



Rotorcraft Systems Engineering and Simulation Center

Enhancing T&E and SE Alignment Using Database Driven Documentation

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Research Funded through the Systems Engineering Research Center



Agenda

- Problem and Objective of the Research
- Research Approach
- Overview of the Foundational Tool SET
- Methods for the Research
- Preliminary Results
- Future Work
- Acknowledgements
- Questions

Problem and Objective

- Problem
 - Key Systems Engineering documents require significant effort to keep current, and to keep the content synchronized in an environment where change is constant. This often results in the documents becoming obsolete relative to fast moving development activities and inconsistencies.
- Objective
 - Research a mechanism and ability to align SE documents (SEP, TEMP, ISP) such that the program documents track and compliment one another, are easier to produce and update, support agile environments, and to move towards a data centric rather than document centric focus

Research Approach

Flexible Modular Documentation for SE

1. Three key SE documents were identified to research (SEP, TEMP and ISP)
2. Develop a modular architecture for each document
3. Determine:
 - a) A dependency structure
 - b) Relationships
 - c) Interdependencies
4. Create linkages between the various topic areas of the multiple SE artifacts to understand dependencies.
5. Developed a document structure to allow better
 - a) Change management across the entire program
 - b) Consistency between the key SE artifacts
6. Demonstrate role based access to SE information from various SE artifacts
7. Built on existing capabilities of the Systems Engineering Toolkit (SET) developed by UAHuntsville's Rotorcraft Systems Engineering and Simulation Center

Overview of the Foundational Tool

Systems Engineering Toolkit
(SET)

Systems Engineering Toolkit

- Web based tool to assist in Systems Planning
- Uses a database to store information, providing a platform for database-driven documentation
- Internal mapping capabilities to provide automatic updating, multiple document creation and display capabilities relevant to a type of user throughout the lifecycle
- Global access to the most up-to-date information
- Secure and controlled access to documents
- No installation is required
 - Only Requirements: Internet Explorer with Javascript Enabled; Adobe Acrobat Reader to view generated documents
- Does NOT require Java, or ActiveX Plug-ins

<http://set.uah.edu/>

Welcome to the System Engineering Toolkit(SET)

Please Log In

Username:
Password:

New User?

[Register for SET](#)
Eligibility: DoD, All Service Branches, Government Contractors

Help

[Support](#)
[Quickstart Guide](#)

FAQs

[How do I register for SET?](#)
[How do I gain access to an existing document?](#)
[How do I reset my password?](#)
[What is SET?](#)

SET is Patent Pending UAHuntsville and was developed in partnership with PEO Aviation and AMRDEC

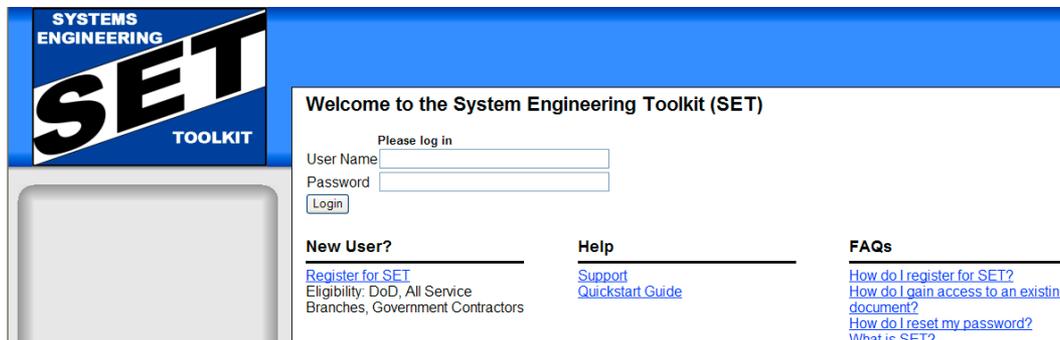


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Systems Engineering Toolkit - Continued

- Presently the toolkit assists in creating SEPs but adaptable and ready to assist in creating a multitude of documents
- The tool is
 - Inquiry driven
 - Configuration controlled
 - Tailorable
- In response to our customers, research is ongoing to further develop the tool and capabilities with funding from NAVAIR, DoD, and NASA Marshall Space Flight Center



The screenshot shows the login interface for the Systems Engineering Toolkit (SET). On the left is a logo with 'SYSTEMS ENGINEERING' above 'SET' and 'TOOLKIT' below it. The main content area has a blue header with the text 'Welcome to the System Engineering Toolkit (SET)'. Below this is a 'Please log in' section with input fields for 'User Name' and 'Password', and a 'Login' button. At the bottom, there are three columns of links: 'New User?' with 'Register for SET' and eligibility information; 'Help' with 'Support' and 'Quickstart Guide'; and 'FAQs' with four questions: 'How do I register for SET?', 'How do I gain access to an existing document?', 'How do I reset my password?', and 'What is SET?'.

Systems Engineering Toolkit - Features

- Modular/adaptable system to many different documents and applications
- Customizable for individual organizations and SE processes
- Mapping occurs between milestones, guidance and document types
- Tailor SEP according to
 - Project/Program Processes
 - Project Phase
 - Family of Systems
 - System of Systems
 - ACAT level

Account: Sue O'Brien ([Logout](#)) Active SEP: Training SEP

ACAT Level	ACAT I	▼
FoS	No	▼
SoS	No	▼
Phase	Concept Refinement ▼	
Milestone	A	▼
Version No.	<input type="text"/>	

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Systems Engineering Toolkit - Features

- Multiple documents per user
- Multiple permissions per user
- Incorporated review process

Available Documents	
Document	Permissions
Test SEP	Read, Write
TEST SEP2V2	Write
LUH	Read, Write, Review, Admin
Aviation Systems Test SEP	Admin
Tool Demo	Read, Write, Admin, Version Control
Joint Air to Ground Missile (JAGM)	Read, Peer Approve, Admin
BlackHawk UH60M	Read, Write, Admin
JAVELIN	Write, Admin
AGSE Practice SEP	Write, Review, Admin
JPEO-CBD	Admin
JNBCRS Increment 2	
Assessments & Support	
GRAM	
PEO CS&CSS SET Trial SEP	
Training SEP	
Training Demo	
Joint Chem Bio Practice SEP	
Training Demo II	
MFOQA Field Prototype Project	
Aerial Common Sensor	

Make a comment regarding this question

Once the comment is submitted, the section will be open for editing by the writers.

Comment

B I U x² x₂ ☰ ☰ ABC ↶ ↷

Training Demo Approval Sheet

[Refresh](#)
[Generate Draft](#)
[Print](#)

Priority Category: Critical: A change that, if not corrected, would result in a non-concurrence; Significant: A substantive concern that must be considered; Administrative: Editorial in nature.

My Comments

CMT#	Section	Para / Figure / Table	Priority	Comment	Rationale	
	1.2 Current Program Status		Critical			X

All Approvers' Comments

CMT#	Approver	Section	Para / Figure / Table	Priority	Comment	Rationale

Peer Approver Comments

CMT#	Approver	Section	Para / Figure / Table	Priority	Comment	Rationale

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Systems Engineering Toolkit - Features

- Allows multiple users and user types to work on the same document at any time
- Enhanced communications
- Gain knowledge from other projects and organizations

a. What is the approach for requirements traceability? What is the approach for requirements verification and validation traceability?

Page being edited by Lance Warden

System requirement traceability is provided from the UH-60M ORD to the Functional Baseline top System Performance Specification. Requirement traceability for the UH-60M Functional Baseline is accomplished via two independent database systems. The primary system is the one developed by Sikorsky utilizing the SE software tool, DOORSTM. Within that database Sikorsky is able to trace performance requirements in section 3 to each of the Verification Requirements in section 4. From there traceability is further carried down to the appropriate Allocated Baseline Segment Specification and/or the SRS. Segment Specifications and the SRS requirements are then traced to the appropriate lower level Product Baseline Detail Specifications and/or Software Design Descriptions (SDD). The Army maintains a parallel traceability from the System Requirements

a. What is the approach for requirements traceability? What is the approach for requirements verification and validation traceability?

