

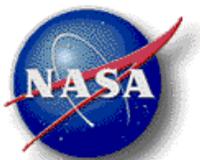
Systems Engineering NPR 7123.1A Center Survey

**For the
Goddard Space Flight Center**

599-SUR-100

Revision: A

DATE: February 17, 2010



**National Aeronautics and
Space Administration**

**CONSULT THE CODE 599 CONFIGURATION MANAGER
TO VERIFY THAT THIS IS THE CORRECT VERSION PRIOR TO USE**

SIGNATURE PAGE

Prepared by: Original signed by _____ Date: 02/17/2010
Ken Yienger
Branch Head, Mission Systems Engineering
NASA, GSFC Code 599

Approved by: Original signed by _____ Date: 03/07/2010
Dennis Andrucyk
Director, Applied Engineering and Technology Directorate
NASA, GSFC Code 500

Approved by: Original signed by _____ Date: 08/06/2010
Steven Kapurch
Program Executive Officer, Office of Chief Engineer
NASA HQ

CONSULT THE CODE 599 CONFIGURATION MANAGER
TO VERIFY THAT THIS IS THE CORRECT VERSION PRIOR TO USE

DOCUMENT CHANGE RECORD

REV LEVEL	DESCRIPTION OF CHANGES	APPROVED BY	DATE APPROVED
-	INITIAL RELEASE	K. Yienger	04/06/2009
A	Updated for synchronization with GPR 7123.1A Release	K. Yienger	02/17/2010

CONSULT THE CODE 599 CONFIGURATION MANAGER
TO VERIFY THAT THIS IS THE CORRECT VERSION PRIOR TO USE

TABLE OF CONTENTS

1	INTRODUCTION.....	5
1.1	PURPOSE	5
1.2	SCOPE.....	5
1.3	BACKGROUND	5
2	REFERENCE DOCUMENTS	7
3	PLANNED ACTIVITIES.....	8
3.1	DESCRIPTION OF CENTER-EQUIVALENT ACTIVITIES.....	8
3.2	TRACEABILITY MATRIX.....	9
3.3	PLAN TO CLOSE GAPS.....	18
4	LESSONS LEARNED	18
5	CENTER BEST PRACTICES	18
6	OTHER.....	19

TABLE OF TABLES

TABLE 3-1.....	9
-----------------------	----------

CONSULT THE CODE 599 CONFIGURATION MANAGER
TO VERIFY THAT THIS IS THE CORRECT VERSION PRIOR TO USE

SE NPR 7123.1A Center Survey for the Goddard Space Flight Center

1 INTRODUCTION

1.1 Purpose

This document presents the GSFC Center Survey as required by paragraph 2.1.2.2d of the System Engineering NPR 7123.1A for implementing the best practice activities as described in Appendix C of the NPR. This survey will be used as a basis for improving the existing procedures, and continuing the implementation of the best practice activities.

1.2 Scope

The scope of this document contains the plan and traceability for implementing the best practice activities as defined in the NPR 7123.1A Appendix C. This document covers procedures for all project activity at Goddard Space Flight Center. It contains the results to date for implementing the systems engineering best practice activities via those procedures. The best practices noted are compared to the existing and near-final draft documents mandated at GSFC for use by all Center project teams. Also included are the plans for closing remaining gaps found.

1.3 Background

NPR 7123.1A includes four product lines: Flight Systems (FS) & Ground Systems (GS), Advanced Technology Development, Basic and Applied Research, and Institutional Projects. GSFC's compliance with each of the product lines is addressed below.

Flight Systems & Ground Systems

All GSFC managed Flight Programs and Projects that follow NPR 7120.5D, *NASA Space Flight Program and Project Management* are required to follow NPR 7123.1A. The GSFC implementation of NPR 7123.1A will be through GPR 7123.1A which will describe the applicability of our system engineering requirements to mission classification.

The vehicle for projects to demonstrate compliance with the GPR 7123.1A is the development of a SEMP for use by the project over the entire lifecycle. The GPR contains the required SEMP outline. GSFC is currently undergoing the process of standardizing project SEMPs to ensure the GPR 7123.1A is being instantiated properly. Project SEMPs will then be monitored (and updated as necessary) to accurately reflect the practices and procedures being followed.

