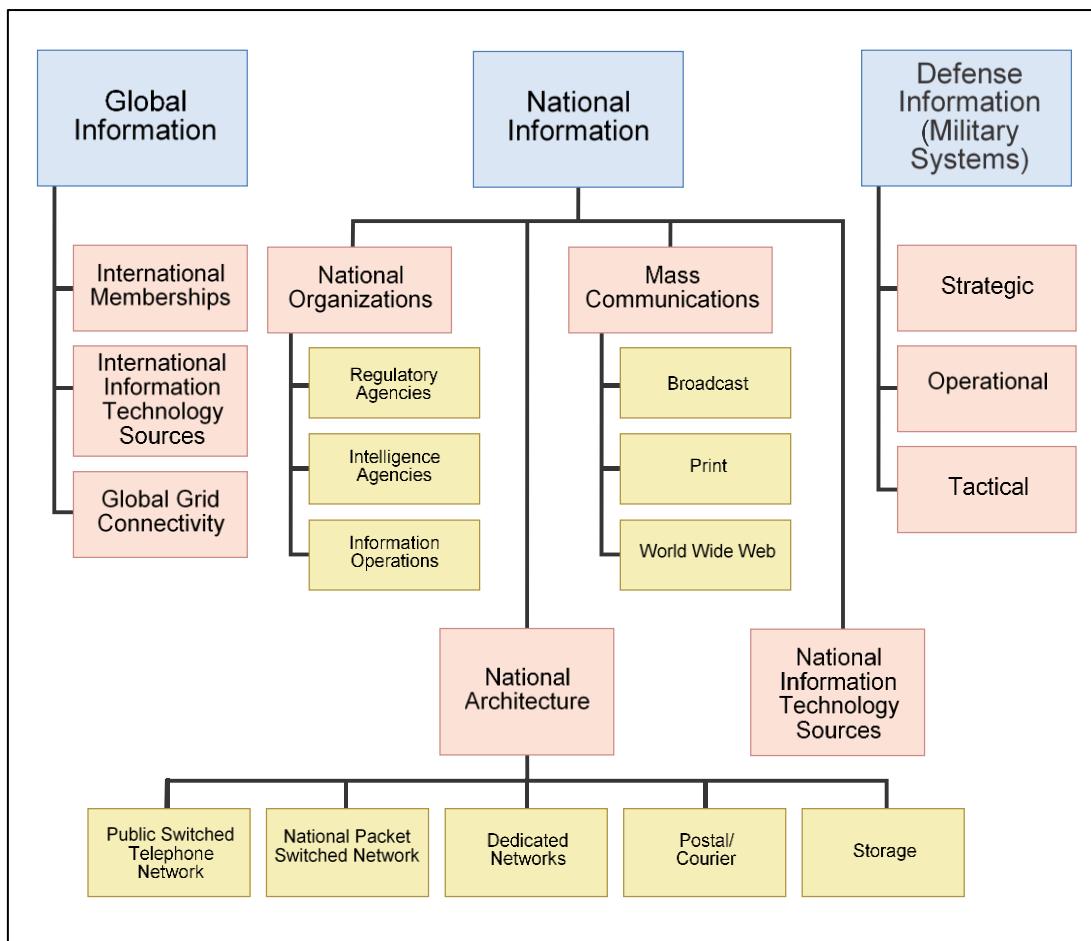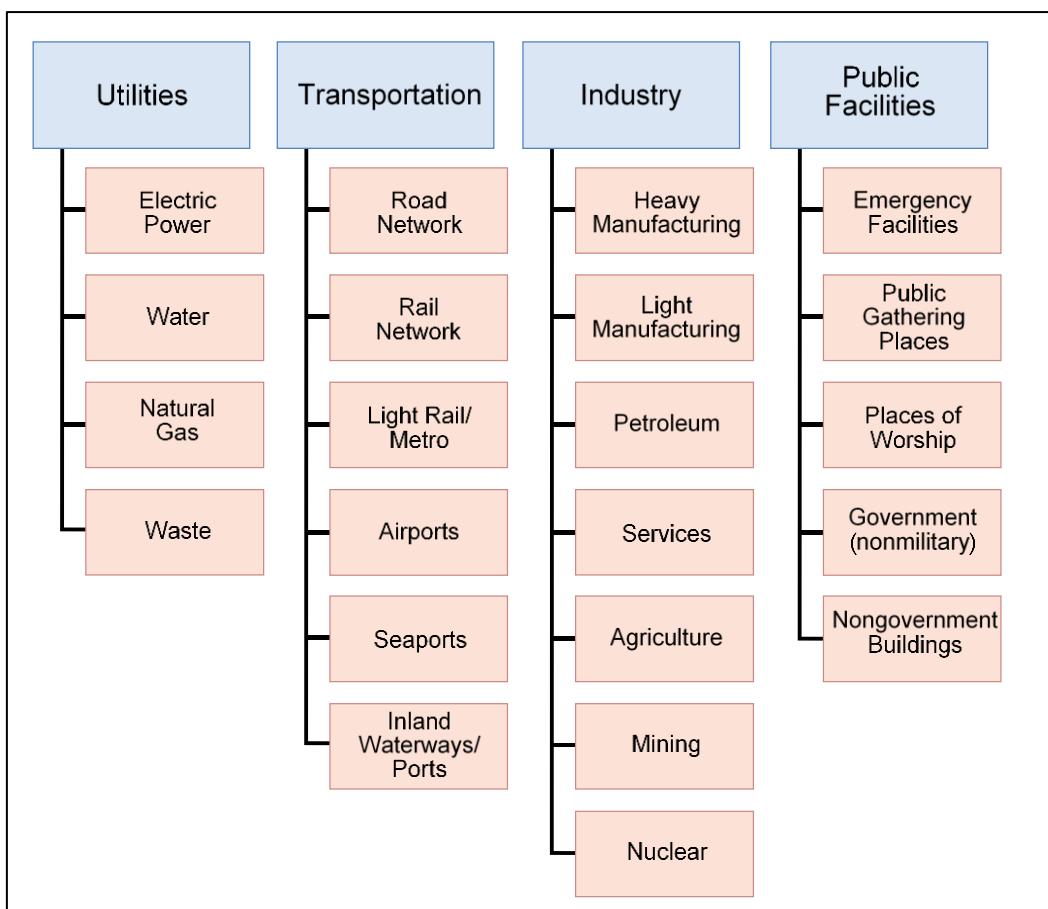
Figure C.4 - Structuring the social factor.

