2012-06

A Systems Engineering Approach to Define the Fundamental Process for Phase 0/Steady State Theater-Level Strategic Assessments

Toohig, Robert J., Jr.

Monterey, California. Naval Postgraduate School

NAVAL POSTGRADUATE SCHOOL

MONTEREY, CALIFORNIA

THESIS

A SYSTEMS ENGINEERING APPROACH TO DEFINE THE FUNDAMENTAL PROCESS FOR PHASE 0/STEADY STATE THEATER-LEVEL STRATEGIC ASSESSMENTS

by

Robert J. Toohig Jr.

June 2012

Thesis Advisor:	Eugene Paulo
Co-Advisor:	Alejandro Hernandez
Second Reader	Richard M. Brown III

THIS PAGE INTENTIONALLY LEFT BLANK

REPORT DOCUMENTATION PAGE		Form Approved OMB No. 0704-0188

1. AGENCY USE ONLY *(Leave blank)*	2. REPORT DATE	3. REPORT TYPE AND DATES COVERED
	June 2012	Master's Thesis

4. TITLE AND SUBTITLE A Systems Engineering Approach to Define the Fundamental Process for Phase 0/Steady State Theater-Level Strategic Assessments	5. FUNDING NUMBERS
6. AUTHOR(S) Robert J. Toohig Jr	
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) Naval Postgraduate School Monterey, CA 93943-5000	8. PERFORMING ORGANIZATION REPORT NUMBER
9. SPONSORING /MONITORING AGENCY NAME(S) AND ADDRESS(ES) N/A	10. SPONSORING/MONITORING AGENCY REPORT NUMBER

11. SUPPLEMENTARY NOTES The views expressed in this thesis are those of the author and do not reflect the official policy or position of the Department of Defense or the U.S. Government. IRB Protocol number _____N/A_____.

12a. DISTRIBUTION / AVAILABILITY STATEMENT	12b. DISTRIBUTION CODE
Approved for public release; distribution is unlimited	A

13. ABSTRACT (maximum 200 words)

This thesis describes a functional framework for developing strategic assessment at the Combatant Command level, specifically European Command. The framework establishes a functional architecture based on derived requirements and objectives according to the systems engineering process described by Dennis Buede. This thesis describes the current methodology for developing theater plans based on the national strategies established by the President, Secretary of Defense and Chairman of the Joint Chiefs of Staff. In addition, it provides an analysis of the system stakeholders in order to define the purpose and utility of a strategic assessment from various perspectives. Based on this analysis, the requirements and functions of the system are decomposed and arranged according to a hierarchy via Vitech's CORE 8 University Edition. Finally, the developed model is tested against a notional scenario that assesses a fictional exercise according to the derived functional model, in order to demonstrate the methodology used to relate activities to strategic goals. This thesis defines the framework for conducting strategic assessments and leveraging them to maximize the impact of U.S. activities.

14. SUBJECT TERMS Strategic Assessment, Functional Architecture, Assessment Framework, Combatant Commands, Theater Assessment Development	15. NUMBER OF PAGES 137
	16. PRICE CODE

17. SECURITY CLASSIFICATION OF REPORT	18. SECURITY CLASSIFICATION OF THIS PAGE	19. SECURITY CLASSIFICATION OF ABSTRACT	20. LIMITATION OF ABSTRACT
Unclassified	Unclassified	Unclassified	UU

NSN 7540-01-280-5500

Standard Form 298 (Rev. 8-98)
Prescribed by ANSI Std. Z39.18

THIS PAGE INTENTIONALLY LEFT BLANK

Approved for public release; distribution is unlimited

A SYSTEM ENGINEERING APPROACH TO DEFINE THE FUNDAMENTAL PROCESS FOR PHASE 0/STEADY STATE THEATER-LEVEL STRATEGIC ASSESSMENTS

Robert J. Toohig Jr.
Lieutenant, United States Navy
B.S., Pennsylvania State University, 2006

Submitted in partial fulfillment of the
requirements for the degree of

MASTER OF SCIENCE IN SYSTEMS ENGINEERING

from the

NAVAL POSTGRADUATE SCHOOL
JUNE, 2012

Author: Robert J. Toohig Jr.

Approved by: Eugene Paulo, PhD
Thesis Advisor

Alejandro Hernandez, PhD
Co-Advisor

Richard M. Brown III
Second Reader

Cliff Whitcomb, PhD, CSEP
Chair, Department of Systems Engineering

THIS PAGE INTENTIONALLY LEFT BLANK

ABSTRACT

This thesis describes a functional framework for developing strategic assessment at the Combatant Command level, specifically European Command. The framework establishes a functional architecture based on derived requirements and objectives according to the systems engineering process described by Dennis Buede. This thesis describes the current methodology for developing theater plans based on the national strategies established by the President, Secretary of Defense and Chairman of the Joint Chiefs of Staff. In addition, it provides an analysis of the system stakeholders in order to define the purpose and utility of a strategic assessment from various perspectives. Based on this analysis, the requirements and functions of the system are decomposed and arranged according to a hierarchy via Vitech's CORE 8 University Edition. Finally, the developed model is tested against a notional scenario that assesses a fictional exercise according to the derived functional model, in order to demonstrate the methodology used to relate activities to strategic goals. This thesis defines the framework for conducting strategic assessments and leveraging them to maximize the impact of U.S. activities.

THIS PAGE INTENTIONALLY LEFT BLANK

TABLE OF CONTENTS

THIS PAGE INTENTIONALLY LEFT BLANK

LIST OF FIGURES

LIST OF TABLES

THIS PAGE INTENTIONALLY LEFT BLANK

LIST OF ACRONYMS AND ABBREVIATIONS

AOR	Area of Responsibility
ECJ5	Policy, Strategy, Partnering, and Capabilities Directorate
ECJ7	Assessment and Analysis Directorate
CJCS	Chairman of the Joint Chiefs of Staff
COCOM	Combatant Commander
CCP	Country Cooperation Plan
DoD	Department of Defense
DoS	Department of State
FCC	Functional Combatant Commander
GCC	Geographic Combatant Commander
IPR	In Progress Review
GEF	Guidance for the Employment of the Forces
JCS	Joint Chiefs of Staff
JSCP	Joint Strategic Capabilities Plan
LOA	Line of Activity
LOE	Line of Effort
MOE	Measure of Performance
NMS	National Military Strategy
NSS	National Security Strategy
NATO	North Atlantic Treaty Organization
QDR	Quadrennial Defense Review
SECDEF	Secretary of Defense
SLOE	Specific Line of Effort
SME	Subject Matter Experts
SOCEUR	Special Operations Command, Europe
RCP	Regional Cooperation Plan
TCP	Theater Campaign Plan
TCSMIS	Theater Cooperation Security Management System
USAFRICOM	U.S. African Command
USAREUR	U.S. Army Europe

USCENTCOM	U.S. Central Command
USEUCOM	U.S. European Command
USNORCOM	U.S. Northern Command
USPACOM	U.S. Pacific Command
USSOUTHCOM	U.S. Southern Command
VEO	Violent Extremist Organization
VTC	Video Teleconference

EXECUTIVE SUMMARY

In June 2011, U.S. European Command's Assessment and Analysis Directorate made a presentation to the Naval Postgraduate School researchers where they expressed a desire to improve the strategic assessment process such that it was useable, feasible and repeatable. Since assessments are based on individual reports, transform vast amounts of data into a strategic presentation and inform decisions and plans, the systems engineering process, as described by Dennis Buede, was required to determine system boundaries, interactions, requirements and functions to satisfy the goals expressed by the directorate.

This thesis applied that process to develop a functional architecture to define a framework for strategic assessment. This process began by identifying stakeholders of the assessment system, including developers, decision makers, and end product users. From this list, a collection of individual needs was aggregated into an effective need that states the purpose of conducting strategic assessments. The statement of need is to develop theater-level assessment capability for the purpose of evaluating current Phase 0/Steady State activities and operations to shape and modify future allocation of resources in order to support and advance the interests of the United States with respect to the European Theater.

From this need a set of objectives and requirements was derived that provides measures of system satisfaction and the foundation for the functions performed by the system. Six top-level functions describe the actions that when performed, will facilitate the achievement of the effective need. The decomposition of these six functions, coupled with their arrangement into a functional process, defines the functional architecture for the system and establishes the structure for relating tactical activities to the strategic goals and desired end states.

A fictional military exercise is described in the European area of responsibility and is assessed against a notional set of goals at the theater, regional and country levels according to the functional model developed in this thesis. The hypothetical assessment illustrates how the assessment links activities at the tactical level to the strategic goals and desired end states through a series of incremental steps corresponding to the planning levels of abstraction (i.e. strategic, operational and tactical).

The functional architecture developed in this thesis provides traceability between the strategic and tactical levels of abstraction. These linkages are not necessarily direct connections; rather the assessment establishes them through a series of smaller steps. This method of relating tactical events to strategic end-states permits the assessor to communicate via the strategic assessment that informs not only whether an action supports strategic goal, but also how the action supported the goal. This understanding facilitates plan development that incorporates the assessment's findings in order to enhance the Combatant Command's ability to implement strategy.

By clearly stating the assessment through a series of well-defined smaller linkages, decision makers gain a better understanding of a given activity's impact on the AOR at various levels of abstraction. They also can more accurately identify risks and impediments to achieving the American goals, by observing the connection between a given level and the level upon which it is built.

ACKNOWLEDGMENTS

To my wife, Holly, and children, Aidan and Connor, I would like to express my deepest appreciation for your sacrifice and understanding when my thesis work kept me away from spending time with you. I could have never have completed my degree without your unending support.

To my advisors, Professor Eugene Paulo and Professor Alejandro Hernandez, I offer my profound gratitude for your guidance and insights into system engineering and the thesis development. Your advice provided me the latitude to explore an area that is relevant and interesting to a naval officer while remaining focused on a clearly defined research area.

I would also like to thank Professor Mitch Brown, my second reader, for your assistance in understanding the nature of national strategy development and decision making at senior levels. My understanding of the operations and functions of the COCOMs greatly benefited from your instruction and our conversations.

To Bill Hershberger and the entire U.S. European Command's Assessment and Analysis Directorate, I sincerely appreciate your assistance and time spent increasing my knowledge and understanding of your work developing strategic assessments. Your constant interactions and feedback have made my research and thesis work rewarding and relevant.

I would also like to thank LT Ben Abeto, Mr. Paul Beery and LT Warren Bong for their insights and opinions during the development of this model and our fact-finding trips to USEUCOM and USSOUTHCOM. Your perspectives aided me in considering the entire scope of the problem.

I would also like to thank the NPS Systems Engineering Department for providing me the tools and academic prowess required to complete my academic requirements.

Finally, I would like to thank my friends and family for their unwavering love and support. My experiences with you have helped establish my commitment to excellence, drive to succeed and devotion to my loved ones.

I. INTRODUCTION

> In the execution of our acknowledged “very good, yet still imperfect” strategy we need a mechanism for making adjustments. We need to be able to assess our performance and our effectiveness.
>
> —Admiral James G. Stavirdis 2010

A. BACKGROUND

As technological advancements reduce the time required to move people, goods, and services, while simultaneously allowing for nearly instantaneous communication between remote locations around the globe, the United States is a member of a highly integrated and alliance-focused global community that is capable of addressing current challenges (The White House 2010, ii). In fact, the United States continues to take the lead in assuring freedom of movement and commerce throughout the world through its active international presence.

The Department of Defense (DoD) divides the world into geographic regions under the command of senior military leadership in order to facilitate international ties in cooperation with other agencies, such as the U.S. Department of State (DoS) and the Ambassadors to given countries. Figure 1 illustrates how the U.S. DoD divides geographic responsibilities among the Combatant Commands (COCOMs).

Figure 1. COCOM Area of Responsibility (AOR) (From The White House 2011)

The Secretary of Defense (SECDEF) in coordination with the Chairman of the Joint Chiefs of Staff (CJCS) tasks the COCOMs to develop a wide range of plans to define a range of activities including peace time training, conflict intervention, and construction (U.S. Joint Chiefs of Staff, 2011a, II-6). These plans describe what efforts the COCOMs will undertake in cooperation with other American agencies, Nongovernment Organizations (NGOs) and other countries in order to achieve the stated goals and end states.

Strategic Assessments are the COCOM's mechanism to evaluate and communicate the state of affairs in their AORs and describe the results of their efforts. Given the current national security threats and budgetary realities, the Pentagon is shifting financial and military resources away from Europe (Dreazen 2012). In the near future, it is likely that these assessments will also be used to illustrate where additional resources are required or where they can be more efficiently used.

B. OBJECTIVE

The challenges of developing, evaluating, and implementing an effective assessment methodology is the essence of an ongoing NPS research effort. This thesis directly supports this research effort by utilizing a systems engineering approach to examine all aspects of the current Theater Campaign Plan (TCP), while addressing the many areas important to the development of U.S. national security interests in the theater. Based on initial input from USEUCOM, of particular interest to the decision maker is to enable useful, feasible, and repeatable TCP assessments. But these three terms are ill-defined and the answers vary based on perspective.

During a video teleconference (VTC) in June 2011, USEUCOM presented many of their current challenges with the assessment process. The presentation described how the Assessment and Analysis Directorate (ECJ7) utilizes compiled data to assess USEUCOM's TCP. The entire plan is assessed annually, divided among four quarterly assessments (Assessment and Analysis Directorate [ECJ7] 2011b, 9).

The objective of this research is to analyze the inputs to the assessment process, the needs of those who use the TCP assessment, and the relationship between the investment of U.S. resources and the desired strategic outcomes. This study will be translated into objectives, requirements, and functions needed to satisfy the characteristics, useful, feasible, and repeatable, and construct a formal framework for developing and integrating strategic assessments into the process of constructing and implementing strategies among the COCOMs.

C. PROBLEM DEFINITION

Under current guidance, the COCOMs are required to generate multiple assessments to different audiences (U.S. Joint Chiefs of Staff, 2011a, D-7). COCOMs present two extensive and separate assessments to SECDEF and CJCS; the nature of the information contained in these assessments does not easily provide feedback on the TCP to USEUCOM, requiring an additional

assessment to inform the USEUCOM Commander (Kuenning 2011, 1). Since the three consumers of the strategic assessment, SECDEF, CJCS and COCOM Commander, have distinct needs, the answers they need from an assessment will necessarily differ; however the assessment itself can be independent of its use and the development process can be improved to enhance efficiency.

The complexity involved with developing the strategic assessments stems from numerous factors. These factors include determining appropriate metrics to measure progress, the evaluation of current realities in the AOR against conducted operations, and preparation time for the assessment. The administrative time requirements involve formatting and tailoring the assessment information for the different audiences, i.e., USEUCOM Commander, CJCS and SECDEF. These complexities result in a large time demand that limits the effectiveness and utility of the assessment itself.

D. RESEARCH QUESTIONS

1. Primary Research Question

What are the critical functions that a strategic theater level assessment must perform to support decision makers?

2. Secondary Research Questions

How are the terms “useful, feasible and repeatable” defined within the context of strategic assessment?

How does the assessment process transform inputs into outputs?

How does the assessment relate activities conducted in the AOR to strategic end states?

E. SCOPE AND LIMITATIONS

A fact-finding trip to USEUCOM’s Headquarters in September 2011 garnered insight into the workings of ECJ7 to determine how to scope this research effort. The ECJ7 is divided into two divisions: the Theater Division and the Operation Division (Assessment and Analysis Directorate [ECJ7] 2011b, 7). The Operation Division works with the ECJ3 to develop and assess current and

future operations; these tend to be less time intensive and do not attempt to assess how the operations affect the greater theater-level concerns. The Theater Division works with ECJ5 to develop and assess future plans to be implemented in the AOR. These plans also involve contingency plans to use at short notice. ECJ7 conducts assessments on those plans, as well as other theater-wide plans implemented by commands that operate across COCOMs.

Due to the robust and diverse nature of strategic assessments, this thesis limits consideration of strategic assessments to those that focus on Phase 0/Steady State operations within USEUCOM's AOR, specifically focusing on the interactions between the end states provided in the Guidance for the Employment of the Force (GEF), TCP, Regional Cooperation Plan (RCP) and Country Cooperation Plan (CCP).

F. EFFECTIVE NEED

Based on the problem definition and scoping of the problem, the effective need presented in USEUCOM's assessment community is to:

> Develop theater-level assessment capability for the purpose of evaluating current Phase 0/Steady State activities and operations to shape and modify future allocation of resources in order to support and advance the interests of the United States with respect to the European Theater.

G. PROPOSED SOLUTION

To satisfy the effective need, this thesis proposes the following solution:

> Develop an assessment process architecture that maps to the planning process architecture. By utilizing objective evidence from the tactical level to inform the Measures of Performances (MOPs) of the CCP, a base assessment of how the CCPs support the RCP, which in turn supports the TCP and by extension the GEF Theater end states. This structure provides the European Commander with the tools to determine where to employ resources and assets to achieve the desired end state and objectives.

H. METHODOLOGY

This project utilized the systems engineering process described by Dennis Buede's *The Engineering Design of Systems: Models and Methods* (2009) to develop a functional architecture. It produced a stakeholder analysis, objective hierarchy, list of requirements and functional analysis. Together, these products describe what must occur to relate tactical-level information to theater-level end states and goals.

I. ORGANIZATION

Chapter II discusses the COCOM's current structure and how it develops theater-level assessments. Chapter III explains the research methodology, stakeholder analysis, objective hierarchy and list of requirements. Chapter IV describes the development of the functional architecture. Chapter V applies a notional scenario to the model to demonstrate its effectiveness. Chapter VI presents conclusions and recommendations for further research.

II. COMBATANT COMMANDER'S ROLE IN U.S. NATIONAL SECURITY

> More than any point in human history—the interests of nations and people are shared.
>
> —President Barack Obama,
> UN General Assembly,
> September 22, 2009

A. PLANNING GUIDANCE

1. National Security Strategy

The National Security Strategy (NSS) is the document that outlines the President's view of the strategic environment and the approach to affect change on that environment (The White House 2010, i). President Obama described this as the difference between the "world as it is" and the "world we seek" (The White House 2010, 7, 9). The most recent NSS stresses the need to work with the international order to address global challenges, stating that "the starting point for that collective action will be our engagement with other countries" (The White House 2010, 3). The NSS does not specifically dictate to the DoD what objectives it must achieve, but rather provides the context for their focus. The SECDEF defines these objectives in the Quadrennial Defense Review (QDR).

2. Quadrennial Defense Review

The QDR builds off the President's view of national security and defines the DoD's strategy to satisfy challenges the NSS describes. It provides military planners with initiatives that their plans must address: congruent with the global point of view of the NSS, the 2010 QDR restates the need to cooperate with allies to increase global security. The key initiatives from that document relating to building security capacity of partner states are:

- Strengthen and institutionalize general purpose force capabilities for security force assistance
- Enhance linguistic, regional and cultural ability
- Strengthen and expand capabilities for training partner aviation forces
- Strengthen capacities for ministerial-level training
- Create mechanisms to expedite acquisition and transfer of critical capabilities to partner forces (Department of Defense. 2010)

The JCS utilizes the QDR and NSS to develop the method that the military will use to advance national interests and communicate that in the National Military Strategy (NMS).

3. National Military Strategy

The NMS provide military leaders with the JCS's vision for the utilization of the Joint Force. The 2011 NMS promotes three encompassing themes:

- Joint Forces' leadership approach is as important as the military capabilities
- The security environment is constantly changing, and it requires the Joint Force to foster relationships with allies to develop security partnerships
- The Joint Force must prepare for a dynamic and uncertain future (U.S. Joint Chiefs of Staff, 2011b)

The combination of the strategies put forth in the NSS, QDR, and NMS result in the GEF.

4. Guidance for the Employment of the Forces

The GEF describes the strategic and functional end states that COCOMs' plans will support when executed. The document consolidates five distinct guidance documents and then feeds in the Joint Strategic Capabilities Plan (JSCP), as shown in Figure 2.

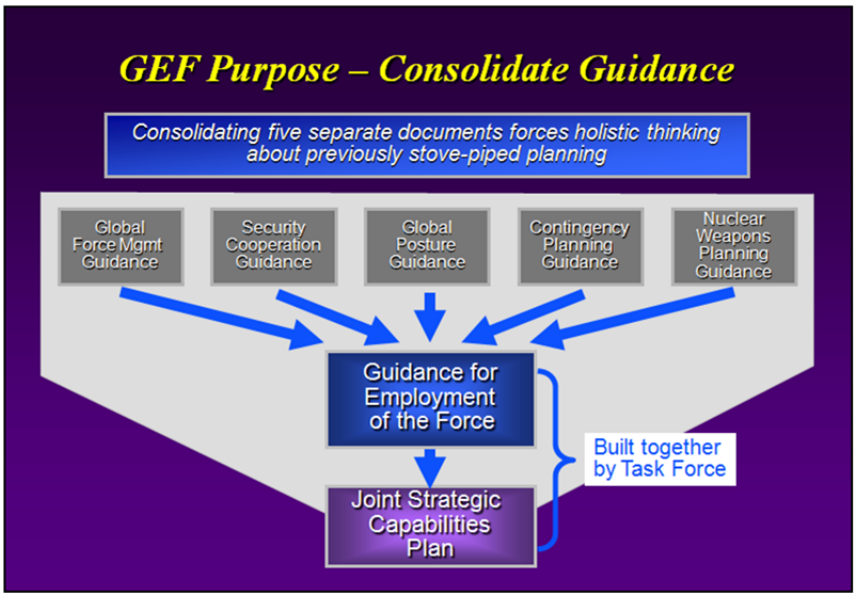

Figure 2. GEF Guidance Consolidation (From Nix 2012, 17)

The GEF also directs COCOMs to develop campaign plans to meet the theater and functional end states described within the document. To assist the combatant commanders in supporting the national strategy, the document provides them with the following (Sweeny 2009, 2):

Strategic end states for campaign planning

Strategic assumptions

Prioritized contingency planning scenarios and end states

Global posture and global force management guidance

Security cooperation priorities

Overarching DoD and U.S. nuclear policy

The GEF divides combatant commanders into two categories: functional and geographic (FCC and GCC, respectively). Figure 3 specifically identifies the commanders addressed in the GEF.

Figure 3. Functional and Geographic Combatant Commanders (From Nix 2012, 23)

5. Joint Strategic Capabilities Plan

Whereas the GEF defines what combatant commanders must do, the JSCP provides guidance on how to plan for the prescribed end states (Sweeny 2009, 4). The JSCP is the CJCS's opportunity to communicate with the GCC, and formalizes their involvement into the planning process. This document connects the strategic-level guidance and the planning activities and provides commanders with a list of available forces and capabilities to complete their mission (National Defense University, 2000, 4-20).

B. USEUCOM PLANNING PROCESS OVERVIEW

1. Theater Campaign Plan

Based on the guidance and strategies of the previously described documents, and the priorities of the COCOM Commander, the planning directorate (ECJ5) generates a Theater Campaign Plan (TCP) that includes Theater Security Cooperation, Phase 0, and contingency plans for the entire AOR, fully illustrated in Figure 4. The TCP also incorporates plans from the FCCs, as their efforts occur around the globe.

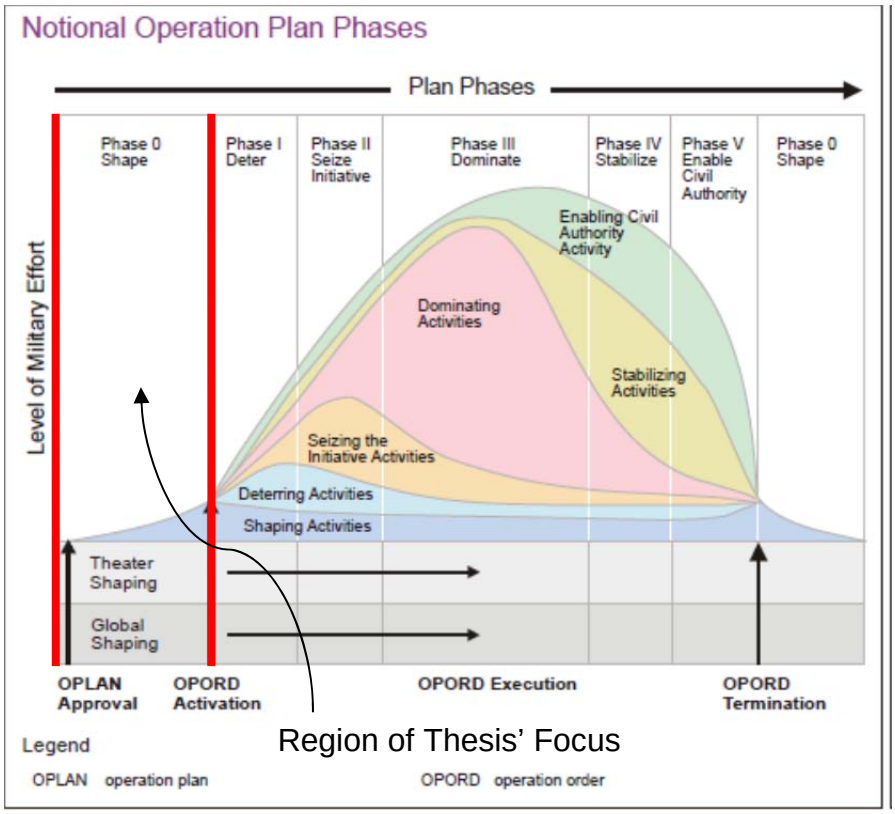

Figure 4. COCOM Operational Plan Phases
(From U.S. Joint Chiefs of Staff 2011b, III-39)

The purpose of the USEUCOM's TCP is to:

- Direct the headquarters' staff, components and Special Operations Command, Europe (SOCEUR) with specific tasks and guidance that will contribute to accomplishing the theater objectives in relationship to the theater priorities
- Inform SECDEF and Joint Planning and Execution Community of the commander's strategy to accomplish strategic goals, objectives and end states
- Establish a common picture of the strategic security environment
- Operationalize the commander's vision, mission, theater objectives and theater priorities
- Establish a framework to integrate, coordinate and synchronize steady state activities
- Link strategic guidance to events and activities (Assessment and Analysis Directorate [ECJ7] 2011a, 3)

A matrix is developed in accordance with the derivation of strategic-theater level objectives, the objectives are across the horizontal axis and the Lines of Effort (LOEs), developed from the commander's priorities are located on the vertical axis. The intersection of the rows and columns becomes the Specific Lines of Efforts (SLOEs).