CONSULT THE CODE 599 CONFIGURATION MANAGER
TO VERIFY THAT THIS IS THE CORRECT VERSION PRIOR TO USE

In order to enable this activity, GSFC Code 599 (Mission Systems Engineering Branch) has implemented a CM system to house and track project SEMP documents. As project SEMP are completed, they are configuration managed at the Branch level as well as at the project level.

The project system engineering representative will work with the Project Manager and the Mission Systems Engineering Branch Head to ensure an adequate systems engineering plan and implementation.

Basic and Applied Research and Advanced Technology Development

GSFC currently manages internal technology development following the guidelines and requirements in PG 8730, *GSFC Technology Management for Internal Technology Development*. For externally funded technology development, GSFC will follow the sponsoring organization's guidelines and requirements. For Advanced Technology Development, the technology will be managed by the project and will follow the project requirements.

Institutional Projects and Institutional IT Projects

Institutional projects, such as the construction of building or office space, are outside the scope of NPR 7123.1A. The construction of facilities and information technology projects related to a particular project such as construction of a thermal vacuum chamber or clean room fall outside of the authority of the GPR 7123.1A.

CONSULT THE CODE 599 CONFIGURATION MANAGER
TO VERIFY THAT THIS IS THE CORRECT VERSION PRIOR TO USE

2 REFERENCE DOCUMENTS

The following is a list of Goddard Procedural Requirements (GPR) and Standards (STD) that reflect implementation of the requirements of the NPR 7123.1A:

GPR 1410.2C	<i>Configuration Management</i>
GPR 1060.2C	<i>Management Review and Reporting for Programs and Project</i>
GPR 7120.1C	<i>Program and Project Management</i>
GPR 7120.4A	<i>Risk Management</i>
GPR 7123.1A	<i>Systems Engineering</i>
GPR 8700.4F	<i>Integrated Independent Reviews</i>
GPR 8700.5A	<i>In-house Development and Maintenance of Software Products</i>
GPR 8700.6A	<i>Engineering Peer Reviews</i>
GPR STD-1000	<i>Rules for the Design, Development, Verification, and Operation of Flight Systems</i>
GPR STD-1001	<i>Review Criteria</i>
599-CMP-100	<i>GSFC Systems Engineering Configuration Management Process</i>
599-IP-100	<i>NPR 7123.1A Implementation Plan for GSFC</i>

CONSULT THE CODE 599 CONFIGURATION MANAGER
TO VERIFY THAT THIS IS THE CORRECT VERSION PRIOR TO USE

3 PLANNED ACTIVITIES

3.1 Description of Center-Equivalent Activities

This section describes the general approach to accomplishing NPR implementation at GSFC, which encompasses implementation of the 17 common processes surveyed herein. The Mission Systems Engineering Branch, GSFC Code 599, (GSFC Center DGA) has initiated/accomplished the following activities in response to the NPR 7123.1A requirements:

- Developed an implementation plan and submitted to NASA HQ SEWG (GSFC-IP-100)
- Developed the GSFC Procedural Requirements (GPR 7123.1A) that establish policies, procedures, and processes to execute the requirements of the NPR 7123.1A at GSFC.
- Established a Goddard Systems Engineering Process Group (GSEPG) within the Mission Systems Engineering Branch (Code 599), whose responsibility is to develop, maintain, support, and improve the processes required by the SE NPR and GPR.
- Perform the Center Survey (this document) as required by the NPR 7123.1A.

GPR 7123.1A implements the NPR 7123.1A requirements as they apply to programs and projects being performed at GSFC and flows the requirements down. The GPR requires GSFC programs and projects to follow the processes developed in response to the SE NPR.

GPR 7123.1A requires compliance for all applicable programs/projects that are not at the Pre-Ship Review or later phases of development as of the time of the release of the GPR 7123.1A. Ongoing Mission Operations projects are expected to comply with the GPR 7123.1A also.

Mission, ground segment and instrument Systems Engineering teams supporting programs and projects are required to respond with a Systems Engineering Management Plan (SEMP), which will document the intended processes to be utilized over the program/project lifecycle. Details specific to that program or project and document include any tailoring or exceptions taken to the GPR requirements and tailoring of GSFC SE processes and associated guidelines. The SEMPs will initially be prepared during Phase A activities (or equivalent). The SEMPs will be approved by the Program/Project Manager and the DGA. The development of the SEMPs will be the responsibility of the Lead Systems Engineer (LSE).

