

NASA's Systems Engineering Competencies



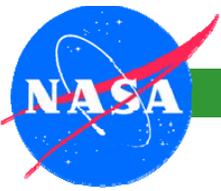
Systems Engineering Competencies*	
Competency Area: 1.0 Concepts and Architecture	Competency Area: 6.0 NASA Internal and External Environments
1.1 Mission Needs Statement	6.1 Agency Structure, Mission, and Internal Goals
1.2 System Environments	6.2 NASA PM/SE Procedures and Guidelines
1.3 Trade Studies	6.3 External Relationships
1.4 System Architecture	
Competency Area: 2.0 System Design	Competency Area: 7.0 Human Capital Management
2.1 Stakeholder Expectation Definition & Management	7.1 Technical Staffing and Performance
2.2 Technical Requirements Definition	7.2 Team Dynamics and Management
2.3 Logical Decomposition	
2.4 Design Solution Definition	
Competency Area: 3.0 Production, Product Transition, Operations	Competency Area: 8.0 Security, Safety and Mission Assurance
3.1 Product Implementation	8.1 Security
3.2 Product Integration	8.2 Safety and Mission Assurance
3.3 Product Verification	
3.4 Product Validation	
3.5 Product Transition	
3.6 Operations	
Competency Area: 4.0 Technical Management	Competency Area: 9.0 Professional and Leadership Development
4.1 Technical Planning	9.1 Mentoring and Coaching
4.2 Requirements Management	9.2 Communication
4.3 Interface Management	9.3 Leadership
4.4 Technical Risk Management	
4.5 Configuration Management	
4.6 Technical Data Management	
4.7 Technical Assessment	
4.8 Technical Decision Analysis	
Competency Area: 5.0 Project Management and Control	Competency Area: 10.0 Knowledge Management
5.1 Acquisition Strategies and Procurement	10.1 Knowledge Capture and Transfer
5.2 Resource Management	
5.3 Contract Management	
5.4 Systems Engineering Management	



Description of Proficiency Levels Associated with the APPEL Model for Systems Engineers

To determine how best to proceed after entering the NASA workforce and progress through the technical professional development model, it is helpful to understand the definition of each level. The following table is intended as a guide for use with the technical development model for systems engineers.

	SE Proficiency Level I	SE Proficiency Level II	SE Proficiency Level III	SE Proficiency Level IV
Engineering Leadership	Technical Engineer / Project Team Member	Subsystem Lead	Project Systems Engineer	Program Systems Engineer or Center/Agency
Description of Role/ Responsibility	Performs fundamental and routine SE activities while supporting a Level II-IV systems engineer as a member of a project team	Performs SE activities for a subsystem or simple project (e.g. no more than two simple internal/external interfaces, simpler contracting processes, smaller team/budget, shorter duration)	Performs as a systems engineer for a complex project (e.g. several distinct subsystems or other defined services, capabilities, or products and their associated interfaces)	Oversees SE activities for a program with several systems and/or establishes SE policies at the Agency or Center level.
Level of Expertise (LEO)/ Competency to Attain Proficiency Level	Practitioners have obtained a working knowledge of technical integration, systems engineering (SE) and project management (PM) concepts and tools and performed tasks and activities to support and contribute to a project. They demonstrated an awareness and understanding of NASA's SE and PM tools, techniques, and lexicon. They have sufficient experience and responsibility and are prepared to contribute to fundamental and routine SE activities.	Practitioners participated in or led SE activities (e.g. requirements development, budget and schedule development, risk management). They demonstrated the application of SE/PM tools, techniques, and lexicon at the project subsystem level, including use of SE/PM best practices. They have sufficient experience and responsibility and are prepared to lead SE and technical integration activities for a subsystem or simple project.	Practitioners have taken a significant leadership role in multiple phases of a project life cycle managing both programmatic and technical aspects and/or managing all technical integration and SE functions for a subsystem or small project. They demonstrated the integration of SE/PM tools, techniques, and best practices across subsystems at the project level. They have sufficient experience and responsibility and are prepared for a technical leadership role in support of a major system or project	Practitioners will have contributed to Agency goals and be effective in managing programmatic, technical, and strategic interfaces both internal and external to the Agency. They demonstrated superior competencies in all Systems Engineering formulation and implementation activities. They have sufficient experience and responsibility and are prepared for a technical leadership role at the program, center, or agency level.
Validation of Levels	Practitioner's immediate supervisor	Center Peer Group and EDP panel	Center Peer Group and EDP panel	Center Peer Group, EDP and Agency-wide panels
Learning and Development emphasis	The emphasis at Level I is knowledge and understanding of technical integration, SE and basic project management.	The emphasis at Level II is leadership application and participation in SE.	The emphasis at Level III is the directing, structuring, and integration activities of SE.	The emphasis at Level IV is on the strategy for SE of large complex initiatives and the strategy and management of Agency initiatives.



Structure of the Systems Engineering Competency Framework

The SE Competencies are structured as follows:

- 1) **Competency Areas:** These describe, in broad terms, what is expected of Systems Engineer personnel in terms of particular components or functions of the job.
- 2) **Competencies:** These express the overall knowledge, skills, behaviors that SEs are expected to possess and/or perform as a part of their job.
- 3) **Competency Elements:** Each Competency Area and Competency consists of Competency Elements that describe the specific knowledge, skills, behaviors, which can be measured against established standards, can be improved via training and development activities, and correlate to performance on the job.
- 4) **Proficiency Level Descriptions:** These specify the knowledge/performance to be achieved in order to demonstrate successful mastery of the competency and are expressed in terms of levels.
- 5) **HQ courses, Center courses, OJL activities, Other learning activities, Assessment Guidelines:** These outline the required/suggested courses and activities to obtain proficiency in the competencies by level. The Assessment Guidelines indicate the evaluation and/or assessment of the competencies by level and are used as entry/exit criteria for each level of development.
- 6) **The Competency framework is hierarchical and the numbering scheme is as follows:**

Competency Area – #.0

Competency – #.# – the first number indicates the Competency Area the competency falls into, the second is the Competency number

Competency Element - #.#.# - the first and second numbers indicate the Competency Area and Competency, respectively, that the Element is related to, the third is the particular Element number



Competency Area: 1.0 Concepts and Architecture

Competency: 1.1 Mission Needs Statement

Competency Elements and Descriptions	Proficiency Level Descriptions			
	Level 1	Level 2	Level 3	Level 4
1.1.1 Mission Need a. Identify need b. Identify basis of need	Aware that projects start with users having an unsatisfied need	Able to (for a subsystem or simple project): <ul style="list-style-type: none"> Identify the users Distinguish between what the users want and what the users need 	Able to (for a system): <ul style="list-style-type: none"> Identify the users Distinguish between what the users want and what the users need 	Able to (for a program): <ul style="list-style-type: none"> Identify the users Distinguish between what the users want and what the users need
1.1.2 Current Situation a. Describe current situation b. Identify deficiencies of situation c. Identify what works in current situation	Contribute to definition of the current situation to include what does and doesn't work	Able to (for a subsystem or simple project) describe the current situation to include what does and doesn't work	Able to (for a system) describe the current situation to include: <ul style="list-style-type: none"> What does and doesn't work What has and hasn't worked in similar projects 	Able to (for a program) describe the current situation to include: <ul style="list-style-type: none"> What does and doesn't work What has and hasn't worked in similar programs
1.1.3 Mission Needs Statement Formulation a. Get agreement on problem definition b. Define desired outcomes c. Define success criteria d. Document Need	Contribute to preparation of the mission needs statement	Able to (for a subsystem or simple project): <ul style="list-style-type: none"> Create consensus regarding the problem definition Describe, identify or define desired outcomes and success criteria Write a mission needs statement 	Able to (for a system) create consensus regarding the problem definition Direct (for a system): <ul style="list-style-type: none"> Description, identification or definition of desired outcomes and success criteria Drafting of a mission needs statement 	Able to (for a program) create consensus regarding the problem definition Direct (for a program): <ul style="list-style-type: none"> Description, identification or definition of desired outcomes and success criteria Drafting of a mission needs statement
HQ courses				
Center courses				
OJL activities				
Other learning activities				
Assessment				



Competency Area: 1.0 Concepts and Architecture

Competency: 1.2 System Environments

Competency Elements and Descriptions	Proficiency Level Descriptions			
	Level 1	Level 2	Level 3	Level 4
1.2.1 System Environment Identification a. Identify constraints b. Identify expected system environment c. Analyze/quantify expected environment	Involved in identifying constraints and the expected system environment Able to analyze/quantify expected environment	Able to (for a subsystem or simple project): <ul style="list-style-type: none"> Identify constraints Identify expected system environment Analyze/quantify expected environment 	Direct (for a system): <ul style="list-style-type: none"> Identification of constraints Identification of expected system environment Analysis/quantification of expected environment 	Direct (for a program): <ul style="list-style-type: none"> Identification of constraints Identification of expected system environment Analysis/quantification of expected environment
1.2.2 Design Guidance a. Establish margin philosophy against the expected environment b. Establish design guidance for the expected environment	Understand the purpose of having a margin philosophy against the expected environment and how that leads to design guidance Apply provided design guidance	Apply (for a subsystem or simple project): <ul style="list-style-type: none"> Margin philosophy against the expected environment Design guidance 	Establish (for a system): <ul style="list-style-type: none"> Margin philosophy against the expected environment Design guidance 	Establish (for a program): <ul style="list-style-type: none"> Margin philosophy against the expected environment Design guidance Define Agency/Center design guidance policies
HQ courses				
Center courses				
OJL activities				
Other learning activities				
Assessment				