Next, planners assign countries to applicable SLOEs and the completed matrix becomes the RCP. Table 1 illustrates a notional matrix prior to assigning countries with SLOEs.

Theater Objectives / LOEs	Objective 1	Objective 2	Objective 3	Objective 4	Objective 5	Objective 6
LOE 1	SLOE 1.1	SLOE 2.1	SLOE 3.1	SLOE 4.1	SLOE 5.1	SLOE 6.1
LOE 2	SLOE 1.2	SLOE 2.2	SLOE 3.2	SLOE 4.2	SLOE 5.2	SLOE 6.2
LOE 3	SLOE 1.3	SLOE 2.3	SLOE 3.3	SLOE 4.3	SLOE 5.3	SLOE 6.3
LOE 4	SLOE 1.4	SLOE 2.4	SLOE 3.4	SLOE 4.4	SLOE 5.4	SLOE 6.4
LOE 5	SLOE 1.5	SLOE 2.5	SLOE 3.5	SLOE 4.5	SLOE 5.5	SLOE 6.5

Table 1. Notional RCP Planning Matrix

The plans are further refined down to the country level by locating all of the SLOEs for a given country. Finally, COCOM planners assign a standardized Line of Activity (LOA) for every LOE (Assessment and Analysis Directorate [ECJ7] 2011a, 19) and this collection of SLOEs and LOAs for the given country becomes the CCP. Component commanders develop missions from these plans and provide them to tactical commanders for execution.

2. Planning Process Architecture

The previous section described the series of publications that build upon each other in order to achieve the U.S. leadership's vision. The necessary plans evolve from general strategies; as the level abstraction progresses down from the strategic to the tactical, the scope narrows and the specifics increase. Visually, Figure 5 shows how the plans are used to move to the lower level in the planning pyramid.

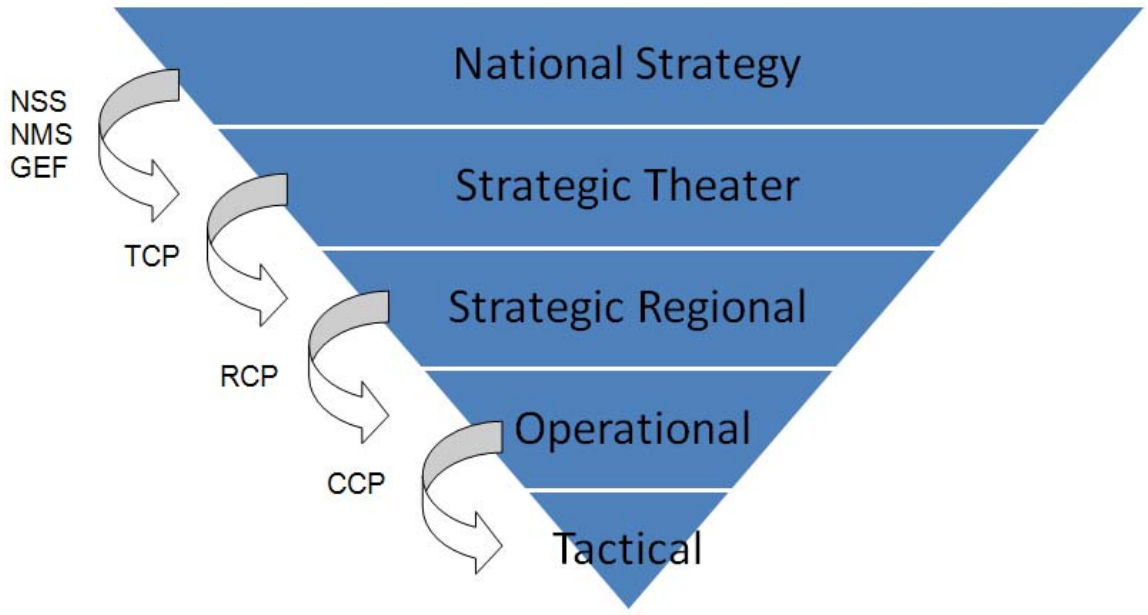

Figure 5. Planning Process Architecture

C. USEUCOM PHASE 0 ASSESSMENT PROCESS OVERVIEW

ECJ7 works with the Policy, Strategy, Partnering, and Capabilities Directorate (ECJ5) to develop the strategic assessments that result from examining the LOAs and their associated MOEs and MOPs. Figure 6 illustrates the current assessment process and the collaboration between the two directorates. The input into the described assessment process is LOA assessment reports, often obtained via the Theater Security Cooperation Management Information System (TCSMIS). These reports utilize feedback from the tactical commanders on the mission via classified networks. In some instances, these reports do not fully capture the breadth of information needed for a complete assessment. To compensate for this occurrence, assessors include information from both classified and unclassified sources to obtain a more complete understanding of events and their effects.

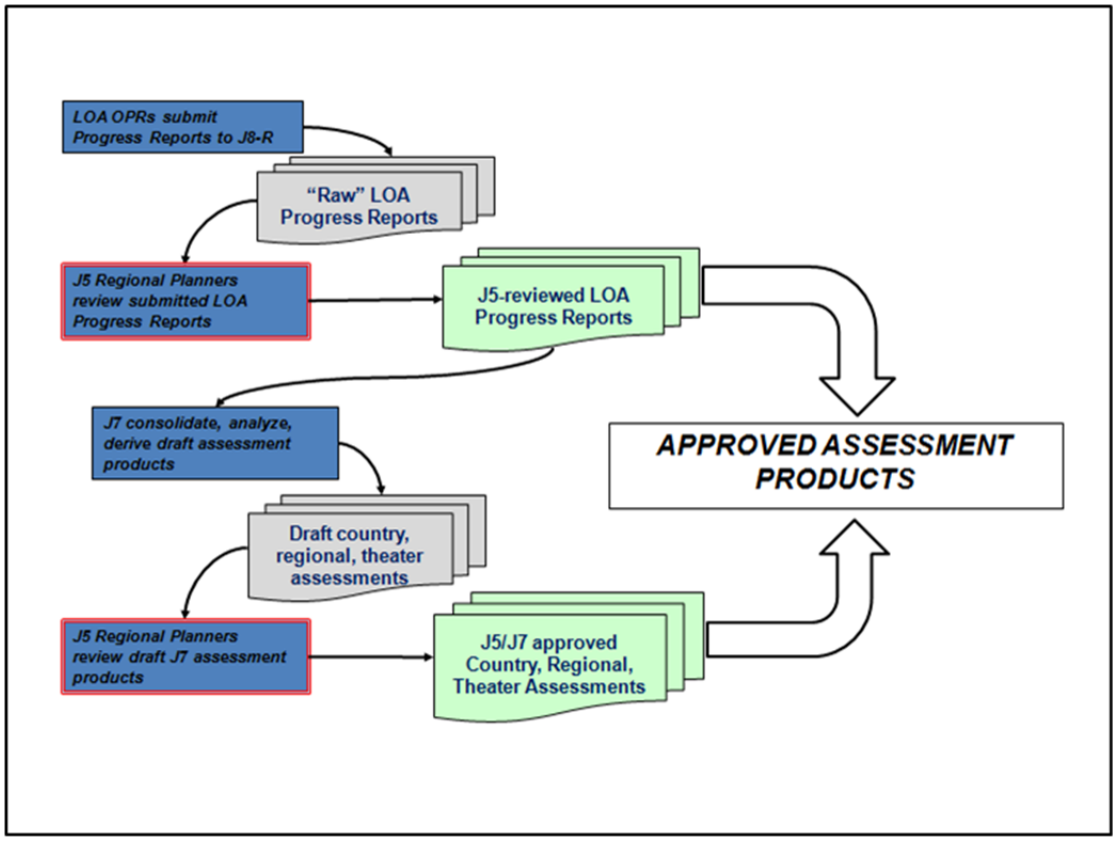

Figure 6. ECJ5-ECJ7 Notional Assessment Process (From Assessment and Analysis Directorate [ECJ7] 2011b, 11)

ECJ7 conducts quarterly progress reports to develop a cumulative annual plans-based, bottom-up assessment (Assessment and Analysis Directorate [ECJ7] 2012b 9). The quarterly reports are generated from the LOA progress reports, identify hindrances, obstacles and shortfalls, and identify the status of the outcomes or tasks.

ECJ7's goal for these assessments is to inform senior leadership such as SECDEF, CJCS, the USEUCOM Commander, and Component Commanders (Kuenning 2011, 1). Each of these leaders has different needs and expectations, complicating the Directorate's ability to use a repeatable process that results in products that are useful and feasible. Due to the ambiguous nature of the linkages between efforts and outcomes, and the diversity of the stakeholder's needs, Dennis Buede's systems engineering approach described in Chapter III, is used to develop a functional architecture that establishes the foundation for developing an efficient system to produce a strategic assessment of USEUCOM's AOR.

THIS PAGE INTENTIONALLY LEFT BLANK

III. DEFINING THE DESIGN PROBLEM

> Defining the design problem in systems engineering is one of several keys to success and can be approached systematically using engineering techniques.
>
> —Dennis M. Buede (2009, ix)

A. METHODOLOGY

The systems engineering process described by Buede facilitated the creation of a system capable of assessing USEUCOM's AOR during the implementation of the phase 0/steady state plans. *The Engineering Design of Systems* identifies five functions for system design (2009, 39):

1. Define the Design Problem
2. Develop Functional Architecture
3. Design Physical Architecture
4. Develop Allocated Architecture
5. Obtain Approval and Document

The first function establishes the boundaries for the system, and determines the objectives and requirements based on the needs of the system's stakeholders.

B. OPERATIONAL CONCEPT

1. Definition

Buede defines the operational concept as "a vision for what the system is (in general terms), a statement of mission requirements, and a description of how the system will be used" (2009, 67).

Recall the effective need stated earlier in this thesis:

> Develop theater-level assessment capability for the purpose of evaluating current Phase 0/Steady State activities and operations to shape and modify future allocation of resources in order to

support and advance the interests of the United States with respect to the European Theater.

Thus, the Strategic Assessment system will receive qualitative and quantitative data detailing the events of a mission, including those still in progress and those completed. Additionally, it applies the assessment process, compare the effects to those described in the plan, and relates outputs to the outcomes. Figure 7 provides a graphical representation of this process.

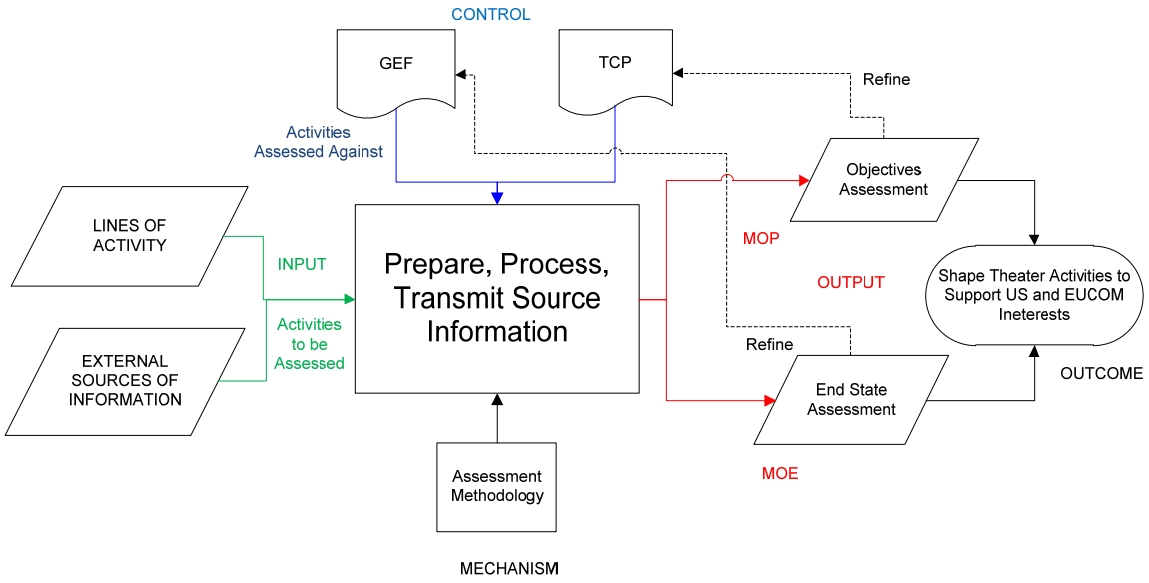

Figure 7. Representation of Proposed Strategic Assessment System

2. System Boundaries

The ECJ7 Directorate will utilize the assessment system to satisfy appropriate stakeholders. A collection database stores much of the source information considered to be within the system boundary. The basis for the placement of the boundary is that the entities are fixed and unalterable; no reorganizing occurs in the military organizations. Such a reorganization is beyond the scope of this thesis, and for the purposes of this analysis is considered a

constraint. Figure 8 describes the interactions between the proposed system and those outside the boundary.

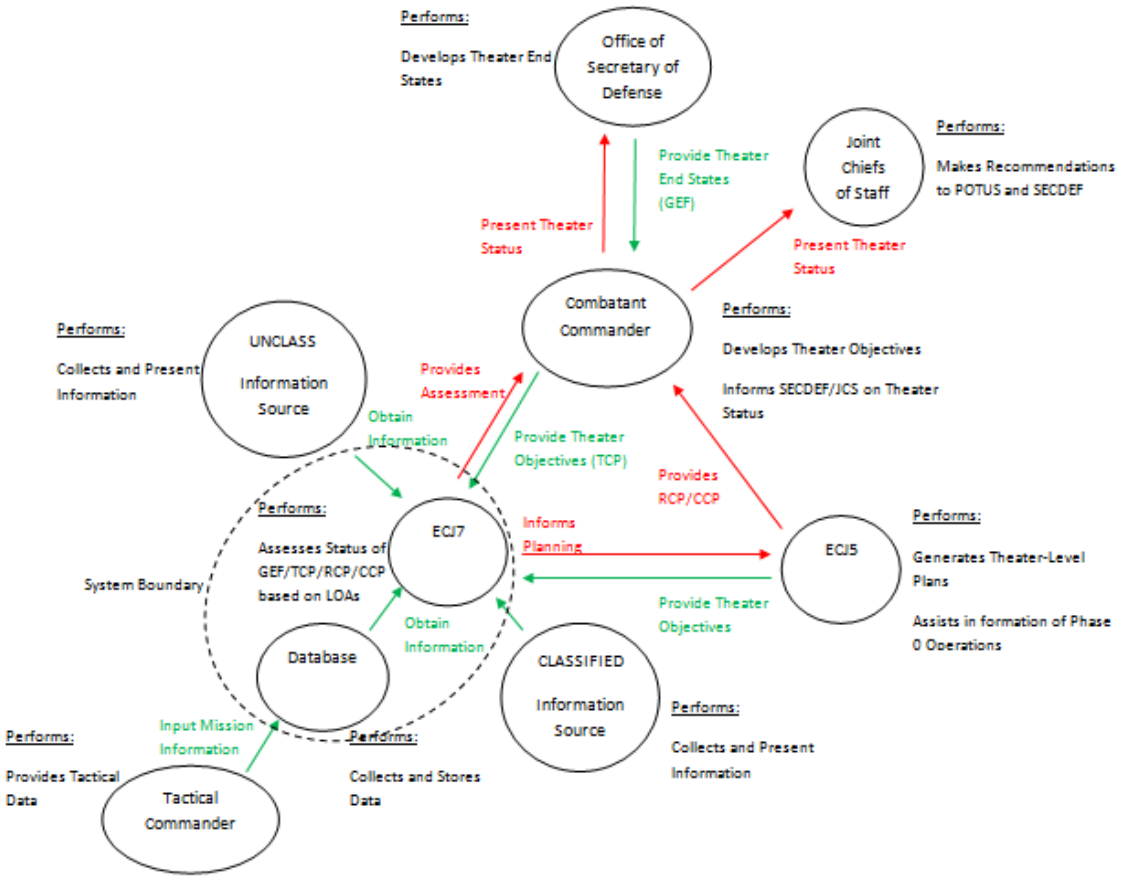

Figure 8. OV-2: External System Interaction

3. System Interactions

Need lines describe the interactions between the proposed system and the external systems; each interaction describes what is inputted into the system or taken from the system as an output. The transformation of the inputs into the outputs facilitates the desired outcomes described in the effective need.

a. Office of the Secretary of Defense

The OSD, under the direction of the SECDEF, defines the Theater End States. When distributed to USEUCOM, these end states serve as the

foundation for the TCP objectives. ECJ7 provides OSD with a strategic assessment that assists the USEUCOM Commander in the understanding of the strategic environment present in EUCOMS's AOR, by describing the linkage between activities conducted and realities within the countries, regions, and which are present theater-wide.

b. The Joint Chiefs of Staff

The JCS does not directly affect the theater end states. However through the NMS, the JCS influences the USEUCOM Commander's theater objectives. Similar to OSD, JCS receives a separate assessment that addresses questions that the CJCS requires to function in an advisory role to the President.

c. Combatant Commander

The Combatant Commander is the hub through which the systems interact. The commander receives guidance and end states from OSD and JCS, while providing direction to their staff via the Commander's priorities and approves the RCP and CCP from ECJ5. The complete theater plan is the metric that ECJ7 uses in the assessment process.

The Combatant Commander reviews the strategic assessments from the ECJ7 prior to OSD and JCS. They also use the assessment to increase their understanding of their AOR, in order to improve the effectiveness of their plans.

d. ECJ5

This directorate generates the Phase 0/steady state plans for USEUCOM and defines the standard LOAs used by the component commands. They also provide ECJ7 with the plans to assess. They receive the assessment of the generated plans; the assessment provides lessons learned that improve the next iteration of theater plans.

e. Tactical Commanders

Tactical Commanders implement the designed plans and provide a description of the mission to ECJ7, via LOA reports. The commanders do not directly communicate with ECJ7. Rather, they submit their report to TCSMIS, accessed by ECJ7.

f. External Sources of Information (Classified or Unclassified)

These sources of information provide context and additional information to support the assessment development. This is a passive interaction; ECJ7 seeks out the required information when necessary.

C. STAKEHOLDER ANALYSIS

According to Buede, stakeholders are organizations and individuals who define the objectives for the system. Prior to defining the objectives, one must identify the stakeholders and determine their needs. The level of interaction with the system will alter the stakeholder's perspective and desires. This analysis classifies the stakeholders into four classes with relation to the assessment system. The first are decision makers, this class uses the assessment to inform decisions about future strategies, such as SECDEF. The second class is system users, these are the stakeholders that implement the system, and example of this class is ECJ7. The third class of stakeholder is system product users, these groups or individuals use the assessment as inputs into their respective system, ECJ5 is an stakeholder in this class. The final class is referred to as "other," thes stakeholders do not share a unifying characteristic but still interact with the system and are invested in the success of the assessment process, the Ambassador to a given country would be in this class.

A list of questions considered for the stakeholders follows (in no particular order):

- What must a strategic assessment accomplish to be considered "useful"?
- What attributes must a strategic assessment possess to be considered "feasible"?
- What are types of input sources used to generate a strategic assessment?
- Who collects the data?
- What is the review process for the strategic assessment?
- What is the appropriate distribution for the strategic assessment?
- How long is a strategic assessment valid?
- How should the information be presented to decision makers (i.e., statistics-focused or conclusion-focused)?
- How can the assessment process be improved with each iteration?
- How does the strategic assessment affect the planning process?
- How does the strategic assessment influence resource allocation?

1. Decision Makers

Below is a list of stakeholders characterized as decision makers:

- Chairman of the Joint Chiefs of Staff
- Secretary of Defense
- Joint Chiefs of Staff
- USEUCOM Commander
- ECJ7 Director
- ECJ5 Director

These stakeholders use the output of the assessment process to shape policy to reach the desired strategic end states and goals. Direct solicitation of this group

was not possible, so an interview with Mr. Mark Bellchambers from Noetic Group occurred on December 1, 2011. His work involves improving the strategic assessment abilities for all of the COCOMS, via consultation with COCOMs and OSD. His knowledge in this study allows him to be considered a subject matter expert (SME) on the current assessments processes. The interview avoided his opinions on what should occur, but focused on what is currently happening. His insight into the desires of senior leadership with respect to strategic assessment provided key information in understanding this group of stakeholders.

Based on the interview, SECDEF is looking for COCOMs to be sufficiently versed in what efforts occurred and those still in progress within their AOR, in addition to how those efforts are affecting the AOR. This desire implies that simply providing a graphical display or a "dashboard" of the assessments findings is insufficient.

This aversion to dashboards is not necessarily constant between different administrations, so products of the system must be detailed enough to inform decision makers about the status of the AOR, but flexible enough to vary presentation style to fit a given preference. To facilitate this flexibility, the assessment should identify the current status of an AOR at the strategic level, an analysis of trends and a discussion of other driving factors.

2. System Users

There is only one anticipated user of the system—the ECJ7 Strategic Assessment Division, which will develop the strategic assessment via the designed system. Between September 20 and 23, NPS researchers met with ECJ7 assessment personnel, primarily Mr. Bill Hershberger, to gain understanding on how they developed strategic assessments. Based on the division's extensive experience with developing strategic assessments, they are also considered SMEs.

These stakeholders connect efforts at the tactical level to strategic objectives and end states, via the assessment process. Thus, these

stakeholders need a system that can collect and store information from the tactical level, and offer them access to it, in order to assess the data. Their work must satisfy the desires of the decision makers in the USEUCOM AOR and Washington, D.C., in addition to communicating their findings to the planning directorate. This process requires significant time to compile the breadth of information into an effective assessment; considering the reporting requirements imposed on the assessment directorate. It is possible that quality will be sacrificed in order to address the concerns of senior leadership. They also need an end product capable of addressing the unique questions of the varied decision makers, without significant rework for each presentation.

3. System Product Users

The output of the proposed system is a strategic assessment of the current plans in the USEUCOM AOR. The next group of stakeholders uses this product to develop the next iteration of their particular activities.

- Office of Secretary of Defense
- ECJ5 Personnel
- Component Commanders
- Tactical Commanders

The mission of these stakeholders differs from each other, so there is no unifying trait among them other than an assessment is involved in their activities. While there was no direct elicitation with these organizations, the trip to USEUCOM provided insight into their relationship to the assessments. OSD conducts reviews of the assessments during In Progress Review (IPR) (U.S. Joint Chiefs of Staff 2011a, I-4). ECJ5 personnel utilize assessments when producing the next iteration of plans. Component Commanders and tactical commanders use given resources to implement the plans, and the quality of ECJ5's plans directly influences their ability to affect the AOR.

Based on interviews with Mr. Bellchambers and members of ECJ7, System Product Users need the given assessment to relate efforts to outcomes, in order to influence future plans, and the assessment shall be distributed in a timely manner to facilitate incorporating the findings into those plans.

4. Other

The last group of stakeholders is not involved with the planning or assessment process; however, they are connected to the implementation of all USEUCOM activities.

- State Department
- U.S. Ambassador
- Military Personnel in USEUCOM AOR

The U. S. Ambassador is the DoS representative in a given country and works with the particular government to facilitate the methods that Component Commands use to perform their given plans, such as a military-to-military exercise or a U.S. military operation. DoS may prevent an exercise from occurring, if it is not in the national interest; this conflict would hinder a plan's effectiveness and the assessment would note the conflict. DoD and DoS would then work together to eliminate the conflict.

Thus, as these stakeholders carry out or facilitate missions at a tactical level, they depend on sound plans that will present achievable goals that continue to foster U.S. strategic goals.

