Complete the SEMP

|  |  |  |  |
| --- | --- | --- | --- |
| Section | Possible Points | 0 |  |
| 1 Intro | 40 |  | 0% |
| 2 Refs | 40 |  | 0% |
| 3 Org | 80 |  | 0% |
| 4 Tech | 80 |  | 0% |
| 5 Mgmt | 120 |  | 0% |
| 6 Invest | 40 |  | 0% |

Integration checklist (affects overall quality and your grade):

Stage direction/suggestions for paragraph content are replaced with appropriate text

All tasks in sections 4, 5, 6 can be found within an element of the WBS

All organizational assignments in sections 4, 5, 6 agree with the RAM.

All documents mentioned throughout the SEMP are listed in section 2, and all documents listed in section 2 are are mentioned in the text.

All acronyms are spelled out *on first use*, and listed in the Table of Acronyms.

“Shall” is not used in the plan

Text is written using complete sentences.

Spell-check and grammar check are completed

Cross-references from text to figure and table number are used and correct

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**Table of Acronyms**

|  |  |
| --- | --- |
| **Acronym** | **Definition** |
|  |  |

# Introduction

## Document Purpose

Why is this document being written? How is it intended to be used? Clearly identify the organization developing and performing this plan.

## Document Scope

What does it cover? What general subjects are not included?

## Document Update

Method and Frequency – How, and how often?

## Program Summary

### Program Objectives and Scope

What are the primary objectives (programmatic and technical)? How will you determine “success”? What is the program organizational and business context? Are there any limitations or key assumptions? Information in this section will be used to evaluate adequacy of this plan.

### Project Summary and Deliverables

Describe major phases of the project, key milestones and deliverables in each phase. These can be more than hardware and software.

### Technical Description

Describe the system and the strategy or approach to achieving the technical objectives. Describe how requirements for all life-cycle phases will be developed and incorporated.

# Reference Documents

Identify references on which you are depending **and** which are cited in the text. How are these references tailored, prioritized, and applied?

## Industry References

Standards, industry handbooks, other references. Identify which are “guidance” (provide useful information) and which are “compliance” (must be adhered to). For “Compliance”, the referencing section of the plan must address how compliance will be shown. List in a tabular form. If you mention a standard in the text it must be listed in these 4 tables

Table 1 Industry Reference Documents

|  |  |  |
| --- | --- | --- |
| **Document Number** | **Document Title, Version, Date** | **“Guidance” or “Compliance”?** |
| ISO/IEC/IEEE 15288 | Systems and Software Engineering – System Life-Cycle Processes, 2015. | Guidance |
|  |  |  |

## Acquirer References

Acquirer-specific references. All DARPA Urban Challenge documents should be listed here. More generally, this section might not be applicable for supplier-funded development.

Table 2 Acquirer Reference Documents

|  |  |  |
| --- | --- | --- |
| **Document Number** | **Document Title, Version, Date** | **“Guidance” or “Compliance”?** |
|  |  | Compliance |
|  |  |  |

## Enterprise References

Your **company** items that apply to more than just your program.

Table 3 Enterprise Reference Documents

|  |  |  |
| --- | --- | --- |
| **Document Number** | **Document Title, Version, Date** | **“Guidance” or “Compliance”?** |
|  |  |  |
|  |  |  |

## Program References

**Project-specific** references controlled by the performing organization. May include, for example, program management plans.

Table 4 Program Reference Documents

|  |  |  |
| --- | --- | --- |
| **Document Number** | **Document Title, Version, Date** | **“Guidance” or “Compliance”?** |
|  |  |  |
|  |  |  |

# Program Organization

## Work Allocation: Work Breakdown Structure

Provide and describe a *summary* work breakdown structure to the tier 3 level that accomplishes the work identified in section 1. List the primary task completion criteria.

## Organization Structure and Overview

Provide a graphical organization chart. Provide a summary description of how the relationships among organizational members help achieve Program Mission and Objectives. Explain any differences compared with the WBS and how the program will ensure all work is efficiently accomplished. Include a *responsibility assignment matrix* that links the organizational structure to the WBS using the RACI (Responsible for doing it, accountable for insuring it’s done right, consulted for input, informed of outputs) structure.