Competency Area: 1.0 Concepts and Architecture

Competency: 1.3 Trade Studies

Competency Elements and Descriptions	Proficiency Level Descriptions			
	Level 1	Level 2	Level 3	Level 4
1.3.1 Concept Definition a. Define scope options b. Define operations concept c. Define technical solution options	Contribute to definition of scope options Understand the need for an operations concept early in the project	Able to define (for a subsystem or simple project): <ul style="list-style-type: none"> • Scope options • Technical solution options Contribute to (for a subsystem or simple project) development of the operations concept	Direct (for a system): <ul style="list-style-type: none"> • Definition of scope options • Definition of technical solution options • Development of the operations concept 	Direct (for a program): <ul style="list-style-type: none"> • Definition of scope options • Definition of technical solution options • Development of the operations concept
1.3.2 System Model a. Create system model b. Validate system model c. Operate system model d. Correlate system model with operational data	Contribute to: <ul style="list-style-type: none"> • Creation of system model • Validation of system model • Correlation of system model with operational data Able to operate a system model	Able to (for a subsystem or simple project): <ul style="list-style-type: none"> • Create, validate, and operate a system model • Correlate a system model with operational data 	Direct (for a system): <ul style="list-style-type: none"> • Creation, validation, and operation a system model • Correlation of system model with operational data 	Direct (for a program): <ul style="list-style-type: none"> • Creation, validation, and operation a system model • Correlation of system model with operational data
1.3.3 System Performance a. Evaluate possible concepts b. Select technical solution	Contribute to: <ul style="list-style-type: none"> • Evaluation of possible concepts • Recommendation of a technical solution that balances technical and non technical features of the system 	Able to (for a subsystem or simple project): <ul style="list-style-type: none"> • Evaluate possible concepts • Recommend a technical solution that balances technical and non technical features of the system 	Direct (for a system): <ul style="list-style-type: none"> • Evaluation of possible concepts • Selection of a technical solution that balances technical and non technical features of the system 	Direct (for a program): <ul style="list-style-type: none"> • Evaluation of possible concepts • Selection of a technical solution that balances technical and non technical features of the system
HQ courses				
Center courses				
OJL activities				
Other learning activities				
Assessment				



Competency Area: 1.0 Concepts and Architecture

Competency: 1.4 System Architecture

Competency Elements and Descriptions	Proficiency Level Descriptions			
	Level 1	Level 2	Level 3	Level 4
1.4.1 Functional Analysis a. Establish system boundaries b. Define architecture functions c. Analyze architecture functional performance	Aware that overall architecture can be broken into functional segments Able to analyze functional performance of at least one segment of the architecture	Able to (for a subsystem or simple project): <ul style="list-style-type: none"> Identify system boundaries including external interfaces Segment an architecture into functions Analyze functional performance of multiple segments 	Direct (for a system): <ul style="list-style-type: none"> Identification of system boundaries including external interfaces Segmentation of an architecture into functions Functional analysis of all systems architecture segments 	Direct (for a program): <ul style="list-style-type: none"> Identification of system boundaries including external interfaces Segmentation of an architecture into functions Functional analysis of all systems architecture segments
1.4.2 Subsystem Mapping a. Map architecture functions to subsystems b. Define subsystem relationships c. Identify internal interfaces	Aware that architecture functions become subsystems Contribute to: <ul style="list-style-type: none"> Definition of subsystem relationships Identification of internal interfaces 	Able to define (for a subsystem or simple project): <ul style="list-style-type: none"> Subsystems from the architecture functions Subsystem relationships Internal interfaces 	Direct definition of (for a system): <ul style="list-style-type: none"> Subsystems from the architecture functions Subsystem relationships Internal interfaces 	Direct definition of (for a program): <ul style="list-style-type: none"> Subsystems from the architecture functions Subsystem relationships Internal interfaces
1.4.3 Systems Architecture Documentation a. Document the systems architecture	Contribute to documentation of systems architecture	Participate in documentation of the systems architecture	Able to (for a system) document systems architecture	Direct (for a program) documentation of systems architecture
HQ courses				
Center courses				
OJL activities				
Other learning activities				
Assessment				



Competency Area: 2.0 System Design				
Competency: 2.1 Stakeholder Expectation Definition & Management				
Competency Elements and Descriptions	Proficiency Level Descriptions			
	Level 1	Level 2	Level 3	Level 4
2.1.1 Stakeholder Identification a. Identify all stakeholders	Aware that stakeholders must be involved early in the project lifecycle	Able to (for a subsystem or simple project) identify project stakeholders	Able to (for a system) identify project stakeholders	Able to identify program stakeholders
2.1.2 Stakeholder Expectation Definition a. Elicit stakeholder expectations b. Define stakeholder expectation in acceptable statements c. Generate MOEs from stakeholder expectation statements	Contribute to: <ul style="list-style-type: none"> Translation of stakeholder expectations into acceptable statements Creation of MOEs from stakeholder expectation statements 	Contribute to (for a subsystem or simple project) obtaining stakeholder expectations Able to (for a subsystem or simple project): <ul style="list-style-type: none"> Translate stakeholder expectations into acceptable statements Create MOEs from stakeholder expectation statements 	Direct (for a system): <ul style="list-style-type: none"> Obtaining of stakeholder expectations Translation of stakeholder expectations into acceptable statements Creation of MOEs from stakeholder expectation statements 	Direct (for a program): <ul style="list-style-type: none"> Obtaining of stakeholder expectations Translation of stakeholder expectations into acceptable statements Creation of MOEs from stakeholder expectation statements
2.1.3 Stakeholder Expectation Validation a. Validate traceability of defined stakeholder expectation statements b. Obtain stakeholder buy-in of validated set of expectations c. Baseline stakeholder expectations	Contribute to: <ul style="list-style-type: none"> Validation of stakeholder expectations statements Baselining of stakeholder expectations Aware that stakeholder buy-in must be obtained	Able to (for a subsystem or simple project): <ul style="list-style-type: none"> Validate stakeholder expectations statements Baseline stakeholder expectations Contribute to (for a subsystem or simple project) obtaining stakeholder buy-in of validated expectations	Direct (for a system): <ul style="list-style-type: none"> Validation of stakeholder expectations statements Baselining of stakeholder expectations Able to (for a system) obtain stakeholder buy-in of validated expectations	Direct (for a program): <ul style="list-style-type: none"> Validation of stakeholder expectations statements Generation of baselined stakeholder expectations Able to (for a program) obtain stakeholder buy-in of validated expectations
2.1.4 Stakeholder Expectation Management a. Manage expectations of stakeholders	Aware that stakeholders expectations must be managed throughout the project lifecycle	Participate in management of stakeholders expectations throughout the project lifecycle	Able to (for a system) manage stakeholders expectations throughout the project lifecycle	Able to (for a program) manage stakeholders expectations throughout the project lifecycle Define Agency/Center stakeholder expectation management policies
HQ courses				
Center courses				
OJL activities				



ACADEMY OF PROGRAM/PROJECT & ENGINEERING LEADERSHIP

Other learning activities				
Assessment				



Competency Area: 2.0 System Design				
Competency: 2.2 Technical Requirements Definition				
Competency Elements and Descriptions	Proficiency Level Descriptions			
	Level 1	Level 2	Level 3	Level 4
2.2.1 Requirements Scope a. Analyze scope of the technical problem b. Define design and product constraints	Aware that <ul style="list-style-type: none"> Design cannot begin until technical scope has been defined Design and product constraints will impact the product 	Aware of technology developments Contribute to (for a subsystem or simple project) definition of: <ul style="list-style-type: none"> Technical problem scope Design and product constraints 	Aware of technology developments Able to define (for a system): <ul style="list-style-type: none"> Technical problem scope Design and product constraints 	Aware of technology developments Able to define: <ul style="list-style-type: none"> Technical problem scope (for a program) Design and product constraints (for Agency/Center)
2.2.2 Conversion from Expectations to Requirements a. Define functional and behavioral expectations in acceptable technical terms b. Define the performance requirements for each defined functional and behavioral expectation c. Define technical requirements in acceptable "shall" statements	Contribute to: <ul style="list-style-type: none"> Conversion of functional and behavioral expectations into technical terms with performance requirements Expression of technical requirements in an acceptable form 	Able to (for a subsystem or simple project): <ul style="list-style-type: none"> Convert functional and behavioral expectations into technical terms with performance requirements Express technical requirements in an acceptable form 	Direct (for a system): <ul style="list-style-type: none"> Conversion of functional and behavioral expectations into technical terms with performance requirements Expression of technical requirements in an acceptable form 	Direct (for a program): <ul style="list-style-type: none"> Conversion of functional and behavioral expectations into technical terms with performance requirements Expression of technical requirements in an acceptable form
2.2.3 Conversion from Requirements to Technical Performance Measures a. Define measures of performance (MOPs) for each measure of effectiveness (MOE) b. Define technical performance measures (TPMs)	Contribute to definition of MOPs and TPMs	Able to (for a subsystem or simple project) define MOPs and TPMs	Direct (for a system) definition of MOPs and TPMs	Direct (for a program) definition of MOPs and TPMs