B I U x² x₂ [List Icon] [List Icon] [Color Picker] [ABC] [Undo] [Redo] [Left Arrow] [Clock] [Question Mark] [Envelope] [Print] [Lock] [Home]

System requirement traceability is provided from the UH-60M ORD to the Functional Baseline top System Performance Specification. Requirement traceability for the UH-60M Functional Baseline is accomplished via two independent database systems. The primary system is the one developed by Sikorsky utilizing the SE software tool, DOORSTM. Within that database Sikorsky is able to trace performance requirements in section 3 to each of the Verification Requirements in section 4. From there traceability is further carried down to the appropriate Allocated Baseline Segment Specification and/or the SRS. Segment Specifications and the SRS requirements are then traced to the appropriate lower level Product Baseline Detail Specifications and/or Software Design Descriptions (SDD). The Army maintains a parallel traceability from the System Requirements

Notes

Reviewer Comments

Date	Reviewer	Comment

Systems Engineering Toolkit - Features

- Image Uploading
- Change Log
- Help
- Spell Check
- Examples
- Appendix
- Acronyms List
- Automatic Table of Contents
- Automatic Page, Figure and Table Numbering

Previous responses for "What are the program's critical path identification and tracking events?"

Response	Replaced By	Replace Date	Copy
The Baseline UH-60M is nearing the end of the SDD Phase of the program. IOT&E is schedule for July 2006, LFT&E is ongoing through the end of 2006, and EMV testing takes place from September 2005 through February 2006. The first four I/Q aircraft have been delivered, the last four I/Q aircraft are in production and the LRIP contract has just been signed. These last I/Q aircraft and the first two LRIP aircraft are production representative and will take part in the IOT&E which is scheduled from	Dawn Sabados	2007-05-31 19:28:23	<input type="button" value="Copy to Clipboard"/>

Help for "Summarize the overall Acquisition Strategy emphasizing that it is event driven."

Source: Systems Engineering Plan Preparation Guide, Version 2.01, page A-1.
(Department of Defense, Office of the Deputy Under Secretary of Defense for Acquisition and Technology, Systems and Software Engineering, Enterprise Development)

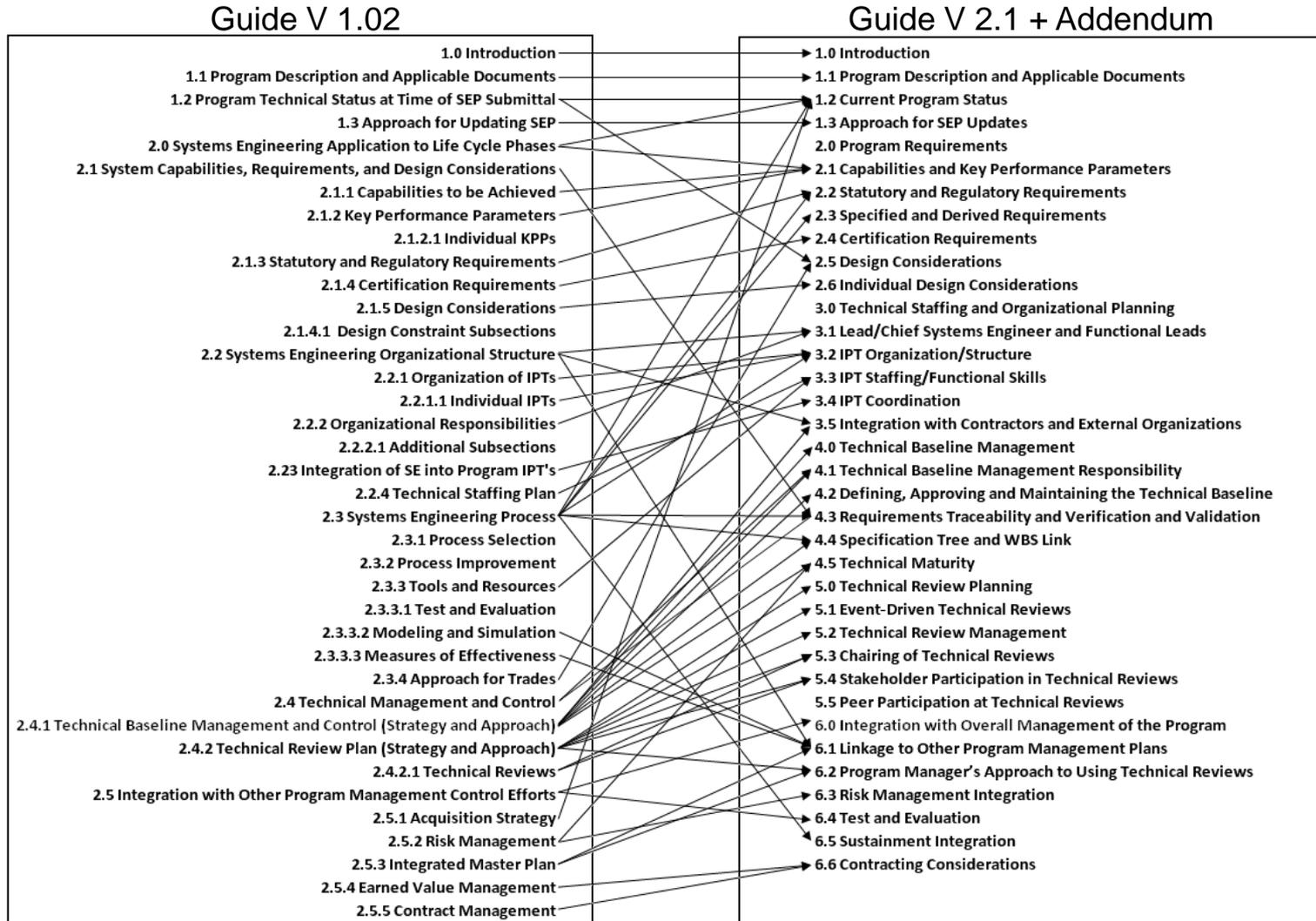
1.2 Current Program Status
Summarize the overall Acquisition Strategy and how it is event driven. Discuss how the technical requirements are being managed.

b. Enter a top-level system description conveying overall key aspects of the program. Include a notional diagram of the system. Use the appropriate DoD Architecture Framework views (e.g. Operational View-1). (When referencing details in other documents, reference by section and page of the document.)

B I U   

The system will be an **precision** guided missile and launcher for use by joint service manned and unmanned aircraft to destroy high value stationary, moving, and relocatable land and naval targets. The system will be capable of providing both current and future aviation platforms with reactive targeting capabilities satisfying the sum of needs across the joint platforms, and eliminating the requirement for separate upgrades to multiple existing missile systems. The system will consist of several integrated subsystems onto various rotary wing, fixed wing and Unmanned Aerial System (UAS) platforms, as well as associated **trainers**, test sets and support equipment. The F/A-18 E/F Super Hornet, AH-64D Apache, and AH-1Z Cobra are MS C threshold platforms with integration occurring no later than (NLT) the end of FY and fielding NLT the end of FY (refer to 2.1.5). Other threshold platforms are the ARH-70 Arapaho, MH-60R Seahawk, and Extended Range Multi-Purpose (ERMP) UAS.