4. Effective Need

The analysis of the system stakeholders illustrates a number of needs relating to strategic assessments. The decision makers require a depth of information that connects efforts to outcomes. The system users must have a process that allows them to gather, review and transform data from the tactical level into an assessment that describes reality in the AOR. The system product users need access to the assessments in a timely manner to incorporate them

into their own products; finally, the assessment needs to improve the COCOM's ability to align the European AOR with strategic goals.

Combining these needs into a single need statement for the system yields the effective need:

> Develop theater-level assessment capability for the purpose of evaluating current Phase 0/Steady State activities and operations to shape and modify future allocation of resources in order to support and advance the interests of the United States with respect to the European Theater.

D. OBJECTIVE HIERARCHY

The objective hierarchy is a series of characteristics used by the stakeholders to measure their satisfaction with the system (Buede 2009, 57). These measures include cost and performance criteria and relate to meeting the effective need. Figure 9 illustrates the objective hierarchy based, on the needs previously discussed.

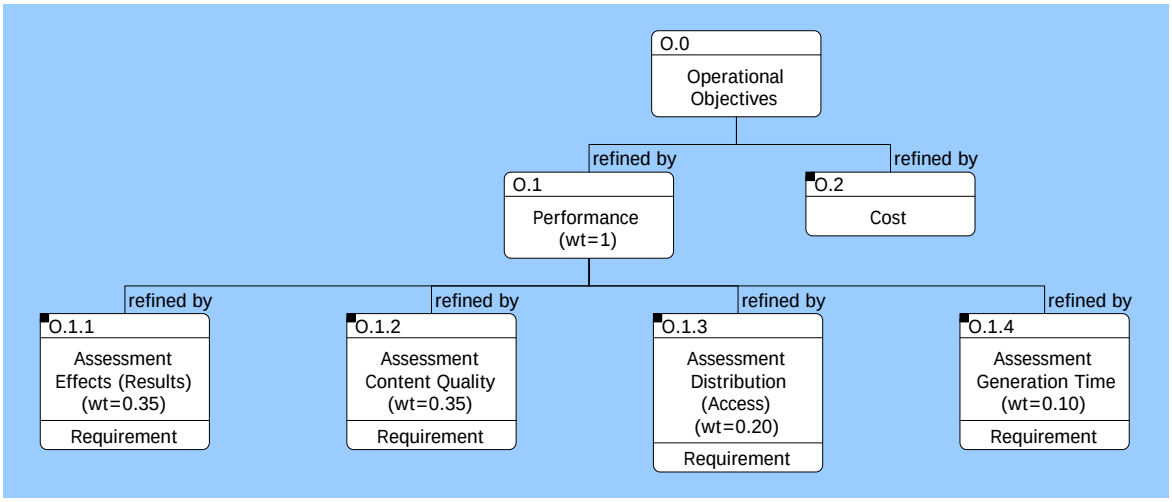

Figure 9. Objective Hierarchy

Cost is beyond the scope of this analysis. Therefore, only the performance objectives were weighted. These weights do not imply that those objectives are

not considered in the functional analysis described in Chapter IV, rather they stress that this analysis is focused on the performance of the system.

The specific performance weights are subjective, as they convey the decision maker's preferences and priorities. Objective 1.1 and 1.2 are the highest priority to the stakeholders and crucial to satisfying the effective need. Appendix A discusses the complete objective hierarchy, but the top two objectives are explored further below.

Objective 1.1 identifies the chain of outputs and outcomes of the assessment process. Figure 10 shows how the objective breaks down into subordinate objectives. This break down serves as a checklist to determine where to make improvements in the assessment process with respect to measuring the effects produced. Table 2 provides a description of each of the objectives shown above. It explains how each objective determines the utility of the assessment.

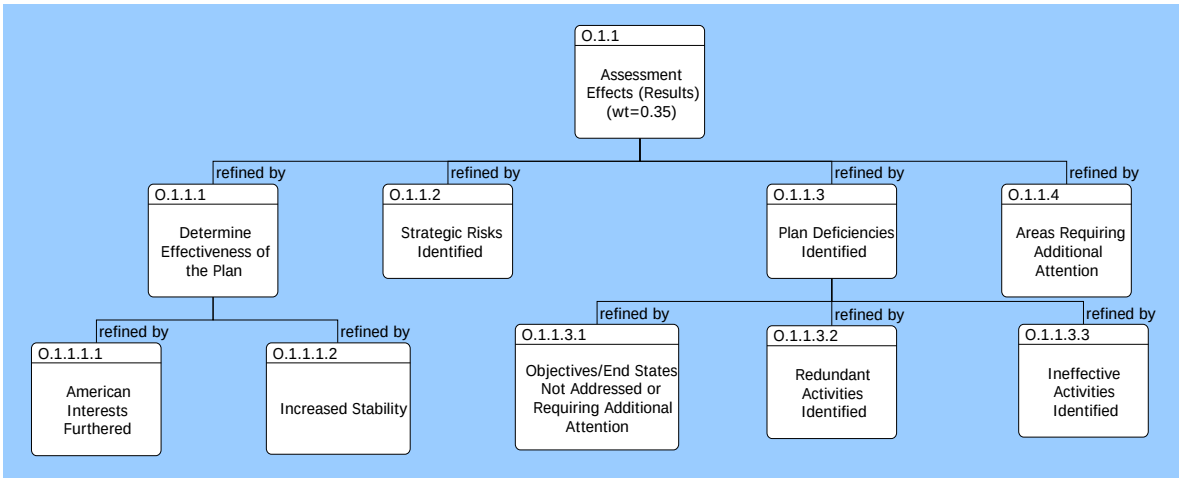

Figure 10. Objective 1.1 Decomposition

Objective Number	Objective Name	Objective Description
O.1	Performance (wt=1)	[redacted]
O.1.1	Assessment Effects (Results) (wt=0.35)	
O.1.1.1	Determine Effectiveness of the Plan	Determine how effective the plan was in producing the desired strategic end states and objectives
O.1.1.1.1	American Interests Furthered	Were American interests furthered in AOR? May or may not be independent of USEUCOM plans.
O.1.1.1.2	Increased Stability	Was stability in the AOR increased? May or may not be independent of USEUCOM plans.
O.1.1.2	Strategic Risks Identified	Identify strategic risks facing AOR. May or may not be independent of USEUCOM actions
O.1.1.3	Plan Deficiencies Identified	Identify areas where the plans have flaws or require improvement
O.1.1.3.1	Objectives/End States Not Addressed or Requiring Additional Attention	Identify areas where the strategic end states and goal require additional attention
O.1.1.3.2	Redundant Activities Identified	Identify activities that accomplish similar effects seen from other activities
O.1.1.3.3	Ineffective Activities Identified	Identify areas that are having no measurable effect on strategic goals or end states
O.1.1.4	Areas Requiring Additional Attention	Identify components of strategic end state or goals that are not supported or weakly supported by current activities

Table 2. Description of Objective 1.1's Sub-Objectives

Objective 1.2 provides measurement of the strategic assessment content quality. This group of assessment objectives separates the elements that describe the feasibility and validity of the assessment. Figure 11 illustrates the decomposition of Objective 1.2, while Table 3 describes the individual objectives.

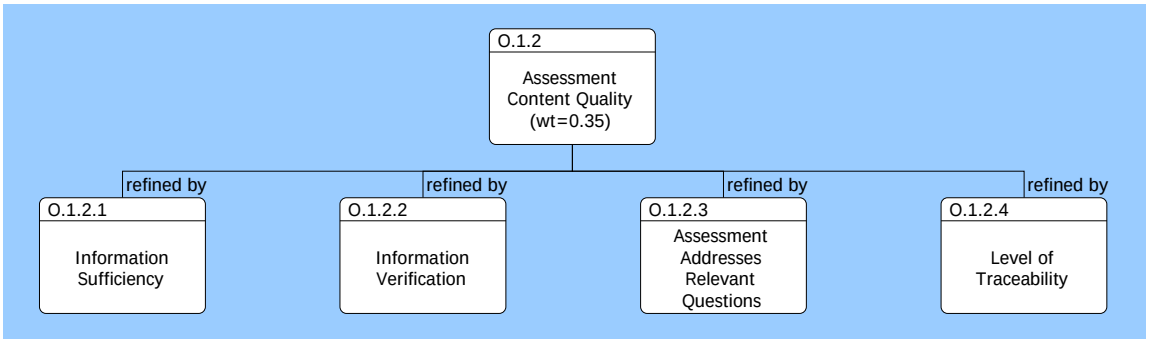

Figure 11. Objective 1.2 Decomposition

Objective Number	Objective Name	Objective Description
O.1.2	Assessment Content Quality (wt=0.35)	[redacted]
O.1.2.1	Information Sufficiency	Is the information contained within the assessment enough to support decisions
O.1.2.2	Information Verification	Was the source information verified whenever possible
O.1.2.3	Assessment Addresses Relevant Questions	Are the concerns of the decision makers addressed by the assessment
O.1.2.4	Level of Traceability	Does the assessment demonstrate the connection between activities at the tactical level and strategic end states and goals?

Table 3. Description of Objective 1.2's Sub-Objectives

E. SYSTEM REQUIREMENTS

There are four categories of requirements to develop for a well-designed system, provided in the list below (Buede 2009, 57, 59). Given the scope of the thesis, the development of a functional architecture, the requirements are restricted to the first two categories.

- Input/output requirements: These requirements cover the functional requirements, and those involved with system interfaces, inputs and outputs.
- Technology and system-wide requirements: These address schedule, cost, technology usage, and suitability of the system.
- Trade-off requirements: These requirements facilitate trade-off analysis.
- System qualification requirements: These requirements involve testing the system to validate that the produced system conforms to the design.

The requirements defined here are the initial list; as development continues and physical components are selected to implement the functional architecture, the list will expand. Currently, the requirements are organized into four classifications. Figure 12 illustrates these headings.

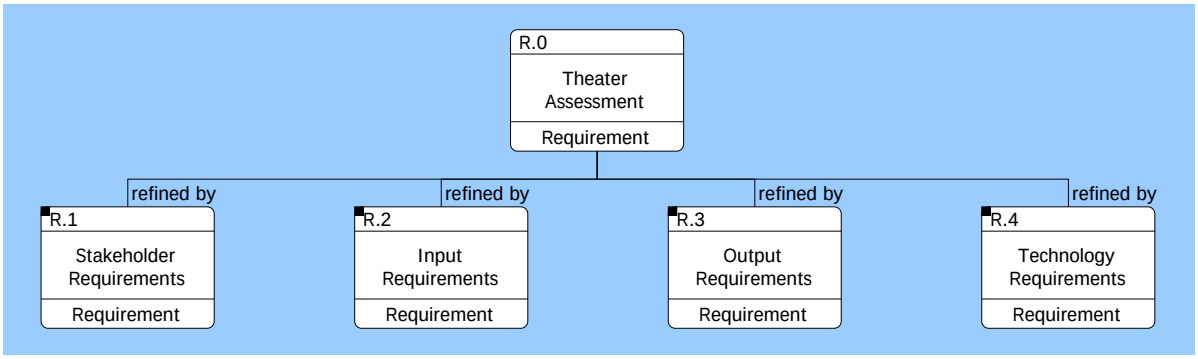

Figure 12. System Requirement Classifications

The stakeholder analysis provided the basis for what the system operation will accomplish; primarily, ECJ7 personnel described what they needed from the system in order to satisfy USEUCOM Commander, SECDEF and CJCS. They described the information they required to generate the assessment, and who would benefit from the assessment beyond the decision makers.

The next consideration for requirements was the system interactions, illustrated in Figure 8. These interfaces identify supporting requirements, such as communication considerations, that necessitate functions to support the assessment development.

Appendix B presents the complete list of requirements, yet to facilitate the development of the functional architecture described in the next chapter, the input and output requirements are given in Tables 4 and 5.

Requirement Number	Requirement Name	Description
R.2	Input Requirements	
R.2.1	Evidence	The Assessment shall utilize LOAs as evidence for conclusions
R.2.2	Report Detail	The information in the reports shall represent what happened prior to, during, and following the event based on the commander's perspective.
R.2.3	Verification	The Assessment shall examine multiple sources of information

Table 4. Input Requirements

Requirement Number	Requirement Name	Description
R.3	Output Requirements	
R.3.1	Traceability	The Assessment Team shall determine how an operational level event supports a GEF End State
R.3.1.1	Country Campaign Plan	The Assessment Team shall determine how the Country Campaign Plan supports the Regional Campaign Plan
R.3.1.2	Regional Campaign Plan	The Assessment Team shall determine how a Regional Campaign Plan supports the Theater Campaign Plan
R.3.1.3	Theater Campaign Plan	The Assessment Team shall determine how the Theater Campaign Plan supports the GEF End State
R.3.2	Availability	The Assessment shall be made available to all appropriate individuals
R.3.2.1	SECDEF	Every Theater Assessment shall be made available to the Secretary of Defense and their staff
R.3.2.2	CJCS	Every Theater Assessment shall be made available to the Chairman of the Joint Chiefs of Staff and their staff
R.3.2.3	COCOM	Every Theater Assessment shall be made available to the Combatant Commander (EUCOM)
R.3.2.4	Planning	Every Theater Assessment shall be made available to Theater Planning Staff (J5)
R.3.3	Emergency Response	The system shall produce low resolution assessments on short notice or emergencies

Table 5. Output Requirements

The foundation of the functional architecture is the complete list of derived functions. In the event that a function is developed and there is no associated requirement, the functional analysis uncovered an implied requirement. The utilization of functions to verify requirements following the functional decomposition minimizes the risk of ignoring a requirement. The requirements given in Appendix B represent the product of this iterative process.

IV. FUNCTIONAL ANALYSIS

> The functions or activities that a system has to perform are a critical element for the design process to be successful on a consistent basis.
>
> —Dennis M. Buede (2009, 211)

A. METHODOLOGY

Recall the five functions in Buede's system design:

1. Defining the Design Problem
2. Develop Functional Architecture
3. Design Physical Architecture
4. Develop Allocated Architecture
5. Obtain Approval and Document

The requirements described in Chapter III are the basis for the functional architecture.

Buede describes decomposition as a "top-down structuring" with the top-level function supported by multiple first-level functions (2009, 218). These functions are broken down into another set of sub-functions. Next, data and items that input or output from the functions or trigger subsequent functions are determined.

Following Buede's methodology, these functions were presented to other engineers and stakeholders in USEUCOM for their consideration (2009, 218). This feedback identified missing functions, and suggested alternative functional organizations. Finally, the functions were arranged in a logical order to trace the flow of data, as it progresses from the system's input to its outputs. CORE 8 University Edition was used to capture the functional architecture. CORE is a systems engineering design tool that utilizes model based system engineering concepts to establish traceability throughout the design. CORE also provides

graphical representations of the designed system in order to communicate interactions and connections between system elements, specifically, requirements, functions and components (Vitech, 2011).

B. FUNCTIONAL DECOMPOSITION

The stakeholders' needs and generated listing of requirements provided the initial set of functions. However, the assessment's role in the development of plans from the strategic to the tactical level presented additional system functions. Figure 8, seen on page 19, illustrated how the various organizations interacted; Figure 13 describes the relationship between plans and assessments.

Figure 13. Assessment's Role in the Planning Process

Since the GEF is revisited every five years, the time required to complete one cycle of the circle exceeds the useful life of a given strategic assessment. Thus, the internal arrows of Figure 13 show how an annual assessment affects the plans generated by USEUCOM.

In addition, Figure 13 alludes to the internal and external assessment distribution required for maximum utility of the assessment. The EUCOM Commander and the ECJ5 need to understand all of the effects of the implemented plans in order to continue effective missions or modify missions that are not supporting the theater end states or goals.

The top-level function of this system is to “Conduct Theater-Level Strategic Assessment.” This function encompasses the entire process, beginning with collecting data describing the details from a given mission, tracing that data to a particular end state or objective, determining the relative value of that mission based on its impact on the AOR, and communicating its findings to decision makers. Imbedded in that communication, the assessors must present the risks that the decision maker faces in either the current environment or future conditions, within the context of the plans in place.

Figure 14 illustrates the decomposition of the top-level function into six sub-functions. Recall that an initial desire of the system was to produce an assessment that was useful, feasible and repeatable. The functional process, described later in the chapter, addresses the “repeatable” characteristic, while the sub-functions address the other two characteristics. Functions F.1, F.3 and F.4 relate to the characteristic, “useful;” these functions provide strategic information and traceability between missions and theater objectives to assist decision makers in understanding the AOR and selecting follow-on action. Function F.2 addresses the term “feasibility;” the accuracy of the assessment is critical to determining linkages between the tactical and strategic levels with greater certainty.

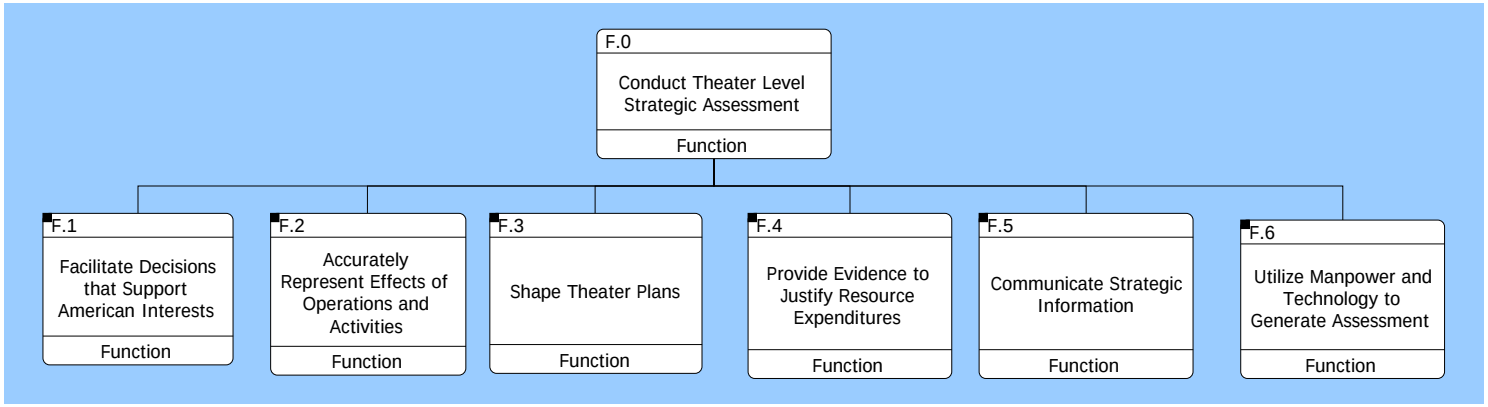

Figure 14. Top Level Functional Decomposition

Function F.5 is a result of Figure 13; this function describes the process for moving information between the activities and providing the feedback to the planning process as shown. The final function, F.6, is a support function based on the technical requirements associated with operating on classified and unclassified computer systems.

This chapter describes the further decomposition of Functions F.1-F.3, since they capture the essence of the Strategic Assessment system and provide sufficient understanding of the functional architecture to describe the functional flow. The complete functional decomposition, their descriptions and requirement basis are given in Appendix C.

1. Facilitate Decisions that Support U.S. Interests

This function addresses the external and internal audiences with whom the assessment must communicate in order to be successful. Figure 15 provides a graphical representation of the sub-function's decomposition, while Table 6 describes each function.

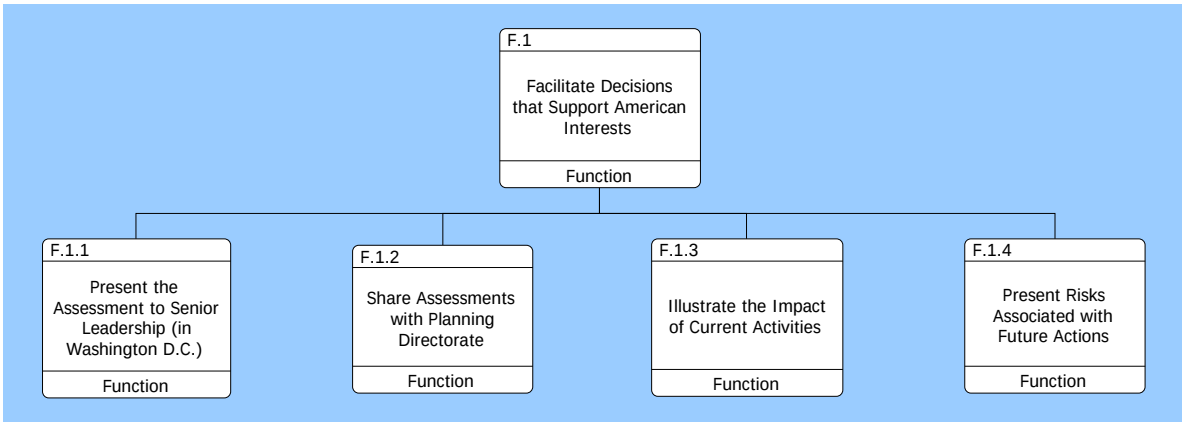

Figure 15. Function F.1 Decomposition

Function Number	Function Name	Function Description
F.1	Facilitate Decisions that Support American Interests	The information contained within the assessment shall be of sufficient detail that it supports a strategic discussion about the AOR such that Senior Leadership can be informed about the environment, current operations, effects of current plans and strategy, Commander's concerns and potential challenges.
F.1.1	Present the Assessment to Senior Leadership (in Washington, D.C.)	The Assessment will be distributed to Chairman of the Joint Chiefs of Staff, Office of the Secretary of Defense and the respective staffs. (external transmission)
F.1.2	Share Assessments with Planning Directorate	The Assessment will be distributed among the COCOM's Directorates, specifically, but not limited to, the J5 Directorate. (internal transmission)
F.1.3	Illustrate the Impact of Current Activities	The assessment teams will clearly present their conclusions relating to the implementation of current strategy and plans to the environment and state of affairs within the AOR. This is likely not to be a 1:1 relationship so the assessor must rely on their expertise and experience to make connections and state a confidence level to the conclusion.
F.1.4	Present Risks Associated with Future Actions	The Assessment will describe the risks that the leadership will accept by continuing the current strategy or altering strategy.

Table 6. Function F.1 Description

Function F.1.1 satisfies the need to present the strategic assessment to SECDEF, CJCS and their respective staffs. Current doctrine requires this to occur annually. However, this function is independent of that time restriction in order to remain doctrine-neutral and applicable to current and future assessment guidance. The second sub-function is required to transmit the findings internal to USEUCOM to promote the modification of theater, regional and country plans to improve the effectiveness of operations and missions in the AOR. The third function is needed to describe how current operations are affecting the AOR. This function would be satisfied when the assessor explains the lack of an impact

from a mission. The final function to facilitate decisions is to present risks to the decision makers. These risks will include the risks associated with maintaining the current plan, risks associated with modifying the plan, and possible risks to the AOR not addressed by the GEF end states or theater objectives. The future risks would indicate that the end states or objectives require a revision.

2. Accurately Represent Effects of Operations and Activities

Function F.2 addresses the quality of the assessment; the function describes the acquisition and examination of the input data. Activities under this function would include corroborating the information from other sources, assigning a confidence to the data and training assessors to perform their duties. Figure 16 decomposes the function and Table 7 describes each function.

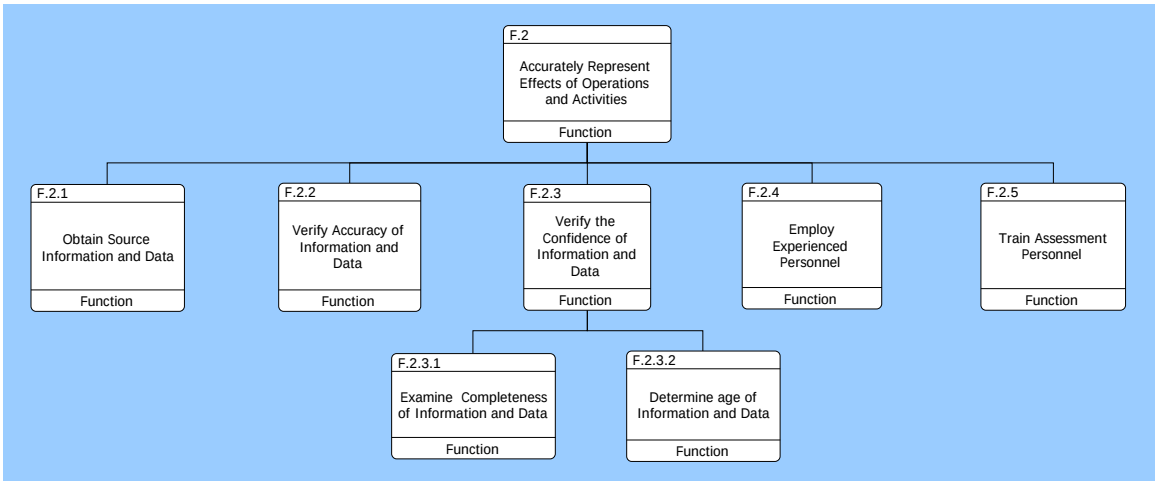

Figure 16. Function F.2 Decomposition

Function Number	Function Name	Function Description
F.2	Accurately Represent Effects of Operations and Activities	The Assessment will describe what impact the current activities on a given AOR. It will link quantitative evidence in a country to qualitative strategic questions, while acknowledging where there is limited data or hindrances to effectiveness.
F.2.1	Obtain Source Information and Data	The assessment team shall obtain feedback and data from tactical and operational commanders who implemented the plans within a country. This data should outline both the quantitative aspects of the operation, i.e., number of units trained, in addition to the opinions of the commanders.
F.2.2	Verify Accuracy of Information and Data	The assessment team will make all attempts to verify the information received independently.
F.2.3	Verify the Confidence of Information and Data	Combine the determination of the how complete the data is with the time latency to assign a confidence level to the information and data.
F.2.3.1	Examine Completeness of Information and Data	The assessment team should consider as many sources as possible to ensure that the data collected is as complete as possible. In addition, this will provide insights that may not have been available to the operational commander This will include unclassified sources such as host nation media, NGOs and international news organizations.
F.2.3.2	Determine age of Information and Data	Given the rapidly changing natures of many countries in an AOR, the assessment team needs to understand the lag between an operation and the completion of the assessment. The disclosure of the age will alert decision makers that the value of the source information may have been altered.
F.2.4	Employ Experienced Personnel	Since an assessment bridges the gap between operational activities and broader strategy, the experience of the assessment team is critical to understanding the dynamics within an AOR. By employing people familiar with an AOR, the Assessment will more effectively link the inputs to the outcome.
F.2.5	Train Assessment Personnel	The assessment team must be continuously trained to understand methods of collecting information, transforming it into a usable form and communicating it to the appropriate organizations.