SEMP's will be configuration managed at the Mission System Engineering Branch level, independently of program/project CM. It is expected that each SEMPs will be reviewed as part of and revalidated or modified as a result of each milestone review. The GSEPG has stood up an review board (as part of the CM process)

CONSULT THE CODE 599 CONFIGURATION MANAGER
TO VERIFY THAT THIS IS THE CORRECT VERSION PRIOR TO USE

that ensures SEMP consistency across program/projects and ensures process definition and contents are in compliance with the GPR 7123.1A.

The GSEPG is currently generating Data Item Description (DID) templates for the lifecycle products, e.g. Concept of Operations document, ICD/IRD to ensure consistency of the products and evaluate compliance with the 17 common processes to ensure programs and projects are following their SEMP and associated processes.

To fully demonstrate compliance with GPR requirements, Program and projects will be periodically audited to ensure that the program/project meets the requirements of the SE NPR and are following their approved/agreed upon SEMP.

3.2 Traceability Matrix

The GSFC approach to generating the Center Survey was accomplished as followed: Members of the Mission Systems Engineering Branch reviewed in detail the existing Center procedures and newly drafted procedures, comparing the wording of specific 'shall' statements contained therein to the best practices contained in NPR 7123.1A, Appendix C for each of the 17 processes.

Table 3-1 provides the cross-reference of the expected process activities listed in Appendix C of the SE NPR with equivalent activities in or planned for Center documentation.

Table 3-1 Process Activity Traceability Matrix

Process	GPR Reference	Required	Guideline	Partial	None	Plan to Close Gaps
1. Stakeholder Expectations						
a. Establish List of Stakeholders	GPR 7123.1A Section 4.1.1 Understanding the Objectives GPR 7123.1A Section 4.1.3 Operations Concept Development	X				N/A
b. Elicit Stakeholder Expectations	GPR 7123.1A Section 4.1.1 Understanding the Objectives	X				N/A
c. Establish Operations Concept and Support Strategies	GPR 7123.1A Section 4.1.3 Operations Concept Development	X				N/A
d. Define Stakeholder Expectations in Acceptable Statements	GPR 7123.1A Section 4.1.1 Understanding the Objectives	X				N/A
e. Analyze Expectation Statements for Measures of Effectiveness	GPR 7123.1A Section 4.1.1 Understanding the Objectives	X				N/A
f. Validate That defined expectations statements reflect bidirectional traceability	GPR 7123.1A Section 4.1.1 Understanding the Objectives	X				N/A
g. Obtain stakeholder commitments to the validated set of expectations	GPR 7123.1A Section 4.1.1 Understanding the Objectives	X				N/A
h. Baseline stakeholder expectations	GPR 7123.1A Section 4.1.1 Understanding the Objectives	X				N/A
2. Requirements Definition						
a. Analyze scope of problem	GPR 7123.1A Section 4.1.3 Operations Concept Development	X				N/A
b. Define design and product constraints	GPR 7123.1A Section 4.1.4 Requirements Identification GPR 7123.1 Section 4.1.2 Mission Environments GPR 7123.1 Section 4.2.4 Technical Budget Resource Tracking	X				N/A
c. Define functional and behavioral expectation in technical terms	GPR 7123.1A Section 4.1.4 Requirements Identification	X				N/A
d. Define performance requirements for each defined functional and behavioral expectation	GPR 7123.1A Section 4.1.4 Requirements Identification GPR 7123.1 Section 4.1.2 Mission Environments GPR 7123.1 Section 4.2.4 Technical Budget Resource Tracking	X				N/A
e. Define technical requirements in acceptable "shall" statements	GPR 7123.1A Section 4.1.4 Requirements Identification	X				N/A