e. **Informational factor.** Research is dedicated to the examination of the informational factor in regards to national objectives, communication capabilities, and operations in support of a focus area. Descriptions can be divided into global information, national information, and defence information networks. Considerations include:

(1) Capabilities of national communications systems.

(2) Location of critical communications facilities.

(3) Foreign support to internal telecommunications.

(4) Programs that support national, technical, and academic research.

(5) Assessment of hardware and software technology standards.

(6) Censorship of the media.

Figure C.5 - Structuring the informational factor.

f.   **Infrastructural factor.** Describing the infrastructural factor includes: utilities, transportation, industry, and public facilities. Research is focused on the discovery of relationships, dependencies, and vulnerabilities within and across various infrastructural components. Considerations include:

(1) Utility network that supports industry and the population.

(2) Sufficiency of water and wastewater facilities.

(3) Adequacy of transportation network.

(4) Contribution of industrial facilities to the economy and national

self-sufficiency.

(5) Adequacy of public facilities meeting the needs of the population.

Figure C.6 - Structuring the infrastructural factor.

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ANNEX D   EXAMPLES OF ASCOPE ELEMENTS

INTRODUCTION. The ASCOPE methodology is comprised six elements (area, structures, capabilities, organizations, people, and events. An understanding of ASCOPE enhances several aspects of operations to include: the selection of objectives; location, movement, and control of forces; use of weapons; and protection measures. The intelligence staff should leverage outside agencies, which have expertise in ASCOPE to aid the intelligence analysis in this area. ASCOPE encompasses the human-made infrastructure, civilian institutions, and attitudes and activities of the civilian leaders, populations, and organisations within the OE and how these elements influence operations.

AREAS

a. Key civilian areas are localities or aspects of the terrain within an OE that often are not militarily significant. This characteristic approaches terrain analysis from a civilian perspective. The intelligence staff analyzes key civilian areas in terms of how they may affect the missions of friendly forces as well as how friendly military operations may affect these areas. Examples of key civilian areas are:

    ▪ Areas defined by political boundaries, such as districts within a city or municipalities within a region.
    ▪ Locations of government centers.
    ▪ Social, political, religious, or criminal enclaves
    ▪ Ethnic/Sectarian fault lines.
    ▪ Agricultural and mining regions.
    ▪ Trade routes.
    ▪ Possible sites for the temporary settlement of displaced civilians or other civil functions.

STRUCTURES

b. Existing structures can have various degrees of significance. Analysing structures involves determining how the location, functions, capabilities, and consequences of its use can support or hinder the operation. Using a structure for military purposes often competes with civilian requirements. Commanders must carefully weigh the expected military benefits against costs to the community that have to be addressed in the future. Commanders also need to consider the significance of the structure in providing stability to the OE. Certain structures are critical in providing a state of normalcy back to the community and need to be maintained or restored quickly. The following are examples of structures within the OE:

    ▪ Military bases.
    ▪ Police stations.

- Jails.
- Courtrooms.
- Political offices.
- Electrical power plants and substations.
- Petroleum, oils, and lubricants refineries.
- Dams.
- Water and sewage treatment and distribution facilities.
- Communications stations and networks.
- Bridges and tunnels.
- Warehouses.
- Airports and bus terminals.
- Universities and schools.

Other structures are cultural sites that international law or other agreements generally protect, for example:

- Religious structures.
- National libraries and archives.
- Hospitals and medical clinics.
- Monuments.
- Works of art.
- Archaeological sites.
- Scientific buildings.
- Museums.
- Crops, livestock, and irrigation works.
- United Nations Educational, Scientific and Cultural Organisations- designated
- World Heritage Sites.

CAPABILITIES

c. Capabilities can refer to the ability of local authorities (those of the host nation, aggressor nation, or some other body) to provide a populace with key functions or services, such as:

- Public administration.
- Public safety.
- Emergency services.
- Technology.
- Basic necessities (food, water, medical availability).

Capabilities include those areas in which the populace may need help after combat operations/major operations, such as public works and utilities, public health, economics, and commerce. Capabilities also refer to resources and services that can be contracted to support the military mission, such as interpreters, laundry services, construction materials, and equipment.

ORGANISATION

d. Analysts consider the organisation dimension (such as the non-military groups or institutions) and political influence and their impacts in the OE. Organisations influence and interact with the populace, friendly forces, the threat/adversary, and each other. An important aspect of civil considerations is the political dimension of the local population and their expectations relative to threat/adversary and friendly operations.

Political structures and processes enjoy varying degrees of legitimacy with populations from local through international levels. Formally constituted authorities and informal or covert political powers strongly influence events. Political leaders can use ideas, beliefs, violence, and other actions to enhance their power and control over people, territory, and resources. There are many sources of political interest. These may include charismatic leadership; indigenous security institutions; and religious, ethnic, or economic factors. Political opposition groups or parties also affect the situation. Each may cooperate differently with military forces.