Table 7. Function F.2 Description

Function F.2.1 encompasses obtaining the source data from a database, such as TCSMIS, or some other reporting method. F.2.2 prompts the assessors to use additional sources of information to support or expand on the data.

"Confidence" as used in F.2.3 considers both the age and completeness of the information. The age is important due to the time sensitive nature of assessments. If the only information available to the assessor is several months old, the assessor will still use the data, but the confidence in the relationship between that data point and the strategic level may be low. The completeness of the data refers to the assessor's ability to understand how the data fits into the strategic picture. An example of incomplete data would be a report that "the mission was successful." In this example, the assessor knows that the mission was a success; however, the lack of amplifying information introduces uncertainty in the relationship between the mission and the strategic objective. When properly implemented, function F.2.3 provides the assessor the ability to generate an assessment, while communicating that there is some risk associated with conclusions due to uncertainty in the source information.

Functions F.2.4 and F.2.5 are support functions that enhance ability to determine the effects of activities at the tactical level. F.2.4 requires the assessment personnel to be experienced in the AOR. Given the difficulty in relating a narrowly scoped mission to a broad theater strategy, it is imperative the assessors possess knowledge of the AOR, in terms of politics, culture, history etc. This knowledge will facilitate understanding how a particular country responds to U.S. efforts, and how that country fits into the larger AOR.

Function F.2.5 is critical to the assessment process in order to ensure that assessors learn skills, such as additional techniques of developing metrics for measuring progress, risk analysis, and effective methods of presenting data. The Combatant Commander will tailor the continuous training program to their needs, with the goal of increasing the competency of the assessors and by extension, the quality of the assessment.

3. Shape Theater Plans

This function addresses the effect that the strategic assessment has on the planning process. The purpose of the function is to use the generated assessment to determine the effectiveness and appropriateness of the plans in order to inform decision makers about where changes are needed. Figure 17 shows how this function is decomposed into sub-functions, with each description presented in Table 8.

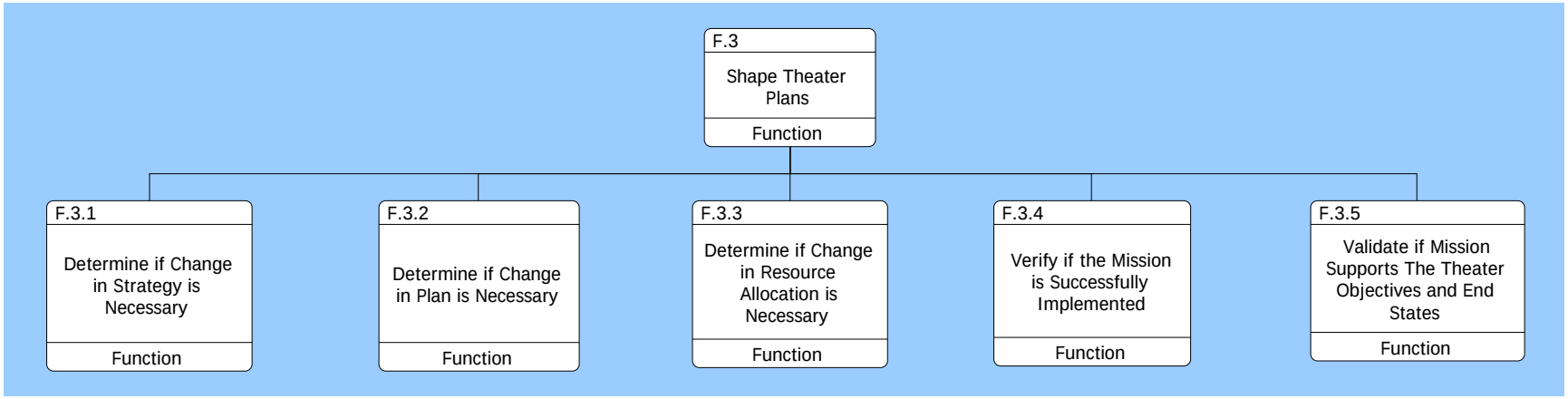

Figure 17. Function F.3 Decomposition

Function Number	Function Name	Function Description
F.3	Shape Theater Plans	The Assessment will feed back into the internal planning process for a COCOM. The Assessment will provide insights on what the U.S. strategy will be in the future, and it will provide the COCOM Commander with recommendations on how to operate under the currently defined strategy.
F.3.1	Determine if Change in Strategy is Necessary	Based on the Assessment's findings, should the overall strategy be modified or continued?
F.3.2	Determine if Change in Plan is Necessary	Based on the Assessment's findings and given the approved strategy, are the plans in place supporting the COCOMs goals and national strategy? If plans are inadequate, the assessment will identify areas for improvement and recommendations.
F.3.3	Determine if Change in Resource Allocation is Necessary	Based on the Assessment's findings and given the approved strategy and plans (regional and county), are the resources being effectively employed? The assessment will provide both positive and negative feedback.
F.3.4	Verify if the Mission is Successfully Implemented	The Assessment will inform leadership if the mission was achieved as defined. (MOP)
F.3.5	Validate if Mission Supports The Theater Objectives and End States	The Assessment will inform leadership if the mission was defined correctly. (MOE)

Table 8. Function F.3 Description

Function F.3.1 and F.3.2 describe the fundamental use of the system output; these functions inform the COCOM Commander or decision maker in Washington, D.C. about the next step for U.S. forces. The outcome from these functions is critical, since the actions that the COCOM conducted may or may not impact the AOR. However, it is possible that the assessment determines that the state of the AOR is aligned with strategic goals independently of the COCOM's activities. In this case, the plan would require revisions, but not the strategy.

F.3.3 addresses the adjustment of resources assigned to the implementation of an aspect of the plan. There are many possible causes for this determination. For example, assume that the assessed cause of a plan not producing the desired effect is a lack of resources (limited scope); the assessment would recommend that by increasing the resources, the operation's effect on the AOR would increase. Another possible situation is that a given resource allocation shows little to no effect toward achieving the COCOM's goals; the assessment would recommend eliminating the resource expenditure in this case.

F.3.4 and F.3.5 inform the decision makers if the operation at the tactical level was conducted in accordance with plan, and whether or not that plan supported the higher planning levels. This information is critical to understanding the strategic situation of the AOR. These functions incorporate the U.S. activities with external factors that are beyond the control of the COCOM, to provide the decision maker with greater insight into the situation and future risks and challenges. It is possible that sweeping political reforms occur in a given country that installs a government that is favorable to U.S. interests; if the assessment only informed that decision maker that the AOR was progressing towards its goals with respect to this country, the decision maker may infer that COCOM activities influenced this result, when this is not true.

C. FUNCTION TO REQUIREMENT MAPPING

Following the decomposition of the system functions, Buede discusses the need to trace the functions back to the developed list of requirements (2009, 246). This is a crucial step to the development of the functional architecture, as it verifies that all of the requirements are addressed by a function. The development of the functional decomposition addressed interfaces between internal and external components; thus, the act of relating functions to requirements can identify new requirements from interface functions, which were otherwise unrealized.

The mapping of functions to requirements presented here represents the iteration of creating functions that were not previously identified, and adding requirements that were not captured during the development from the stakeholder analysis. Appendix C provides a complete listing of the basis for each function. However, Table 3 shows the basis for the functions F.0-F.1.4. Table 3 also shows that the function-to-requirement is not 1:1, meaning the functions satisfy multiple requirements and each requirement supports multiple functions.

Function Number	Function's Name	Function's Basis
F.1	Facilitate Decisions that Support American Interests	Requirement R.1.1 Theater Periodicity Requirement R.1.2 Country Periodicity Requirement R.1.6 Effects Requirement R.1.6.1 Hindrance Requirement R.1.6.2 Failure Requirement R.1.6.3 Success Requirement R.1.6.4 Objective Requirement R.1.6.5 End State
F.1.1	Present the Assessment to Senior Leadership (in Washington, D.C.)	Requirement R.1.6 Effects Requirement R.3.2 Availability Requirement R.3.2.1 SECDEF Requirement R.3.2.2 CJCS
F.1.2	Share Assessments with Planning Directorate	Requirement R.3.2 Availability Requirement R.3.2.3 COCOM Requirement R.3.2.4 Planning
F.1.3	Illustrate the Impact of Current Activities	Requirement R.1.6 Effects Requirement R.1.6.1 Hindrance Requirement R.1.6.2 Failure Requirement R.1.6.3 Success Requirement R.1.6.4 Objective Requirement R.1.6.5 End State Requirement R.3.1 Traceability Requirement R.3.1.1 Country Campaign Plan Requirement R.3.1.2 Regional Campaign Plan Requirement R.3.1.3 Theater Campaign Plan
F.1.4	Present Risks Associated with Future Actions	Requirement R.1.6 Effects

Table 9. Function to Requirement Mapping for F.1

D. FUNCTIONS PERFORMED BY ACTIVITIES

Recall Figure 8 that describes the interactions between activities internal and external to the system. For this analysis, ECJ7 is decomposed into the ECJ7 Director and the assessors. The functional analysis also reveals a critical

interaction between the system and the COCOM Commander. While the Commander is considered outside the system boundaries due to their extensive responsibilities beyond assessment, they perform system functions vital to satisfying the effective need.

The first component analyzed is the database that collects information on missions and activities from tactical commanders and stores that data for use in assessment generation. Figure 18 illustrates the functions that are assigned to this physical component; trade-off analysis determines the specifics of the database which leads to additional requirements and possibly more functions. However, these are the fundamental functions that the database performs. Note that an "Assessment Request" triggers the "Obtain Source Information and Data." This trigger may be a periodic request determined by doctrine or a specific request from a decision maker. This function is performed by the database rather than the assessor since at a functional level, the assessor requests the database to provide them the data, as opposed the assessor going out to obtain the information on their own. The other functions performed included using Internet connections to communicate between nodes, i.e., EUCOM Commander and ECJ7, display the tactical mission reports, and provide information to the assessor that allows for the determination of the age of the report.

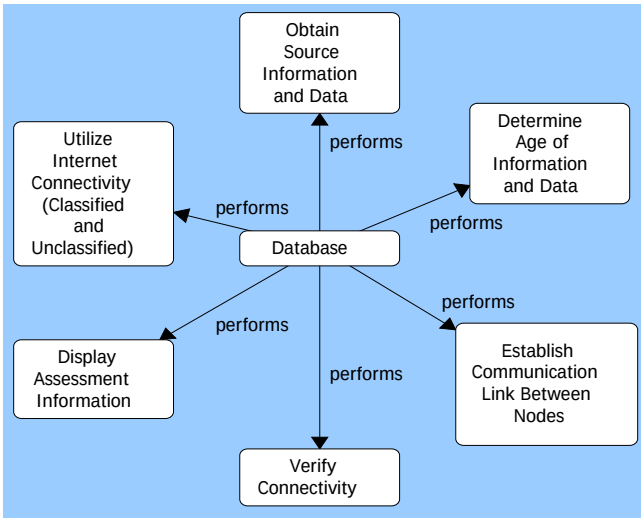

Figure 18. Functions Performed by Database Component

Figure 19 displays the functions the assessor performs while generating the strategic assessment. This diagram represents the bulk of the functions performed by the system. Thus, the assessor is the crux of the system and if they do not have the proper tools or training, the assessment process and quality suffers. These functions represent the tasks required to relate mission effects to strategic outcomes. The two outputs shown represent the complete assessments for internal and external review. The Objective Assessment Report informs the COCOM Commander while the Strategic Assessment Report is presented to decision makers in Washington, D.C.

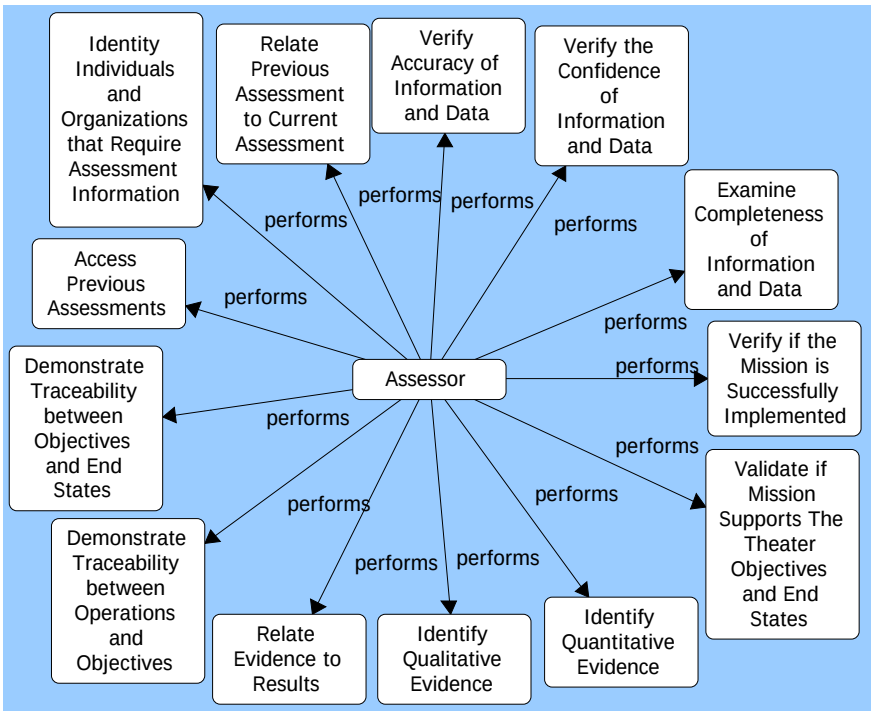

Figure 19. Functions Performed by Assessor Component

The next component examined is the ECJ7 Director; Figure 20 presents the functions performed by this component. This component receives the assessment from the assessors and interfaces with the ECJ5 Director and COCOM Commander. He also performs the support functions for the directorate, such as instituting a training program for the assessors and ensuring that the people hired to assess the AOR are qualified to perform the job.

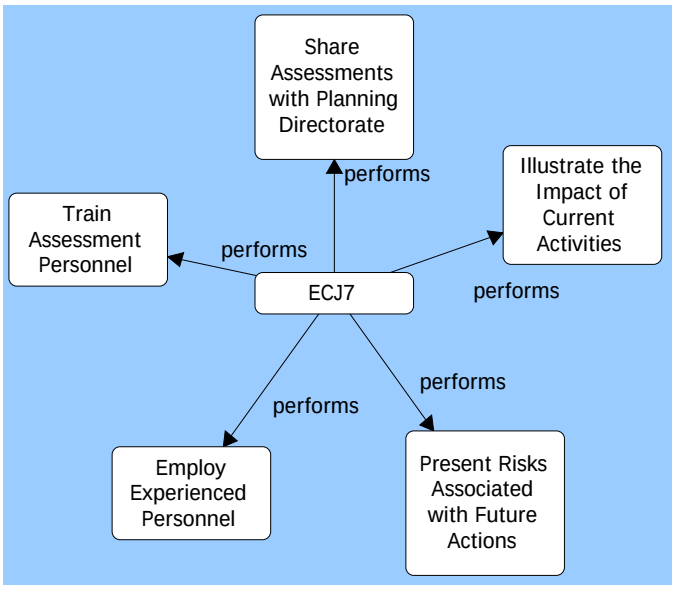

Figure 20. Functions Performed by ECJ7 Component

The final component present here is the COCOM Commander. This is a unique component, as it is both a decision maker and performs system functions. During the internal assessment process the Commander is the decision maker, yet when the strategic assessment is presented to decision makers in Washington, the Commander presents the information to CJCS and SECDEF. The Commander uses the strategic assessment as part of a dialogue to communicate the environment and conditions in their AOR in order to shape the AOR to meet the established end states and goals.

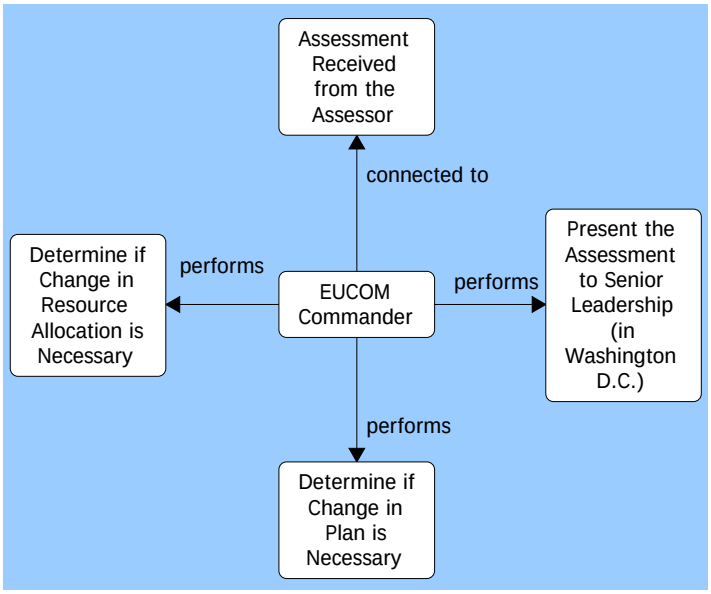

Figure 21. Functions Performed by EUCOM Commander Component

E. FUNCTIONAL PROCESS MODEL

In addition to the function decomposition, a functional architecture process model is used to trace how data is moved from input to output and then to outcomes. Buede describes this as transforming the "black box" model, shown in Figure 7, into a "white box" model that illustrates what functions are used (2009 216).

CORE was used to develop Figures 22–28; each white block represents a function from the functional hierarchy. The number at the top is the function number, the function name is in the middle, and the component that performs the function is shown at the bottom. Grey bubbles represent items that are inputs to or outputs from the function and greens bubbles indicate items that trigger a given function. Triggers also use a double arrow to show what function is triggered.

First, the functional process model (Figure 22) shows that there are five functional processes that are used during system operation. These processes are Technical Support, Personnel Training and Support, Assessment Development, Internal Assessment Presentation, and External Assessment

Presentation. Technical Support and Personnel Training and Support are continuous processes, as indicated by the loop graphic in the figure, which support the overall assessment process. The middle path describes the strategic assessment process that begins with an assessment request; currently this request is in the form of a requirement imposed on the COCOMs (U.S. Joint Chiefs of Staff, 2011a, II-6). However, the request is not limited to that method. At the conclusion of the Assessment Development process, a Final Strategic Assessment is generated, which triggers the final two functional processes. The output of the model indicates that the decisions reached at the end of the process feedback into the planning process shown in Figure 13 as applicable and the output of the system produces the desired outcome that U.S. interests are furthered in the USEUCOM AOR.

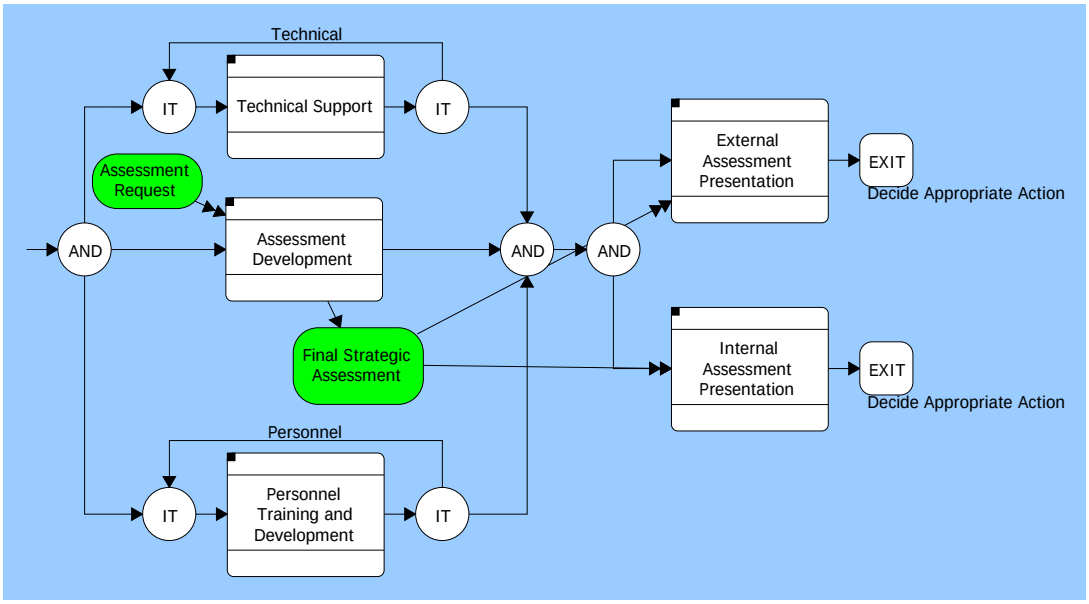

Figure 22. Overall Function Flow Block Diagram

Figure 23 presents the first support functional process. This continuous process begins with determining the technical architecture for the system. This includes selection of hardware, software and determining the methods for connecting the access points to the system. Next, the individuals and organizations that require access to the system are identified; examples of this

include tactical commanders, Component Commands, COCOMs, etc. Then, a connection to a network will be established to allow information to be entered into the database and remote access to information on the database. The system will allow the user to define criteria to sort through the information on the database, such as keyword searches. In addition, the database will allow the users to assign a value or weight to the information based on the value system selected later. Finally, the system will use a loop that monitors the systems connectivity link and alerts the user when connectivity is lost.

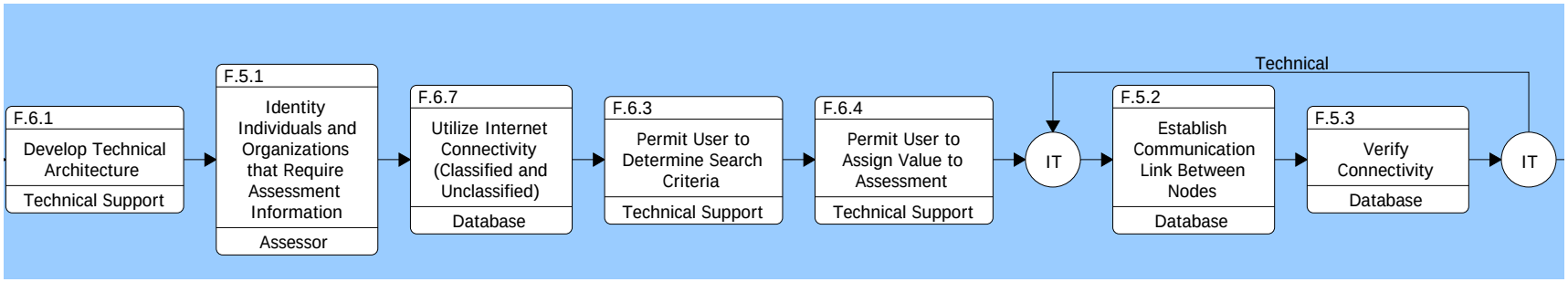

Figure 23. Technical Support

The next functional process involves the staffing requirement for the system, presented in Figure 24. The system relies on qualified individuals being selected as assessors, and then training them on the methods and goals of strategic assessments. The training program will also provide the assessors with sufficient understanding of USEUCOM's AOR in order to make conclusions about the environment, and establish linkages between USEUCOM efforts and strategic objectives and end states.