CONSULT THE CODE 599 CONFIGURATION MANAGER
TO VERIFY THAT THIS IS THE CORRECT VERSION PRIOR TO USE
Page 10 of 19

Table 3-1 Process Activity Traceability Matrix

Process	GPR Reference	Required	Guideline	Partial	None	Plan to Close Gaps
f. Validate technical requirements	GPR 7123.1A Section 4.1.4 Requirements Identification	X				N/A
g. Define measures of Performance for each measure of effectiveness	GPR 7123.1A Section 4.1.4 Requirements Identification	X				N/A
h. Define Technical Performance Measures	GPR 7123.1A Section 4.1.4 Requirements Identification	X				N/A
i. Establish Technical Requirements baseline	GPR 7123.1A Section 4.1.4 Requirements Identification	X				N/A
3. Logical Decomposition						
a. Define one or more logical decomposition models	GPR 7123.1A Section 4.1.5 Architecture and Design Development	X				N/A
b. Allocate technical requirements to logical decomposition models to form a set of derived technical requirements	GPR 7123.1A Section 4.1.5 Architecture and Design Development GPR 7123.1A Section 4.1.4 Requirements Identification	X				N/A
c. Resolve derived technical requirement conflicts	GPR 7123.1A Section 4.1.5 Architecture and Design Development GPR 7123.1A Section 4.1.4 Requirements Identification	X				N/A
d. Validate the resulting set of derived technical requirements	GPR 7123.1A Section 4.1.5 Architecture and Design Development GPR 7123.1A Section 4.1.4 Requirements Identification	X				N/A
e. Establish the derived technical requirements baseline	GPR 7123.1A Section 4.1.5 Architecture and Design Development GPR 7123.1A Section 4.1.4 Requirements Identification	X				N/A
4. Design Solution						
a. Define alternative design solutions	GPR 7123.1A Section 4.1.5 Architecture and Design Development	X				N/A
b. Analyze each alternative design solution	GPR 7123.1A Section 4.1.5 Architecture and Design Development	X				N/A
c. Select Best Design Solution Alternative	GPR 7123.1A Section 4.1.5 Architecture and Design Development	X				N/A
d. Generate full design description of the selected solution	GPR 7123.1A Section 4.1.5 Architecture and Design Development	X				N/A
e. Verify the fully defined design solution	GPR 7123.1A Section 4.1.5 Architecture and Design Development	X				N/A

CONSULT THE CODE 599 CONFIGURATION MANAGER
TO VERIFY THAT THIS IS THE CORRECT VERSION PRIOR TO USE

Table 3-1 Process Activity Traceability Matrix

Process	GPR Reference	Required	Guideline	Partial	None	Plan to Close Gaps
f. Baseline design solution specified reqts and design descriptions	GPR 7123.1A Section 4.1.5 Architecture and Design Development	X				N/A
g. Initiate development of enabling products	GPR 7123.1A Section 4.1.5 Architecture and Design Development	X				N/A
h. Initiate development of next lower level products	GPR 7123.1A Section 4.1.5 Architecture and Design Development	X				N/A
5. Product Implementation						
a. Prepare to conduct implementation	GPR 7123.1A Section 4.1.6 Product Implementation	X				N/A
b. If buying: participate in the buy of the specified end product	GPR 7123.1A Section 4.1.6 Product Implementation GPR 7123.1A Section 4.2.8 Acquisition Support	X				N/A
c. If implemented by reuse: participate in acquiring the reuse end product	GPR 7123.1A Section 4.1.6 Product Implementation	X				N/A
d1. if implemented by making: evaluate readiness of product implementation-enabling products	GPR 7123.1A Section 4.1.6 Product Implementation	X				N/A
d2. Make the specified product	GPR 7123.1A Section 4.1.6 Product Implementation	X				N/A
d3. Prepare appropriate product support documentation	GPR 7123.1A Section 4.1.6 Product Implementation	X				N/A
e. Capture product implementation work products	GPR 7123.1A Section 4.1.6 Product Implementation	X				N/A
6. Product Integration						
a. Prepare to conduct product integration	GPR 7123.1A Section 4.1.7 Product Integration	X				N/A
b. obtain lower-level products for assembly and integration	GPR 7123.1A Section 4.1.7 Product Integration	X				N/A
c. Confirm that received products have been validated	GPR 7123.1A Section 4.1.7 Product Integration	X				N/A
d. Prepare the integration environment for assembly and integration	GPR 7123.1A Section 4.1.7 Product Integration	X				N/A
e. Assemble and integrate the received products into the desired end product	GPR 7123.1A Section 4.1.7 Product Integration	X				N/A
f. Prepare appropriate product support documentation	GPR 7123.1A Section 4.1.7 Product Integration	X				N/A