Understanding the political circumstances helps commanders and staffs recognize key organisations and determine their aims and capabilities. Understanding political implications requires analysing all relevant partnerships—political, economic, military, religious, and cultural. This analysis captures the presence and significance of external organisations and other groups, including groups united by a common cause. Examples include private security organisations, transnational corporations, and NGOs that provide humanitarian assistance.

Descriptions of political elements must include an assessment of varying political interests and the actor's' political decision points/CoGs and political will. Understanding what motivates key groups (for example, political, military, and insurgent) helps commanders understand the groups' goals and willingness to sacrifice to achieve their ends.

Organisations are non-military groups or institutions in the JOA. They influence and interact with the populace, the force, and each other. They generally have a hierarchical structure, defined goals, established operations, fixed facilities or meeting places, and a means of financial or logistic support. Some organisations may be indigenous to the area. These organisations may include:

- Religious organisations.
- Fraternal organisations.
- Patriotic or service organisations.
- Labour unions.
- Criminal organisations.
- Community watch groups.
- Political groups.
- Agencies, boards, committees, commissions (local and regional, councils).

- Multinational corporations.
- IGOs such as United Nations agencies.
- Other host-nation government agencies.
- NGOs, such as the International Committee of the Red Cross.

To enhance their situational awareness, commanders must remain familiar with organisations operating in their JOAs, such as local organisations which understand the political dimension of the population. Situational awareness includes having knowledge of how the activities of different organisations may affect military operations and how military operations may affect these organisations' activities. From this, commanders can determine how organisations and military forces can work together toward common goals when necessary.

Military forces tend to have more resources than civilian organisations. However, civilian organisations may possess specialized capabilities that they may be willing to share with military forces. Commanders do not command civilian organisations in their JOAs. However, some operations require achieving unity of effort between them and the force. These situations require commanders to influence the leaders of these organisations through persuasion. They produce constructive results by the force of argument and the example of their actions.

PEOPLE

e. The use of the general term "people" describes non-military personnel encountered by military forces. The term includes all civilians within an JOA as well as those outside the JOA whose actions, opinions, or political influence can affect the mission. Individually or collectively, people can affect a military operation positively, negatively, or neutrally. In stability tasks, forces work closely with civilians of all types. Understanding the sociocultural factors of the people in the JOA is a critical component of understanding the operational environment.

There can be many different kinds of people living and operating in and around a JOA. As with organisations, people may be indigenous or introduced from outside the JOA. An analysis of people will identify them by their various capabilities, needs, and intentions. It is useful to separate people into distinct categories such as demographically, social and political groups. When describing the populace, commanders consider historical, cultural, ethnic, political, economic, religious, and humanitarian factors. They also identify the key communicators and the formal and informal processes used to influence people.

The languages used in the region will have a huge impact on operations. The staff identifies the languages and dialects used within the JOA so language training, communication aids (such as phrase cards and requisitioning of translators) can begin. Translators will be crucial for collecting intelligence, interacting with local citizens and community leaders, and developing products.

Another aspect of language involves the transliteration guide not written using the Latin alphabet. This will have an impact on all intelligence operations to include collection, analysis, dissemination, and targeting. In countries that do not use the Latin alphabet, a theatre-wide standard should be set for spelling names. Without a spelling standard, it can be difficult to conduct effective analysis. In addition, insurgents and/or criminals may be released from custody if their names are misidentified. To overcome these problems, there must be one spelling standard for a theatre. Intelligence staffs should also be aware of family naming conventions in places like the Middle East where various cultures do not use an individual's surname and family name.

Another major consideration is religion. Religion has shaped almost every conflict of the past, and there are indicators that its influence will only grow. The staff considers the following when incorporating religion in planning:

(1) Know when religious traditions will be affected by the mission and try to determine how religion will affect the mission.

(2) Know when religious figures have influenced social transformations in a negative or positive way.

(3) Attempt to understand all parties, no matter how violent or exclusive.

Religion has the ability to shape the operational environment. Religion can add a higher intensity, severity, brutality, and lethality to conflicts than almost any other factor. Religion can motivate the masses quickly and inexpensively.

Part of the analysis of people is identifying cultural terms and conditions. Cultural terms and conditions describe both NATO and foreign ways of thought and behaviour. Understanding culture gives insight into motives and intent of nearly every person or group in the OE. This insight, in turn, allows commanders and staffs to allocate resources, out-manoeuvre opponents, alleviate friction, and reduce the fog of war. Cultural factors include:

- Social structure.
- Behavioural patterns.
- Perceptions.
- Religious beliefs.
- Tribal relationships.
- Behavioural taboos.
- Centres of authority.
- Lifestyles.
- Social history.
- Gender norms and roles.

Cultural aspects within the OE is studied in order to give insights into the way people think, the reasons for their beliefs and perceptions, and what kind of behaviour they can be expected to display in given situations. Because cultures are constantly

shifting, the study of culture is an enduring task that requires historical perspective as well as the collection and analysis of current information.

EVENTS

f. Events are routine, cyclical, planned, or spontaneous activities that significantly affect organisations, people, and military operations. Examples include:

- National and religious holidays.
- Agricultural crop or livestock and market cycles.
- Elections.
- Civil disturbances.
- Celebrations.
- Natural phenomenon (such as monsoon, seasonal floods and droughts, volcanic and seismic activity, natural disasters).
- Manmade disasters.

Examples of events precipitated by military forces include combat operations/major operations, congested road networks, security restrictions, and economic infrastructure disruption or stimulus. Once significant events are determined, it is important to template the events and to analyse them for their political, economic, psychological, environmental, and legal implication.