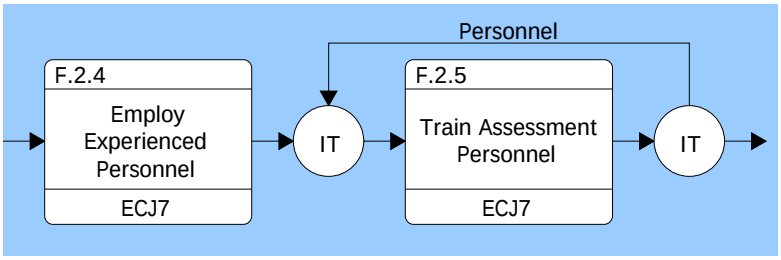

Figure 24. Personnel Training and Development

Figures 25 and 26 capture the functional process that begins with a request for a strategic assessment and ends with the finalization of the assessment. The first part of the process is the determination that an assessment is required; currently doctrine establishes this to be completed annually. This produces a request to trigger the assessment development. Tactical commanders submit reports to the system database upon completion of their mission or periodically if the mission is still in progress.

Based on the trigger, the assessor will access the database to obtain the mission reports and classify them as source information that comprise the LOA reports and form the basis for the strategic assessment. The assessor segregates the source data into qualitative and quantitative information to facilitate conclusions later in the process. Next, the assessor will obtain supporting information from sources such as intelligence reports or news stories to verify the accuracy of the source information and to establish context for the source data.

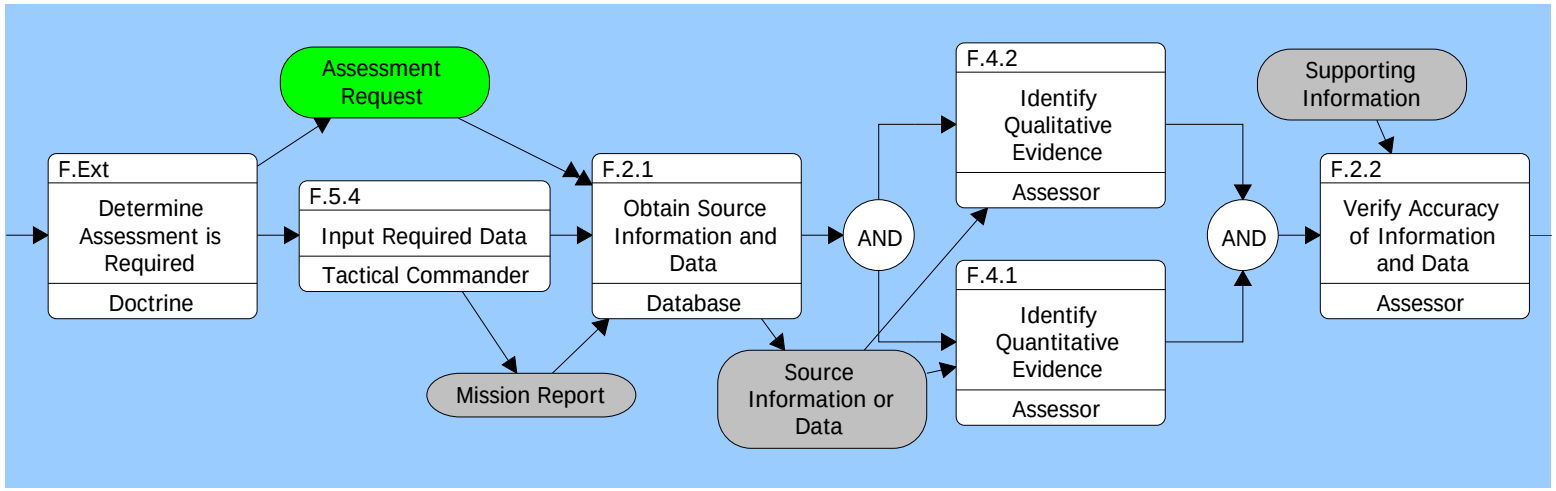

Figure 25. Assessment Development Part 1

Figure 26 continues the process by determining the confidence level for the source information based on a combination of the data's completeness and age. The assessor will determine the completeness of the source information to identify if additional information is required from the tactical commander. Missions still in progress may present challenges to the assessor as the information is not complete. In this case, the assessor may have to utilize his or her expertise more than during a situation where the source data provides the assessor with a great deal of detail. Then the assessor will identify the age of the data; mission reports submissions do not necessarily match the assessment time lines, so there exists the possibility that a given report is months old, and the situation may be different than the report indicates. The output of Function F.2.3.1 and F.2.3.2 produce a confidence level used later in the process. The next set of functions occurs in parallel and relate to the purpose of the assessment. The assessor will determine if the mission was successfully completed, establish the linkage between the mission and the theater objectives, and then relate the theater objectives to the desired end states.

Once the assessor understands the impact of missions on the state of the AOR, the assessor will review prior assessments to establish trends. Given the trend analysis and confidence level of the source information from earlier steps, the assessor can put current COCOM efforts into a historical context in order to demonstrate progress made since the previous assessment and generate the Strategic Assessment Report for external distribution and the Objective Assessment Report Assessment for internal distribution.

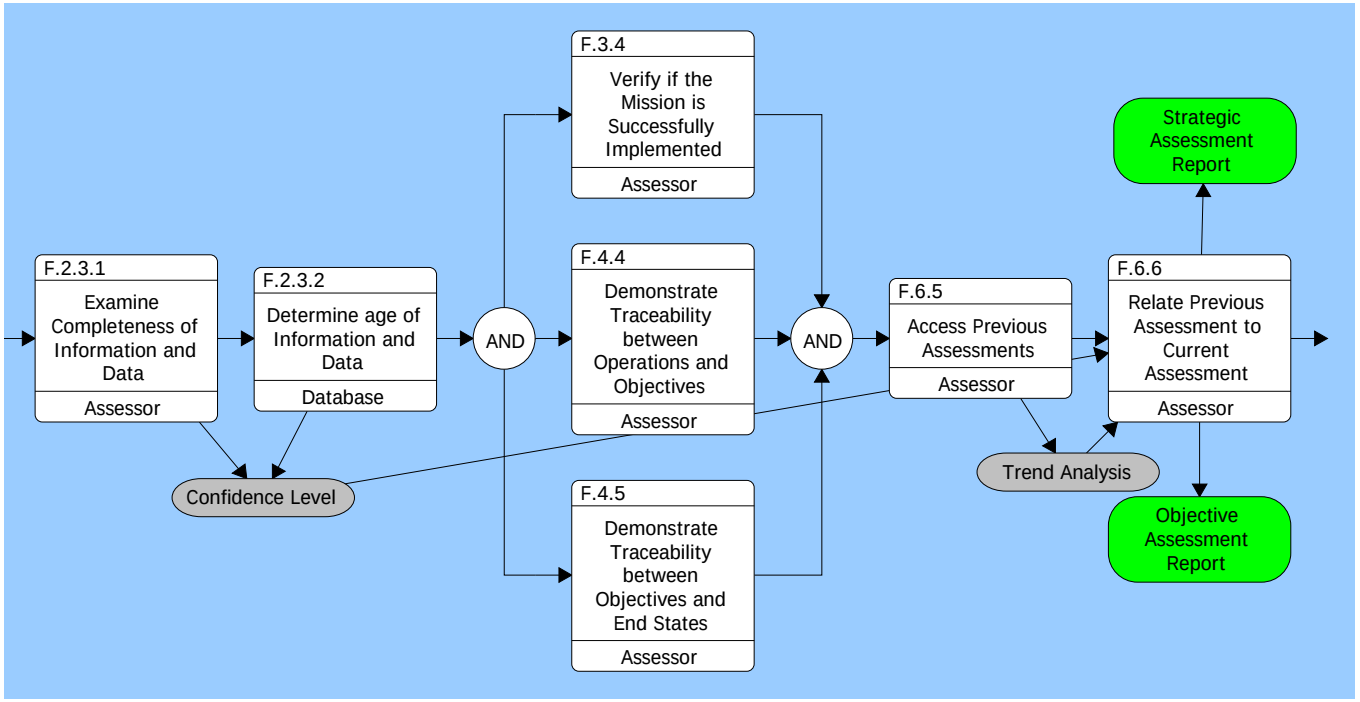

Figure 26. Assessment Development Part 2

The internal assessment process, illustrated in Figure 27, is triggered by the Objective Assessment report and involves presenting a strategic theater assessment to the COCOM Commander. This process begins by sharing the findings with ECJ5 for their use in plan development; the ECJ7 and ECJ5 interaction is critical to maximizing the utility of the assessment and improving the effectiveness of USEUCOM's plans.

The findings of the assessment are presented to the COCOM Commander in a format deemed appropriate by USEUCOM. Possible methods include PowerPoint presentations or interactive "dashboard" displays that can vary the data in real-time to observe the predicted effects. The purpose of the presentation is to communicate the traceability between USEUCOM's efforts and the plans at the country, region and theater level and relate them to the GEF end states. This is accomplished by demonstrating the impact of current activities on the AOR, presenting risks to the AOR and making recommendation for changes in the way USEUCOM allocates its resources, changes in the plans at any level and validating that the plans support the theater objectives and end states. This process ends with the COCOM Commander deciding the appropriate action based on the findings.

The external assessment process, shown in Figure 28 is similar to the internal process, except that the COCOM Commander approves the presentation prior to its distribution and the presentation makes recommendations to the leadership in Washington on the same issues as the internal presentation, with the addition of a recommendation with regards to strategy.

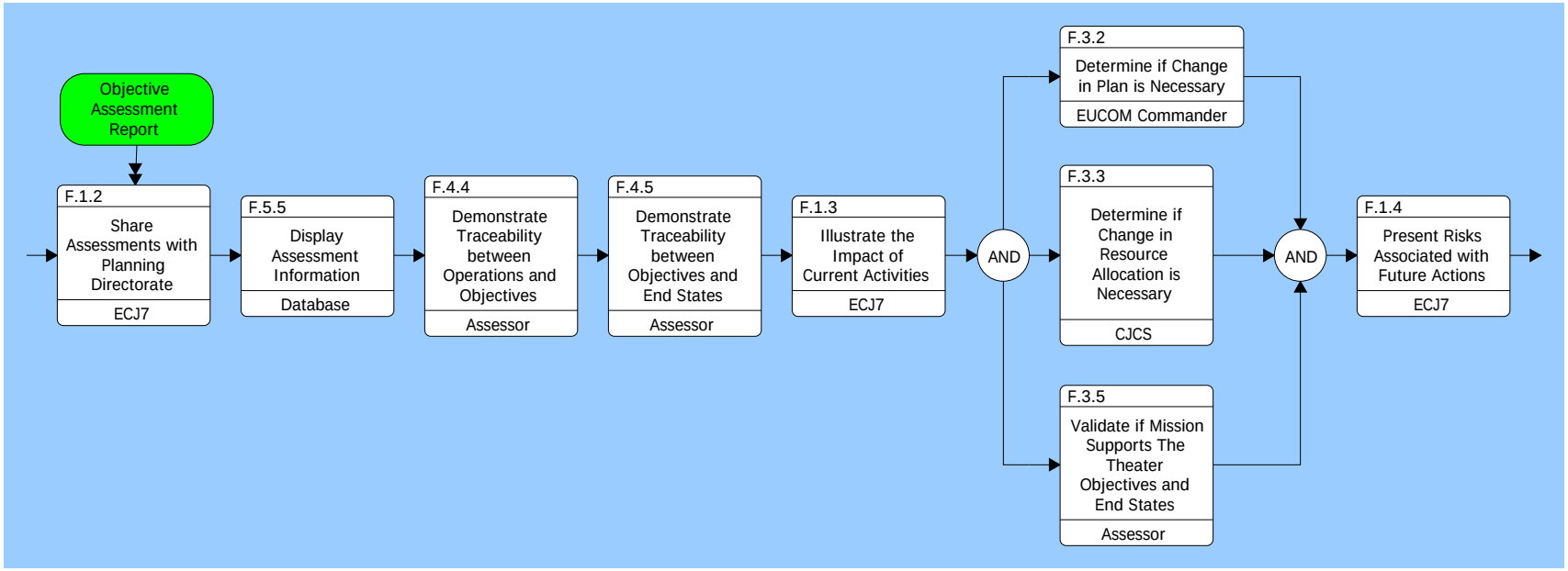

Figure 27. Internal Assessment Presentation

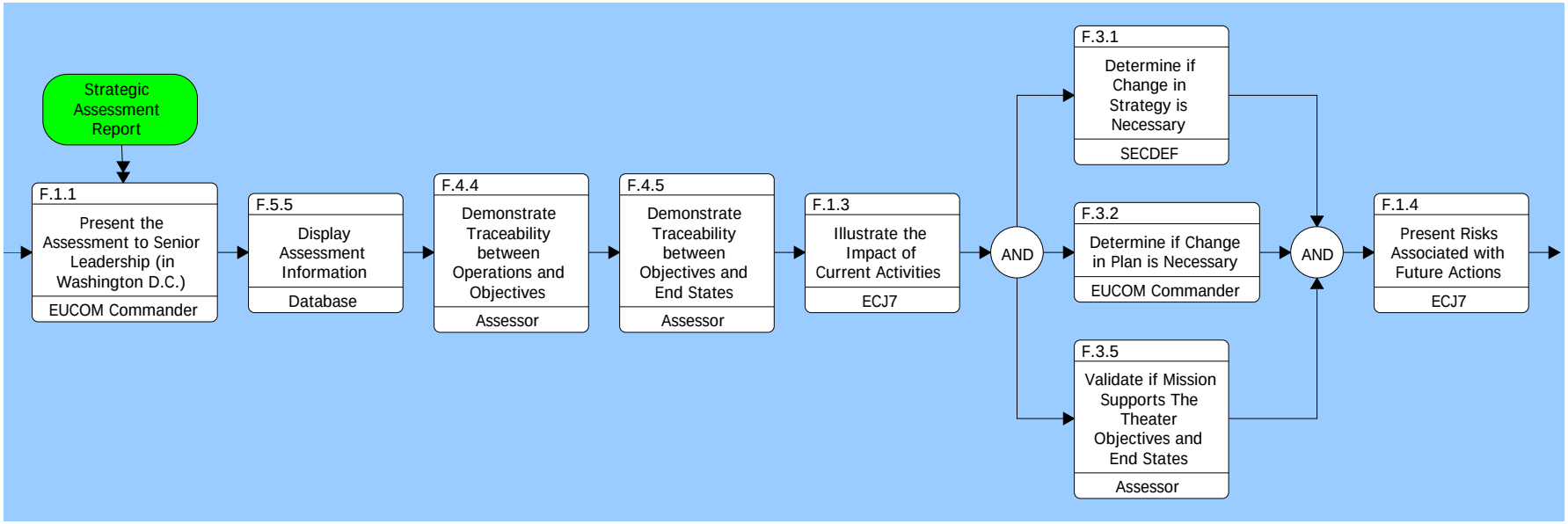

Figure 28. External Assessment Presentation

F. PROPOSED ASSESSMENT PROCESS ARCHITECTURE

Given the functional architecture developed and described in the functional process, a proposed assessment process architecture is given in Figure 29. This architecture is juxtaposed with the planning process shown in Figure 5; there is a clear connection between planning and assessment, so it follows that the process architectures would be similar. Another advantage to this architecture is that the linkage between the mission and the theater goal is established in steps. Under this structure, a level is supported by the one below it so the assessor has to show that a mission supports a country plan, a country plan supports a regional plan, a regional plan supports a theater objective, and that objective supports an end state, so by extension, the mission supports the given end state.

This process is simpler to address than attempting to directly to connect a given effort to a strategic end state. In the event that a particular mission failed to support an end state, the assessment would inform the decision maker where the breakdown occurred. For example a mission may support a country plan but the country plan does not support a regional plan. In this case the assessor may still be able to establish a linkage between a mission and an end state, yet the assessment revealed a disconnect between two plans that requires ECJ5 to re-evaluate the given plan.

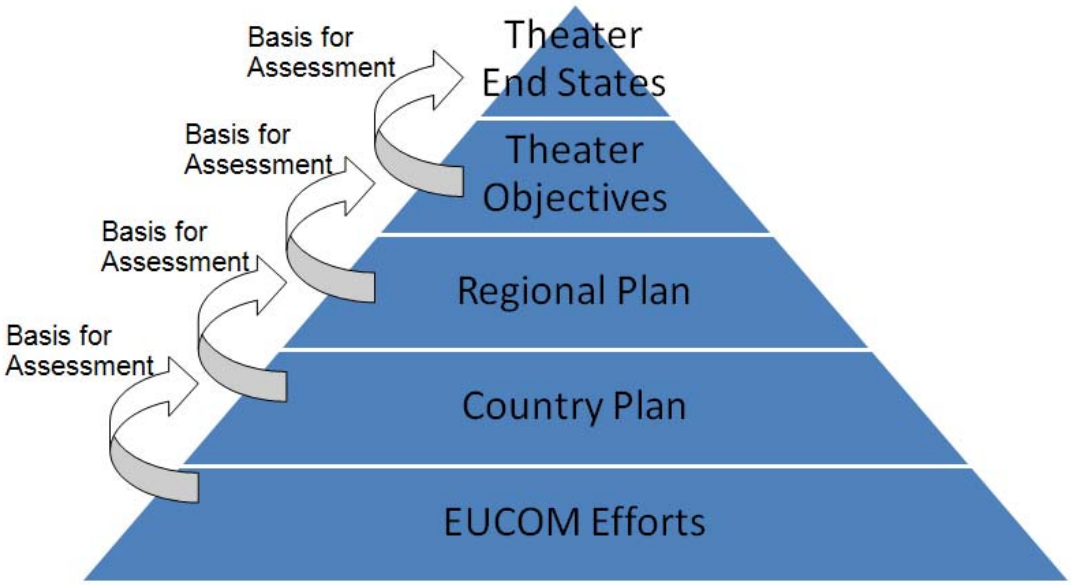

Figure 29. Progressive Assessment Structure

V. APPLICATION OF FUNCTIONAL ARCHITECTURE

> We must find ways to operate government more efficiently and at a lower cost to taxpayers.
>
> —Senator John McCain (U.S. Congress 2011, 13)

A. APPLICATION RATIONALE

In order to verify the effectiveness of the developed model, it needs to be tested against a hypothetical scenario. The scenario includes a given set of plans at the levels of abstraction described in Chapter I and a notional set of USEUCOM operations: one conducted in a North Atlantic Treaty Organization (NATO) member country and the other conducted in a non-NATO member country. To avoid clearance issues, both the plans and scenarios are fictional and do not represent current USEUCOM plans. The purpose of this examination is to provide an example of what occurs during the assessment process model to demonstrate its utility.

B. NOTIONAL PLAN

The notional plan represents the entire planning process from the GEF end states down to the country plan. For ease of development, USEUCOM is divided into 2 regions: developed and developing nations. This is not the method USEUCOM uses, but it is convenient for the purposes of this thesis. Recalling Figure 5, the notional plan provides greater specificity as it moves from the strategic to tactical level. The plan also demonstrates that the lower levels support the level above it, as, for instance, Theater Objectives 2 and 3 support the first end state. This relationship is integral to the assessment process, as it develops the linkage between operations conducted in a country and the desired end state.

The notional plan is:

End States

1. Stable and Secure Europe
2. Strong NATO, Capable of Conducting Out-of-Area Operations

Theater Objectives

1. Support Regional Stability
2. Support efforts to counter transnational threats
3. Promote NATO Interoperability and Active Support of NATO Operations
4. Encourage Participation in Regional Security Alliances

Regional Plan

1. Developed Nations
    a. Foster Military-to-Military Relationship
    b. Build Support for Participation in NATO Operations
    c. Build Information Sharing Agreements
2. Developing Nations
    a. Assist National Military Development
    b. Facilitate NATO interactions
    c. Support Defense Reform

Country Blue Plan

1. Cooperate to Counter Support to Violent Extremist Organizations (VEO)
2. Support NATO Peace Keeping Operations

Country Green Plan

1. Develop military capabilities

2. Enhance country's international presence

3. Support country's defense against threats from Country Orange

C. NOTIONAL SCENARIO

The fictional scenario involves an exercise off the coast of Country Green, a hypothetical non-NATO country in the USEUCOM AOR. The exercise is two weeks in duration, with the naval forces comprised of U.S. and Country Blue, a fictional NATO nation, assets and Green land forces. The event is conducted following the completion of an U.S. Army Europe (USAREUR) training program with Green's Army.

The premise of the exercise, led by USAREUR is that a VEO is threatening to overthrow Country Green's elected government and NATO has been asked to provide support to Green's forces without putting NATO forces on Green's soil. Green has authorized NATO forces to use their airspace and enter their territorial waters.

At the end of the exercise, USAREUR submits a report that NATO forces conducted 50 strike missions, discovered a cache of small arms during an unopposed boarding and provided Green forces reconnaissance on VEO movements outside the capital city. The report also stated that Green forces, acting on NATO intelligence, attacked the VEO leadership compound. The attack demonstrated small unit, urban tactics and coordination between land and naval units. In the Commander's Comments section, it is stated, "U.S. and Blue forces operated in accordance with NATO procedure, and executed strikes against VEO targets in a timely fashion. Green forces demonstrated increased proficiency from previous operations and were capable of disrupting rebel forces within their country. Coalition forces experienced significant challenges communicating and coordinating movement with Green units."

D. APPLICATION OF THE MODEL

1. Data Processing

Given there is an assessment request to trigger the assessment process shown in Figure 25, the USAREUR report is sent to the assessment database. The assessor separates the data into two categories: the number of strikes, number of weapons recovered, number of Green troops used to attack the VEO compound, and the items recovered from the compound are considered quantitative evidence, and the Commander's Comments are classified qualitative evidence.

Media reports and press releases from Green's military leadership supported the quantitative evidence. Conversations with members of the embassy staff from both countries indicated satisfaction with the exercise and agreed with the Commander's findings. The assessor then determines that the USAREUR report is two months old and all the required fields of the report were completed. Based on the report and corroborating information, the assessor assigns a high confidence to the report and findings. The completion of this step satisfies the functions in Figure 26 up to Function 2.3.2.

2. Relating Data to the Plan

The determination of linkages between the levels of abstraction utilizes the three parallel functions presented in Figure 26 and highlighted in Figure 30.

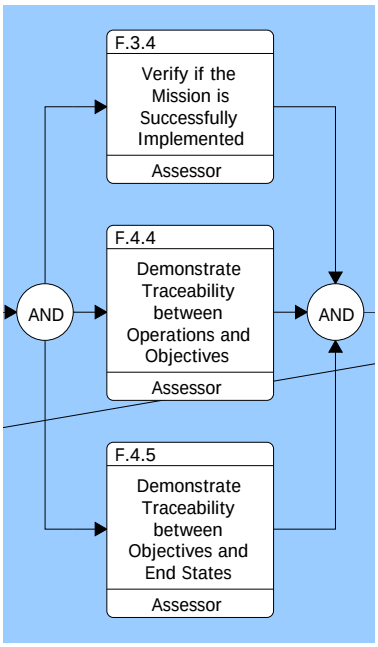

Figure 30. Functions That Establish Linkage Between Mission and End State

The assessor will use F.3.4 to determine if the mission achieved the goals as set forth prior to the mission. F.4.4 is achieved when the assessor describes the linkages through a series of intermediate steps: how the mission supports the given country plan, how the country plan supports the regional plan and how the regional plan supports the theater objective. The final function in Figure 30, F.4.5, is achieved when the connections to the end states are established by identifying how the theater objectives are promote the end state.

Thus, the assessor reviews the mission plans and determines that they were successful, satisfying F.3.4. The assessor determines that the exercise supports Country Blue Plan 1 and Country Green Plan 1. Subsequently, the assessor establishes the linkage to the next level of abstractions. Country Blue Plan 1 supports Regional Plan 1.a and 1.b; Country Green Plan 1 supports Regional Plan 2.a and 2.b. Following, the assessor links Regional Plan 1.a to Theater Objective 4, Regional Plan 1.b to Theater Objective 3, Regional Plan 2.a to Theater Objective 1 and Regional Plan 2.b to Theater Objective 3. This series of linkages represents the completion of the F.4.4. Finally, the assessor links

Objective 1 and 4 to End State 1 and Objective 3 to End State 2, fulfilling F.4.5. Figure 30 illustrates how the missions support End State 1.