Mapping and Tailoring

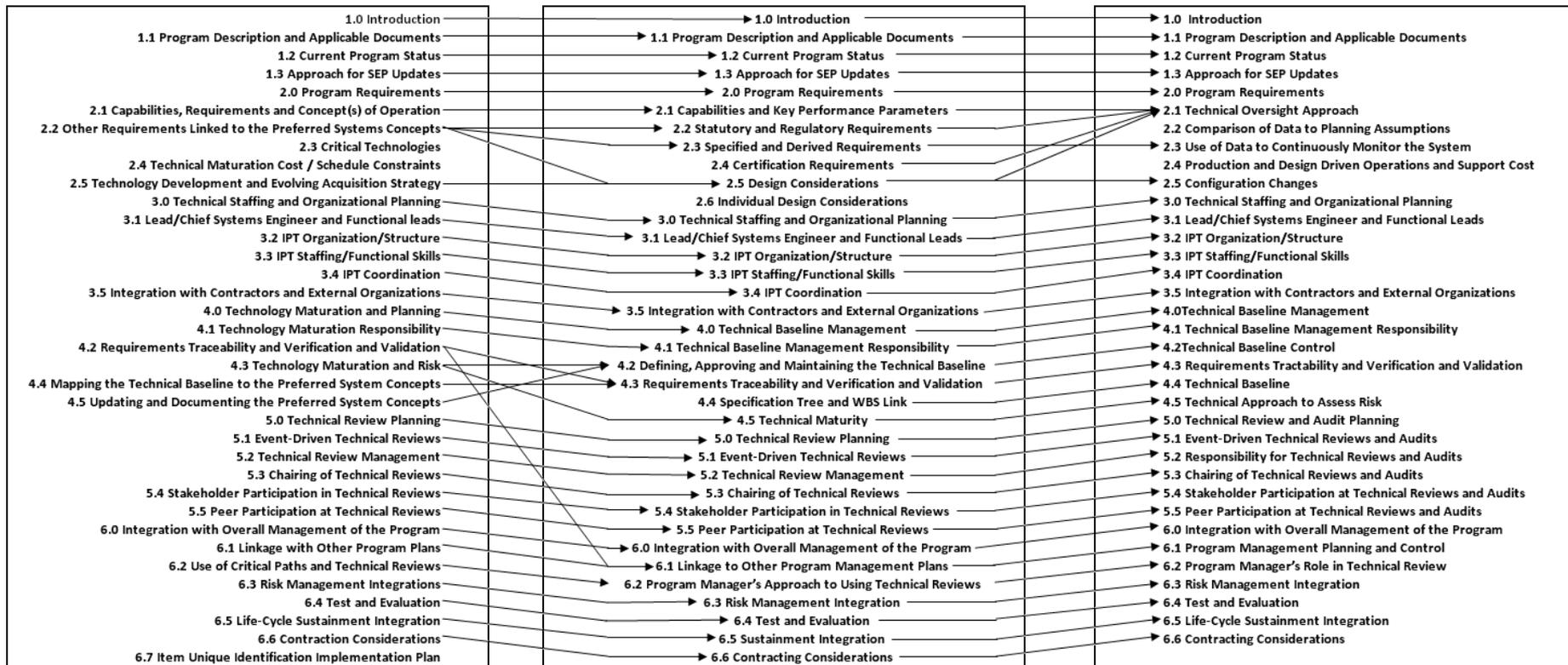


Mapping and Tailoring Creating and Maintaining a Living SEP

MS A

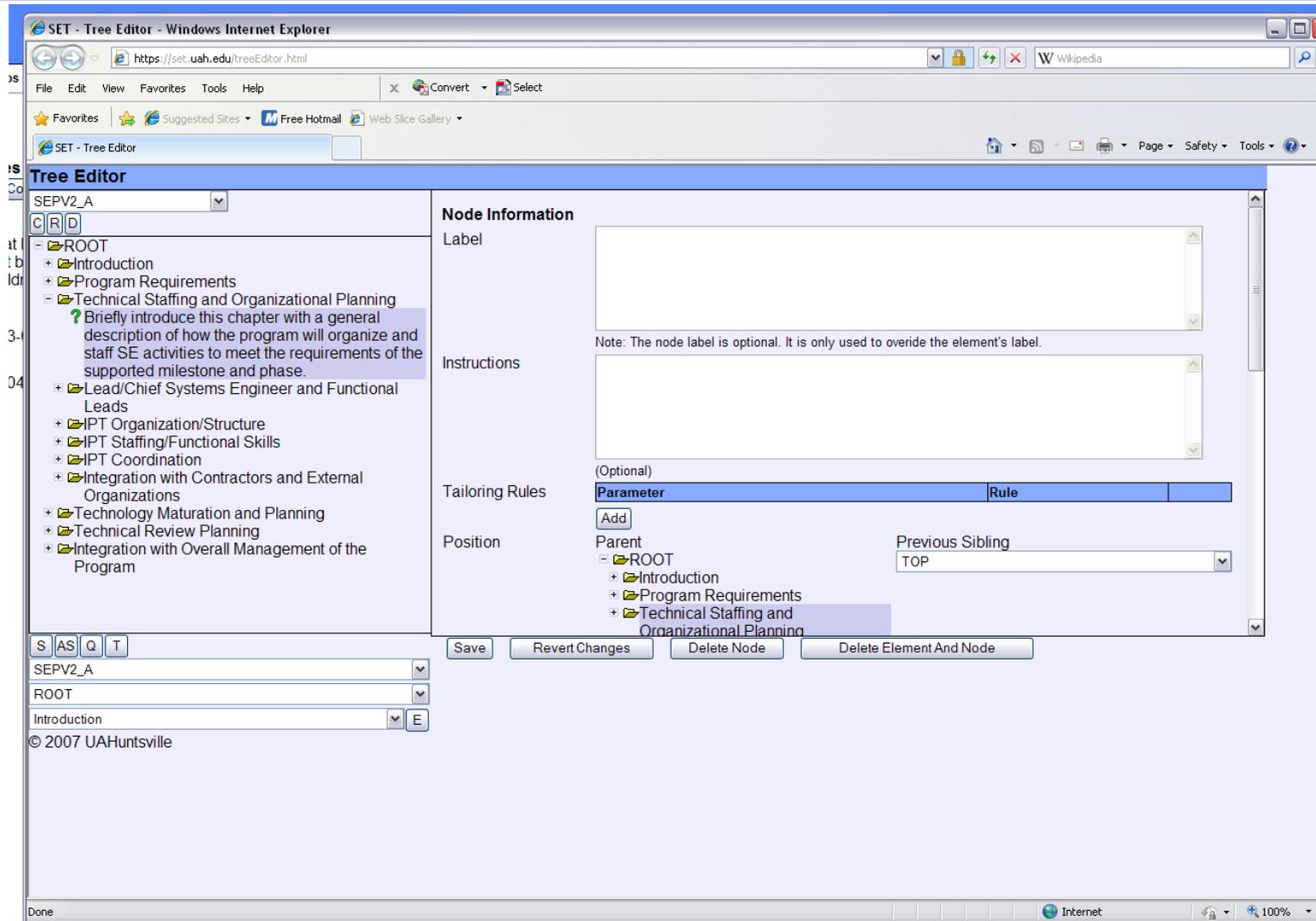
MS B

MS C



As a program progresses through the lifecycle, contents automatically update to reflect the Milestone, and pertinent text is flowed forward.

Tree Editor for the Mapping Process



Tree Editor

SEPV2_A

C R D

- ROOT
 - + Introduction
 - + Program Requirements
 - Technical Staffing and Organizational Planning
 - ? Briefly introduce this chapter with a general description of how the program will organize and staff SE activities to meet the requirements of the supported milestone and phase.
 - + Lead/Chief Systems Engineer and Functional Leads
 - + IPT Organization/Structure
 - + IPT Staffing/Functional Skills
 - + IPT Coordination
 - + Integration with Contractors and External Organizations
 - + Technology Maturation and Planning
 - + Technical Review Planning
 - + Integration with Overall Management of the Program

Node Information

Label

Instructions

Note: The node label is optional. It is only used to override the element's label.

Tailoring Rules

Parameter	Rule
Add	

Position

Parent

- ROOT
 - + Introduction
 - + Program Requirements
 - + Technical Staffing and Organizational Planning

Previous Sibling

TOP

S AS Q T

SEPV2_A

ROOT

Introduction

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Save Revert Changes Delete Node Delete Element And Node

Department of Defense (DoD) SET Version 1.0



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[Configure SEP](#)
[Title & Coordination](#)
[Approval Sheet](#)

Based on OSD Guidance

- 1 Introduction
 - 1.1 Program Description and Applicable Documents
 - 1.2 Current Program Status
 - 1.3 Approach for SEP Updates
- + 2 Program Requirements
- + 3 Technical Staffing and Organizational Planning
- + 4 Technology Maturation and Planning
- + 5 Technical Review Planning
- + 6 Integration with Overall Management of the Program

[Attachments](#)
[Images](#)
[Acronym List](#)




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Account: Sue O'Brien ([Logout](#)) Active SEP: Tool Demo

Section not complete. Cannot be submitted at this time.

Current Program Status

- a. Summarize the overall Acquisition Strategy emphasizing that it is event driven.
- b. Provide a program schedule which shows major milestones; SE technical reviews; and notional dates for major events (developmental, operational, and live fire test phases; deliveries; certifications; contract awards; training; site activities, etc.)
- c. Highlight the major activities that tie independent reviews, risk reduction activities, and program milestones.
- e. What technical refreshes are planned?
- f. What are the top-level risks associated with the program and 6.3. Referencing these sections must be done.
- g. How will the technical requirements be managed?
- d. How does the Acquisition Strategy reflect the maturity of technologies to be used?

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- Based on OSD Guidance
- + 1 Introduction
 - 2 Systems Engineering Application to Life Cycle Phases
 - + 2.1 System Capabilities, Requirements, and Design Considerations
 - + 2.2 Systems Engineering Organizational Structure
 - + 2.3 Systems Engineering Process
 - + 2.4 Technical Management and Control
 - + 2.5 Integration with Other Program Management Control Effects

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Account: Sue O'Brien ([Logout](#)) Active SEP: Joint Air to Ground Missile (JAGM)

b. Given the Requirements outlined in System Capabilities, Requirements, and Design Considerations, who are the appropriate technical authorities?