ANNEX E   EXAMPLES OF MODIFIED COMBINED OBSTACLE OVERLAYS.
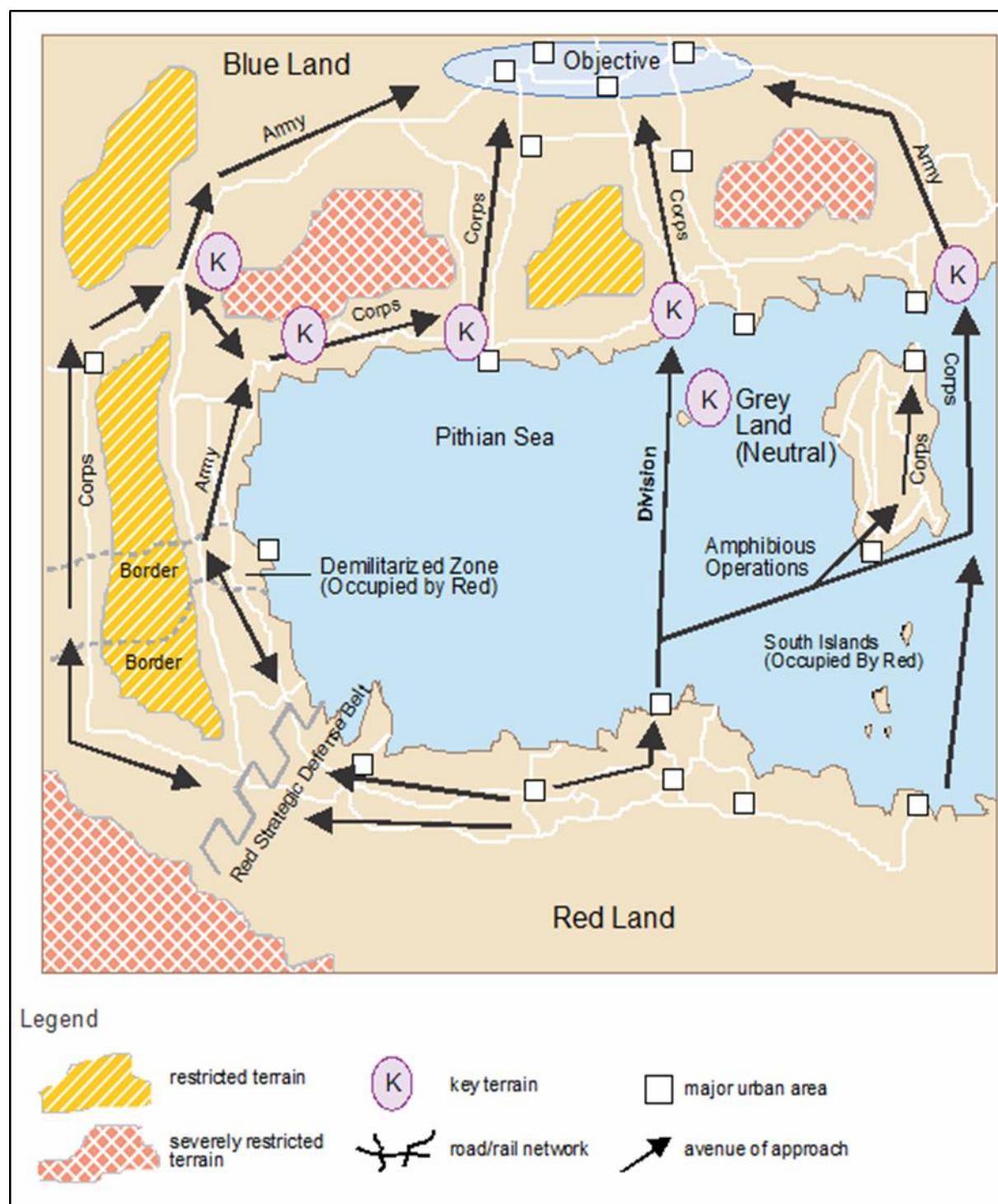

**Figure E.1 - Example of a land modified combined obstacle overlay.