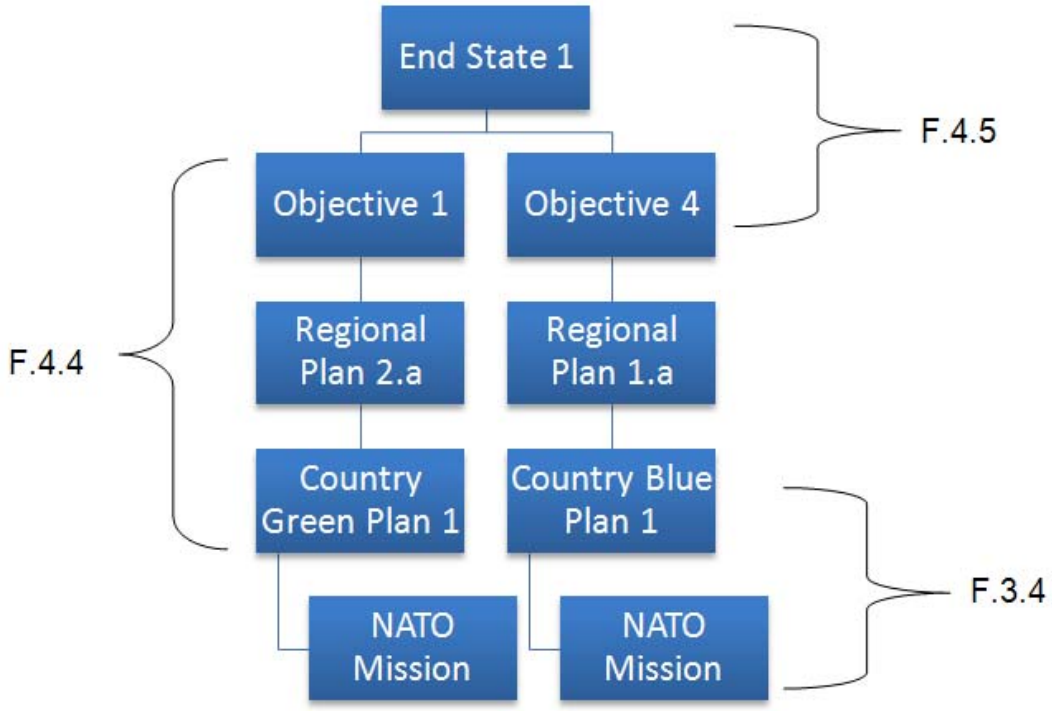

Figure 31. Linkage between End State 1 and the Notional NATO Mission

After the linkage between the event and the theater's end states, the assessor reviews previous assessments related to the end states and theater objectives to determine trends on USEUCOM's progress toward achieving the strategic goals. Trend analysis is also necessary at the regional and country level to determine how efforts over time are affecting the lower levels of the planning structure. This lower level trend analysis will likely not occur in conjunction with the strategic assessment; it is recommended that these trends be determined earlier, in order to provide additional context for the strategic assessment.

After the assessor incorporates the trend analysis, they can format the assessment as appropriate for internal and external transmission. The functional process breaks the follow-on actions into parallel branches, since the internal

report is not necessarily the foundation for the external report, nor does the internal report always require a follow-on report be generated, if the purpose of the given assessment is for USEUCOM use. However, in general the internal process will occur and following approval, the assessment will be sent outside of USEUCOM.

3. Presenting the Assessment

At this point the assessment has progressed through the functions shown in Figures 25 and 26 on page 55 and 57 respectively, and the strategic assessment has included data from the described exercise and all other activities in the AOR during the assessment period. The aggregation of the information is formatted into the Strategic and Objective Assessment Reports. These reports trigger the next set of functional processes described in Figures 27 and 28 on page 59 and 60 respectively. For the internal process, the report is provided to the planning directorate for them to review and incorporate into the next revision of the plans. It is critical that the planning directorate receive the assessment early in the planning timeline, to maximize the assessment's impact on USEUCOM's plans; this requires the assessment and planning timelines to be synchronized within the COCOM.

Over the course of several meetings of working groups, the report is used to describe the findings of the assessment, traceability between tactical and strategic levels, and risks to address in the future. These groups provide recommendations to the COCOM Commander concerning changes in plans and resource allocation. The Commander then decides the appropriate course of action and provides direction to USEUCOM's directorates. The strategic assessment report progresses through a similar process, although the decisions made based on the assessment reflect a global strategic point of view, rather than a theater strategic view. Thus, SECDEF makes decisions about U.S. strategy and instead of resource allocation within a theater, there are considerations about how to allot resources among all the COCOMs.

4. Making Decisions

For simplicity, there is an assumption that the notional exercise was the first of its kind with the two countries, so there is little historical evidence to establish trends. In addition, all other aspects of the assessment are ignored, so the decisions will be solely based on the single exercise.

The assessment process demonstrated the connection between the exercise and the theater's desired end state, by establishing links between one level and the level directly above it. Since the exercise illustrated deficiencies in coordination between NATO and Country Green, the assessment indicates that future iterations of the exercise, and possibly conducting further training with Green's Army, supports the theater end states and U.S. strategy. As such, the exercise provides value to the AOR, and is an effective use of USEUCOM's resources. Assuming appropriate metrics are used to quantify the utility of the exercise, it would then be possible to measure the utility of the exercise against other activities conducted in the AOR. Figure 32 displays how the three groups discussed in the previous sections use the strategic assessment to improve the COCOM's ability to develop and implement plans that support U.S. interests, building of Figure 13, which describes the assessment's role in the planning process on page 34.

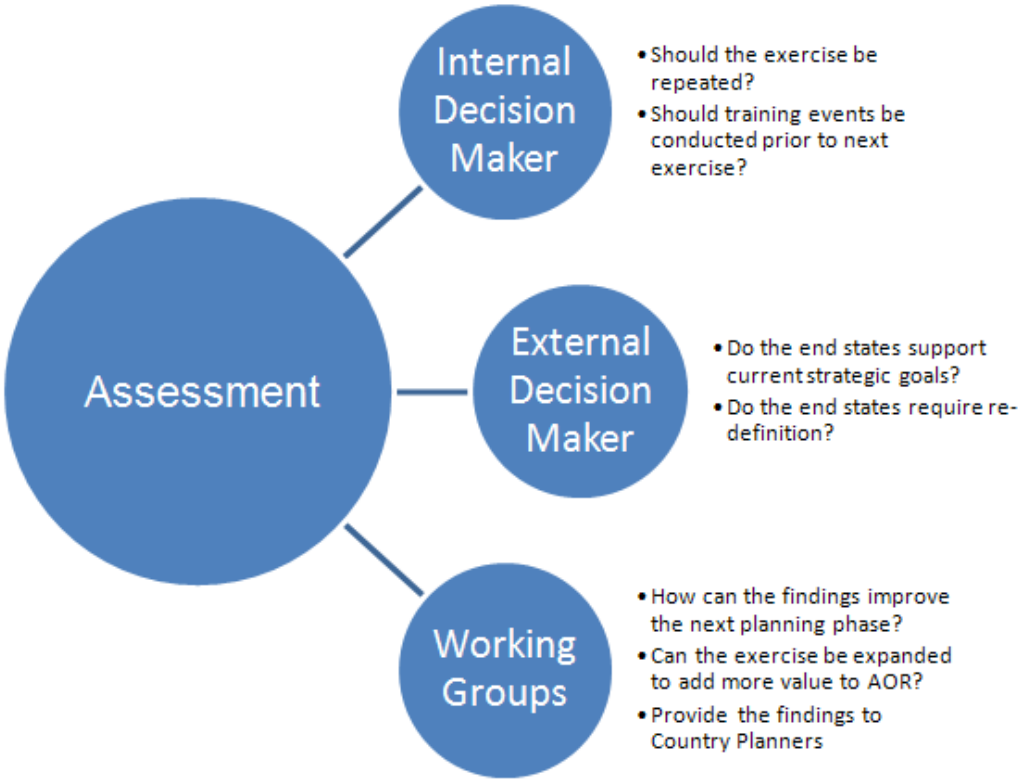

Figure 32. Assessment's Utilization by Decision Makers and Planners

E. IMPLICATIONS OF THE MODEL'S APPLICATION

All of the COCOMs, and EUCOM in particular, are currently conducting assessments in their AOR, so they are able to relate events conducted at the tactical level to strategic end states. This demonstration of the assessment process is useful to establish a framework for establishing the traceability between the levels of abstraction. The described model provides a defined high-level process that provides COCOMs flexibility in the implementation and communicates to decision makers the impact of activities in an AOR, without an explicit linkage between an activity and effects observed in a given country.

This simplistic example describes how the system's functions chronologically over time to facilitate and provide context to strategic decisions. This application did not combine all of the activities conducted in the AOR, since

the purpose to use the notional scenario to frame the functional model in the context of a practical exercise. The above example describes the process from which hundreds of data points can be combined into tens of items that express the strategic reality of the AOR, and thus making the assessor's task of relating events and effects at the tactical level to the strategic more manageable and meaningful.

VI. CONCLUSIONS AND RECOMMENDATIONS

> The United States and Europe are inextricably linked-politically as allies and partners in diplomacy.
>
> —Admiral James G. Stavirdis (U.S. Congress 2011, 1)

A. CONCLUSIONS

Based on the functional architecture developed in this thesis, the research questions posed earlier can be answered.

1. What Are The Critical Functions That A Strategic Theater Level Assessment Must Perform To Support Decision Makers?

The process of the functional decomposition, detailed in this thesis, answered the first question and can be summarized by five critical functions for a strategic assessment system:

1. Facilitate Decisions that Support American Interests
2. Accurately Represent Effects of Operations and Activities
3. Shape Theater Plans
4. Provide Evidence to Justify Resource Expenditures
5. Communicate Strategic Information

2. How Are The Terms "Useful, Feasible And Repeatable" Defined Within The Context Of Strategic Assessment?

This thesis concluded that a strategic assessment is a useful product when it facilitates future decisions by informing leadership about how missions conducted in the AOR do or do not support the strategic end states. If an assessment cannot describe the linkages between tactical and strategic levels of abstraction, it will not provide the greatest possible utility to decision makers.

Feasibility, the second characteristic, is realized when the effects of given activities are realized and accurate. This characteristic is achieved through a series of data verifications and the expertise of the assessors.

The final characteristic, repeatability, is necessary to the assessment process to ensure that it has sufficient flexibility to be valid for any administration or set of goals, while producing consistent desired results. In this case, a process is repeatable if it satisfies the functions defined earlier. The means by which these functions are implemented will change as new assessment techniques and technologies are developed, however the developed functional process will be repeatable over time.

3. How Does The Assessment Process Transform Inputs Into Outputs?

The assessment system receives reports from tactical commanders that describe the events of a given mission. The assessor transforms these inputs in a strategic context by validating that data, identifying trends and determining relationship between a given level of abstraction and the level immediately above it until the assessor has reached the strategic end states.

4. How Does The Assessment Relate Activities Conducted In The AOR To Strategic End States?

While this thesis did not specifically define the actions that COCOMs must take to relate tactical events to strategic end states, it shows that the relationship between these levels of abstraction can be determined through a series of intermediate connections. Since only a single level separates the items being connected, the relationship between them is easier to determine than relating a mission directly to a strategic goal.

5. Conclusion

Strategic assessments are the primary vehicle for COCOMs to communicate how their efforts support U.S. strategy and areas that require

additional time and or resources to achieve success. Therefore, the assessment process requires a definition that is flexible enough to be applicable regardless of U.S. strategy yet still provides sufficient detail that when implemented, addresses the concerns of the stakeholders, specifically, SECDEF and CJCS. The foundation of such a process is the functional architecture provided by this thesis.

B. KEY POINTS AND RECOMMENDATIONS

This thesis develops a functional architecture for conducting strategic assessments in the USEUCOM AOR utilizing Vitech's CORE 8 University Edition, according to the systems engineering process described by Dennis Buede. Requirements and objectives derived from a stakeholder analysis and communication with ECJ7 provides the basis for this architecture. From the architecture, a functional process model details high level functions that activate during the creation and presentation of strategic assessments.

Strategic assessments inform senior leadership of the impact of activities conducted in the AOR and describe risks facing the AOR in order to facilitate decisions that can shape the area according to national strategy. Joint Publications 3-0 and 5-0 provide guidance for conducting and developing these assessments, yet the particular expectations are ambiguous and vary among the different audiences.

Given budget realities facing the U.S. Government and specifically DoD, it is crucial to minimize unnecessary work and resource expenditures. To this aim, this thesis defines the individuals and organizations connected to the assessment process, thereby capturing the various needs and perspectives of the system users. Understanding the spectrum of users ensures that the system outputs better align with the set of needs the system is addressing than if consideration was only given to the immediate problems the system is desired to correct. Thus, thorough stakeholder analysis promotes efficiency and effectiveness.

Stakeholder analysis led to the development of system requirements that informs all stakeholders about the purpose of the system. This derivation is necessary to prevent an organization from expecting unrealistic outputs from the assessment. In addition, the requirements inform organizations about the relationship between the inputs and the ability to produce quality assessments. From an engineering perspective, this step ensures that a complete set of functions is created to satisfy all requirements.

The created functional architecture establishes the framework for conducting assessment. This framework defines what the system will accomplish and provides a process that describes when functions activate over time. Decomposing the core functions into sub-functions establish a hierarchy for the system. Next, these functions are assigned to the physical entities that perform the given function and arranged into a process as a function of time; the combination of the hierarchy and process defines the functional architecture for the strategic assessment system. The functional process demonstrates the order of functions that transform inputs from tactical commanders into an assessment of the AOR that serves as the basis for decision makers and planners to develop strategies that facilitate outcomes favorable to U.S. interests.

The application of the functional timeline describes that events at the tactical level do not have to be connected directly to a strategic goal. In fact this is not desired, as it is difficult to accomplish, and it is possible to dilute or inflate the impact of an activity on the AOR. By establishing the relationships through a series of incremental and clearly annotated steps, the assessment demonstrates areas that require additional attention, or a common fault that is impeding a range of activities from achieving their goals that could have been otherwise unobserved.

Beyond defining what the system accomplishes, this thesis illustrates the interactions between assessments and other systems and processes such as planning and resource allocation. By considering the integration of assessment into a larger system, concepts such as synchronization with plan development,

which may have otherwise been overlooked, are shown to be critical to the utility of assessments. Failure to account for these integration points creates situations that can marginalize the assessment's effect on the AOR and national interests.

C. AREAS FOR FURTHER RESEARCH

Since this thesis develops the assessment framework by accomplishing the early stages of the system engineering process, there are numerous follow-on research opportunities.

1. Metric Development

The assessor must identify quantitative and qualitative evidence; implicit in that requirement is the measurement of that information. Examples of measurement can be money spent on the activity, time spent on the activity and public polling before and after the activity. Value functions can be developed to quantify these measurements in terms of their utility.

2. Data Aggregation

There are many possible choices for aggregating the information from the tactical level up to the strategic level. The challenge is preventing selective information from driving the strategic summary to an "average" value that has lost meaning and requires investigation to determine the information critical to the AOR's strategic environment.

A research trip to USSOUTHCOM in March 2012, revealed that an assessment represents the completion of strategic objectives for each country as a percentage. This method weights each objective equally; therefore, it is interesting to explore how to weight the strategic objectives. Across the AOR, they might be equally valuable; however, a given objective may not be applicable to a particular country, so the assessment must account for the varied application of the objectives across the AOR. Accordingly, a research topic of interest is how to present the assessment in a concise way that begins at the strategic level and becomes more detailed, as the level of abstraction is reduced. For example,

this could aggregate the countries across the AOR, removing the extremely stable and unstable countries as outliers beyond the COCOM's immediate influence.

3. Graphical Presentation of Assessment

By considering the decision making process and its dependency on the way information is received, a potential research topic examines the data that needs to be presented, and how the orientation of that information can be used to maximize the comprehension of the presentation by the decision maker under the time-constrained environments of senior leadership.

A well-designed graphical dashboard that presents strategic information and offers the ability to forecast the effect of events on the overall AOR would be a valuable tool for decision makers. Such a tool could indicate that it would require significant allocation of resources to affect change, where those same resources, spread over multiple countries, could affect change over a wider geographic space.

4. Functional Model Validation

Leveraging a battle space simulation program, such as Joint Theater Level Simulation, to build a scenario with defined units from the various country participants. This simulation can produce quantitative data for comparison against metrics that represent a given COCOMs goals. Such an examination facilitates a validation of the functional architecture beyond the notional example in this thesis.

LIST OF REFERENCES

Assessment and Analysis Directorate (ECJ7). 2011a. “USEUCOM Theater Campaign Plan” EUCOM Video Teleconference, Monterey, CA, 13 June 2011.

———. 2011b. “USEUCOM Theater Campaign Plan (TCP) Assessment Approach: A Plans-Based Assessment ” EUCOM Video Teleconference, Monterey, CA, 13 June 2011.

Buede, Dennis. 2009. *The Engineering Design of Systems: Models and Methods*. 2nd ed. Hoboken NJ: Wiley.

Department of Defense. 2010. *Quadrennial Defense Review.* Accessed on 23 January 2012: http://www.defense.gov/qdr/images/QDR_as_of_12Feb10_1000.pdf.

Dreazen, Yochi. “Pentagon Cuts and a Changing U.S. Military,*” The Atlantic,* 6 January 2012, Accessed 29 January 2012 http://www.theatlantic.com/international/archive/2012/01/pentagon-cuts-and-a-changing-us-military/250997/.

Kuenning, Howard, F. 2011. “Theater Assessment Approach.” Paper present to Naval Postgraduate School, 8 September 2011. Monterey, CA.

National Defense University. 2000. *Joint Forces Staff College Publication 1* Norfolk, VA.

Nix, Dayne. “Adaptive Planning and Execution System” Lecture presented as part of the Joint Military Planning Phase 2 course, NW 3276, at NPS, Monterey, CA, February 2012.

Stavridis, James G. 2010. *Partnership for the Americas: Western Hemisphere Strategy and U.S. Southern* Command. Washington DC: National Defense University Press. http://www.ndu.edu/press/lib/pdf/books/stavridis.pdf.

Sweeney, Patrick C. 2009. *A Primer for Guidance for Employment of Force (GEF), Joint Strategic Capabilities Plan (JSCP), the Adaptive Planning and Execution (APEX) System and Global Force Management (GFM*). Newport, RI: U.S. Navy.

The White House. 2008. *Unified Command Plan.* Accessed on 23 January 2012: http://info.publicintelligence.net/UCP-2008.pdf.

———. 2010. *National Security Strategy.* Accessed on 23 January 2012:http://www.whitehouse.gov/sites/default/files/rss_viewer/national_security_strategy.pdf.

———. 2011, *Unified Command Plan Map.* Accessed on 23 January 2012: http://www.defense.gov/news/UCP_2011_Map4.pdf.

U.S. Congress. Senate. Armed Service Committee. 2011. *Testimony of Admiral James G Stavridis, United States Navy Commander, United States European Command*. 112th Congress. 29 March 2011.

U.S. Joint Chiefs of Staff. 2011a. *Joint Publication 5-0: Joint Operation Planning.* Washington, DC: Government Printing Office.

———. 2011b. *National Military Strategy*. Accessed on 1 February 2012: http://www.jcs.mil/content/files/2011-2/020811084800_2011_NMS_-_08_FEB_2011.pdf.

Vitech Cooperation. 2011. *CORE 8 Architecture Guide.* Blacksburg, VA.

APPENDIX A. OBJECTIVE HIERARCHY

This appendix details the full objective hierarchy, both in visual decompositions and tables describing the objectives.

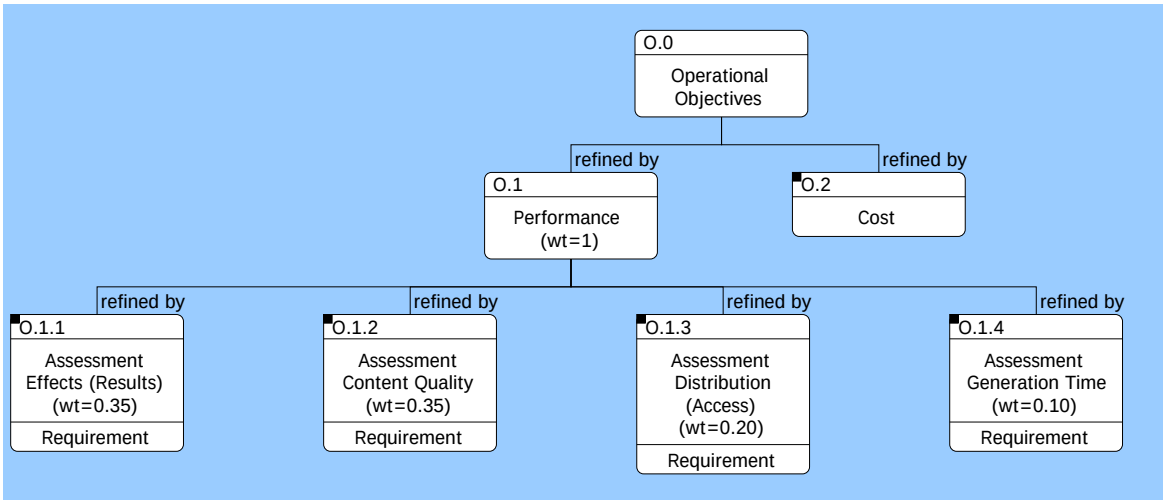

Figure 33. Objective O.1 Decomposition

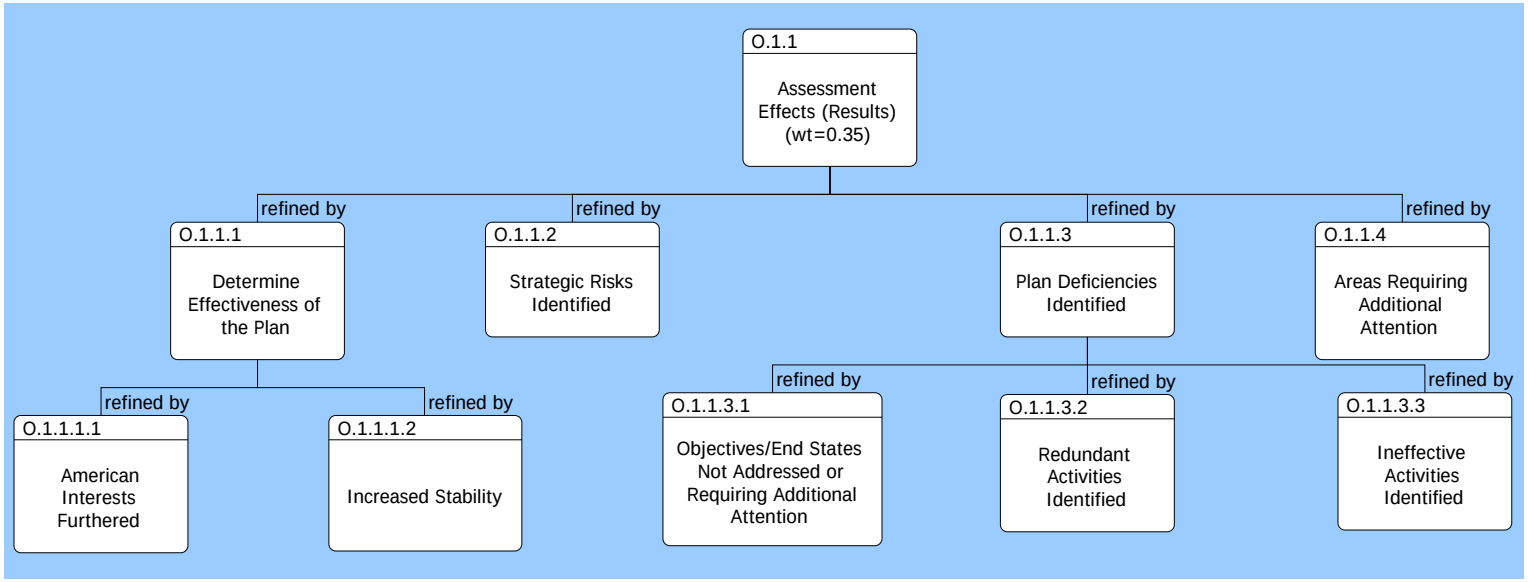

Figure 34. Objective O.1.1 Decomposition

Objective Number	Objective Name	Objective Description
O.0	Operational Objectives	Develop Theater Assessment Capability for the purpose of Evaluating Current Activities, Operations, and Environmental Conditions Against Established Goals and Strategic Objectives to Shape and Modify Future Plans and Resource Allocations in Order to Support and Advance the Interests of the United States, with Respect to the European Theater
O.1	Performance (wt=1)	
O.1.1	Assessment Effects (Results) (wt=0.35)	
O.1.1.1	Determine Effectiveness of the Plan	Determine how effective the plan was in producing the desired strategic end states and objectives
O.1.1.1.1	American Interests Furthered	Were American interests furthered in AOR? May or may not be independent of USEUCOM plans.
O.1.1.1.2	Increased Stability	Was stability in the AOR increased? May or may not be independent of USEUCOM plans.
O.1.1.2	Strategic Risks Identified	Identify strategic risks facing AOR. May or may not be independent of USEUCOM actions
O.1.1.3	Plan Deficiencies Identified	Identify areas where the plans have flaws or require improvement
O.1.1.3.1	Objectives/End States Not Addressed or Requiring Additional Attention	Identify areas where the strategic end states and goal require additional attention
O.1.1.3.2	Redundant Activities Identified	Identify activities that accomplish similar effects seen from other activities
O.1.1.3.3	Ineffective Activities Identified	Identify areas that are having no measurable effect on strategic goals or end states
O.1.1.4	Areas Requiring Additional Attention	Identify components of strategic end state or goals that are not supported or weakly supported by current activities

Table 10. Objective O.0-1.1.4 Descriptions

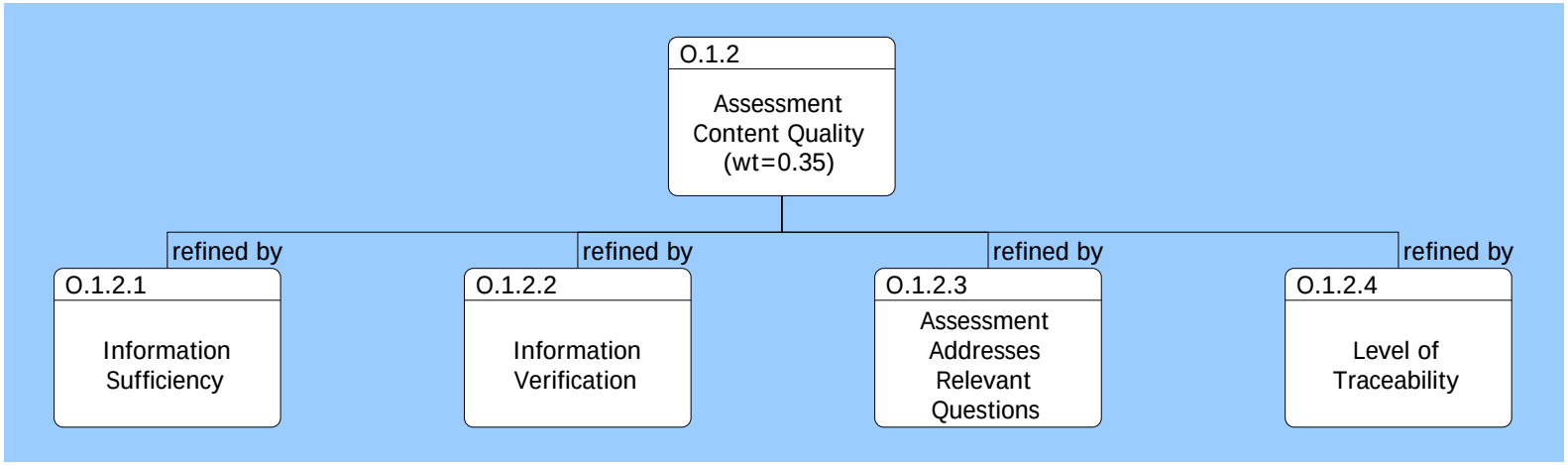

Figure 35. Objective O.1.2 Decomposition

Objective Number	Objective Name	Objective Description
O.1.2	Assessment Content Quality (wt=0.35)	
O.1.2.1	Information Sufficiency	Is the information contained within the assessment enough to support decisions
O.1.2.2	Information Verification	Was the source information verified whenever possible
O.1.2.3	Assessment Addresses Relevant Questions	Are the concerns of the decision makers addressed by the assessment
O.1.2.4	Level of Traceability	Does the assessment demonstrate the connection between activities at the tactical level and strategic end states and goals?