B / **I** / **U** 

The SE Directorate is organized to support each JAMS Product and SE functional area. The JAGM system Division Chief is the JAGM system LSE and coordinates with the Navy counterpart LSE. The LSE's primary responsibility is the day-to-day application of systems engineering principles, processes, and products and coordinates with the SE Director, the JAGM system Product Manager, and JAMS Project Manager (PM) through joint IPT process.



Notes

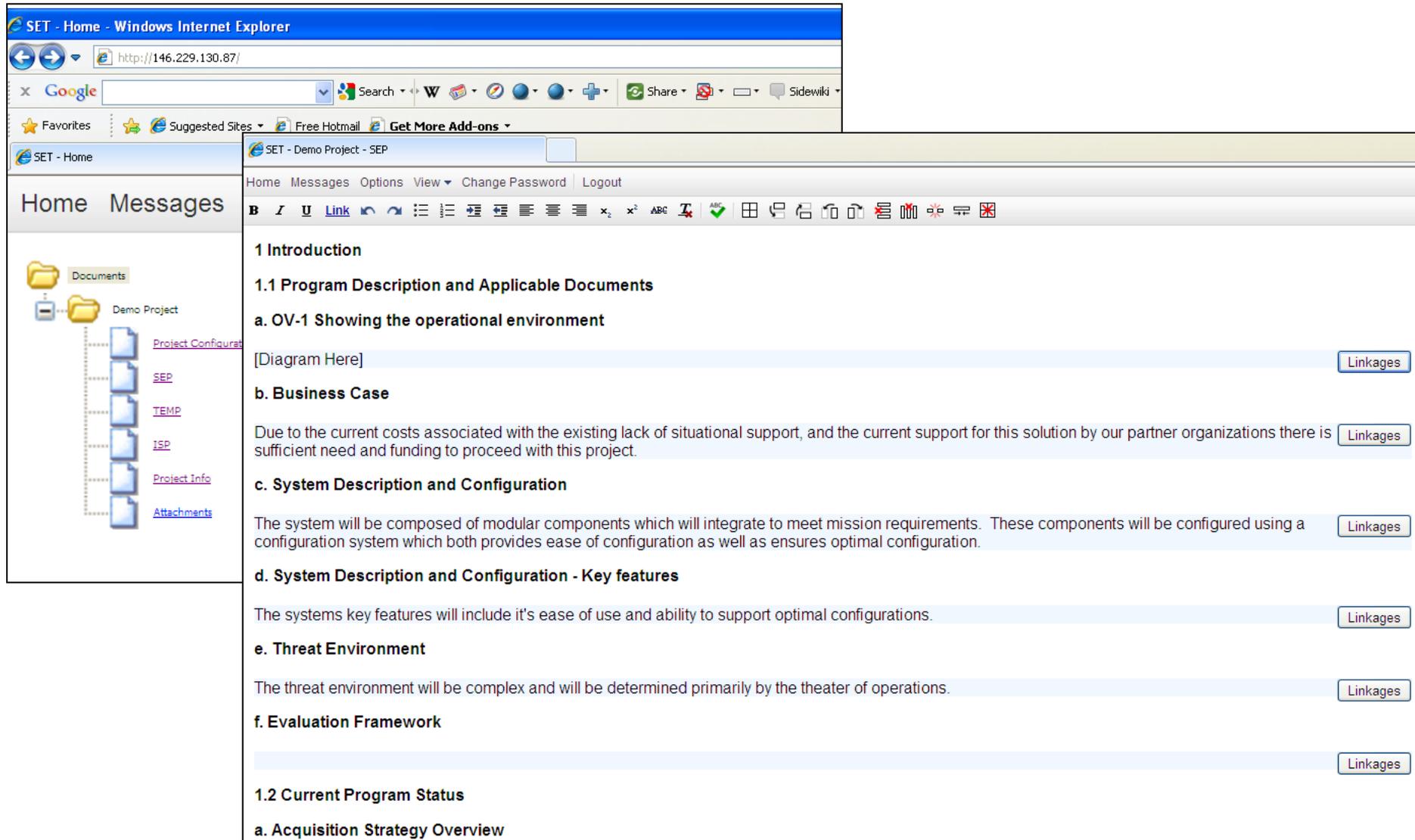
Para with reference to SEIT was moved to 2.2.1.

Reviewer Comments

Date	Reviewer	Comment

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Department of Defense (DoD) SET Version 1.5



SET - Home - Windows Internet Explorer

http://146.229.130.87/

Google Search

SET - Home

SET - Demo Project - SEP

Home Messages Options View Change Password Logout

1 Introduction

1.1 Program Description and Applicable Documents

a. OV-1 Showing the operational environment

[Diagram Here] [Linkages](#)

b. Business Case

Due to the current costs associated with the existing lack of situational support, and the current support for this solution by our partner organizations there is sufficient need and funding to proceed with this project. [Linkages](#)

c. System Description and Configuration

The system will be composed of modular components which will integrate to meet mission requirements. These components will be configured using a configuration system which both provides ease of configuration as well as ensures optimal configuration. [Linkages](#)

d. System Description and Configuration - Key features

The systems key features will include it's ease of use and ability to support optimal configurations. [Linkages](#)

e. Threat Environment

The threat environment will be complex and will be determined primarily by the theater of operations. [Linkages](#)

f. Evaluation Framework

[Linkages](#)

1.2 Current Program Status

a. Acquisition Strategy Overview

Research Leading to SET Version 1.5

Research Method

The RSESC team analyzed existing documents and guidance to identify common topic areas and subsequently implemented mapping into the tool.

Procedures

1. Analyze existing SEPs, TEMPs, and ISP standards, guidance, instructions and examples
2. Dissect existing guidance and approved plans to determine topic areas, correlations and dependencies
3. Develop the table of contents for the SEP, TEMP and ISP within the SET tool and map high level topic areas into the appropriate section
4. Create a role based system for creating project documentation
5. Create linkages between the three documents in SET using identified correlations and dependencies

Definitions

The following terms have been defined for use in breaking down and mapping content within and between documents:

Correlated Information - Duplicate topic information found in more than one document with only one governing entity

- Governing Document - Topic areas are dependent on specific documents such as the SEP, TEMP, ISP, etc. , not necessarily a particular role or SME. The governing document controls the content and changes to that content for a subject area. (Generic roles: reader, writer, reviewer, approver, version controller)
- Governing Role - Independent topic areas and not governed by a specific document. This information would be changed by preapproved individual roles. Changes to the information is not governed by the document. (Specific Roles: PM, LSE, SMEs, Logisticians, etc.)

• **Dependent Information**

- Level 1: High level details about a topic area. An overview on how processes will be handled. Should be consistent with Level 2 information.
- Level 2: Lower level more specific information that falls in line with the Level 1 information but has much more detail specifics.

Level 1/Level 2 Example SEP and TEMP Dependency

The IPTs for the program are listed as product teams across the bottom of Figure 15.

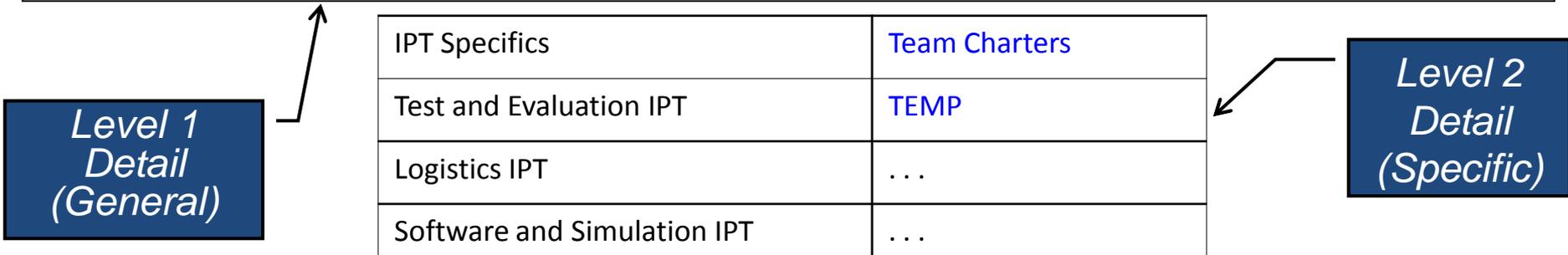
The IPT Leads have responsibility and authority (within the bounds of the contract) for cost, schedule, and technical accomplishment for what tasks needs to be done and when they need to meet program objectives. In that role, they direct the day-to-day tasking of resources toward IPT objectives.

The IPTs have responsibility to ensure that processes and procedures are being followed and providing a properly trained staff. In essence, the functional leads, including engineering, have responsibility and authority for how a task is accomplished and by whom.