CONSULT THE CODE 599 CONFIGURATION MANAGER
TO VERIFY THAT THIS IS THE CORRECT VERSION PRIOR TO USE

Table 3-1 Process Activity Traceability Matrix

Process	GPR Reference	Required	Guideline	Partial	None	Plan to Close Gaps
g. Capture product integration work products	GPR 7123.1A Section 4.1.7 Product Integration	X				N/A
7. Product Verification						
a. Prepare to conduct product verification	GPR 7123.1A Section 4.1.8 Verification	X				N/A
b. Perform the product verification	GPR 7123.1A Section 4.1.8 Verification	X				N/A
c. Analyze the outcomes of the product verification	GPR 7123.1A Section 4.1.8 Verification	X				N/A
d. Prepare a product verification report	GPR 7123.1A Section 4.1.8 Verification	X				N/A
e. Capture the work products from product verification	GPR 7123.1A Section 4.1.8 Verification	X				
8. Product Validation						
a. Prepare to conduct product validation	GPR 7123.1A Section 4.1.9 Validation	X				N/A
b. Perform the product validation	GPR 7123.1A Section 4.1.9 Validation	X				N/A
c. Analyze the outcomes of the product validation	GPR 7123.1A Section 4.1.9 Validation	X				N/A
d. Prepare a product validation report	GPR 7123.1A Section 4.1.9 Validation	X				N/A
e. Capture the work products for product validation	GPR 7123.1A Section 4.1.9 Validation	X				N/A
9. Product Transition						
a. Prepare to conduct product transition	GPR 7123.1A Section 4.1.10 Product Acceptance and Transition	X				N/A
b. Evaluate the end product, personnel and enabling product readiness for transition	GPR 7123.1A Section 4.1.10 Product Acceptance and Transition	X				N/A
c. Prepare the end product for transition	GPR 7123.1A Section 4.1.10 Product Acceptance and Transition	X				N/A
d. Transition the end product to the customer with required documentation based on the type of transition required	GPR 7123.1A Section 4.1.10 Product Acceptance and Transition	X				N/A

CONSULT THE CODE 599 CONFIGURATION MANAGER
TO VERIFY THAT THIS IS THE CORRECT VERSION PRIOR TO USE

Table 3-1 Process Activity Traceability Matrix

Process	GPR Reference	Required	Guideline	Partial	None	Plan to Close Gaps
e. Prepare sites, as required, where the end product will be stored, assembled, integrated, installed, used and/or maintained	GPR 7123.1A Section 4.1.10 Product Acceptance and Transition	X				N/A
f. Capture Product implementation work products	GPR 7123.1A Section 4.1.10 Product Acceptance and Transition	X				N/A
10. Planning						
a. Prepare to conduct technical planning	GPR 7123.1A Section 4.2.3 Technical Planning	X				N/A
b. Define the technical work	GPR 7123.1A Section 4.2.3 Technical Planning	X				N/A
c. Schedule, organize, and cost the technical work	GPR 7123.1A Section 4.2.3 Technical Planning	X				N/A
d. Prepare SEMP and other technical plans	GPR 7123.1A Section 4.2.3 Technical Planning	X				N/A
e. Obtain stakeholder commitments to technical plans	GPR 7123.1A Section 4.2.3 Technical Planning	X				N/A
f. Issue Authorized technical work directives	GPR 7123.1A Section 4.2.3 Technical Planning	X				N/A
g. Capture technical planning work products	GPR 7123.1A Section 4.2.3 Technical Planning	X				N/A
11. Requirements Mgmt						
a. Prepare to conduct requirements management	GPR 7123.1A Section 4.2.1 Requirements Mgmt	X				N/A
b. Conduct requirement management	GPR 7123.1A Section 4.2.1 Requirements Mgmt	X				N/A
c. Conduct expectation and requirements traceability	GPR 7123.1A Section 4.2.1 Requirements Mgmt	X				N/A
d. Manage expectation and requirement changes	GPR 7123.1A Section 4.2.1 Requirements Mgmt	X				N/A
e. Capture work products from requirement management activities	GPR 7123.1A Section 4.2.1 Requirements Mgmt	X				N/A
12. Interface Mgmt						
a. Prepare or update interface management procedures	GPR 7123.1A Section 4.2.2 Interface Management	X				N/A