Table 11. Objective O.1.2-1.2.4 Descriptions

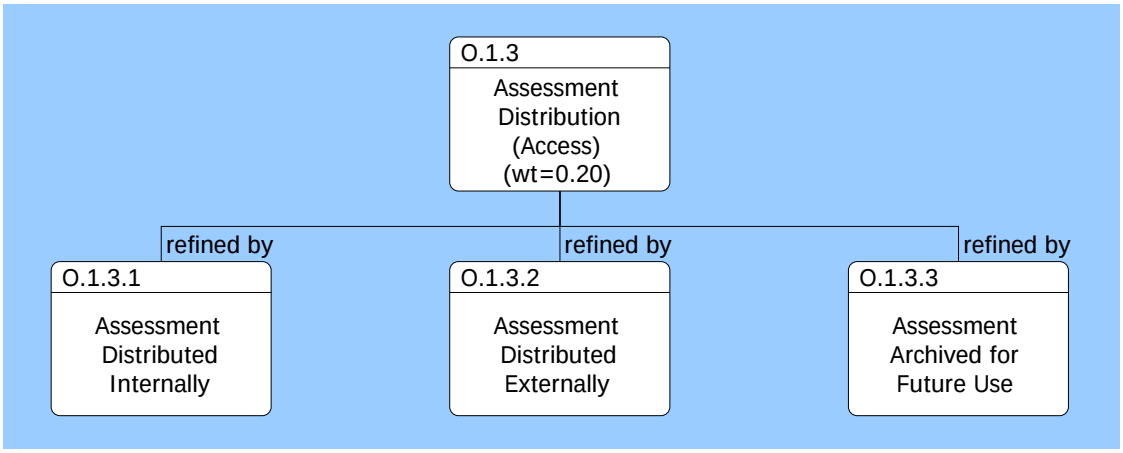

Figure 36. Objective O.1.3 Decomposition

Objective Number	Objective Name	Objective Description
O.1.3	Assessment Distribution (Access) (wt=0.20)	[redacted]
O.1.3.1	Assessment Distributed Internally	Was the assessment distributed internally? Should additional personnel/organizations be added to the distribution list
O.1.3.2	Assessment Distributed Externally	Was the assessment distributed externally? Should additional personnel/organizations be added to the distribution list
O.1.3.3	Assessment Archived for Future Use	Was the assessment archived? Is the archive accessible

Table 12. Objective O.1.3-1.3.3 Descriptions

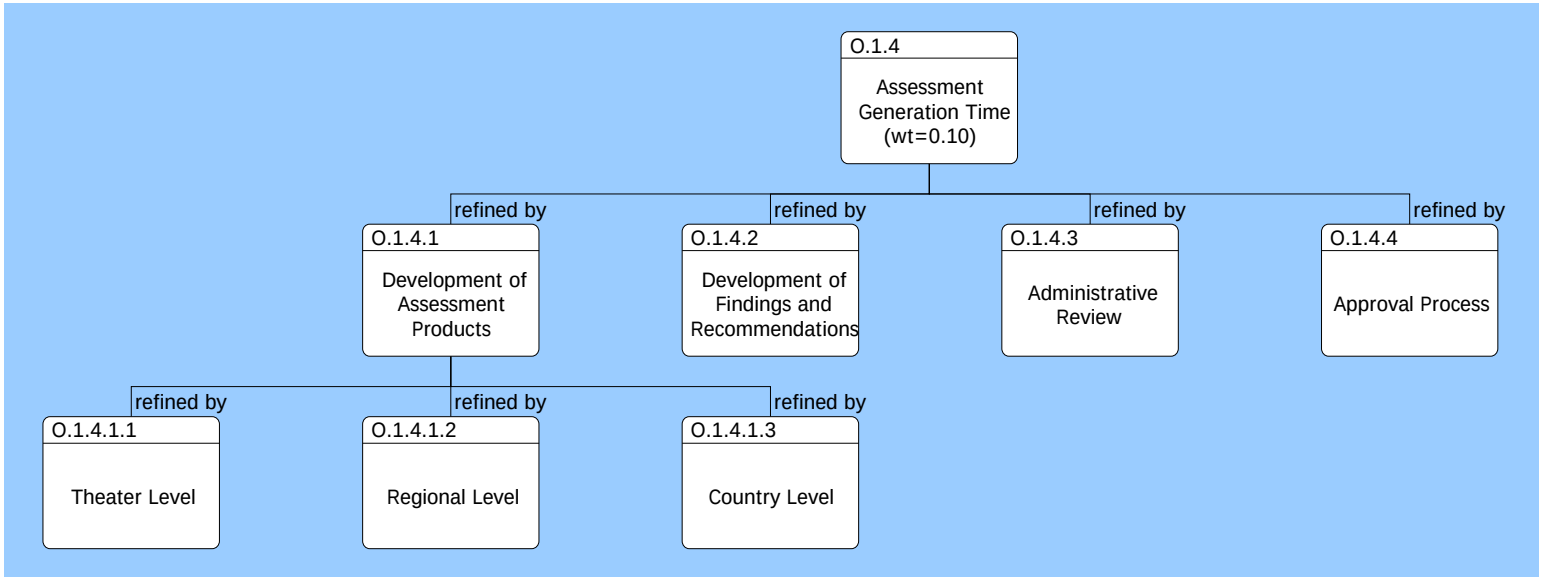

Figure 37. Objective O.1.4 Decomposition

Objective Number	Objective Name	Objective Description
O.1.4	Assessment Generation Time (wt=0.10)	
O.1.4.1	Development of Assessment Products	Were the appropriate products produced?
O.1.4.1.1	Theater Level	Was a theater level assessment produced?
O.1.4.1.2	Regional Level	Was a regional level assessment produced?
O.1.4.1.3	Country Level	Was a country level assessment produced?
O.1.4.2	Development of Findings and Recommendations	Do the products include both findings and recommendations?
O.1.4.3	Administrative Review	Were the appropriate leaders included in the review process? Was their feedback useful to process?
O.1.4.4	Approval Process	Does the approval process impede the assessment process or reduce its utility due to time latency issues?

Table 13. Objective O.1.4-1.4.4 Descriptions

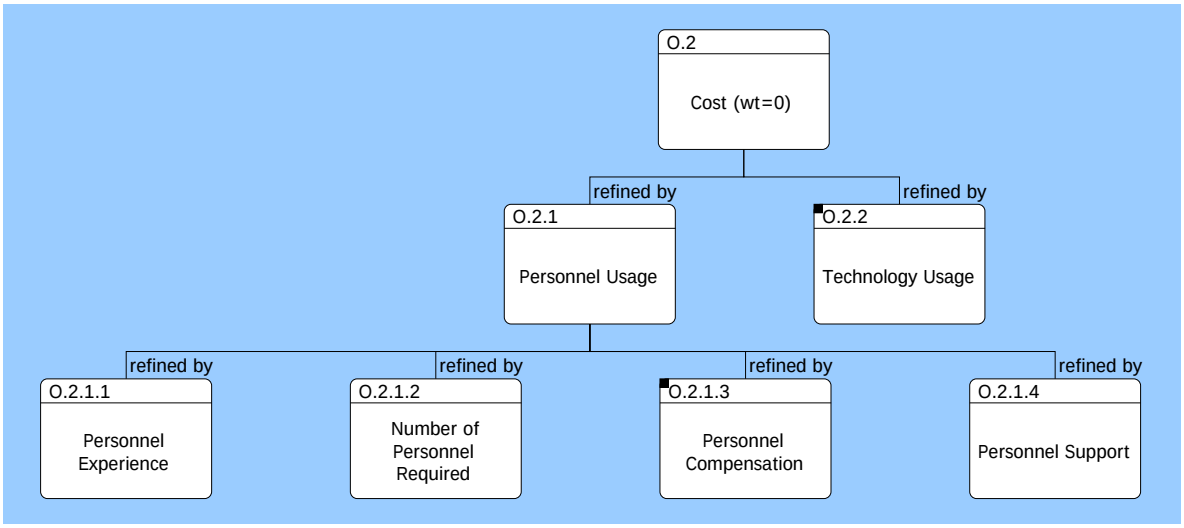

Figure 38. Objective O.2.1 Decomposition

Objective Number	Objective Name	Objective Description
O.2	Cost (wt=0)	
O.2.1	Personnel Usage	
O.2.1.1	Personnel Experience	Do assessors possess the requisite experience?
O.2.1.2	Number of Personnel Required	Are the requirements placed on the division exceeding manning? Is manning level affecting quality of assessment?
O.2.1.2.1	Users	Are more assessors required?
O.2.1.2.2	Technical Support	Is greater technical support required?
O.2.1.3	Personnel Compensation	What is the total personnel cost?
O.2.1.3.1	Salary	What is the cost due to salary?
O.2.1.3.2	Training	What are the personnel training cost?
O.2.1.3.3	Other	What are the additional costs? i.e., medical benefits, COLA, housing etc
O.2.1.4	Personnel Support	What support infrastructure is in place or required to conduct operations?

Table 14. Objective O.2-2.1.4 Descriptions

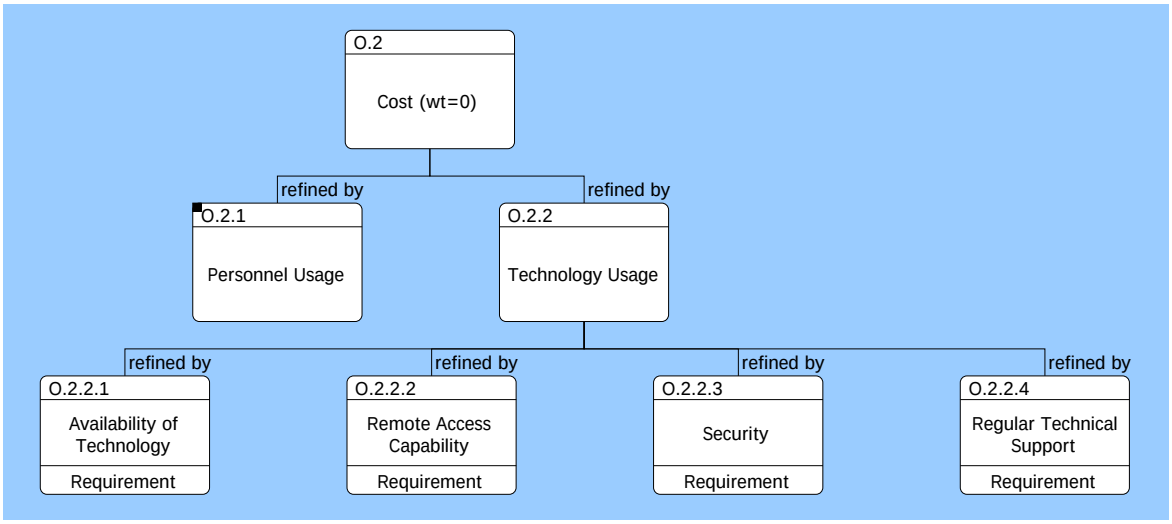

Figure 39. Objective O.2.2 Decomposition

Objective Number	Objective Name	Objective Description
O.2.2	Technology Usage	
O.2.2.1	Availability of Technology	Is the technology required for system performance available to all appropriate organizations? i.e., are portable devices or encrypted connections available
O.2.2.2	Remote Access Capability	Is remote connectivity in place for appropriate organizations throughout the AOR? What are the costs associated with maintaining/improving the infrastructure?
O.2.2.3	Security	What are the cost for securing the hardware and software required for system operation
O.2.2.4	Regular Technical Support	What are the day-to-day cost for operating the system

Table 15. Objective O.2.2-2.2.4 Descriptions

APPENDIX B. SYSTEM REQUIREMENTS

This appendix provides a complete list of the requirements and their description according to their classification.

Requirement Number	Requirement Name	Description
R.0	Theater Assessment	Overall System Requirements
R.1	Stakeholder Requirements	
R.1.1	Theater Periodicity	Each Theater objective shall be assessed at least annually
R.1.2	Country Periodicity	Each country in the AOR shall be assessed at least annually
R.1.3	DOD Guidance	The system must conform to applicable DOD Guidance
R.1.4	History	The Theater Assessment shall be stored for X years
R.1.5	Trend Analysis	Assessments shall be compared to previous assessments to determine trends
R.1.6	Effects	The Assessment Shall generate products that support decision-making at the following Levels: Commander, Component Directorate, O-6.
R.1.6.1	Hindrance	The Assessment shall identify hindrances to success
R.1.6.2	Failure	The Assessment shall identify reasons for failure
R.1.6.3	Success	The Assessment shall identify contributors to success
R.1.6.4	Objective	The Assessment shall determine what Theater Objective was supported
R.1.6.5	End State	The Assessment shall determine what GEF end state was supported

Table 16. Stakeholder Requirements

Requirement Number	Requirement Name	Description
R.2	Input Requirements	[redacted]
R.2.1	Evidence	The Assessment shall utilize LOAs as evidence for conclusions
R.2.2	Report Detail	The information in the reports shall represent what happened prior to, during, and following the event based on the commander's perspective.
R.2.3	Verification	The Assessment shall examine multiple sources of information

Table 17. Input Requirements

Requirement Number	Requirement Name	Description
R.3	Output Requirements	[redacted]
R.3.1	Traceability	The Assessment Team shall determine how an operational level event supports a GEF End State
R.3.1.1	Country Campaign Plan	The Assessment Team shall determine how the Country Campaign Plan supports the Regional Campaign Plan
R.3.1.2	Regional Campaign Plan	The Assessment Team shall determine how a Regional Campaign Plan supports the Theater Campaign Plan
R.3.1.3	Theater Campaign Plan	The Assessment Team shall determine how the Theater Campaign Plan supports the GEF End State
R.3.2	Availability	The Assessment shall be made available to all appropriate individuals
R.3.2.1	SECDEF	Every Theater Assessment shall be made available to the Secretary of Defense and their staff
R.3.2.2	CJCS	Every Theater Assessment shall be made available to the Chairman of the Joint Chiefs of Staff and their staff
R.3.2.3	COCOM	Every Theater Assessment shall be made available to the Combatant Commander (EUCOM)
R.3.2.4	Planning	Every Theater Assessment shall be made available to Theater Planning Staff (J5)
R.3.3	Emergency Response	The system shall produce low resolution assessments on short notice or emergencies

Table 18. Output Requirements

Requirement Number	Requirement Name	Description
R.4	Technology Requirements	
R.4.1	Operating AOR	The system shall be accessible throughout the EUCOM AOR
R.4.2	Compatibility	The system shall be compatible with DOD's SIPRnet and NIPRnet
R.4.3	Environment	The system shall exist on SIPRnet

Table 19. Technical Requirements

THIS PAGE INTENTIONALLY LEFT BLANK

APPENDIX C. FUNCTIONAL ARCHITECTURE

The complete functional decomposition is provided in this appendix in addition to identifying the requirements that provide the basis for each function.

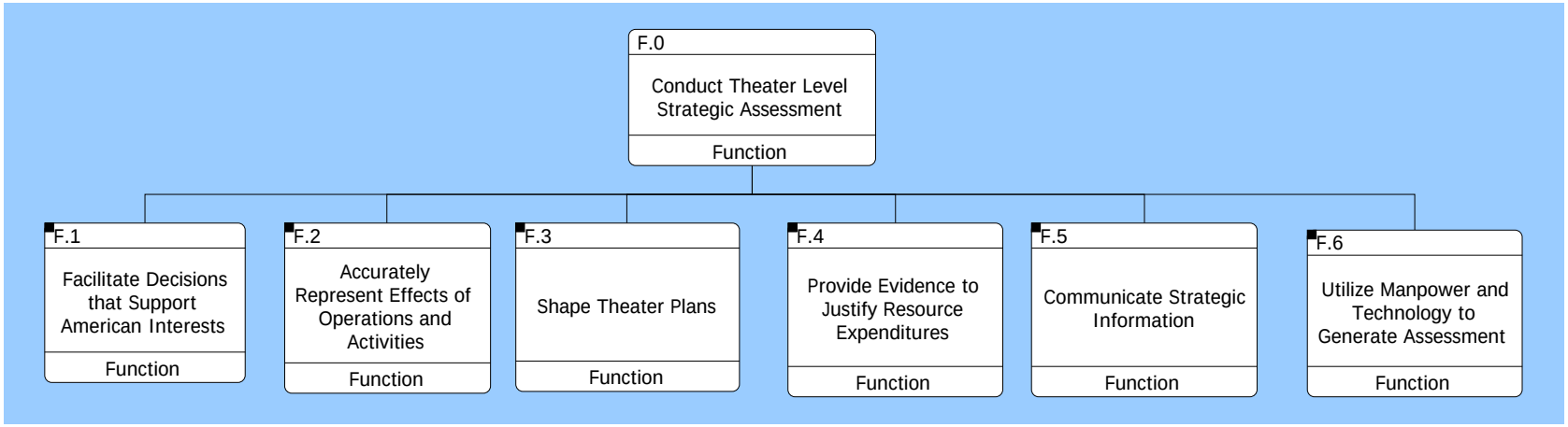

Figure 40. Top Level Functional Decomposition

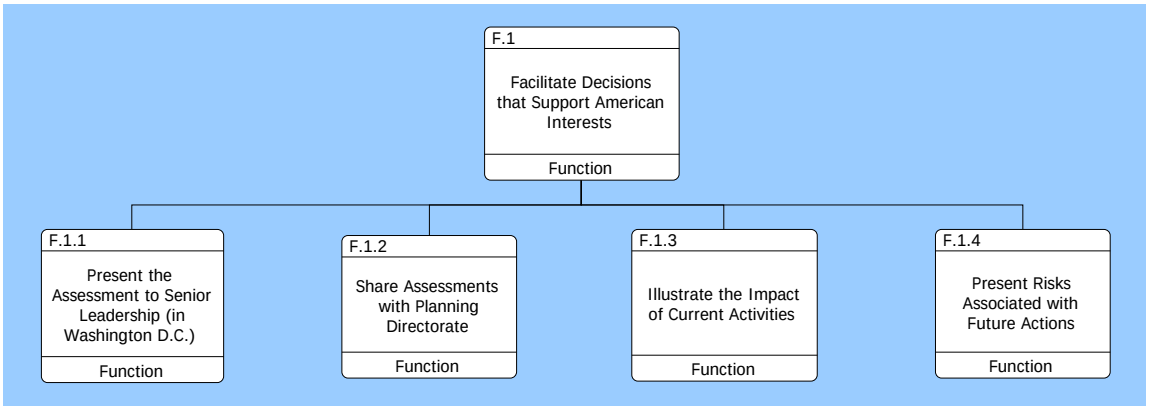

Figure 41. Function F.1 Decomposition

Function Number	Function Name	Function Description
F.1	Facilitate Decisions that Support American Interests	The information contained within the assessment shall be of sufficient detail that it supports a strategic discussion about the AOR such that Senior Leadership can be informed about the environment, current operations, effects of current plans and strategy, Commander's concerns and potential challenges.
F.1.1	Present the Assessment to Senior Leadership (in Washington, D.C.)	The Assessment will be distributed to Chairman of the Joint Chiefs of Staff, Office of the Secretary of Defense and the respective staffs. (external transmission)
F.1.2	Share Assessments with Planning Directorate	The Assessment will be distributed among the COCOM's Directorates, specifically, but not limited to, the J5 Directorate. (internal transmission)
F.1.3	Illustrate the Impact of Current Activities	The assessment teams will clearly present their conclusions relating to the implementation of current strategy and plans to the environment and state of affairs within the AOR. This is likely not to be a 1:1 relationship so the assessor must rely on their expertise and experience to make connections and state a confidence level to the conclusion.
F.1.4	Present Risks Associated with Future Actions	The Assessment will describe the risks that the leadership will accept by continuing the current strategy or altering strategy.