There exists an open and informal communication channel across the various teams involved in the development of the program. Emphasis is placed on cross-communication beginning at the Subject Matter Expert (SME) level with the IPT lead being informed of issues or risks. When a change in the scope of tasks arises, the contractual communication channels are adhered to. Figure 16 depicts the communication guidelines between development teams.

Figure 17 depicts the formal communication . . .

Specific details about the individual IPTs can be found in the following documents:



**Level 1
Detail
(General)**

**Level 2
Detail
(Specific)**

Level 1/Level 2 Example

SEP and TEMP Dependency

- SEP Level 1
 - 1.2 Current Program Status Highlight the major activities that the program conducted to date such as outcomes of technical reviews, *test phases*, independent reviews, risk reduction activities, trade studies, etc.
- TEMP Level 2
 - 1.3.2.1. Previous Testing. Discuss the results of any previous tests that apply to, or have an effect on, the test strategy.

Breakdown of the Documents

Topic Areas	Level	Governing Entity	TEMP Section	SEP Section	Milestone	ISP (DODI/DAG)	ISP Example
Mission Need	1	Role Based/SME	1.2	2	A, B, and C	2.1	2.1
Supported Capability	2	Role Based/SME				2.2	2.2
OV-1 Showing the operational environment	1	Role Based/SME	1.2	1.1	A, B, and C	1.1	1.1
Organizations which the system will be integrated (if applicable)	1	Role Based/SME	1.2	3.5	A, B, and C	1.1	1.1.1
Role Definitions	2	Role Based/SME				1.3	1.3
Business Case	1	Role Based/SME	1.2	1.1	A, B, and C		
System Description and Configuration	1	Role Based/SME	1.3	1.1	A, B, and C	1.1	1.1
Key features	2	Role Based/SME	1.3	1.1	A, B, and C	1.1	1.1
Required Capabilities	2	Role Based/SME				2.4	2.4
Threat Environment	1	Role Based/SME	1.3.1	1.1	A, B, and C	1.1	1.1
Analysis of Alternatives	1	Role Based/SME	1.3.2	4.4	A	Appendix A refers to it	Touches on this in 1.1.1 and 1.3.2.1 but no big discussion
Acquisition Strategy Overview	1	Role Based/SME	1.3.2	1.2	A, B, and C		Touches on evolutionary acquisition in 2.1 an 2.13 but no big discussion
Previous Testing	1	Document Based/TEMP	1.3.2.1	1.2	A, B, and C (Considered 6.4 but since can only one chose 1.2)		
KPPs, KSAs	1	Role Based/SME	1.3.3	2.1	A, B, and C		Referenced but not
Data/Information Flow	1	Document Based/SEP	2.2	4.5A 4.2B 4.2C			
TEMP Deficiency Reporting	2	Document Based/TEMP	2.3	6.4	6.4C		
Data Quality Requirements	2	Document Based/ISP				2.4	2.4
System Data Exchange	2	Role Based/SME				Appendix B	Appendix B
Data Timeliness	2	Document Based/ISP				2.5	2.5
Information Access	2	Document Based/ISP				2.7	2.7

The Systems Engineering Toolkit will be used to provide linkages of multiple documents within one database. It will allow topic searches across multiple documents to ensure consistency and efficient SE planning,

Modularity Results

- When examining the topic areas, seventy-six topic areas were in common between at least two of the three documents

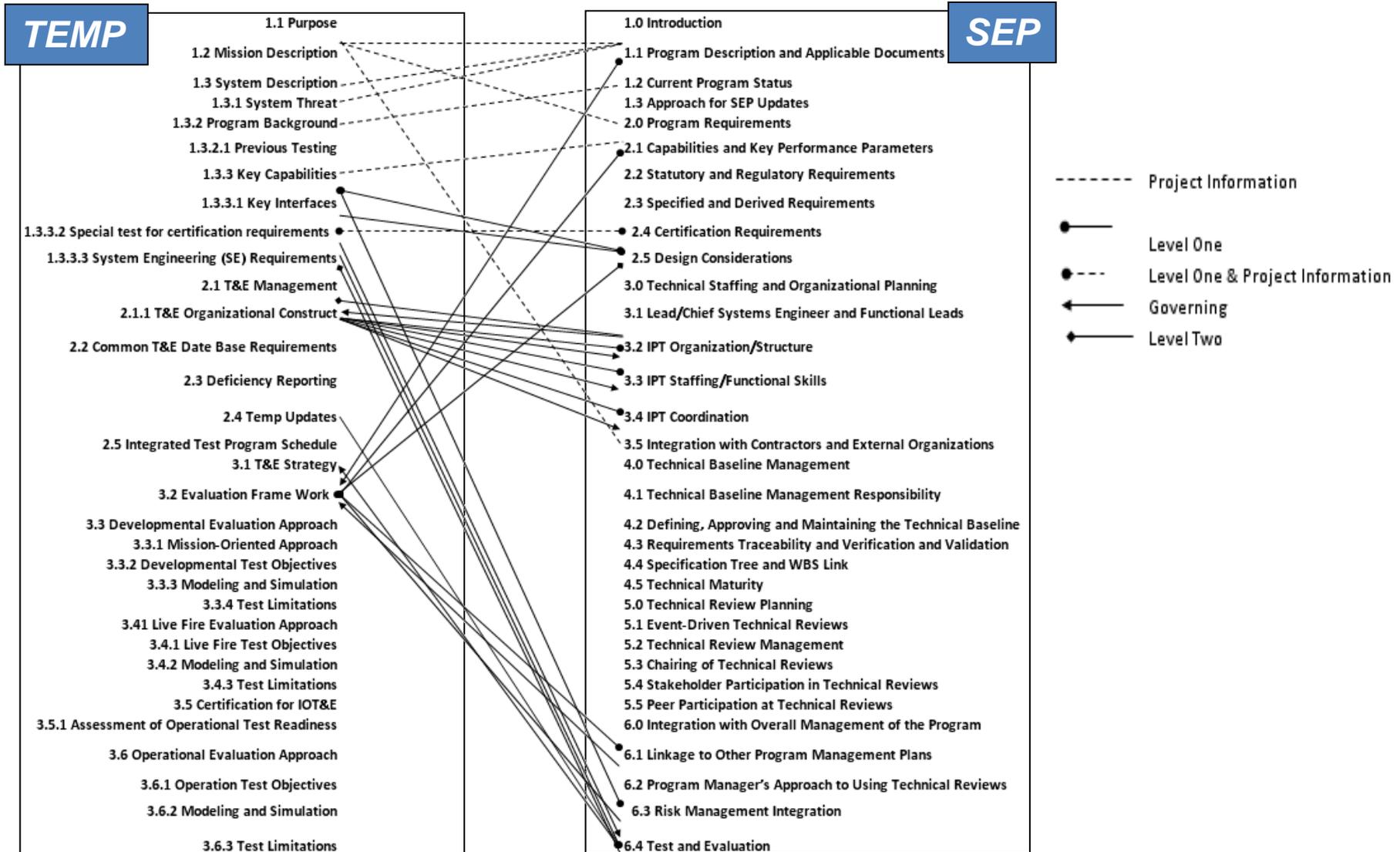
Document	Topic Areas with Commonality	Percent Commonality
SEP	52	68%
TEMP	49	64%
ISP (DODI/DAG)	21	28%
ISP (Example)	24	32%

Modularity Results

- When examining the Table of Contents from each of the three documents

Document	Total Number of Sections	Number of Orphan Sections	Number of Sections with Common Information	Percent Common
SEP MS A	29	10	19	65.5%
SEP MS B	29	11	18	62.1%
SEP MS C	29	13	16	55.2%
TEMP	57	26	32	56.1%
ISP (DODI/DAG)	23	9	14	60.8%