**
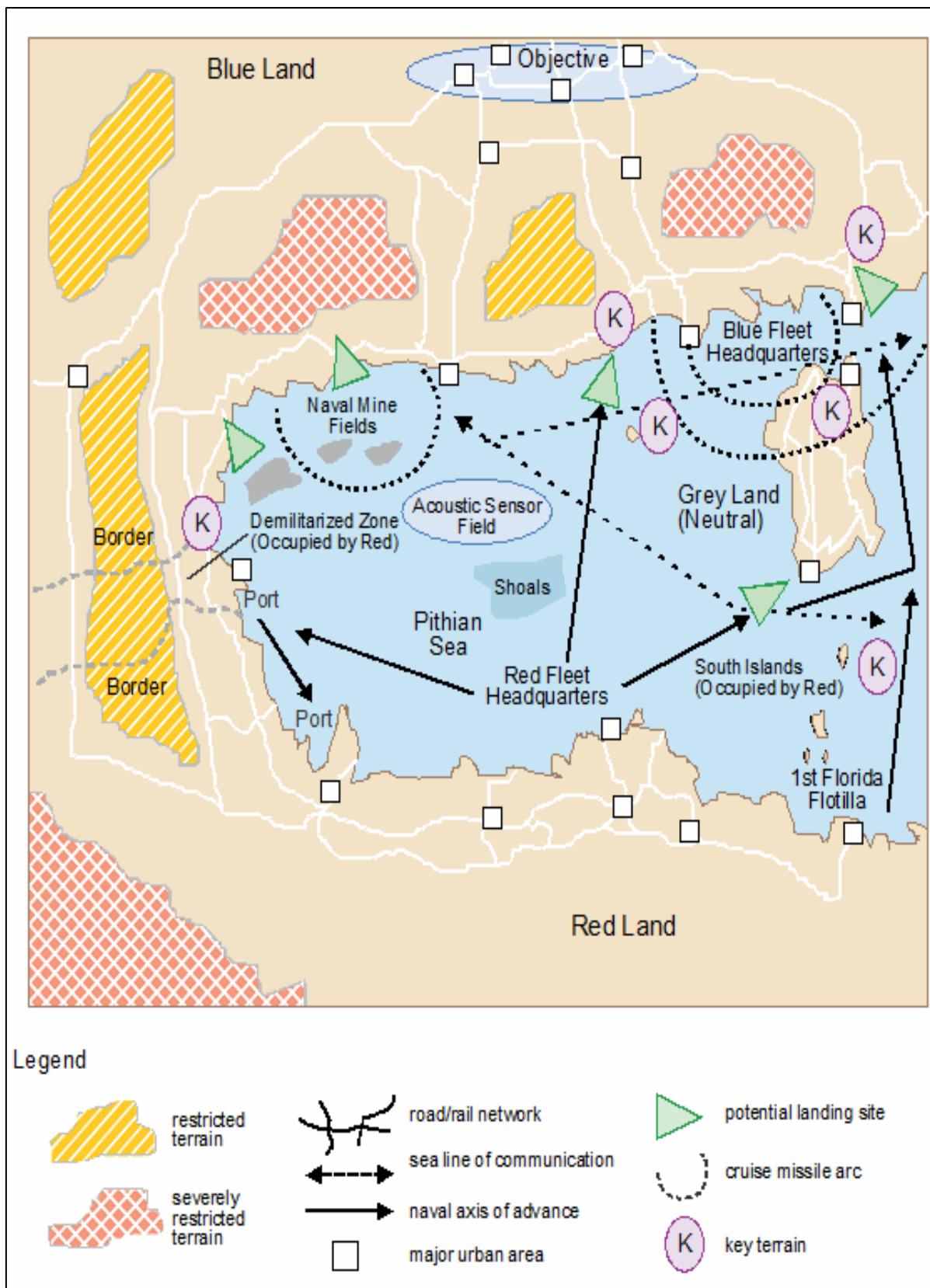
Figure E.2 - Example of a maritime modified combined obstacle overlay.
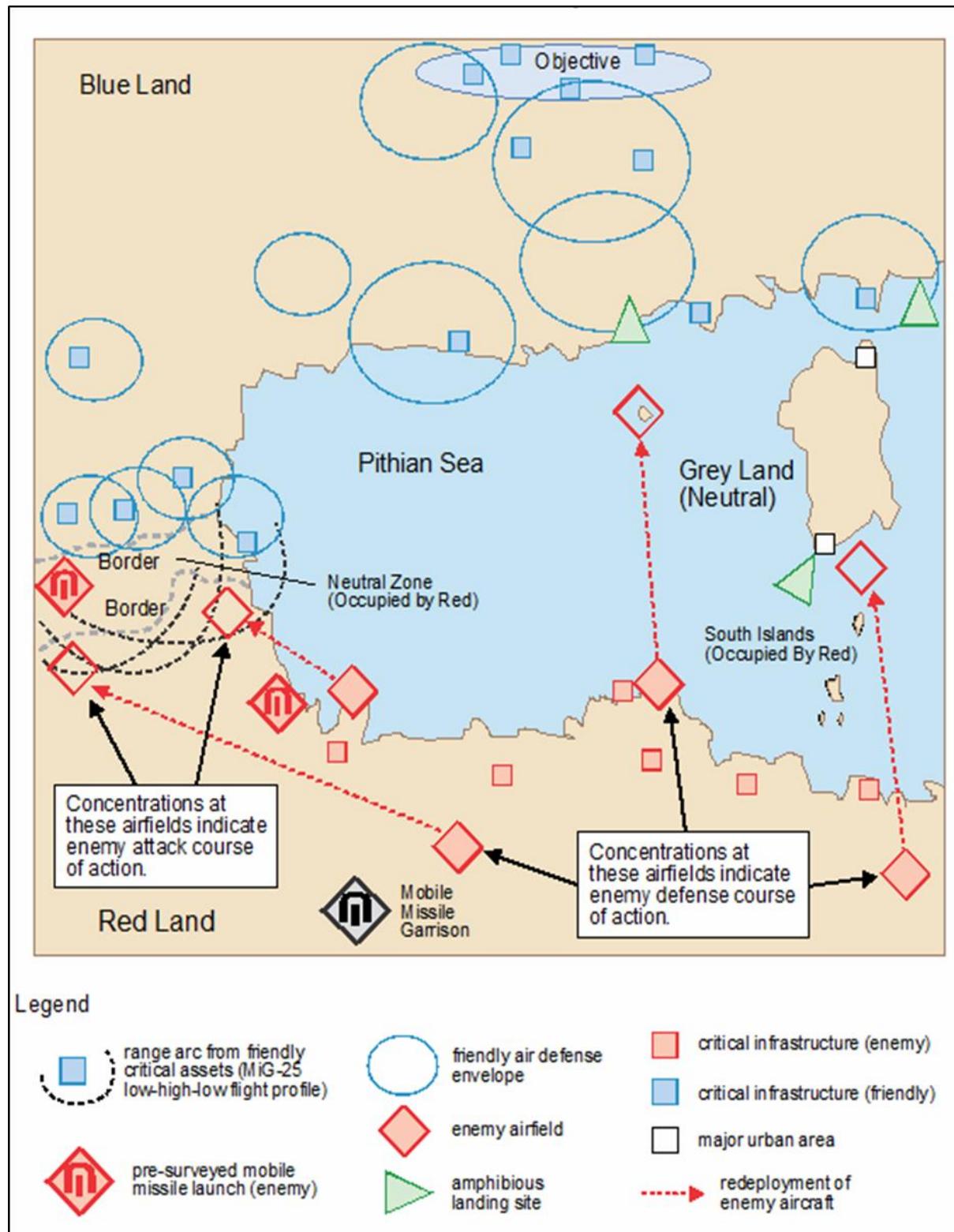