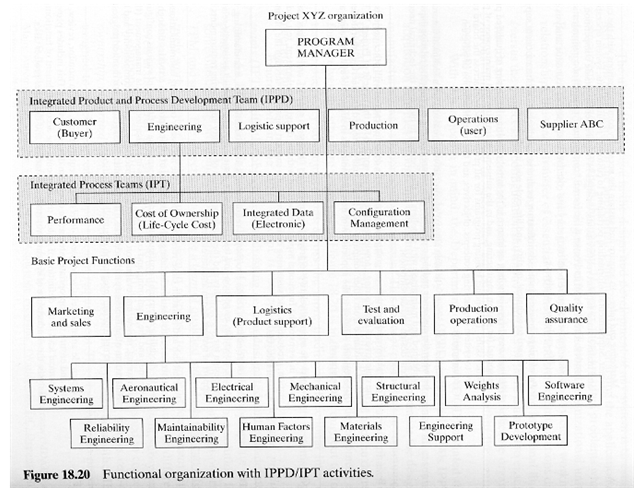


Figure 3‑1. Dummy Org Chart figure

## Role, Responsibility, Authority, Accountability

In the following subsections, describe each role (a summary of what they do), specific responsibilities, specific authority, to whom they are accountable, and responsibilities for specific program results or deliverables. This collection of information can be described as a “charter”. These descriptions should be consistent with the allocation of tasks in the following sections and the WBS.

### Program Leadership

Program Management, acquirer engagement, cost and schedule, etc.

### Technical Leadership

Chief Engineer or Chief Architect, Chief Systems Engineer, other function or product team leaders

### Teams and Functions

Integrated product and process development (IPPD) and/or function-based organization.

### Key Suppliers and Supplier Integration

“Acquisition” per the Handbook. Identify suppliers who are critical for program success and how they are integrated into the program SE execution.

### Associate organizations

If applicable, identify partners or other suppliers who deliver to a common acquirer on a specific project.

### Acquirer

“Supply” per the Handbook. Describe any execution-level involvement of acquirer organizations, such as working groups, integrated product or process teams.

### User

If different from acquirer, identify their specific involvement in working groups, integrated product or process teams, evaluation (validation), etc.

## Organizational Integration

### Working Groups and Boards

Internal and external. These are used to integrate efforts across organizational boundaries.

### Technical Specialty Integration

Identification of Specialties

Identify and justify specific specialties that are needed, e.g., Safety, Reliability, Maintainability & Testability, Electromagnetics, Human-Systems Integration, System Security, etc. Note: typical engineering functions, e.g., electrical, mechanical, software, are not considered “specialty” for the reasons outlined in class.

#### Tasks of Technical Specialists

Describe common approaches across all specialties. Identify any unique efforts for each applicable specialty area. Consider program planning, application of specialty areas standards, requirements development, design guidance and design analysis, developmental testing, verification (both test and analysis), and any required operations, maintenance, or disposal support. This section is about the strategic approach to deploying specialties, not a process description section. The intent is not to duplicate information in sections 3.3 or 4, but to identify the roles of specialists being identified. This is especially important in a product-based organization structure.

#### Integrating Specialties

Describe how the specialists are organized and deployed, their specific roles, responsibilities, authority, accountability, and how they are integrated across the organization (vertically – a single specialty throughout the whole organization, and horizontally – all the specialties at a given level).

# Technical Processes

For each item below, identify tasks and work products, why they are needed, organizational allocation of work, workflow (among organizations), processes, measurement, tools and databases, subordinate plans, and when the work products are needed. Refer to Slide 13 of Lecture 3 - "Technical Processes" for guidance on writing paragraphs in this and subsequent sections.

## Business/Mission Analysis

Analysis to define the mission problem or business opportunity from the user or acquirer perspective.

## Stakeholder Needs and Requirements Definition

Includes stakeholder identification. May include modeling and simulation.

## Requirements Definition, Validation, and Traceability

Analysis, validation, and traceability of stakeholder requirements. May include modeling and simulation.

## Architecture Definition and Traceability

Decomposition and allocation of requirements to the lowest level of architecture (configuration items). Includes interface identification.

## Design Definition and Traceability

Processes enable implementation of configuration items. Includes interface definition.

## System Analysis

Identify, plan, and perform analyses for other processes. May include modeling and simulation.

## Implementation

Includes procurement, prototype fabrication, software coding, Production (if applicable): Low-Rate Initial Production and Full-Rate Production.

## Integration

Include description of any facilities.

## Verification and Traceability

Include verification logic, and description of any facilities. For the DARPA Urban Challenge, the NQE should be treated as a Verification event.

## Transition

This is the deployment process: the transition from fabrication to operations. Include description of any facilities and transportation needs.