CONSULT THE CODE 599 CONFIGURATION MANAGER
TO VERIFY THAT THIS IS THE CORRECT VERSION PRIOR TO USE

Table 3-1 Process Activity Traceability Matrix

Process	GPR Reference	Required	Guideline	Partial	None	Plan to Close Gaps
b. Conduct interface management during system design activities for each WBS link model in the system structure	GPR 7123.1A Section 4.2.2 Interface Management	X				N/A
c. Conduct interface management during product integration activities	GPR 7123.1A Section 4.2.2 Interface Management	X				N/A
d. Conduct interface control	GPR 7123.1A Section 4.2.2 Interface Management	X				N/A
e. Capture work products from interface management activities	GPR 7123.1A Section 4.2.2 Interface Management	X				N/A
13. Risk Mgmt						
a. Prepare a strategy to conduct technical risk management	GPR 7123.1A Section 4.2.6 Risk Management	X				N/A
b. Identify technical risks	GPR 7123.1A Section 4.2.6 Risk Management	X				N/A
c. Conduct technical risk assessment	GPR 7123.1A Section 4.2.6 Risk Management	X				N/A
d. Prepare for technical risk mitigation	GPR 7123.1A Section 4.2.6 Risk Management	X				N/A
e. Monitor the status of each technical risk periodically	GPR 7123.1A Section 4.2.6 Risk Management	X				N/A
f. Implement technical risk mitigation and contingency action plans as triggered	GPR 7123.1A Section 4.2.6 Risk Management	X				N/A
g. Capture work products from technical risk management activities	GPR 7123.1A Section 4.2.6 Risk Management	X				N/A
14. Configuration Mgmt						
a. Prepare a strategy to conduct configuration management	GPR 7123.1A Section 4.2.5 Configuration Management and Data Storage GPR 1410.2C Configuration Management 599-CMP-100 MSE Branch CM Plan	X				N/A
b. Identify baseline to be under configuration control	GPR 7123.1A Section 4.2.5 Configuration Management and Data Storage GPR 1410.2C Configuration Management 599-CMP-100 MSE Branch CM Plan	X				N/A
c. Manage configuration change control	GPR 7123.1A Section 4.2.5 Configuration Management and Data Storage GPR 1410.2C Configuration Management 599-CMP-100 MSE Branch CM Plan	X				N/A

CONSULT THE CODE 599 CONFIGURATION MANAGER
TO VERIFY THAT THIS IS THE CORRECT VERSION PRIOR TO USE

Table 3-1 Process Activity Traceability Matrix

Process	GPR Reference	Required	Guideline	Partial	None	Plan to Close Gaps
d. Maintain the status of configuration documentation	GPR 7123.1A Section 4.2.5 Configuration Management and Data Storage GPR 1410.2C Configuration Management 599-CMP-100 MSE Branch CM Plan	X				N/A
e. Conduct configuration audits	GPR 7123.1A Section 4.2.5 Configuration Management and Data Storage GPR 1410.2C Configuration Management 599-CMP-100 MSE Branch CM Plan	X				N/A
f. Capture work products from configuration management activities	GPR 7123.1A Section 4.2.5 Configuration Management and Data Storage GPR 1410.2C Configuration Management 599-CMP-100 MSE Branch CM Plan	X				N/A
15. Technical Data Mgmt						
a. Prepare for Technical data management implementation	GPR 7123.1A Section 4.2.5 Configuration Management and Data Storage	X				N/A
b. Collect and store required technical data	GPR 7123.1A Section 4.2.5 Configuration Management and Data Storage	X				N/A
c. Maintain stored technical data	GPR 7123.1A Section 4.2.5 Configuration Management and Data Storage	X				N/A
d. Provide technical data to authorized parties	GPR 7123.1A Section 4.2.5 Configuration Management and Data Storage	X				N/A
16. Technical Assessment						
a. Prepare strategy for conducting technical assessments	GPR 7123.1A Section 4.2.3 Technical Planning GPR 7123.1 Section 4.2.4 Technical Resource Budget Tracking	X				N/A
b. Assess technical product productivity	GPR 7123.1A Section 4.2.3 Technical Planning GPR 7123.1 Section 4.2.4 Technical Resource Budget Tracking	X				N/A
c. Assess technical product quality	GPR 7123.1A Section 4.2.3 Technical Planning GPR 7123.1 Section 4.2.4 Technical Resource Budget Tracking	X				N/A
d. Conduct horizontal & vertical progress technical review	GPR 7123.1A Section 4.2.3 Technical Planning GPR 7123.1 Section 4.2.4 Technical Resource Budget Tracking	X				N/A