**Figure E.3 - Example of an air modified combined obstacle overlay.**
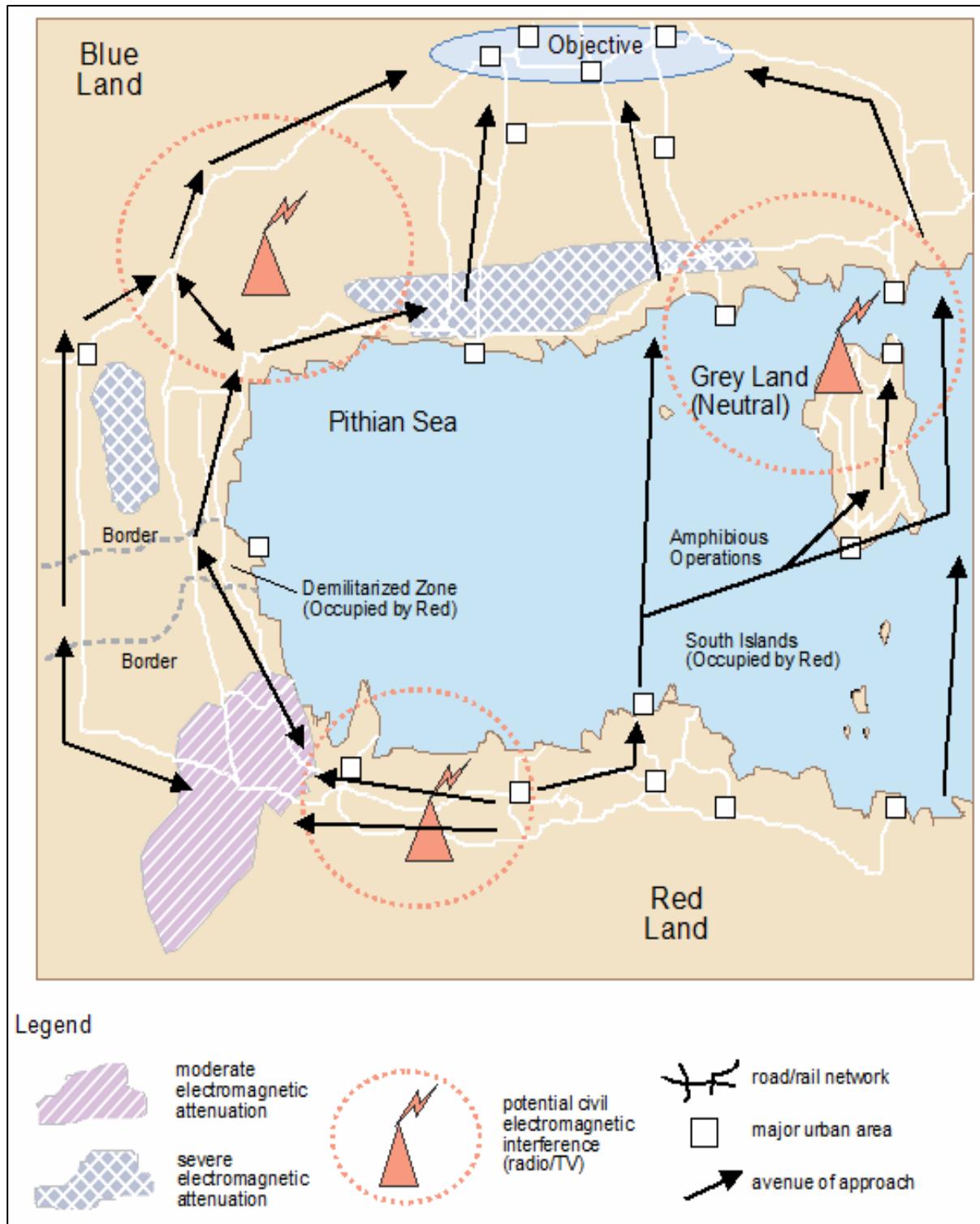
**Figure E.4 - Example of an electromagnetic modified combined overlay.