## Validation

Operational test and evaluation. Include description of any facilities. May include modeling and simulation. For the DARPA Urban Challenge, the “Final Event” should be treated as a Validation event.

## Operations

Operations Training, Operational Assessments (Type 4 testing), Corrections (Improvements), Increments, and Upgrades. Include description of any facilities. For the DARPA Urban Challenge, any additional “challenge” or other events after the Final Event would be considered part of Operations, also requiring Maintenance and training support.

## Maintenance

Logistics, Maintenance and Assessments (Availability, Reliability, FRACAS, Maintainability), Maintenance Training. Include description of any facilities.

## Disposal

Includes Retirement and Disposition: planned life, plans for disposition (including disposal).

# Technical Management Processes

For each item below, identify tasks and work products, why they are needed, organizational allocation of work, workflow (among organizations), processes, measurement, tools and databases, subordinate plans, and when any specific work products are needed.

## Project Technical Planning

### Major Events: Integrated Master Plan

Identify major milestones that will be used to assess technical and programmatic progress and how each is used. Identify major deliverables for each event. Identify all technical reviews and include entry and exit criteria for each review. Identify measures that will be applied to assess progress and completeness for each event. See Lecture 4 Slide 25 for general entry and exit criteria.

### Work Packages

Describe how work packages are defined and planned (WBS below the tier 3 level). Consider size (hours, time), deliverables, technical success criteria, allocation of work, relationship to IMP events.

## Technical Management and Assessment

### Technical Performance Management

Describe how TPM will be executed. Also describe any technical performance measures already identified.

### Continuous Assessment

Describe additional technical assessment of the design with respect to the requirements, including design analysis and developmental testing. May include modeling and simulation.

### Other Technical Measurements

Identify any other technical measures used for technical management, e.g., measures for requirements, architecture, analyses, etc.

## Integration with Cost and Schedule Management

Identify EVM or other methods for program progress management. Need to address the integration of cost, schedule, and technical progress.

## Decision-Making

Including trade studies, design decision and decision-deployment processes. Identify when formal vs. informal trades will be performed, and common or mandatory decision criteria for formal trades.

## Issue Identification and Resolution

Includes program identification (including problem reporting systems), root cause analysis, corrective action, preventive action (applying lessons learned)

## Risk and Opportunity Management

Includes risk and opportunity identification, analysis, prioritization, handling methods, mitigation/ achievement plans, tracking and reporting.

## Configuration Management

Includes configuration identification, change management, baselines, configuration status accounting. Address Reviews and Audits in 5.1.1 .

### Baseline Definition and Management

#### Configuration Identification

Describe how configuration items are designated (criteria and processes), and how baselines are established.

#### Configuration Status Accounting

Describe the methods for establishing and reporting the status of the CM processes in terms of change activity, hardware and software configurations.

### Change Management

Describe how changes are initiated, executed, verified, and deployed.

### Requirements Management

Describe requirements configuration management. Traceability should be addressed in 4.2-4.4.

### Interface Management

Describe the overall process of interface management with emphasis on ensuring agreements are captured, configuration control, and compliance of designs with interfaces (through design, integration, and verification). Identification and definition of interfaces should be addressed in 4.4 and 4.5.

## Information Management and Product Lifecycle Management (PLM)

Describe how engineering development data will be managed to minimize errors and rework. Describe how the engineering and manufacturing (product definition) and support data will be maintained over the life-cycle, including HW and SW.

# Organizational Investment (~ 4 pages)

Topics in this section are often performed by or in the larger organization outside of a specific program, and are necessary for guarding against near-term sub-optimization. For each item below, identify tasks and work products, why they are needed, organizational allocation of work, workflow (among organizations), processes, measurement, tools and databases, subordinate plans.

## Life Cycle Management

### Program Policies and Procedures

Describe how policies and procedures will be established, maintained, and assessed for compliance.

### Program Measurement and Assessment

Address program items not previously described under technical assessment.

### Continuous Improvement

Describe how measurements will be used to improve the current and future programs.

## Investment Management

### Product Line Investment (Portfolio Management)

Describe how new or improved products and services will be developed.

### Supply

Describe obtaining new acquirers and providing new products to existing acquirers.

### Acquisition

Describe developing new suppliers, and maintaining and improving existing suppliers

## Resource Management

### Personnel

Include training and development.

### Infrastructure

Include tools, facilities, databases, networks, support services.

## Quality Management

Include quality guidelines, standards, measures, controls, mission assurance; improvement can be covered in 6.1.3.