ACADEMY OF PROGRAM/PROJECT & ENGINEERING LEADERSHIP

2.2.4 Requirements Documentation a. Validate the technical requirements b. Baseline technical requirements	Contribute to: <ul style="list-style-type: none"> Validation of requirements Development of specification doc. 	Able to (for a subsystem or simple project) validate requirements Contribute to (for a subsystem or simple project) development of specification doc.	Direct (for a system): <ul style="list-style-type: none"> Validation of requirements Development of specification doc. 	Direct (for a program): <ul style="list-style-type: none"> Validation of requirements Development of specification doc. Define Agency/Center technical requirements definition policies
HQ courses				
Center courses				
OJL activities				
Other learning activities				
Assessment				



Competency Area: 2.0 System Design				
Competency: 2.3 Logical Decomposition				
Competency Elements and Descriptions	Proficiency Level Descriptions			
	Level 1	Level 2	Level 3	Level 4
2.3.1 Requirements Flow a. Decompose requirements b. Allocate requirements c. Resolve derived requirements conflicts	Contribute to: <ul style="list-style-type: none"> Decomposition of requirements Allocation of requirements Identification and resolution of requirements conflicts 	Able to (for a subsystem or simple project): <ul style="list-style-type: none"> Decompose requirements Allocate requirements Identify and resolve requirements conflicts 	Direct (for a system): <ul style="list-style-type: none"> Decomposition of requirements Allocation of requirements Identification and resolution of requirements conflicts 	Direct (for a program): <ul style="list-style-type: none"> Decomposition of requirements Allocation of requirements Identification and resolution of requirements conflicts
2.3.2 Derived Requirements Documentation a. Validate derived requirements b. Baseline derived requirements	Contribute to: <ul style="list-style-type: none"> Validation of derived requirements Development of specification document 	Able to (for a subsystem or simple project): <ul style="list-style-type: none"> Validate derived requirements Develop specification document 	Direct (for a system): <ul style="list-style-type: none"> Validation of derived requirements Development of specification document 	Direct (for a program): <ul style="list-style-type: none"> Validation of derived requirements Development of specification document Define Agency/Center logical decomposition policies
HQ courses				
Center courses				
OJL activities				
Other learning activities				
Assessment				



Competency Area: 2.0 System Design				
Competency: 2.4 Design Solution Definition				
Competency Elements and Descriptions	Proficiency Level Descriptions			
	Level 1	Level 2	Level 3	Level 4
2.4.1 Alternative Designs a. Define alternative design solutions b. Analyze alternative design solutions c. Select best design solution alternative	Contribute to: <ul style="list-style-type: none"> Definition of alternative design solutions Evaluation of alternative design solutions Able to recommend best design solution	Able to (for a subsystem or simple project): <ul style="list-style-type: none"> Define alternative design solutions Evaluate alternative design solutions Recommend best design solution 	Direct (for a system): <ul style="list-style-type: none"> Definition of alternative design solutions Evaluation of alternative design solutions Able to (for a system) select best design solution	Direct (for a program): <ul style="list-style-type: none"> Definition of alternative design solutions Evaluation of alternative design solutions Able to (for a program) select best design solution
2.4.2 Design Solution Documentation a. Generate full design description b. Verify design solution c. Baseline selected design solution	Contribute to: <ul style="list-style-type: none"> Generation of full design description Verification of the design solution Baselining of selected design solution 	Able to (for a subsystem or simple project): <ul style="list-style-type: none"> Generate full design description Verify the design solution Baseline selected design solution 	Direct (for a system): <ul style="list-style-type: none"> Generation of full design description Verification of the design solution Baselining of selected design solution 	Direct (for a program): <ul style="list-style-type: none"> Generation of full design description Verification of the design solution Baselining of selected design solution Define Agency/Center design solution policies
HQ courses				
Center courses				
OJL activities				
Other learning activities				
Assessment				



Competency Area: 3.0 Product, Product Transition, Operations

Competency: 3.1 Product Implementation

Competency Elements and Descriptions	Proficiency Level Descriptions			
	Level 1	Level 2	Level 3	Level 4
3.1.1 Product Implementation Preparation a. Begin enabling product development or acquisition b. Begin development of next lower-level products c. Prepare product implementation strategy d. Review existing product configuration documentation	Aware that product implementation requires enabling products and lower level products Contribute to review of existing product configuration documentation	Contribute to (for a subsystem or simple project): <ul style="list-style-type: none"> Acquisition or development of enabling products Development of next lower-level products Readiness of existing product configuration documentation Development of the product implementation strategy 	Ensure (for a system): <ul style="list-style-type: none"> Acquisition or development of enabling products Development of next lower-level products Readiness of existing product configuration documentation Develop (for a system) the product implementation strategy	Ensure (for a program): <ul style="list-style-type: none"> Acquisition or development of enabling products Development of next lower-level products Readiness of existing product configuration documentation Direct (for a program) development of the product implementation strategy
3.1.2 Product Purchase a. Review product technical information b. Prepare vendor requests c. Assist product inspection d. Assess product validation status e. Assess enabling product status	Contribute to product purchase by: <ul style="list-style-type: none"> Reviewing product technical information Assisting product inspection Assessing product validation status Assessing enabling product status 	Able to (for a subsystem or simple project) provide SE participation in the product purchase: <ul style="list-style-type: none"> Review of product technical information Assess product validation status Assess enabling product status Contribute to (for a subsystem or simple project) SE participation in the product purchase: <ul style="list-style-type: none"> Preparation of vendor requests Product inspection 	Direct (for a system) SE participation in the product purchase: <ul style="list-style-type: none"> Review of product technical information Preparation of vendor requests Product inspection Assessment of product validation status Assessment of enabling product status 	Direct (for a program) SE participation in the product purchase: <ul style="list-style-type: none"> Review of product technical information Preparation of vendor requests Assisting product inspection Assessment of product validation status Assessment of enabling product status
3.1.3 Product Fabrication a. Evaluate readiness of implementation of enabling products	Contribute to product fabrication by: <ul style="list-style-type: none"> Enabling products status assessment Product fabrication monitoring 	Able to (for a subsystem or simple project) provide SE participation in product fabrication: <ul style="list-style-type: none"> Assess enabling products status 	Direct (for a system) SE participation in product fabrication: <ul style="list-style-type: none"> Assessment of enabling products status Monitoring product 	Direct (for a program) SE participation in product fabrication: <ul style="list-style-type: none"> Assessment of enabling products status Monitoring product



ACADEMY OF PROGRAM/PROJECT & ENGINEERING LEADERSHIP

<ul style="list-style-type: none"> b. Fabricate product c. Prepare support documentation 	<ul style="list-style-type: none"> • Support documentation preparation 	<ul style="list-style-type: none"> • Monitor product fabrication <p>Contribute to (for a subsystem or simple project) preparation of support documentation</p>	<p>fabrication</p> <ul style="list-style-type: none"> • Preparing support documentation 	<p>fabrication</p> <ul style="list-style-type: none"> • Preparing support documentation
<p>3.1.4 Product Reuse</p> <ul style="list-style-type: none"> a. Review product technical information b. Assess supporting documentation status c. Assess enabling product status d. Assist in requests to acquire the product from Government source e. Assist in product inspection 	<p>Contribute to acquiring the product for reuse by:</p> <ul style="list-style-type: none"> • Reviewing product technical information • Assessing status of supporting documentation and user manuals • Assessing enabling products status • Assisting in requests to acquire the product from Government sources • Assisting product inspection 	<p>Able to (for a subsystem or simple project) provide SE participation in acquiring the product for reuse by:</p> <ul style="list-style-type: none"> • Review of product technical information • Assessment of supporting documentation and user manuals status • Assessment of enabling products status • Assisting in requests to acquire the product from Government sources • Product inspection 	<p>Direct (for a system) SE participation in acquiring the product for reuse by:</p> <ul style="list-style-type: none"> • Review of product technical information • Assessment of supporting documentation and user manuals status • Assessment of enabling products status • Assisting in requests to acquire the product from Government sources • Product inspection 	<p>Direct (for a program) SE participation in acquiring the product for reuse by:</p> <ul style="list-style-type: none"> • Review of product technical information • Assessment of supporting documentation and user manuals status • Assessment of enabling products status • Assisting in requests to acquire the product from Government sources • Assisting product inspection
<p>3.1.5 Product Implementation Documentation</p> <ul style="list-style-type: none"> a. Capture product implementation work products 	<p>Contribute to capture of work products from product implementation activities</p>	<p>Participate in capture of work products from product implementation activities</p>	<p>Direct (for a system) capture of work products from product implementation activities</p>	<p>Direct (for a program) capture of work products from product implementation activities</p> <p>Define Agency/Center product implementation policies</p>
HQ courses				
Center courses				
OJL activities				
Other learning activities				
Assessment				