Mapping Between Documents



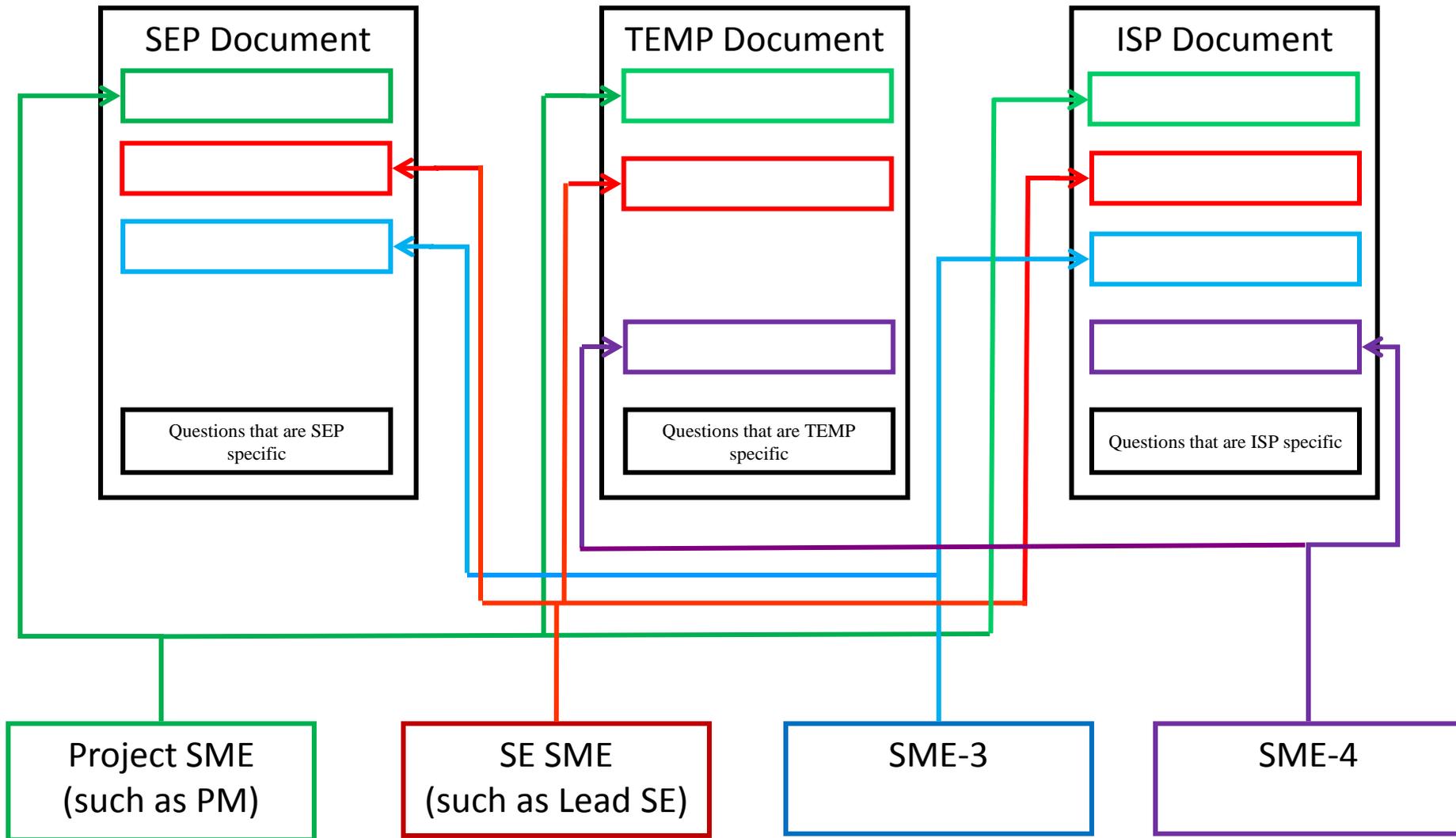
Modular Documents Research Results

- Evidence showed:
 - Various subject matter experts are needed within a project and the SME can vary between milestones (chief engineer, lead system engineer, project manager, test lead, logisticians, etc.)
 - Topic area information is co-located in multiple documents and various SMEs govern the information
- Migrating to a role based modular database would increase synchronization and consistency across multiple documents and could increase efficiency for the SME and overall program

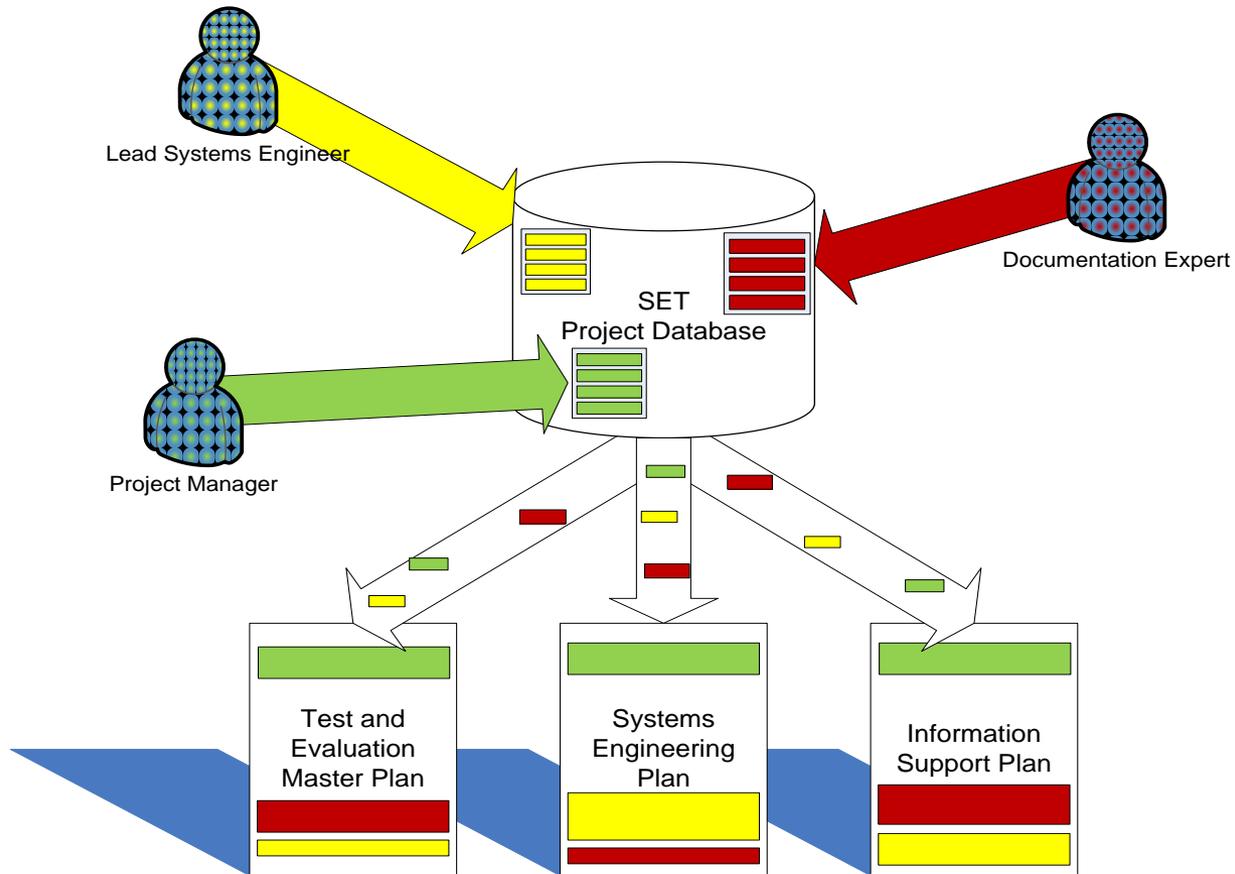
Modular Documents Concept

- Document template is pulled from the library for the project
- Principal writers or SMEs are selected for the predetermined topic areas
- Governing information is written by the subject matter experts and made available to the pertinent documents (This information could be pulled from already written documents within the tool, require newly developed information or a combination of the two.)
- Remaining topic areas that are specific to that particular document are written
- Documents are frozen and version controlled at each milestone

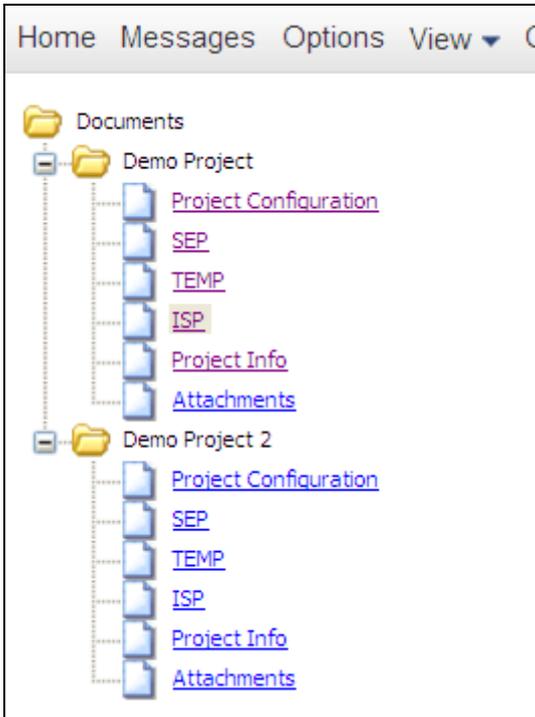
Role Based Documentation



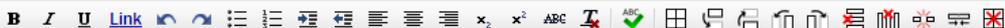
Modular Documents Concept



SME Information Requests



Home Messages Options View ▾ Change Password Logout

B *I* U [Link](#) 