**
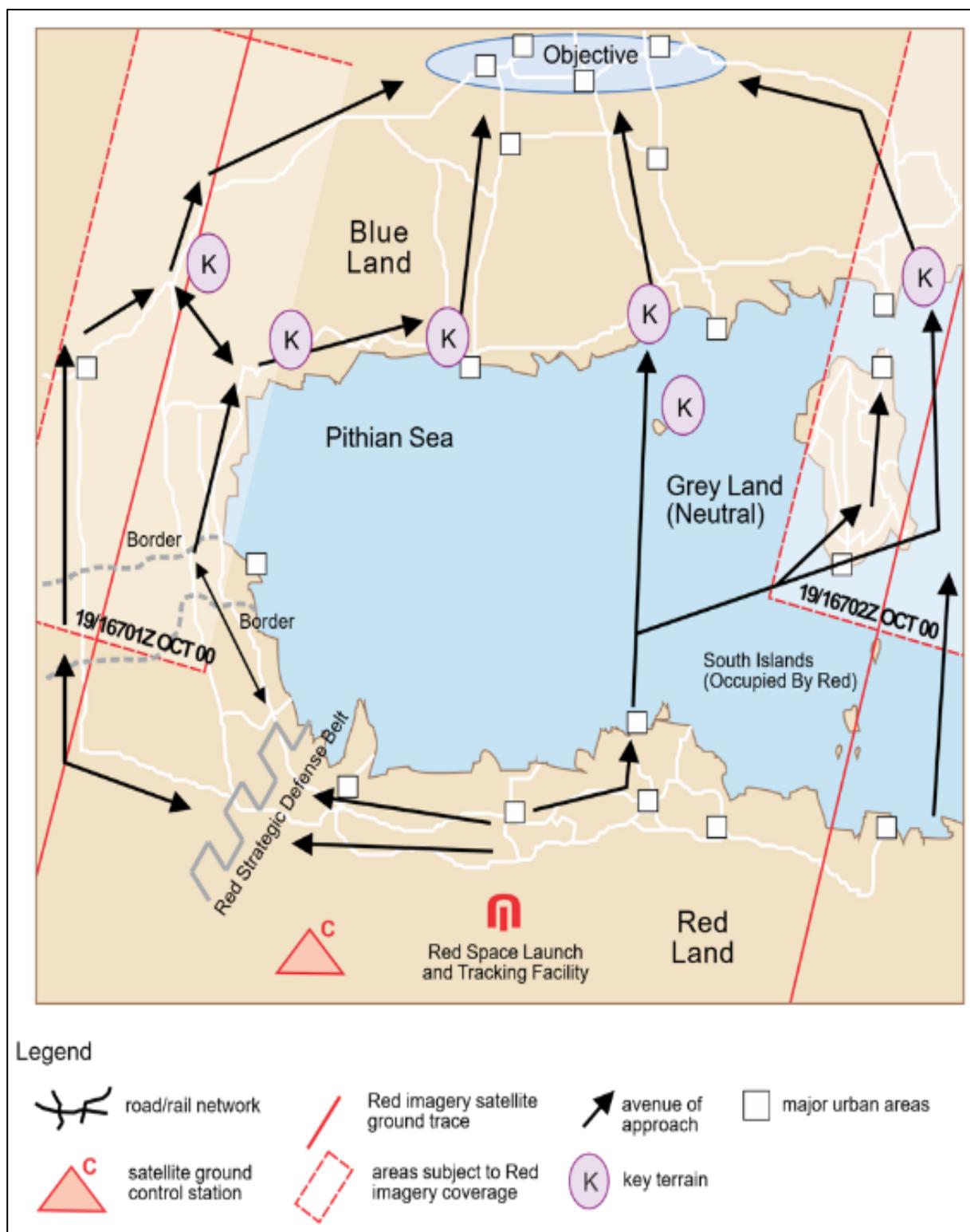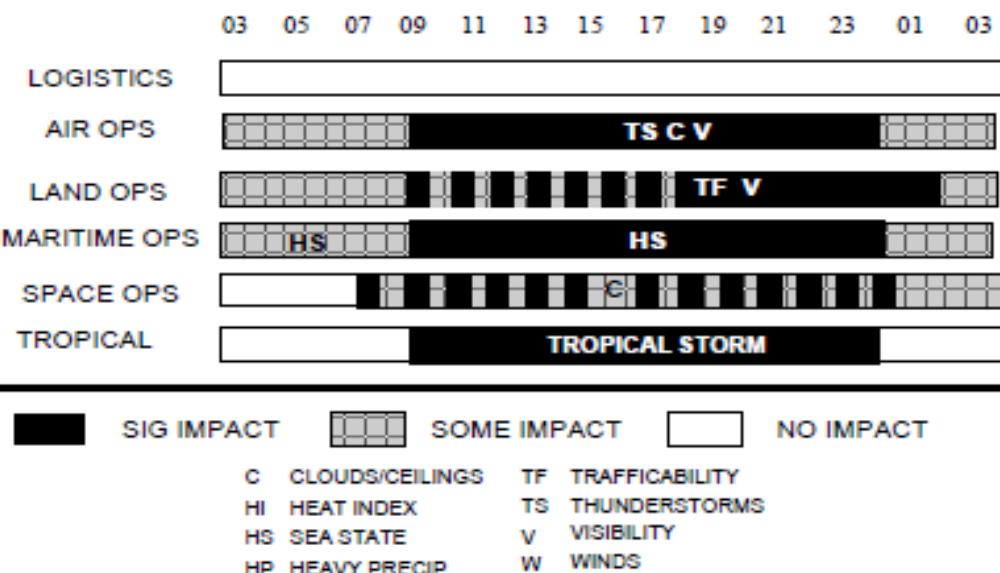
Figure E.5 - Example of a space modified combined obstacle overlay.