Competency Area: 3.0 Product, Product Transition, Operations

Competency: 3.2 Product Integration

Competency Elements and Descriptions	Proficiency Level Descriptions			
	Level 1	Level 2	Level 3	Level 4
3.2.1 Product Integration Preparation a. Prepare product integration strategy b. Review existing product configuration documentation	Understand integration preparation	Contribute to (for a subsystem or simple project) development of: <ul style="list-style-type: none"> Product integration strategy Detailed planning for integration Integration sequence and procedures Ensure (for a subsystem or simple project) existing product configuration documentation will permit product integration	Develop (for a system) the product integration strategy Direct (for a system) development of: <ul style="list-style-type: none"> Detailed planning for integration Integration sequence and procedures Ensure (for a system) existing product configuration documentation will permit product integration	Direct (for a program) development of: <ul style="list-style-type: none"> Product integration strategy Detailed planning for integration Integration sequence and procedures Ensure (for a program) existing product configuration documentation will permit product integration
3.2.2 Lower Level Product Procurement a. Obtain lower level products b. Confirm received products have been validated	Aware that lower level products must be obtained and validated	Ensure (for a subsystem or simple project) lower level products are in place and have been validated	Ensure (for a system) lower level products are in place and have been validated	Ensure (for a program) lower level products are in place and have been validated
3.2.3 Product Assembly a. Prepare integration environment b. Assemble and integrate the received products	Aware of process to prepare integration environment Contribute to assembly and integration	Ensure (for a subsystem or simple project) readiness of: <ul style="list-style-type: none"> Product integration enabling products Product integration workforce Participate in (for a subsystem or simple project) assembly and integration of received products	Ensure (for a system) readiness of: <ul style="list-style-type: none"> Product integration enabling products Product integration workforce Direct (for a system) assembly and integration of received products	Ensure (for a program) readiness of: <ul style="list-style-type: none"> Product integration enabling products Product integration workforce Direct (for a program) assembly and integration of received products
3.2.4 Product Integration Documentation a. Prepare product support documentation b. Capture product integration work	Contribute to capture of work products and related information from product integration activities	Participate in capture of work products and related information from product integration activities	Direct (for a system) capture of work products and related information from product integration activities	Direct (for a program) capture of work products and related information from product integration activities Define Agency/Center product integration policies



ACADEMY OF PROGRAM/PROJECT & ENGINEERING LEADERSHIP

products				
HQ courses				
Center courses				
OJL activities				
Other learning activities				
Assessment				



Competency Area: 3.0 Product, Product Transition, Operations

Competency: 3.3 Product Verification

Competency Elements and Descriptions	Proficiency Level Descriptions			
	Level 1	Level 2	Level 3	Level 4
3.3.1 Product Verification Preparation a. Prepare to conduct product verification	Aware of steps to prepare for product verification	Review (for a subsystem or simple project) product verification plan Contribute to (for a subsystem or simple project): <ul style="list-style-type: none"> Obtaining product verification enabling products Obtaining specification and configuration baseline against which the verification is to be made Readiness of verification environment 	Review (for a system) product verification plan Ensure (for a system): <ul style="list-style-type: none"> Product verification enabling products are obtained Specification and configuration baseline against which the verification is to be made are obtained Readiness of verification environment 	Review (for a program) product verification plan Ensure (for a program): <ul style="list-style-type: none"> Product verification enabling products are obtained Specification and configuration baseline against which the verification is to be made are obtained Readiness of verification environment
3.3.2 Product Verification Execution a. Perform product verification b. Analyze product verification outcomes	Contribute to: <ul style="list-style-type: none"> Product verification Analysis of product verification outcomes Able to: <ul style="list-style-type: none"> Identify verification anomalies or conformance 	Participate in (for a subsystem or simple project): <ul style="list-style-type: none"> Product verification Analysis of product verification outcomes Identification of anomalies and corrective action recommendations Establish (for a subsystem or simple project): product conformance	Direct (for a system): <ul style="list-style-type: none"> Product verification Analysis of product verification outcomes Identification of anomalies and corrective action recommendations Able to (for a system): <ul style="list-style-type: none"> Establish product conformance or Select corrective action 	Direct (for a program): <ul style="list-style-type: none"> Product verification Analysis of product verification outcomes Identification of anomalies and corrective action recommendations Able to (for a system): <ul style="list-style-type: none"> Establish product conformance or Select corrective action
3.3.3 Product Verification Documentation a. Prepare product verification report b. Capture product verification work products	Contribute to: <ul style="list-style-type: none"> Preparation of product verification report Capture of work products and related information from product verification activities 	Participate in: <ul style="list-style-type: none"> Preparation of product verification report Capture of work products and related information from product verification activities 	Direct (for a system): <ul style="list-style-type: none"> Preparation of product verification report Capture of work products and related information from product verification activities 	Direct (for a program): <ul style="list-style-type: none"> Preparation of product verification report Capture of work products and related information from product verification activities Define Agency/Center product verification policies
HQ courses				
Center courses				



ACADEMY OF PROGRAM/PROJECT & ENGINEERING LEADERSHIP

OJL activities				
Other learning activities				
Assessment				



Competency Area: 3.0 Product, Product Transition, Operations

Competency: 3.4 Product Validation

Competency Elements and Descriptions	Proficiency Level Descriptions			
	Level 1	Level 2	Level 3	Level 4
3.4.1 Product Validation Preparation a. Prepare to conduct product validation	Aware of steps to prepare for product validation	Review (for a subsystem or simple project) product validation plan Contribute to (for a subsystem or simple project): <ul style="list-style-type: none"> Obtaining product validation enabling products Getting the end product to be validated in place Obtaining stakeholder expectations baseline against which the validation is to be made Readiness of validation environment 	Review (for a system) product validation plan Ensure (for a system): <ul style="list-style-type: none"> Product validation enabling products are obtained Getting the end product to be validated in place Stakeholder expectations baseline against which the validation is to be made is obtained Readiness of validation environment 	Review (for a program) product validation plan Ensure (for a program): <ul style="list-style-type: none"> Product validation enabling products are obtained Getting the end product to be validated in place Stakeholder expectations baseline against which the validation is to be made is obtained Readiness of validation environment
3.4.2 Product Validation Execution a. Perform product validation b. Analyze product validation outcomes	Contribute to: <ul style="list-style-type: none"> Execution of product validation Analysis of product validation outcomes Able to: <ul style="list-style-type: none"> Identify validation anomalies or conformance 	Participate in (for a subsystem or simple project): <ul style="list-style-type: none"> Product validation Analysis of product validation outcomes Identification of anomalies and corrective action recommendations Establish (for a subsystem or simple project): product conformance	Direct (for a system): <ul style="list-style-type: none"> Product validation Analysis of product validation outcomes Identification of anomalies and corrective action recommendations Able to (for a system): <ul style="list-style-type: none"> Establish product conformance or Select corrective action 	Direct (for a program): <ul style="list-style-type: none"> Product validation Analysis of product validation outcomes Identification of anomalies and corrective action recommendations Able to (for a system): <ul style="list-style-type: none"> Establish product conformance or Select corrective action
3.4.3 Product Validation Documentation a. Prepare product validation report b. Capture product validation work products	Contribute to: <ul style="list-style-type: none"> Preparation of product validation report Capture of work products and related information from product validation activities 	Participate in: <ul style="list-style-type: none"> Preparation of product validation report Capture of work products and related information from product validation activities 	Direct (for a system): <ul style="list-style-type: none"> Preparation of product validation report Capture of work products and related information from product validation activities 	Direct (for a program): <ul style="list-style-type: none"> Preparation of product validation report Capture of work products and related information from product validation activities Define Agency/Center product validation policies
HQ courses				