CONSULT THE CODE 599 CONFIGURATION MANAGER
TO VERIFY THAT THIS IS THE CORRECT VERSION PRIOR TO USE

Table 3-1 Process Activity Traceability Matrix

Process	GPR Reference	Required	Guideline	Partial	None	Plan to Close Gaps
e. Capture work products from technical assessment activities	GPR 7123.1A Section 4.2.3 Technical Planning GPR 7123.1 Section 4.2.4 Technical Resource Budget Tracking	x				N/A
17. Decision Analysis						
a. Establish guidelines to determine which technical issues are subject to a formal analysis/evaluation process	GPR 7123.1A Section 4.2.7 Decision Analysis	X				N/A
b. Define the criteria for evaluating alternative solutions	GPR 7123.1A Section 4.2.7 Decision Analysis	X				N/A
c. Identify alternative solutions to address decision issues	GPR 7123.1A Section 4.2.7 Decision Analysis	X				N/A
d. Select evaluation methods and tools	GPR 7123.1A Section 4.2.7 Decision Analysis	X				N/A
e. Evaluate alternative solutions with the established criteria and selected methods	GPR 7123.1A Section 4.2.7 Decision Analysis	X				N/A
f. Select recommended solutions from the alternatives based on the evaluation criteria	GPR 7123.1A Section 4.2.7 Decision Analysis	X				N/A
g. Report analysis results with recommendations, impacts and corrective actions	GPR 7123.1A Section 4.2.7 Decision Analysis	X				N/A
h. Capture work products from decision analysis activities	GPR 7123.1A Section 4.2.7 Decision Analysis	X				N/A

CONSULT THE CODE 599 CONFIGURATION MANAGER
TO VERIFY THAT THIS IS THE CORRECT VERSION PRIOR TO USE

3.3 Plan to Close Gaps

The compliance matrix indicates that GSFC is fully compliant with the 17 process definitions and the associated subactivities through their descriptions within the released GPR 7123.1A. Further efforts include developing Data Item Descriptions (DID's) for SE lifecycle processes to conform to documentation submittals and potential development of Process Guidelines to further delineate the specific process activities to provide guidance for programs and processes for Technical Management processes.

4 LESSONS LEARNED

Lessons learned during completion of this survey include the following:

- Establishment of a Mission Systems Engineering Branch Configuration Control Board for managing documentation (including SEMP's, the NPR Implementation Plan, and this document) enables the Branch to ensure the consistency, continuity and quality of System Engineering products to achieve the objectives of NPR 7123.1 and improve the processes performed at the GSFC;
- Tracking SEMP development and utilization is essential in ensuring that each program/project are implementing the processes planned per their SEMP's;
- Providing training to System Engineers for the GPR 7123.1A and NPR 7123.1A is essential in achieving consistency of processes across programs and projects being performed at GSFC;
- Developing a standard toolkit for programs/project SE teams to use during all phases would aid in ensuring processes/products are consistent across the Center;
- Generating Data Item Descriptions (DID's) is key in establishing common products that allow the GSEPG to ensure that standard processes are being followed at the GSFC

5 CENTER BEST PRACTICES

It is anticipated that the project/program System Engineering teams will participate in updating and improving the Center processes as defined in the GPR 7123.1A, as well as all associated process guidelines and plans generated. As the users of the procedures/guidelines/plans, all SE personnel are expected to analyze their use of it, and provide input as a continuous process improvement effort. The SE team members will also collaborate internally within their assigned program/project to effectively develop processes to be used and provide feedback to the GSEPG as a result of lessons learned during development and implementation to contribute any ideas for continuous improvement.

The GSEPG has initiated piloting of the draft processes by selected active center programs/projects and assessment activities on those same projects. As the subset programs/projects use the procedures, they are providing feedback on suggested improvements for more practical usage, and using the updated procedures. The GSEPG will work with the program/project teams to provide consistency across

projects and provide consultation to enable compliance with the developing/approved guidelines.

6 OTHER

None

CONSULT THE CODE 599 CONFIGURATION MANAGER
TO VERIFY THAT THIS IS THE CORRECT VERSION PRIOR TO USE