- Mission Need
Due to a lack of situational support in the theater of operations it is apparent that a new capability to provide both support and diagnostic capabilities is needed.
- Mission Need - Supported Capability
The supported capability will provide awareness, diagnostics and prevention of existing problems while building on existing capabilities.
- OV-1 Showing the operational environment
[Diagram Here]
- Organizations which the system will be integrated (if applicable)
For this effort we will coordinate with the applicable organizations in order to leverage resources and ensure stakeholder interests are met.
- Organizations which the system will be integrated - Role Definitions
The developers will develop a solution and will coordinate with manufacturers and operations personnel to ensure proper integration of the system.
- Business Case
Due to the current costs associated with the existing lack of situational support, and the current support for this solution by our partner organization, there is a sufficient need and funding to proceed with this project.
- System Description and Configuration
The system will be composed of modular components which will integrate to meet mission requirements. These components will be configured into a modular configuration system which both provides ease of configuration as well as ensures optimal configuration.
- System Description and Configuration - Key features
The systems key features will include it's ease of use and ability to support optimal configurations.
- Threat Environment
The threat environment will be complex and will be determined primarily by the theater of operations.
- Analysis of Alternatives
Contact the A team.
- Acquisition Strategy Overview

SET Version 1.5

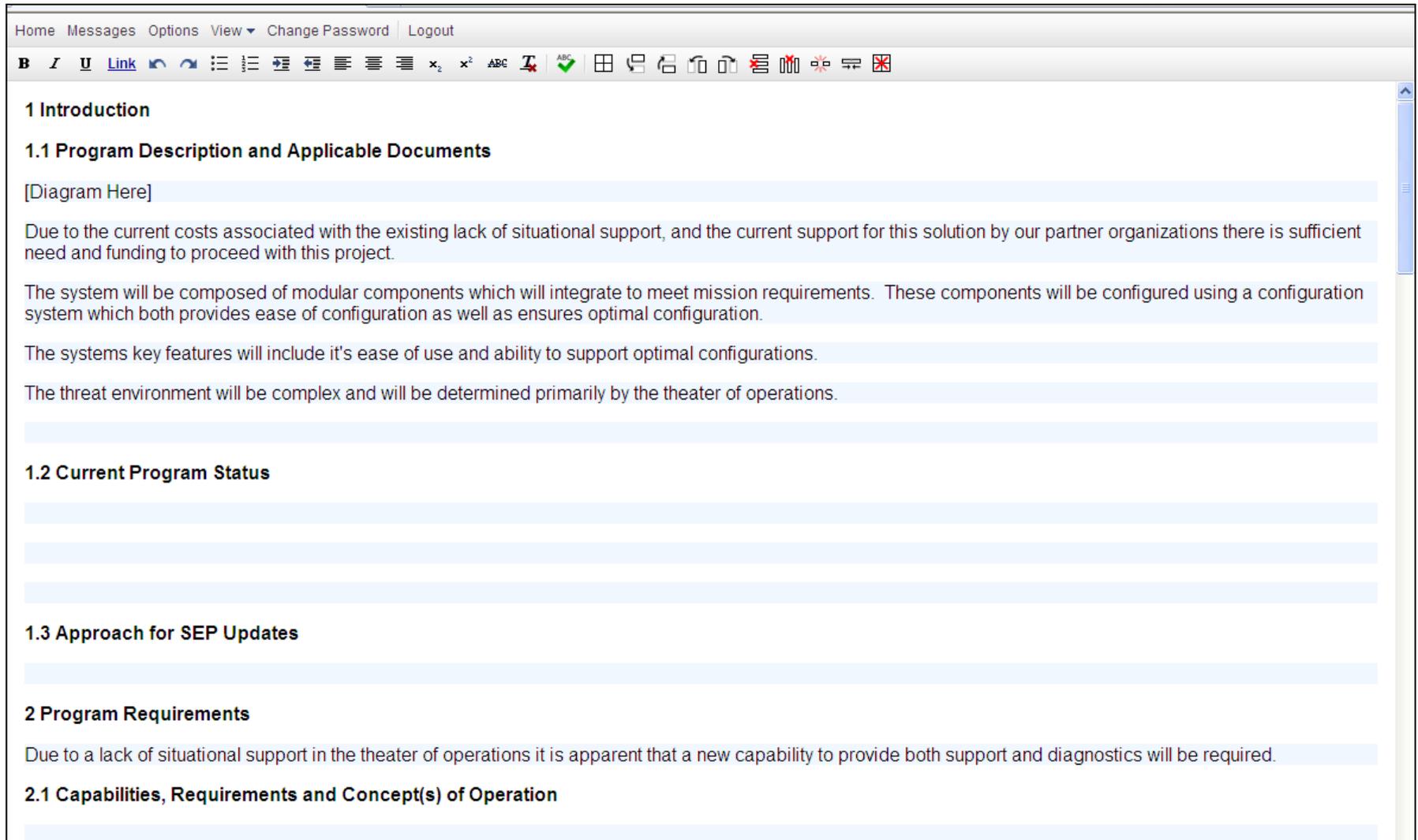
Systems Engineering Plan

Home Messages Options View ▾ Change Password Logout

B *I* U [Link](#)                                           

SET Version 1.5

Systems Engineering Plan



Home Messages Options View ▾ Change Password Logout

B *I* U [Link](#) [Icons: Undo, Redo, Bulleted List, Numbered List, Indent, Outdent, Bold, Italic, Underline, Text Color, Background Color, ABC, Spell Check, Table, Copy, Paste, Undo, Redo, Print, Refresh, Stop, Home, Back, Forward, Reload]

1 Introduction

1.1 Program Description and Applicable Documents

[Diagram Here]

Due to the current costs associated with the existing lack of situational support, and the current support for this solution by our partner organizations there is sufficient need and funding to proceed with this project.

The system will be composed of modular components which will integrate to meet mission requirements. These components will be configured using a configuration system which both provides ease of configuration as well as ensures optimal configuration.

The systems key features will include it's ease of use and ability to support optimal configurations.

The threat environment will be complex and will be determined primarily by the theater of operations.

1.2 Current Program Status

1.3 Approach for SEP Updates

2 Program Requirements

Due to a lack of situational support in the theater of operations it is apparent that a new capability to provide both support and diagnostics will be required.

2.1 Capabilities, Requirements and Concept(s) of Operation

Next Steps for Modular Documents

- Higher fidelity of the topic areas and information requests
- Level 1 and Level 2 mappings further definition and finalization
- Determination of documentation process
- Determination of roles
- Final determination of governing entities

RSESC will continue to leverage research being performed for the Department of Defense, NAVAIR and NASA Marshall Space Flight Center to implement effective systems engineering tailored to the customers' needs

Areas for Further Benefits

- Addition of more documents, possibilities include acquisition strategy, ICD, CDD, CPD and many others that are referenced in these documents to increase benefits
- Increased tailoring for small programs and block modifications
- Inclusion of Statutory, Regulatory and Certification Requirements and other standard items

Summary

- From the research performed using a data-centric modular database for creating program documentation is feasible and could be beneficial
- Evidence shows dependencies and correlations between the three artifacts
- Automated mapping function, database capabilities, statistical and data collection methods designed within the SET tool allowed research to be performed on the most advantageous method while providing both a testbed environment and implementation tool for users
- SET Version 1.0 is available for use to any government organization
- User inputs are encouraged

Questions?