ACADEMY OF PROGRAM/PROJECT & ENGINEERING LEADERSHIP

Center courses				
OJL activities				
Other learning activities				
Assessment				



Competency Area: 3.0 Product, Product Transition, Operations

Competency: 3.5 Product Transition

Competency Elements and Descriptions	Proficiency Level Descriptions			
	Level 1	Level 2	Level 3	Level 4
3.5.1 Product Transition Preparation a. Determine type of product transition b. Identify special transition procedures and enabling product needs c. Prepare end product for transition	Aware of steps to prepare for product transition	Participate in (for a subsystem or simple project) preparing: <ul style="list-style-type: none"> • Documentation that will accompany the product • Product transition procedures • Personnel availability and skills • Packaging material, handling equipment, storage facilities, and shipping services Oversee (for a subsystem or simple project) packaging, storing, moving end product to shipping location	Develop (for a system) product transition strategy Ensure (for a system) the readiness of: <ul style="list-style-type: none"> • Documentation that will accompany the product • Product transition procedures • Personnel availability and skills • Packaging material, handling equipment, storage facilities, and shipping services Oversee (for a system) packaging, storing, moving end product to shipping location	Direct (for a program) development of product transition strategy Ensure (for a program) the readiness of: <ul style="list-style-type: none"> • Documentation that will accompany the product • Product transition procedures • Personnel availability and skills • Packaging material, handling equipment, storage facilities, and shipping services Oversee (for a program) packaging, storing, moving end product to shipping location
3.5.2 Product Transition Execution a. Transition product to end user b. Prepare sites for end product	Aware that product transition can be to the next higher level for integration or to end user	Ensure (for a subsystem or simple project): <ul style="list-style-type: none"> • End product and its documentation transition to customer • Receiving sites are ready for end product 	Ensure (for a system): <ul style="list-style-type: none"> • End product and its documentation transition to customer • Receiving sites are ready for end product 	Ensure (for a program): <ul style="list-style-type: none"> • End product and its documentation transition to customer • Receiving sites are ready for end product
3.5.3 Product Transition Documentation a. Capture product transition work products	Contribute to capture of work products and related information from product transition activities	Participate in capture of work products and related information from product transition activities	Direct (for a system) capture of work products and related information from product transition activities	Direct (for a program) capture of work products and related information from product transition activities Define Agency/Center product transition policies
HQ courses				
Center courses				
OJL activities				
Other learning activities				



Assessment				
------------	--	--	--	--



Competency Area: 3.0 Product, Product Transition, Operations

Competency: 3.6 Operations

Competency Elements and Descriptions	Proficiency Level Descriptions			
	Level 1	Level 2	Level 3	Level 4
3.6.1 Operations Planning a. Develop operations plan	Contribute to development of the operations plan	Participate in development of the operations plan	Direct (for a system) development of the operations plan	Direct (for a program) development of the operations plan
3.6.2 Operations Execution a. Manage Operations	Contribute to operation of the product	Participate in (for a subsystem or simple project) operation of the product	Participate in (for a system) operation of the product	Participate in (for a program) operation of the product
HQ courses				
Center courses				
OJL activities				
Other learning activities				
Assessment				



Competency Area: 4.0 Technical Management

Competency: 4.1 Technical Planning

Competency Elements and Descriptions	Proficiency Level Descriptions			
	Level 1	Level 2	Level 3	Level 4
4.1.1 Technical Planning Preparation a. Prepare a planning strategy for common technical processes b. Define technical work to be done c. Schedule, organize and cost the technical work	Aware that common technical processes need to be planned Contribute to technical planning by providing inputs as requested	Participate in (for a subsystem or simple project): <ul style="list-style-type: none"> Collection of information for technical planning Definition of technical work to be done Schedule, organize and cost the technical work 	Develop (for a system) or update planning strategies for common technical processes Able to (for a system): <ul style="list-style-type: none"> Collect information for technical planning Define technical work to be done Schedule, organize and cost the technical work 	Develop (for a program) or update planning strategies for common technical processes Direct (for a program): <ul style="list-style-type: none"> Collection of information for technical planning Definition of technical work to be done Schedule, organize and cost the technical work
4.1.2 Technical Plans Development a. Prepare Systems Engineering Management Plan (SEMP) b. Prepare product verification plan c. Prepare product validation plan d. Prepare other technical plans as needed e. Obtain stakeholder buy-in to the technical plans	Contribute to development of technical plans Aware that stakeholders can't be ignored during technical planning	Participate in (for a subsystem or simple project) development of formal technical plans (i.e. SEMF, Product Verification Plan, Product Validation Plan, etc) Able to (for a subsystem or simple project) obtain stakeholder agreements with the technical plans	Direct (for a system) development of formal technical plans (i.e. SEMF, Product Verification Plan, Product Validation Plan, etc) Able to (for a system) obtain stakeholder agreements with the technical plans	Direct (for a program) development of formal technical plans (i.e. SEMF, Product Verification Plan, Product Validation Plan, etc) Able to (for a program) obtain stakeholder agreements with the technical plans
4.1.3 Technical Work Directives a. Issue authorized technical work directives	Able to follow technical work directives	Participate in (for a subsystem or simple project) development of technical work directives	Develop (for a system) technical work directives	Direct (for a program) development of technical work directives
4.1.4 Technical Planning Documentation a. Capture technical planning work products	Contribute to capture of work products and related information from technical planning activities	Participate in capture of work products and related information from technical planning activities	Direct (for a system) capture of work products and related information from technical planning activities	Direct (for a program) capture of work products and related information from technical planning activities Define Agency/Center technical planning policies



ACADEMY OF PROGRAM/PROJECT & ENGINEERING LEADERSHIP

HQ courses				
Center courses				
OJL activities				
Other learning activities				
Assessment				



Competency Area: 4.0 Technical Management				
Competency: 4.2 Requirements Management				
Competency Elements and Descriptions	Proficiency Level Descriptions			
	Level 1	Level 2	Level 3	Level 4
4.2.1 Requirements Management Preparation a. Prepare strategies for requirements management	Aware of activities to prepare for requirements management	Contribute to (for a subsystem or simple project) strategies for requirements management	Develop (for a system) strategies for requirements management	Develop (for a program) strategies for requirements management
4.2.2 Requirements Management Execution a. Document expectations and requirements in proper format b. Confirm requirements baseline has been validated c. Identify and propose changes to out-of-tolerance technical parameters	Contribute to collection of requirements for documenting Able to review requirement statements to ensure compliance with guidelines	Participate in (for a subsystem or simple project): <ul style="list-style-type: none"> Documenting requirements in the proper format Validating the requirements baseline Able to (for a subsystem or simple project) identify and propose changes to out-of-tolerance technical parameters	Ensure (for a system): <ul style="list-style-type: none"> Requirements are documented in proper format Requirements baseline is validated Identification of out-of-tolerance technical parameters Approve (for a system) changes to out-of-tolerance technical parameters	Ensure (for a program): <ul style="list-style-type: none"> Requirements are documented in proper format Requirements baseline is validated Identification of out-of-tolerance technical parameters Approve (for a program) changes to out-of-tolerance technical parameters
4.2.3 Expectation/Requirements Traceability a. Track expectations and requirements between baselines b. Establish and maintain requirements compliance matrices	Contribute to: <ul style="list-style-type: none"> Development and maintenance of compliance matrices 	Able to (for a simple project or subsystem) track between baselines Participate in development and maintenance of compliance matrices	Able to (for a system): <ul style="list-style-type: none"> Track between baselines Develop and maintain compliance matrices 	Direct (for a program): <ul style="list-style-type: none"> Tracking between baselines Development and maintenance of compliance matrices
4.2.4 Expectation/Requirements Change Management a. Review engineering change proposals (ECPs) b. Implement formal change procedures c. Disseminate approved changes	Able to review ECPs	Contribute to (for a subsystem or simple project): <ul style="list-style-type: none"> Review ECPs and provide recommendations Disseminate approved changes 	Direct (for a system): <ul style="list-style-type: none"> Review ECPs and provide recommendations Implementation of change procedures Dissemination of approved changes 	Direct (for a program): <ul style="list-style-type: none"> Review ECPs and provide recommendations Implementation of change procedures Disseminate approved changes



ACADEMY OF PROGRAM/PROJECT & ENGINEERING LEADERSHIP

4.2.5 Requirement Management Documentation a. Capture requirement management work products	Contribute to capture of work products from requirements management activities	Participate in capture of work products from requirements management activities	Direct (for a system) capture of work products from requirements management activities	Direct (for a program) capture of work products from requirements management activities Define Agency/Center requirements management policies
HQ courses				
Center courses				
OJL activities				
Other learning activities				
Assessment				



Competency Area: 4.0 Technical Management

Competency: 4.3 Interface Management

Competency Elements and Descriptions	Proficiency Level Descriptions			
	Level 1	Level 2	Level 3	Level 4
4.3.1 Interface Management Preparation a. Prepare procedures for interface management	Aware of activities to prepare for interface management	Contribute to (for a subsystem or simple project) development of procedures for interface management	Develop (for a system) procedures for interface management	Direct (for a program) development of procedures for interface management
4.3.2 Interface Management During System Design a. Integrate interface and requirements management activities b. Identify interfaces not in the stakeholder set of expectations c. Document interfaces as system structure emerges d. Document origin, destination, stimulus, and special characteristics of interfaces e. Maintain the design solution for internal interfaces f. Maintain horizontal traceability across interfaces g. Confirm ICDs validated with parties on both sides of interface	Contribute to interface management during system design	Participate in interface management during system design	Direct (for a system) interface management during system design	Direct (for a program) interface management during system design
4.3.3 Interface Management During Product Integration a. Review product integration procedures b. Identify interface discrepancies c. Confirm a pre-check is	Contribute to interface management during product integration	Participate in interface management during product integration	Direct (for a system) interface management during product integration	Direct (for a program) interface management during product integration