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ANNEX F   EXAMPLES OF WEATHER CHARTS

WEATHER IMPACTS ON OPERATIONS
VALID: 27/03Z-28/03Z Created 26/23Z

| | 03 | 05 | 07 | 09 | 11 | 13 | 15 | 17 | 19 | 21 | 23 | 01 | 03 |

LOGISTICS

AIR OPS — TS C V

LAND OPS — TF V

MARITIME OPS — HS   HS

SPACE OPS — C

TROPICAL — TROPICAL STORM

■ SIG IMPACT   ▦ SOME IMPACT   ☐ NO IMPACT

C CLOUDS/CEILINGS	TF TRAFFICABILITY
HI HEAT INDEX	TS THUNDERSTORMS
HS SEA STATE	V VISIBILITY
HP HEAVY PRECIP	W WINDS

WEATHER IMPACTS ON OPERATIONS
VALID: 28/0300Z - 30/0300Z Created 26/2300Z

	24HR		48HR		72HR	
LOGISTICS	☐	△	☐	△	☐	△
AIR OPERATIONS	▦	▲	▦	△	☐	△
LAND OPERATIONS	▦	△	☐	△	☐	△
MARITIME OPERATIONS	▦	▲	☐	△	☐	△
SPACE OPERATIONS	▦	△	☐	△	☐	△
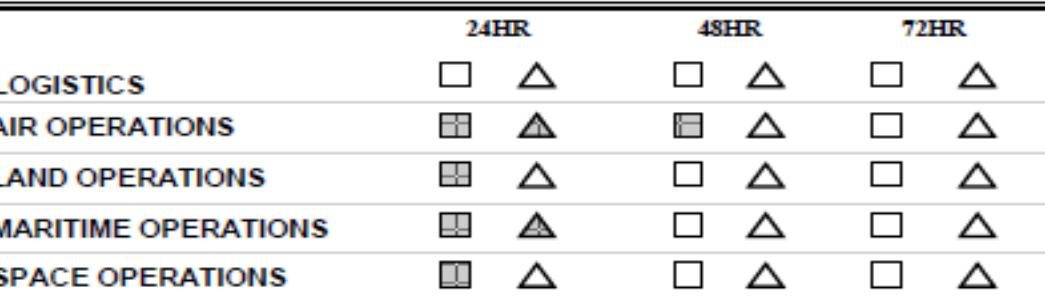
☐ FRIENDLY FORCES   ◯ NO IMPACT

△ OPPOSING FORCES   ◗ SOME IMPACT

● SIG IMPACT

Figure F.1 - Examples of a weather chart.

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LEXICON[23]

PART I – Acronyms and abbreviations

AII	area of intelligence interest
AIR	area of intelligence responsibility
ASAT	anti-satellite
ASCOPE	area, structures, capabilities, organizations, people, and events
C2	command and control
CBRN	chemical, biological, radiological, and nuclear
CCIR	commander's critical information requirement
COA	course of action
CoG	centre of gravity
COPD	comprehensive operations planning directive
CR	collection requirement
DMZ	demilitarized zone
EMS	electromagnetic spectrum
GO	government organization
GSM	global system for mobile communications
HN	host nation
HVT	high-value target
IGO	intergovernmental organisation
IPB	intelligence preparation of the battlespace
IR	intelligence requirement
IRC	information-related capability
I2	identity intelligence
JIPOE	joint intelligence preparation of the operating environment
JISR	joint intelligence, surveillance and reconnaissance
JOA	joint operations area
LOC	line of communications
LOS	line of sight
METOC	meteorological and oceanographic
MSI	multispectral imagery
NAI	named area of interest

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[23] Some terms only appear in the figures and not in the main text of this document.

NATO	North Atlantic Treaty Organization
NGO	nongovernmental organisation
OE	operating environment
OPP	operations planning process
PIR	priority intelligence requirement
PMESII	political, military, economic, social, information, and infrastructure
PNT	positioning, navigation, and timing
SLCM	sea-launched cruise missile
SLOC	sea line of communications
SME	subject matter expert
TCPED	task, collect, process, exploit, and disseminate
TTP	tactics, techniques, and procedures
WMD	weapons of mass destruction

PART II - Terms and definitions

actor
A person or organization, including state and non-state entities, within the international system with the capability or desire to influence others in pursuit of its interest and objectives.

adversary
A party acknowledged as potentially hostile and against which the use of legal force may be envisaged. (NATOTerm)

area of intelligence interest (AII)
A geographical area for which a commander requires intelligence on the factors and developments that may affect the outcome of operations. (NATOTerm)

area of intelligence responsibility (AIR)
The area for which a commander has the responsibility to provide intelligence with the means available. (NATOTerm)

centre of gravity (CoG)
The primary source of power that provides an actor its strength, freedom of action and/or will to fight. (NATOTerm)

course of action (COA)
In the estimate process, an option that will accomplish or contribute to the accomplishment of a mission or task, and from which a detailed plan is developed. (NATOTerm)

decisive condition
A combination of circumstances, effects, or a specific key event, critical factor, or function that, when achieved, allows commanders to gain a marked advantage over an opponent or contribute materially to achieving an objective. (NATOTerm)

domain
A specified sphere of activity or knowledge. (NATOTerm)

end state
The political and/or military situation to be attained at the end of an operation, which indicates that the objective has been achieved. (NATOTerm)

human network analysis and support to targeting (HNAT)
An intelligence process intended to provide understanding of the organizational dynamics of human networks and to recommend individuals or nodes within those networks for interdiction, action, or pressure. (NATOTerm)

identity intelligence (I2)
Intelligence derived from the processing of identity attributes concerning individuals, groups, networks, or populations of interest. (NATOTerm)

intelligence estimate
The appraisal, expressed in writing or orally, of available intelligence relating to a specific situation or condition with a view to determining the courses of action open to the enemy or potential enemy and the order of probability of their adoption. (NATOTerm)

joint intelligence preparation of the operating environment (JIPOE)
The intelligence process and analytical methodology used to produce intelligence assessments, estimates, and other intelligence products in support of the commander's decision-making and operations planning process.

joint operations area (JOA)
A temporary area within a theatre of operations defined by the Supreme Allied Commander Europe, in which a designated joint force commander plans and executes a specific mission at the operational level. (NATO Term)

key terrain
Any locality, or area, the seizure or retention of which affords a marked advantage to either combatant. (NATOTerm)

lines of communications (LOC)
All the land, water, and air routes that connect an operating military force with one or more bases of operations, and along which supplies and reinforcements move. (NATOTerm)

mission
A clear, concise statement of the task of the command and its purpose. (NATOTerm)

network
An arrangement of nodes and interconnecting branches. (NATOTerm)

objective
A clearly defined and attainable goal for a military operation, for example seizing a terrain feature, neutralizing an adversary's force or capability or achieving some other desired outcome that is essential to a commander's plan and towards which operation is directed. (NATOTerm)

operating environment (OE)
A composite of the conditions, circumstances, and influences that affect the employment of capabilities and bear on the decisions of the commander. (NATOTerm)

order of battle
The identification, strength, command structure, and disposition of the personnel, units, and equipment of any military force. (NATOTerm)

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