Table 20. Function F.1 Description

Function Number	Function Name	Function's Basis
F.0	Conduct Theater Level Strategic Assessment	Requirement R.0 Theater Assessment
F.1	Facilitate Decisions that Support American Interests	Requirement R.1.1 Theater Periodicity Requirement R.1.2 Country Periodicity Requirement R.1.6 Effects Requirement R.1.6.1 Hindrance Requirement R.1.6.2 Failure Requirement R.1.6.3 Success Requirement R.1.6.4 Objective Requirement R.1.6.5 End State
F.1.1	Present the Assessment to Senior Leadership (in Washington, D.C.)	Requirement R.1.6 Effects Requirement R.3.2 Availability Requirement R.3.2.1 SECDEF Requirement R.3.2.2 CJCS
F.1.2	Share Assessments with Planning Directorate	Requirement R.3.2 Availability Requirement R.3.2.3 COCOM Requirement R.3.2.4 Planning
F.1.3	Illustrate the Impact of Current Activities	Requirement R.1.6 Effects Requirement R.1.6.1 Hindrance Requirement R.1.6.2 Failure Requirement R.1.6.3 Success Requirement R.1.6.4 Objective Requirement R.1.6.5 End State Requirement R.3.1 Traceability Requirement R.3.1.1 Country Campaign Plan Requirement R.3.1.2 Regional Campaign Plan Requirement R.3.1.3 Theater Campaign Plan
F.1.4	Present Risks Associated with Future Actions	Requirement R.1.6 Effects

Table 21. Function to Requirement F.1

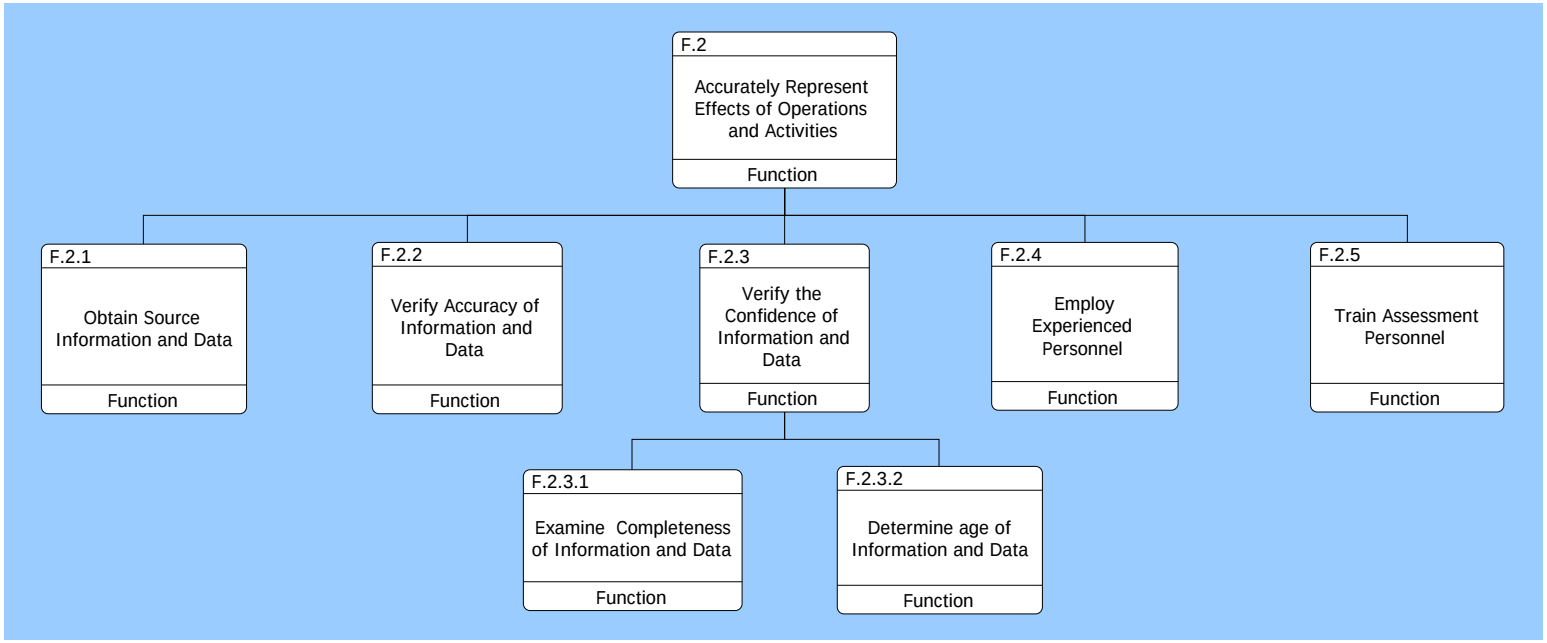

Figure 42. Function F.2 Decomposition

Function Number	Function Name	Function Description
F.2	Accurately Represent Effects of Operations and Activities	The Assessment will describe what impact the current activities on a given AOR. It will link quantitative evidence in a country to qualitative strategic questions, while acknowledging where there is limited data or hindrances to effectiveness.
F.2.1	Obtain Source Information and Data	The assessment team shall obtain feedback and data from tactical and operational commanders who implemented the plans within a country. This data should outline both the quantitative aspects of the operation, i.e., number of units trained, in addition to the opinions of the commanders.
F.2.2	Verify Accuracy of Information and Data	The assessment team will make all attempts to independently verify the information received.
F.2.3	Verify the Confidence of Information and Data	Combine the determination of the how complete the data is with the time latency to assign a confidence level to the information and data.
F.2.3.1	Examine Completeness of Information and Data	The assessment team should consider as many sources as possible to ensure that the data collected is as complete as possible. In addition, this will provide insights that may not have been available to the operational commander This will include unclassified sources such as host nation media, NGOs and international news organizations.
F.2.3.2	Determine age of Information and Data	Given the rapidly changing natures of many countries in an AOR, the assessment team needs to understand the lag between an operation and the completion of the assessment. The disclosure of the age will alert decision makers that the value of the source information may have been altered.
F.2.4	Employ Experienced Personnel	Since an assessment bridges the gap between operational activities and broader strategy, the experience of the assessment team is critical to understanding the dynamics within an AOR. By employing people familiar with an AOR, the Assessment will more effectively link the inputs to the outcome.
F.2.5	Train Assessment Personnel	The assessment team must be continuously trained to understand methods of collecting information, transforming it into a usable form and communicating it to the appropriate organizations.

Table 22. Function F.2 Description

Function Number	Function Name	Function's Basis
F.2	Accurately Represent Effects of Operations and Activities	Requirement R.1.6 Effects Requirement R.1.6.1 Hindrance Requirement R.1.6.2 Failure Requirement R.1.6.3 Success Requirement R.1.6.4 Objective Requirement R.1.6.5 End State Requirement R.2.2 Report Detail
F.2.1	Obtain Source Information and Data	Requirement R.2.1 Evidence Requirement R.2.3 Verification
F.2.2	Verify Accuracy of Information and Data	Requirement R.2.3 Verification
F.2.3	Verify the Confidence of Information and Data	Requirement R.1.1 Theater Periodicity Requirement R.1.2 Country Periodicity Requirement R.2.3 Verification
F.2.3.1	Examine Completeness of Information and Data	Requirement R.2.3 Verification
F.2.3.2	Determine age of Information and Data	Requirement R.1.1 Theater Periodicity Requirement R.1.2 Country Periodicity
F.2.4	Employ Experienced Personnel	Requirement R.3.1 Traceability Requirement R.3.1.1 Country Campaign Plan Requirement R.3.1.2 Regional Campaign Plan Requirement R.3.1.3 Theater Campaign Plan
F.2.5	Train Assessment Personnel	Requirement R.3.1 Traceability Requirement R.3.1.1 Country Campaign Plan Requirement R.3.1.2 Regional Campaign Plan Requirement R.3.1.3 Theater Campaign Plan

Table 23. Function to Requirement F.2

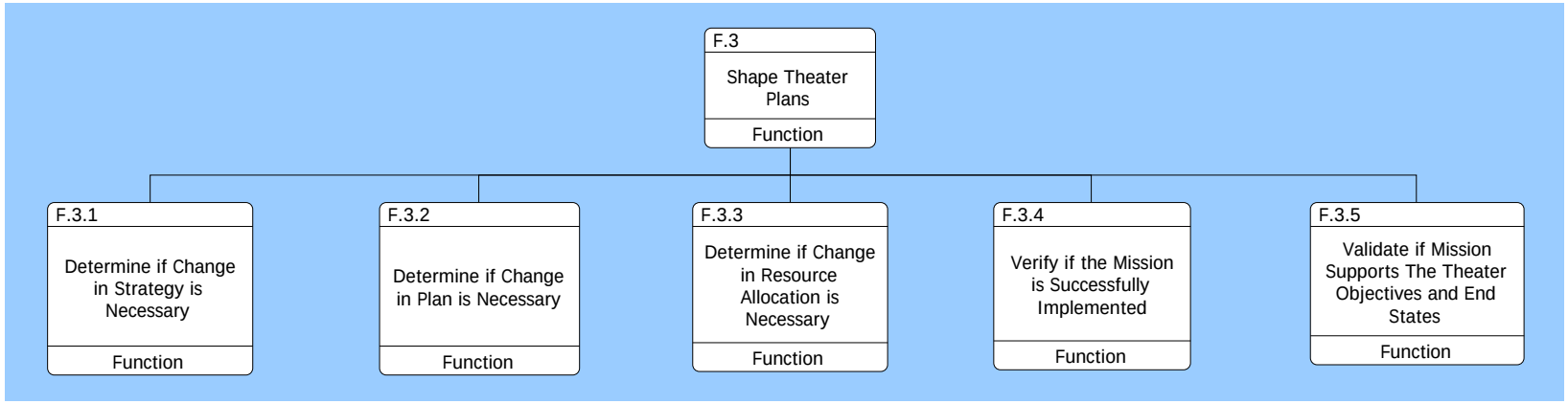

Figure 43. Function F.3 Decomposition

Function Number	Function Name	Function Description
F.3	Shape Theater Plans	The Assessment will feed back into the internal planning process for a COCOM. The Assessment will provide insights on what the U.S. strategy will be in the future, and it will provide the COCOM Commander with recommendations on how to operate under the currently defined strategy.
F.3.1	Determine if Change in Strategy is Necessary	Based on the Assessment's findings, should the overall strategy be modified or continued?
F.3.2	Determine if Change in Plan is Necessary	Based on the Assessment's findings and given the approved strategy, are the plans in place supporting the COCOMs goals and national strategy? If plans are inadequate, the assessment will identify areas for improvement and recommendations.
F.3.3	Determine if Change in Resource Allocation is Necessary	Based on the Assessment's findings and given the approved strategy and plans (regional and county), are the resources being effectively employed? The assessment will provide both positive and negative feedback.
F.3.4	Verify if the Mission is Successfully Implemented	The Assessment will inform leadership if the mission was achieved as defined. (MOP)
F.3.5	Validate if Mission Supports The Theater Objectives and End States	The Assessment will inform leadership if the mission was defined correctly. (MOE)

Table 24. Function F.3 Description

Function Number	Function Name	Functions Basis
F.3	Shape Theater Plans	Requirement R.1.6 Effects Requirement R.1.6.1 Hindrance Requirement R.1.6.2 Failure Requirement R.1.6.3 Success Requirement R.1.6.4 Objective Requirement R.1.6.5 End State Requirement R.3.1 Traceability Requirement R.3.1.1 Country Campaign Plan Requirement R.3.1.2 Regional Campaign Plan Requirement R.3.1.3 Theater Campaign Plan
F.3.1	Determine if Change in Strategy is Necessary	Requirement R.3.1 Traceability Requirement R.3.1.3 Theater Campaign Plan
F.3.2	Determine if Change in Plan is Necessary	Requirement R.3.1 Traceability Requirement R.3.1.3 Theater Campaign Plan
F.3.3	Determine if Change in Resource Allocation is Necessary	Requirement R.3.1 Traceability Requirement R.3.1.1 Country Campaign Plan Requirement R.3.1.2 Regional Campaign Plan Requirement R.3.1.3 Theater Campaign Plan
F.3.4	Verify if the Mission is Successfully Implemented	Requirement R.2.1 Evidence Requirement R.3.1 Traceability Requirement R.3.1.1 Country Campaign Plan
F.3.5	Validate if Mission Supports The Theater Objectives and End States	Requirement R.1.6.4 Objective Requirement R.1.6.5 End State Requirement R.3.1 Traceability Requirement R.3.1.1 Country Campaign Plan Requirement R.3.1.2 Regional Campaign Plan Requirement R.3.1.3 Theater Campaign Plan

Table 25. Function to Requirement F.3

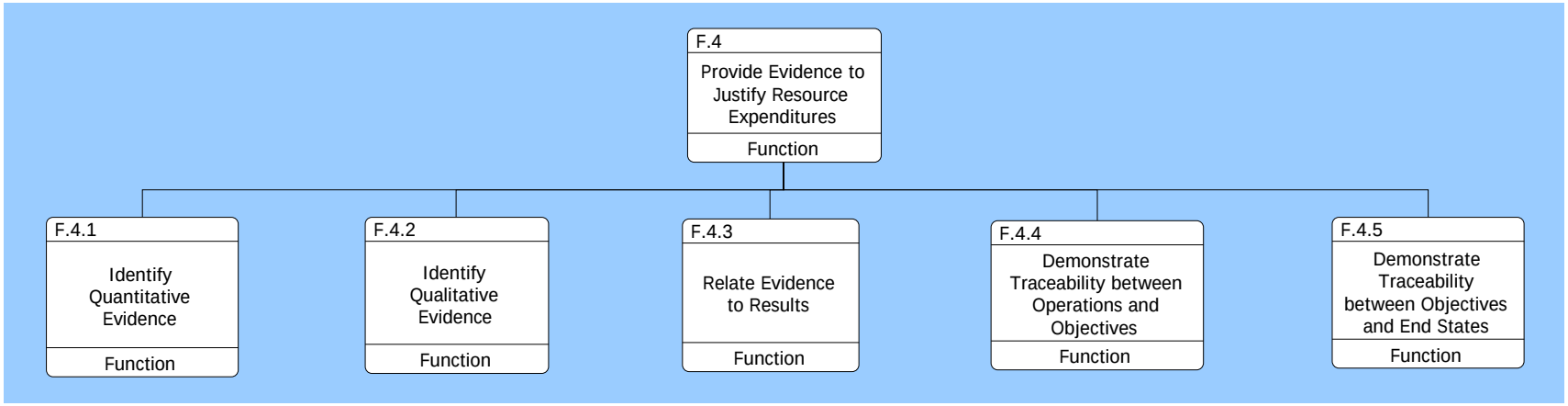

Figure 44. Function F.4 Decomposition

Function Number	Function Name	Function Description
F.4	Provide Evidence to Justify Resource Expenditures	The Assessment will relate the efforts conducted in the COCOM's AOR to effects seen after the operations were conducted. This relationship will provide COCOM Commanders with evidence to justify resource allocation to the Pentagon. By extension, the Secretary of Defense can utilize the same evidence to demonstrate to Congress the value of DOD efforts to national priorities.
F.4.1	Identify Quantitative Evidence	The assessment shall define the evidence as quantitative or qualitative.
F.4.2	Identify Qualitative Evidence	The assessment shall define the evidence as quantitative or qualitative.
F.4.3	Relate Evidence to Results	The Assessment will demonstrate the traceability between the data collect from activities in a given country and the effects seen.
F.4.4	Demonstrate Traceability between Operations and Objectives	The traceability established in the Assessment will be accomplished in steps in order to show leadership how each level supports the one above it. This method will also demonstrate what level does not support the overall strategy when an issue is identified.
F.4.5	Demonstrate Traceability between Objectives and End States	The traceability established in the Assessment will be accomplished in steps in order to show leadership how each level supports the one above it. This method will also demonstrate what level does not support the overall strategy when an issue is identified.

Table 26. Function F.4 Description

Function Number	Function Name	Function's Basis
F.4	Provide Evidence to Justify Resource Expenditures	Requirement R.2.1 Evidence
F.4.1	Identify Quantitative Evidence	Requirement R.2.1 Evidence Requirement R.2.2 Report Detail Requirement R.2.3 Verification
F.4.2	Identify Qualitative Evidence	Requirement R.2.1 Evidence Requirement R.2.2 Report Detail Requirement R.2.3 Verification
F.4.3	Relate Evidence to Results	Requirement R.3.1 Traceability Requirement R.3.1.1 Country Campaign Plan Requirement R.3.1.2 Regional Campaign Plan Requirement R.3.1.3 Theater Campaign Plan
F.4.4	Demonstrate Traceability between Operations and Objectives	Requirement R.3.1 Traceability Requirement R.3.1.1 Country Campaign Plan Requirement R.3.1.2 Regional Campaign Plan Requirement R.3.1.3 Theater Campaign Plan
F.4.5	Demonstrate Traceability between Objectives and End States	Requirement R.3.1 Traceability Requirement R.3.1.1 Country Campaign Plan Requirement R.3.1.2 Regional Campaign Plan Requirement R.3.1.3 Theater Campaign Plan

Table 27. Function to Requirement F.4

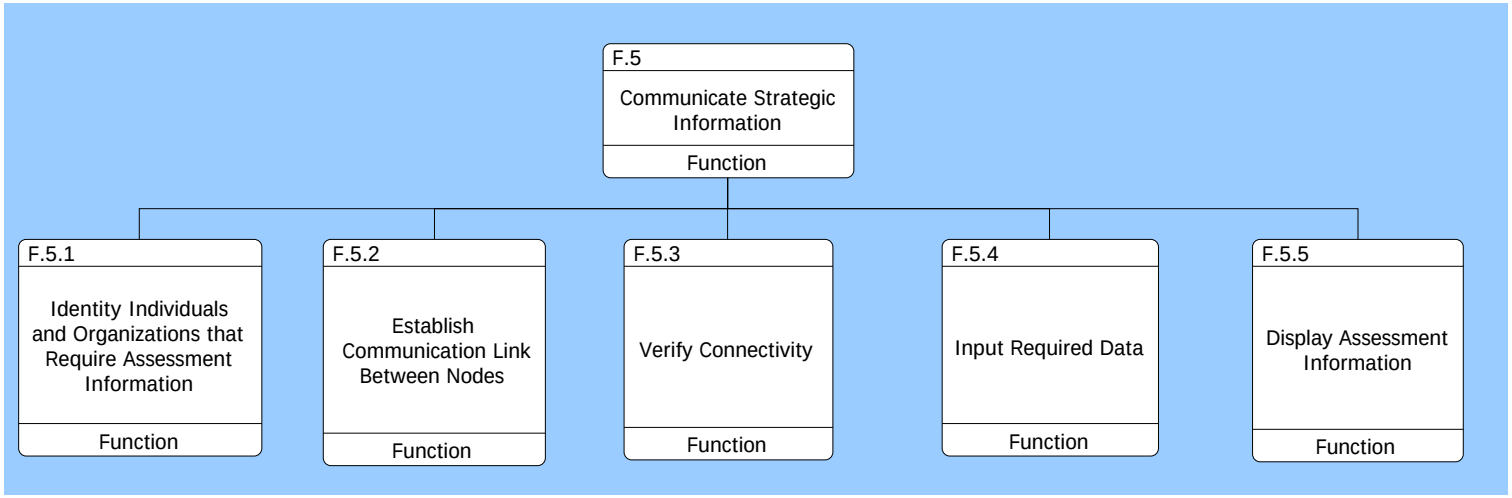

Figure 45. Function F.5 Decomposition

Function Number	Function Name	Function Description
F.5	Communicate Strategic Information	The Assessment will be communicated up and down the chain of command to inform all pertinent organizations what occurred in the AOR, what the impact of those actions are and how they do or do not support the governing strategy.
F.5.1	Identity Individuals and Organizations that Require Assessment Information	The leadership will determine what individuals and organizations would benefit from the information presented in the Assessment.
F.5.2	Establish Communication Link Between Nodes	The system will establish a communication link between nodes to allow the passage of information between activities
F.5.3	Verify Connectivity	The system will verify that it is connected to external networks. In the event connectivity fails, a alert will prompt user to seek corrective actions.
F.5.4	Input Required Data	The system will receive input data from tactical operations that serve as the foundation for the strategic assessment.
F.5.5	Display Assessment Information	The system will present the information contained within the data base to facilitate utilization and dissemination the data and conclusions

Table 28. Function F.5 Description

Function Number	Function Name	Function's Basis
F.5	Communicate Strategic Information	Requirement R.4.1 Operating AOR Requirement R.4.2 Compatibility Requirement R.4.3 Environment
F.5.1	Identity Individuals and Organizations that Require Assessment Information	Requirement R.3.2 Availability
F.5.2	Establish Communication Link Between Nodes	Requirement R.3.2 Availability
F.5.3	Verify Connectivity	Requirement R.4.2 Compatibility Requirement R.4.3 Environment
F.5.4	Input Required Data	Requirement R.2.1 Evidence Requirement R.2.3 Verification
F.5.5	Display Assessment Information	Requirement R.1.4 History Requirement R.1.5 Trend Analysis Requirement R.4.1 Operating AOR Requirement R.4.2 Compatibility Requirement R.4.3 Environment

Table 29. Function to Requirement F.5

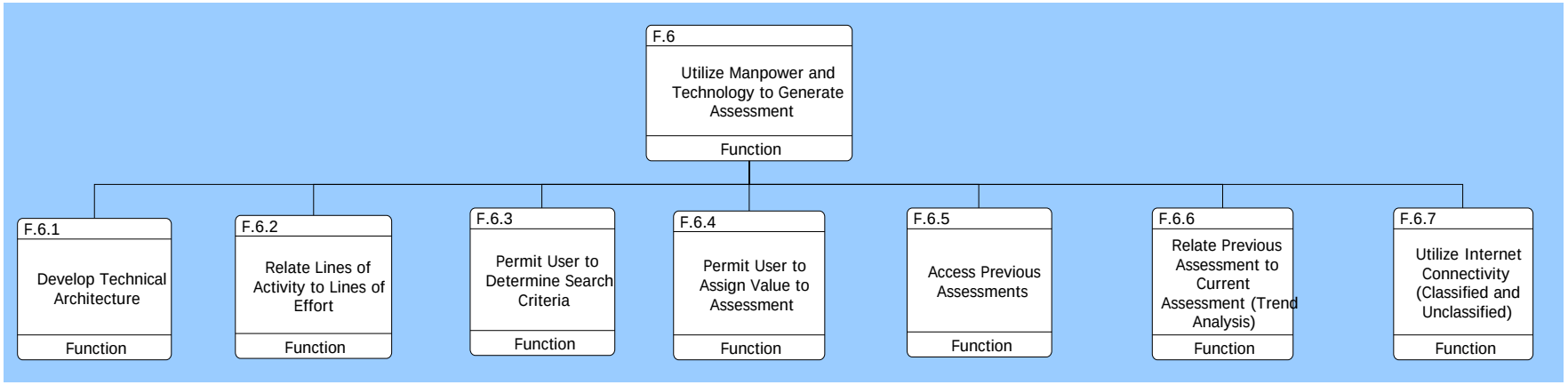

Figure 46. Function F.6 Decomposition

Function Number	Function Name	Function Description
F.6	Utilize Manpower and Technology to Generate Assessment	The system will use a combination of hardware, software, and peopleware to develop the assessment
F.6.1	Develop Technical Architecture	Develop the technical architecture to develop, communicate, and present assessment data and conclusions
F.6.2	Relate Lines of Activity to Lines of Effort	The assessment will relate inputs to the system to outputs seen at the strategic level
F.6.3	Permit User to Determine Search Criteria	Allow user to search the database for key concepts in order to develop the assessment.
F.6.4	Permit User to Assign Value to Assessment	Allows the user to associate a weight or confidence to an assessment or factor.
F.6.5	Access Previous Assessments	The database will permit user to review previous assessments to assist in the development of current assessment.
F.6.6	Relate Previous Assessment to Current Assessment (Trend Analysis)	The user will use historical data to compare current information in order to establish trend.
F.6.7	Utilize Internet Connectivity (Classified and Unclassified)	Classified and Unclassified networks will be used in order to obtain information pertinent to the assessment, as well as communicate information to other activities on the network.

Table 30. Function F.6 Description

Function Number	Function Name	Function's Basis
F.6	Utilize Manpower and Technology to Generate Assessment	Requirement R.1.3 DOD Guidance Requirement R.1.4 History Requirement R.3.2 Availability Requirement R.4.1 Operating AOR Requirement R.4.2 Compatibility Requirement R.4.3 Environment
F.6.1	Develop Technical Architecture	Requirement R.4.1 Operating AOR Requirement R.4.2 Compatibility Requirement R.4.3 Environment
F.6.2	Relate Lines of Activity to Lines of Effort	Requirement R.1.3 DOD Guidance Requirement R.1.6 Effects Requirement R.1.6.4 Objective Requirement R.1.6.5 End State Requirement R.3.1 Traceability Requirement R.3.1.1 Country Campaign Plan
F.6.3	Permit User to Determine Search Criteria	Requirement R.1.3 DOD Guidance Requirement R.3.3 Emergency Response Requirement R.4.1 Operating AOR Requirement R.4.2 Compatibility Requirement R.4.3 Environment
F.6.4	Permit User to Assign Value to Assessment	Requirement R.1.3 DOD Guidance Requirement R.1.6 Effects Requirement R.1.6.1 Hindrance Requirement R.1.6.2 Failure Requirement R.1.6.3 Success Requirement R.1.6.4 Objective Requirement R.1.6.5 End State Requirement R.3.1 Traceability Requirement R.3.1.1 Country Campaign Plan Requirement R.3.1.2 Regional Campaign Plan Requirement R.3.1.3 Theater Campaign Plan Requirement R.3.3 Emergency Response Requirement R.4.1 Operating AOR
F.6.5	Access Previous Assessments	Requirement R.1.4 History Requirement R.1.5 Trend Analysis Requirement R.4.2 Compatibility Requirement R.4.3 Environment
F.6.6	Relate Previous Assessment to Current Assessment (Trend Analysis)	Requirement R.1.4 History Requirement R.1.5 Trend Analysis Requirement R.3.1 Traceability Requirement R.3.1.1 Country Campaign Plan Requirement R.3.1.2 Regional Campaign Plan Requirement R.3.1.3 Theater Campaign Plan
F.6.7	Utilize Internet Connectivity (Classified and Unclassified)	Requirement R.3.3 Emergency Response Requirement R.4.1 Operating AOR Requirement R.4.2 Compatibility Requirement R.4.3 Environment

Table 31. Function to Requirement F.6

INITIAL DISTRIBUTION LIST

1. Defense Technical Information Center
   Ft. Belvoir, Virginia

2. Dudley Knox Library
   Naval Postgraduate School
   Monterey, California

3. Eugene Paulo
   Naval Postgraduate School
   Monterey, California

4. Alejandro Hernandez
   Naval Postgraduate School
   Monterey, California

5. Richard M. Brown, III
   Naval War College
   Monterey, California

6. William Hershberger
   HQ U.S. European Command
   Stuttgart, Germany

7. Rick Kuenning
   HQ U.S. European Command
   Stuttgart, Germany

8. Jorge Silveria
   HQ U.S. Southern Command
   Doral, Florida

9. Garrett Moynihan
   HQ U.S. Southern Command
   Doral, Florida

10. Robert Toohig
    Naval Postgraduate School
    Monterey California