<ul style="list-style-type: none"> completed on all physical interfaces d. Evaluate assembled products for interface compatibility e. Confirm product V/V plans include confirming interfaces f. Prepare and interface evaluation report 				
<p>4.3.4 Interface Control Execution</p> <ul style="list-style-type: none"> a. Manage interface changes with the system structure b. Identify and track changes to interface documentation c. Confirm interface issues are analyzed and resolved when a change affects products on both sides of the interface d. Control traceability of interface changes e. Disseminate approved interface change information 	<p>Contribute to interface control activities</p>	<p>Participate in interface control activities</p>	<p>Direct (for a system) interface control activities</p>	<p>Direct (for a program) interface control activities</p>
<p>4.3.5 Interface Management Documentation</p> <ul style="list-style-type: none"> a. Capture interface management work products 	<p>Contribute to capture of work products from interface management activities</p>	<p>Participate capture of work products from interface management activities</p>	<p>Direct (for a system) capture of work products from interface management activities</p>	<p>Direct (for a program) capture of work products from interface management activities</p> <p>Define Agency/Center interface management policies</p>
HQ courses				
Center courses				
OJL activities				
Other learning activities				
Assessment				



Competency Area: 4.0 Technical Management				
Competency: 4.4 Technical Risk Management				
Competency Elements and Descriptions	Proficiency Level Descriptions			
	Level 1	Level 2	Level 3	Level 4
4.4.1 Technical Risk Management Preparation a. Prepare strategies to conduct technical risk management	Aware of activities to prepare for technical risk management	Contribute to development of strategies to conduct technical risk management	Develop (for a system) strategies to conduct technical risk management	Direct (for a program) development of strategies to conduct technical risk management
4.4.2 Technical Risk Identification and Assessment a. Identify risks b. Coordinate with stakeholders c. Analyze risks for severity of consequences and likelihood of occurrence	Contribute to: <ul style="list-style-type: none"> • Identification of risk • Risk analysis 	Participate in (for a subsystem or simple project): <ul style="list-style-type: none"> • Identification of risk • Stakeholder coordination Able to perform risk analysis	Able to (for a system) conduct: <ul style="list-style-type: none"> • Risk identification • Stakeholder coordination Direct risk analysis	Direct (for a program): <ul style="list-style-type: none"> • Identification of risk • Stakeholder coordination • Risk analysis
4.4.3 Technical Risk Mitigation a. Prepare for technical risk mitigation b. Monitor status of each technical risk c. Implement technical risk mitigation and contingency action plans as triggered	Contribute to: <ul style="list-style-type: none"> • Risk monitoring • Development of risk mitigation/contingency action plans • Implementation of plans 	Able to recommend risks for mitigation Participate in: <ul style="list-style-type: none"> • Development of risk mitigation/contingency action plans • Plan implementation 	Able to (for a system) select risks for mitigation Direct (for a system): <ul style="list-style-type: none"> • Development of risk mitigation/contingency action plans • Plan implementation 	Able to (for a program) select risks for mitigation Direct (for a program): <ul style="list-style-type: none"> • Development of risk mitigation/contingency action plans • Plan implementation
4.4.4 Technical Risk Documentation a. Capture technical risk management work products	Contribute to capture of work products from technical risk management activities	Participate in capture of work products from technical risk management activities	Direct (for a system) capture of work products from technical risk management activities	Direct (for a program) capture of work products from technical risk management activities Define Agency/Center technical risk management policies
HQ courses				
Center courses				



ACADEMY OF PROGRAM/PROJECT & ENGINEERING LEADERSHIP

OJL activities				
Other learning activities				
Assessment				



Competency Area: 4.0 Technical Management

Competency: 4.5 Configuration Management

Competency Elements and Descriptions	Proficiency Level Descriptions			
	Level 1	Level 2	Level 3	Level 4
4.5.1 Configuration Management Preparation a. Prepare strategies to conduct configuration management	Aware of activities to prepare for configuration management	Participate in (for a subsystem or simple project) development of strategies to conduct configuration management	Develop (for a system) strategies to conduct configuration management	Direct (for a program) development of strategies to conduct configuration management
4.5.2 Configuration Control Baseline a. Identify configuration control items b. Establish baseline for each configuration item	Aware of activities to baseline a configuration	Contribute to (for a subsystem or simple project) SE participation in configuration control baseline: <ul style="list-style-type: none"> • Identify items to control • Establish baseline 	Able to (for a system): <ul style="list-style-type: none"> • Identify items to be place under configuration control • Establish baseline 	Direct (for a program) SE participation in configuration control baseline: <ul style="list-style-type: none"> • Identify items to control • Establish baseline
4.5.3 Configuration Control Management a. Establish configuration change process b. Implement configuration change process	Aware of configuration change control	Contribute to (for a subsystem or simple project) configuration change control	Contribute to (for a system) configuration change control	Contribute to (for a program) configuration change control
4.5.4 Configuration Documentation Status a. Maintain configuration item description records b. Maintain change records c. Maintain differences between baselines	Aware of content of configuration control	Contribute to (for a subsystem or simple project) identification of content for configuration control	Able to (for a system) identify content of configuration control	Able to (for a program) identify content of configuration control
4.5.5 Configuration Audits a. Audit baselines b. Identify risks caused by poor configuration control c. Track action items to correct anomalies	Contribute to configuration audits	Participate in configuration audits	Direct (for a system) SE participation in configuration audits	Direct (for a program) SE participation in configuration audits
4.5.6 Configuration	Contribute to capture of work	Participate capture of work	Direct (for a system) capture of work	Direct (for a program) capture



ACADEMY OF PROGRAM/PROJECT & ENGINEERING LEADERSHIP

Management Documentation a. Capture configuration management work products	products from configuration management activities	products from configuration management activities	work products from configuration management activities	of work products from configuration management activities Define Agency/Center configuration management policies
HQ courses				
Center courses				
OJL activities				
Other learning activities				
Assessment				



Competency Area: 4.0 Technical Management

Competency: 4.6 Technical Data Management

Competency Elements and Descriptions	Proficiency Level Descriptions			
	Level 1	Level 2	Level 3	Level 4
4.6.1 Technical Data Management Preparation a. Prepare strategies to conduct technical data management	Aware of activities to prepare for technical data management	Contribute to (for a subsystem or simple project) strategies to conduct technical data management	Develop (for a system) strategies to conduct technical data management	Direct (for a program) development of strategies to conduct technical data management
4.6.2 Technical Data Collection and Storage a. Collect and store technical data b. Record and distribute lessons learned c. Perform technical data integrity checks	Provide: <ul style="list-style-type: none"> Data for storage Lessons learned 	Provide (for a subsystem or simple project): <ul style="list-style-type: none"> Data for storage Lessons learned 	Direct (for a system): <ul style="list-style-type: none"> Data for storage Development of lessons learned 	Direct (for a program): <ul style="list-style-type: none"> Data for storage Development of lessons learned
4.6.3 Technical Data Maintenance a. Manage the databases b. Perform technical data maintenance c. Protect stored data	Aware of measures to protect technical data	Aware of measures to protect technical data	Ensure (for a system) measures to protect technical data	Ensure (for a program) measures to protect technical data
4.6.4 Technical Data Access a. Maintain an information library b. Process requests for technical data c. Confirm that electronic access rules are followed d. Provide proof of correctness, reliability and security of technical data	Aware of procedures to access technical data	Contribute to (for a subsystem or simple project) development of procedures to access technical data	Direct (for a system) development of procedures to access technical data	Direct (for a program) development of procedures to access technical data Define Agency/Center technical data management policies
HQ courses				