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SET is Patent Pending UAHuntsville and was developed in partnership with PEO Aviation and AMRDEC



<http://www.sercuarc.org/>

UAHuntsville
Rotorcraft System Engineering and Simulation Center

BACK-UP

SEP Topic Area Orphans

Milestone	Section	Title
A	1.3	Approach for SEP Updates
	2.5	Technology Development and Evolving Acquisition Strategy
	4.1	Technology Maturation Responsibility
	5.1	Event-Driven Technical Reviews
	5.2	Technical Review Management
	5.3	Chairing of Technical Reviews
	5.4	Stakeholder Participation in Technical Reviews
	5.5	Peer Participation at Technical Reviews
	6.2	Use of Critical Paths and Technical Reviews
	6.6	Contracting Considerations

Milestone	Section	Title
B	1.3	Approach for SEP Updates
	2.2	Statutory and Regulatory Requirements
	4.1	Technical Baseline Management Responsibility
	4.4	Specification Tree and WBS Link
	5.1	Event -Driven Technical Reviews
	5.2	Technical Review Management
	5.3	Chairing of Technical Reviews
	5.4	Stakeholder Participation in Technical Reviews
	5.5	Peer participation at Technical Reviews
	6.2	Program Manager's Approach to Using Technical Reviews
	6.6	Contracting Considerations

Milestone	Section	Title
C	1.3	Approach for SEP Updates
	2.2	Comparison of Data to Planning Assumptions
	2.4	Production and Design Driven Operations & Support Costs
	3.1	Lead/Chief Systems Engineer and Functional Leads
	4.1	Technical Baseline Management Responsibility
	4.4	Technical Baseline

Common Themes	Milestone and Section
SEP Updates	1.3 of A, B, and C
Roles and Responsibilities	4.1A and B and C
Reviews	5.1 - 5.5A and B and C
Contracting	6.2 B and C 6.6A and B and C

TEMP Topic Area Orphans

Section	Title	Description
1.1	Purpose	
2.4	TEMP Updates	
3.3.1	Mission-Oriented Approach	Evaluate mission performance in a mission context (focuses on how the system will be employed)
3.3.2	Developmental Test Objectives	Summarize the planned objectives and state the methodology to test the system attributes defined by the applicable capability requirement document
3.3.4	Test Limitations	
3.4	Live Fire Test and Evaluation Approach	
3.4.1	Live Fire Test Objectives	
3.4.2	Modeling & Simulation	in terms of life fire
3.4.3	Test Limitations	
3.6	Operational Evaluation Approach	Independent evaluation of the system
3.6.3	Test Limitations	
3.7	Other Certifications	
3.8	Reliability growth	
4.1.1	Test Articles	Actual number and timing
4.1.2	Test Sites and Instrumentation	
4.1.3	Test Support Equipment	
4.1.4	Threat Representation	
4.1.5	Test Targets and Expendables	
4.1.6	Operational Force Test Support	
4.1.7	Models, Simulations, and Testbeds	
4.1.8	Joint Mission Environment	Live, virtual, or constructive components for an acceptable environment
4.2	Federal, State, and Local Requirements	environmental regs

ISP Topic Area Orphans

Chapter 1: Introduction	Project Info
2.3 Step 3: Determine the operational users and notional suppliers of the information needed.	
2.9 Step 9: Discuss RF Spectrum needs.	
2.10 Step 10: Perform a Net-Centric Assessment	
2.12 Step 12: Discuss the program's Information Assurance strategy and reference the Program Protection Plan.	IAS
2.13 Step 13: Identify information support needs to support development, testing and training.	
Chapter 3 - Issues	
Appendix D. - Acronym List	ISP

ISP Example Topic Area Orphans

(U) EXECUTIVE SUMMARY		
1	(U) INTRODUCTION	
1.1.2	(U) Relationship to Other Programs	
1.1.3	(U) Relationship to Relevant Joint Functional Concepts (JFCs), Joint	
1.1.3.1	(U) Joint Functional Concepts	
1.1.3.2	(U) Associated Integrated Architectures	
1.1.3.3	(U) JCIDS	
1.2	(U) PROGRAM DATA	Current MS and Acquisition Status Integrated Master Schedule Increment I schedule Increment II schedule
1.2.1	(U) Milestone and Acquisition Status	
1.2.2	(U) Spiral Evolution Strategy	
1.2.3	(U) Program Points of Contact	
1.3.1	(U) Information Integrity	
1.3.2	(U) DoD PKI System Architecture	
1.3.2.1	(U) DoD PKI Certificate Management Components	
1.3.3	(U) Role Definitions	
1.3.4	(U) PKI System Interface Overview	
1.4	(U) ISP DOCUMENT STRUCTURE	
2	(U) ANALYSIS	
2.3	(U) STEP 3 - DETERMINE OPERATIONAL USERS AND NOTIONAL SUPPLIERS	OV-4 Organizational Relationship Role Overview
2.3.1	(U) Operational Nodes and Elements (OV-2)	Operational Nodes and Elements (OV-2)
2.3.2	(U) Operational Node Activities	Operational Node Activities (SV-5)

ISP Example Topic Area Orphans Continued

2.9	(U) STEP 9 - DISCUSS RADIO FREQUENCY SPECTRUM NEEDS
2.1	(U) STEP 10 - PERFORM A NET-CENTRIC ASSESSMENT
2.10.1	(U) Step 10-A: Evaluate Program Against Measurement Criteria
2.10.1.1	(U) PKI's Incorporation of NCOW RM Capabilities and Services
2.10.1.2	(U) Technical View Products
2.10.1.3	(U) SV-TV Bridge
2.10.1.4	(U) Definitions and Vocabulary
2.10.1.5	(U) GIG Mission Area Initial Capabilities Document (MA ICD)
2.10.2	(U) Step 10-B: Compliance with Emerging NCES CESS
2.10.3	(U) Step 10-C: Assess the Use of Software-Compliant Radios
2.10.4	(U) Step 10-D: Assess the Use of IPv6 DoD Net-Centric Data Strategy
2.10.5	(U) Step 10e: Assess the Use of DoD-Centric Data Management Strategy
2.10.6	(U) Step 10-F: Assess the GIG Bandwidth Expansion Relationship
2.10.7	(U) Step 10-G Net-Ready Key Performance Parameter (NR-KPP) Statement
2.10.8	(U) Applicability of Major Net-Centricity Characteristics of PKI Increments One and Two
2.12	(U) STEP 12: DISCUSS THE INFORMATION ASSURANCE STRATEGY

2.12.1	(U) Program Category and Life-Cycle Status
2.12.2	(U) Mission Assurance Category and Confidentiality Level
2.12.3	(U) System Description
2.12.4	(U) Threat/Risk Assessment
2.12.5	(U) IA Requirements
2.12.6	(U) Certification and Accreditation
2.12.7	(U) IA Testing
2.12.8	(U) IA Analysis
2.13	(U) STEP 13: IDENTIFY SUPPORT NEEDS FOR DEVELOPMENT, TESTING, AND TRAINING
2.13.1	(U) Development
2.13.2	(U) Testing
2.13.3	(U) Developmental Test and Evaluation (DT&E)
2.13.4	(U) Operational Test and Evaluation (OT&E)
2.13.5	(U) Training
2.13.6	(U) CC/S/A Training Requirements
2.13.7	(U) LRA/TRA Background, qualifications, experience, and clearance requirements
3	(U) ISSUES
Appendix A	References
Appendix D	Acronym List and Glossary (AV-2)
Appendix E	Public Key Infrastructure Overview and Summary Information (AV-1)
Appendix F	Key Interface Profile (KIP)
Appendix G	Data AND Service Exposure

RSESC Overview

The University of Alabama in Huntsville (UAH) Rotorcraft Systems Engineering and Simulation Center (RSESC) is a state-of-the-art research and development Center that provides engineering solutions and products to Department of Defense (DoD), National Aeronautics and Space Administration (NASA), and industry customers with a focus on aerospace flight hardware systems. RSESC brings flight proven, unparalleled capabilities in atmospheric and aerospace flight hardware development, rotorcraft, fabrication, integration, and testing. RSESC has proven expertise in the fields of engineering design and analysis, rapid prototyping, fabrication, integration, destructive and non-destructive testing, flight qualification and acceptance testing, and launch/mission services.

The Center's foundation has been in the development of manned and unmanned aerospace systems. RSESC brings three key ingredients that are absolutely necessary to assure mission success: (1) knowledge of, and experience with, launch vehicle systems and payload development, (2) experience and in depth knowledge of the design requirements and the mission objectives, and (3) experience in the detailed engineering design, analysis, fabrication, and integration of flight hardware systems.



<http://rsesc.uah.edu/>



Notes

Systems Engineering Toolkit - User Roles

- SET provides eight types of users allowing you to use the document generation and review process that works for your organization
- Available User Roles
 - Reader – Lowest level of permissions, only able to generate document
 - Writer – User populates the document
 - Reviewer – Reviews the document at an inquiry level
 - Peer Reviewer* – Reviews the document at an inquiry level
 - Approver – Approves the document at the section level
 - Peer Approver* – Approves the document at the section level
 - Version Controller – Final approver of the document, one person
 - Administrator – Sets up user roles, document type, etc.
- Users may be assigned multiple roles to allow greater flexibility
- * - Peer roles do not effect document processing, inputs are merely advise.

Systems Engineering Toolkit - Process Document Development