ACADEMY OF PROGRAM/PROJECT & ENGINEERING LEADERSHIP

Center courses				
OJL activities				
Other learning activities				
Assessment				



Competency Area: 4.0 Technical Management

Competency: 4.7 Technical Assessment

Competency Elements and Descriptions	Proficiency Level Descriptions			
	Level 1	Level 2	Level 3	Level 4
4.7.1 Technical Assessment Preparation a. Prepare strategies for conducting technical assessments	Aware of activities to prepare for technical assessments	Contribute to (for a subsystem or simple project) strategies to conduct technical assessments	Develop (for a system) strategies to conduct technical assessments	Direct (for a program) development of strategies to conduct technical assessments
4.7.2 Technical Work Productivity Assessment a. Identify, collect, and analyze process measures b. Monitor technical data management against plans	Aware of technical work productivity assessment	Able to (for a subsystem or simple project): <ul style="list-style-type: none"> Identify process measures Monitor progress against plans 	Direct (for a system) identification of process measures Monitor (for a system) progress against plans	Direct (for a program) identification of process measures Monitor (for a program) progress against plans
4.7.3 Technical Product Quality Assessment a. Identify, collect, and analyze the degree of technical requirement and technical performance measures satisfaction b. Determine any variances from expected values of product performance	Aware of quality assessment measures against technical requirements	Participate in (for a subsystem or simple project) determination of: <ul style="list-style-type: none"> Degree to which product satisfies requirements Product performance variances and recommend corrective action 	Direct (for a system) determination of: <ul style="list-style-type: none"> Degree to which product satisfies requirements Product performance variances Able to select corrective action	Direct (for a program) determination of: <ul style="list-style-type: none"> Degree to which product satisfies requirements Product performance variances Able to select corrective action
4.7.4 Technical Reviews a. Identify the type of technical reviews b. Determine progress toward satisfying entry criteria c. Establish make up of the review team d. Prepare the review	Aware of review types and their purposes Contribute to: <ul style="list-style-type: none"> Review material preparation Identification and resolution of action items 	Able to (for a simple project or subsystem) identify type and when a technical review is needed Contribute to (for a subsystem or simple project): <ul style="list-style-type: none"> Review material preparation Action item identification and resolution 	Able to (for a system) identify type and when a technical review is needed Direct (for a system): <ul style="list-style-type: none"> Review material preparation Action item identification and resolution Able to chair variety of	Able to (for a program) identify type and when a technical review is needed Direct (for a program): <ul style="list-style-type: none"> Review material preparation Action item identification and resolution Able to chair variety of review



ACADEMY OF PROGRAM/PROJECT & ENGINEERING LEADERSHIP

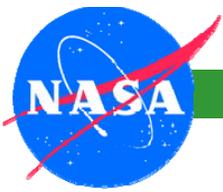
presentation materials e. Identify and resolve action items			technical review boards (e.g. PDR, CDR, TRR)	boards for other projects (e.g. PNAR, NAR)
4.7.5 Technical Assessment Documentation a. Capture technical assessment work products	Contribute to capture of work products from technical assessment activities	Participate in capture of work products from technical assessment activities	Direct (for a system) capture of work products from technical assessment activities	Direct (for a program) capture of work products from technical assessment activities Define Agency/Center technical assessment policies
HQ courses				
Center courses				
OJL activities				
Other learning activities				
Assessment				



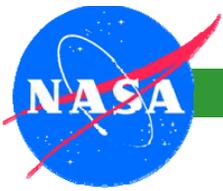
Competency Area: 4.0 Technical Management

Competency: 4.8 Technical Decision Analysis

Competency Elements and Descriptions	Proficiency Level Descriptions			
	Level 1	Level 2	Level 3	Level 4
4.8.1 Decision Analysis Preparation a. Establish guidelines for when and how to use a formal decision making process	Apply decision making guidelines	Contribute to (for a simple project or subsystem) guidelines for: <ul style="list-style-type: none"> When to use formal decision making Who will make decisions 	Develop (for a system) guidelines for: <ul style="list-style-type: none"> When to use formal decision making Who will make decisions 	Direct (for a program) development of guidelines for: <ul style="list-style-type: none"> When to use formal decision making Who will make decisions
4.8.2 Criteria Definition a. Define types of criteria to include b. Define acceptable range and scale of criteria c. Rank each criterion by importance	Contribute to criteria definition	Participate in establishing criteria definition: <ul style="list-style-type: none"> Types and ranges Rank criteria 	Establish (for a system) criteria definition: <ul style="list-style-type: none"> Types and ranges Rank criteria 	Direct (for a program) establishment of criteria definition: <ul style="list-style-type: none"> Types and ranges Rank criteria
4.8.3 Decision Alternatives a. Select evaluation methods and tools/techniques b. Identify and evaluate alternative solutions c. Select recommended solutions	Contribute to identification and evaluation of alternatives Able to: <ul style="list-style-type: none"> Recommend evaluation method Recommend solution 	Able to: <ul style="list-style-type: none"> Recommend evaluation method Identify and evaluate alternatives Recommend a solution 	Able to (for a system) select: <ul style="list-style-type: none"> Evaluation method Solution Direct (for a system) identification and evaluation of alternatives	Able to (for a program) select: <ul style="list-style-type: none"> Evaluation method Solution Direct (for a program) identification and evaluation of alternatives
4.8.4 Decision Analysis Documentation a. Capture decision analysis work products	Contribute to capture of work products from decision analysis activities	Participate in capture of work products from decision analysis activities	Direct (for a system) capture of work products from decision analysis activities	Direct (for a program) capture of work products from decision analysis activities Define Agency/Center decision analysis policies
HQ courses				
Center courses				
OJL activities				
Other learning activities				
Assessment				



Competency Area: 5.0 Project Management and Control				
Competency: 5.1 Acquisition Strategies and Procurement				
Competency Elements and Descriptions	Proficiency Level Descriptions			
	Level 1	Level 2	Level 3	Level 4
5.1.1 Acquisition Strategies a. Identify technical inputs for acquisition strategies b. Develop acquisition strategies	Contribute to acquisition strategy technical inputs	Participate in acquisition strategy development	Direct (for a system) effort to provide acquisition strategy technical inputs Contribute to (for a system) acquisition strategy development	Direct (for a program) effort to provide acquisition strategy technical inputs Contribute to (for a very large, complex project) acquisition strategy development
5.1.2 Procurement a. Write technical proposals b. Review and evaluate technical proposals c. Execute acquisition instruments d. Manage acquisition instruments	Contribute to technical proposal writing and evaluation Aware of execution and management of acquisition instruments	Participate in technical proposal writing and evaluation Contribute to execution and management of acquisition instruments	Direct (for a system) technical proposal writing and evaluation Participate in (for a system) execution and management of acquisition instruments	Direct (for a program) technical proposal writing and evaluation Participate in (for a program) execution and management of acquisition instruments
HQ courses				
Center courses				
OJL activities				
Other learning activities				
Assessment				



Competency Area: 5.0 Project Management and Control				
Competency: 5.2 Resource Management				
Competency Elements and Descriptions	Proficiency Level Descriptions			
	Level 1	Level 2	Level 3	Level 4
5.2.1 Resource Margin Determination a. Identify resources to be allocated and tracked b. Provide resource estimates to include cost, schedule, and labor c. Define acceptable resource margins d. Allocate resources among subsystems	Aware of margins and how they are used to manage the project	Identify (for a subsystem or simple project) resources to track Contribute to (for a subsystem or simple project) development of resource estimates and margins down to subsystem level	Identify (for a system) resources to track Direct (for a system) development of resource estimates and margins down to subsystem level	Identify (for a program) resources to track Direct (for a program) development of resource estimates and margins down to subsystem level
5.2.2 Resource Tracking a. Implement earned value for systems engineering tasks b. Monitor resources and margins and re-allocate as required c. Provide status relative to cost, schedule, and technical progress	Contribute to resource tracking: <ul style="list-style-type: none"> Monitor assigned resources and margins using tools as appropriate Provide resource status inputs 	Participate in resource tracking: <ul style="list-style-type: none"> Monitor resources and margins using tools as appropriate Provide resource status 	Manage (for a system) resource tracking: <ul style="list-style-type: none"> Monitor resources and margins using tools as appropriate Provide resource status 	Manage (for a program) resource tracking: <ul style="list-style-type: none"> Monitor resources and margins using tools as appropriate Provide resource status
HQ courses				
Center courses				
OJL activities				
Other learning activities				
Assessment				



Competency Area: 5.0 Project Management and Control

Competency: 5.3 Contract Management

Competency Elements and Descriptions	Proficiency Level Descriptions			
	Level 1	Level 2	Level 3	Level 4
5.3.1 Contractor Monitoring a. Develop technical penetration/insight required for contractor activities e. Monitor technical performance of contractors	Contribute to: <ul style="list-style-type: none"> Development of technical penetration of contractor Monitoring of contractor technical performance 	Participate in (for a subsystem or simple project) technical penetration of contractor Monitor (for a subsystem or simple project) contractor technical performance	Develop (for a system) technical penetration of contractor Monitor (for a system) contractor technical performance	Direct (for a program) development of technical penetration of contractor Monitor (for a program) contractor technical performance
5.3.2 Technical Inputs a. Provide technical inputs for project contract management including change control	Provide technical inputs for contract management	Develop (for a subsystem or simple project) technical inputs for contract management	Develop (for a system) technical inputs for contract management	Develop (for a program) technical inputs for contract management
HQ courses				
Center courses				
OJL activities				
Other learning activities				
Assessment				



Competency Area: 5.0 Project Management and Control				
Competency: 5.4 Systems Engineering Management				
Competency Elements and Descriptions	Proficiency Level Descriptions			
	Level 1	Level 2	Level 3	Level 4
5.4.1 Systems Engineering Implementation a. Implement the SEMP and other technical plans b. Monitor and report on Systems Engineering status	Contribute to portion of SE effort: <ul style="list-style-type: none"> Implement technical plans Monitor and report SE status 	Participate in SE effort: <ul style="list-style-type: none"> Implement technical plans Monitor and report SE status 	Direct (for a system) SE effort: <ul style="list-style-type: none"> Implement technical plans Monitor and report SE status 	Direct (for a program) SE effort: <ul style="list-style-type: none"> Implement technical plans Monitor and report SE status
5.4.2 Systems Engineering Management Responsibilities a. Evaluate systems engineering process and make improvements as necessary b. Prioritize/reprioritize activities of technical teams c. Integrate information across subsystems d. Manage system engineering deliverables (e.g., technical baseline, TPMs, etc) e. Monitor build-up of the system	Aware of SE management activities	Contribute to management of SE effort: <ul style="list-style-type: none"> Evaluate and make improvements Prioritize technical team activities Integrate information across subsystems Manage deliverables Monitor system build-up 	Able to (for a system) manage SE effort: <ul style="list-style-type: none"> Evaluate and make improvements Prioritize technical team activities Integrate information across subsystems Manage deliverables Monitor system build-up 	Able to (for a program) manage SE effort: <ul style="list-style-type: none"> Evaluate and make improvements Prioritize technical team activities Integrate information across subsystems Manage deliverables Monitor system build-up
HQ courses				
Center courses				
OJL activities				
Other learning activities				
Assessment				



Competency Area: 6.0 NASA Internal and External Environments

Competency: 6.1 Agency Structure, Mission, and Internal Goals

Competency Elements and Descriptions	Proficiency Level Descriptions			
	Level 1	Level 2	Level 3	Level 4
6.1.1 Agency Internal Environment a. Function within the Agency structure and culture b. Align technical activities with Agency vision, mission, objectives, goals and plans	Knowledge of: <ul style="list-style-type: none"> Agency structure; goals at all levels; vision, mission, plans and objectives How to align technical activities and metrics with Agency vision, mission, plans, and objectives 	Perform (for a subsystem or simple project) system engineering activities within the Agency structure and across programs, Centers and NASA, as needed to achieve project and subsystem goals Contribute to the alignment of a subsystem's technical activities and metrics with Agency vision, mission, plans, and objectives	Lead and manage (for a system) system engineering activities within the Agency structure and across programs, Centers and NASA, as needed to achieve project and system goals Lead and manage (for a system) the alignment of a system's technical activities and metrics with Agency vision, mission, plans, and objectives Contribute to the establishment of the Agency's technical requirements and infrastructure	Establish (for a program) the system engineering requirements needed to achieve program goals within the Agency structure and ensure mission success Make decisions from an Agency perspective through the understanding of NASA's functional, social, cultural, and political environments to ensure mission success Lead the alignment of a Agency's technical activities and metrics with Agency vision, mission, plans, and objectives Establish the Agency's technical requirements and infrastructure to ensure mission success
6.1.2 Center Internal Environment a. Function within the Center structure and culture b. Align technical activities with Center vision, mission, objectives, goals and plans	Knowledge of: <ul style="list-style-type: none"> Center structure; goals at all levels; vision, mission, plans and objectives How to align technical activities and metrics with Center vision, mission, plans, and objectives 	Perform (for a subsystem or simple project) system engineering activities within the Center structure and across divisions and Center, as needed to achieve project and subsystem goals Contribute to alignment of the subsystem's technical activities and metrics with Center vision, mission, plans, and objectives	Perform (for a system) system engineering activities within the Center structure and across divisions and Center, as needed to achieve project and system goals Lead and manage (for a system) the alignment of the system's technical activities and metrics with Center vision, mission, plans, and objectives	Lead the alignment of a Center's technical activities and metrics with Agency vision, mission, plans, and objectives Establish the Center's technical requirements and infrastructure to be aligned with Agency structure
HQ courses				
Center courses				
OJL activities				



ACADEMY OF PROGRAM/PROJECT & ENGINEERING LEADERSHIP

Other learning activities				
Assessment				



Competency Area: 6.0 NASA Internal and External Environments

Competency: 6.2 NASA PM/SE Procedures and Guidelines

Competency Elements and Descriptions	Proficiency Level Descriptions			
	Level 1	Level 2	Level 3	Level 4
6.2.1 Agency PM/SE Procedures and Guidelines a. Structure technical activities to comply with relevant Agency processes and guidelines	Knowledge of NASA engineering of systems and PM policies and guidelines outlined in NASA procedures and guidelines documents	Structure and manage (for a subsystem or simple project) technical activities to comply with NASA engineering of systems and PM policies and guidelines	Structure and manage (for a system) technical activities to comply with NASA systems engineering and PM policies and guidelines Contribute to the review and development of Agency systems engineering policies and guidelines to ensure mission success	Establish (for a program) requirements for technical activities that comply with NASA systems engineering and PM policies and guidelines Assess the Agency's technical processes and guidelines Lead the review and development of Agency systems engineering policies and guidelines to ensure mission success
6.2.1 Center PM/SE Procedures and Guidelines a. Structure technical activities to comply with relevant Center processes and guidelines	Knowledge of Center engineering of systems and PM policies and guidelines outlined in Center procedures and guidelines documents	Structure and manage (for a subsystem or simple project) technical activities to comply with Center engineering of systems and PM policies and guidelines	Structure and manage (for a system) technical activities to comply with Center systems engineering and PM policies and guidelines Contribute to the review and development of Center systems engineering policies and guidelines to ensure mission success	Establish (for a program) requirements for technical activities that comply with Center systems engineering and PM policies and guidelines Assess the Center's technical processes and guidelines Lead the review and development of Center systems engineering policies and guidelines to support Agency policy
HQ courses				
Center courses				
OJL activities				
Other learning activities				
Assessment				



Competency Area: 6.0 NASA Internal and External Environments

Competency: 6.3 External Relationships

Competency Elements and Descriptions	Proficiency Level Descriptions			
	Level 1	Level 2	Level 3	Level 4
6.3.1 Professional Associations a. Membership and participation in professional societies/ organizations b. Contribution to profession c. Structure technical activities to conform to industry/professional standards, procedures, and regulations	Participate in: <ul style="list-style-type: none"> Professional societies/ organizations Technical activities that conform to industry/professional standards, procedures, and regulations 	Contribute to professional societies/ organizations Maintain knowledge of current up-to-date research and key individuals in the field Manage (for a subsystem or simple project) technical activities that conform to industry/ professional standards, procedures, and regulations	Participate in leadership roles within professional societies/ organizations Maintain knowledge of current up-to-date research and key individuals in the field Lead and manage (for a system) technical activities that conform to industry/ professional standards, procedures, and regulations Develop key contacts within the discipline (both within and outside of NASA)	Provide leadership to professional societies/ organizations to guide the establishment of industry/professional standards, procedures, and regulations Contribute to the knowledge and up-to-date research in the discipline Establish (for a program) technical requirements that conform to industry/ professional standards, procedures, and regulations
6.3.2 International Relationships (when engineering systems for or with international partners) a. Develop international partnerships and agreements b. Comply with ITAR c. Comply with international agreements and standards	Aware of international partnerships, agreements, standards, and ITAR as they relate to the team's technical activities	Contribute to (for a subsystem or simple project) the development of international partnerships and agreements as they relate to the subsystem Comply with ITAR and international agreements and standards as they relate to the subsystem	Lead and manage (for a system) the development of international partnerships and agreements as they relate to the system Comply with ITAR and international agreements and standards as they relate to the system	Establish international partnerships and agreements to ensure mission success Comply with ITAR and international agreements and standards as they relate to the program
HQ courses				
Center courses				
OJL activities				
Other learning activities				
Assessment				



Competency Area: 7.0 Human Capital Management

Competency: 7.1 Technical Staffing and Performance

Competency Elements and Descriptions	Proficiency Level Descriptions			
	Level 1	Level 2	Level 3	Level 4
7.1.1 Staffing Function a. Define roles and responsibilities of the technical workforce b. Identify and obtain the required technical personnel resources	<p>Understand the roles and responsibilities of each member of a technical team</p> <p>Aware of NASA's processes for selecting, staffing, and evaluating teams</p>	<p>Define (for a subsystem of simple project) the technical team members' roles and responsibilities for performing technical activities</p> <p>Assist in identifying and obtaining the required technical personnel resources for developing a subsystem</p> <p>Ensure that the technical team members (for a subsystem of simple project) have the appropriate skills, expertise, and experience</p>	<p>Integrate (for a system) the technical team members' roles and responsibilities</p> <p>Employ skills analysis and team selection techniques to build technical teams (for a system) with complementary talents and the necessary skills, expertise, and experiences</p> <p>Contribute to the assessment of the Agency's technical workforce's capabilities and gaps for achieving mission success</p>	<p>Establish staffing strategies and selection criteria for recruiting, evaluating, selecting and staffing technical teams for a program</p> <p>Identify and obtain the required technical leadership personnel resources for a program</p> <p>Establish the Agency's technical workforce personnel and infrastructure requirements to ensure mission success</p> <p>Lead the assessment of the Agency's technical workforce's capabilities and gaps for achieving mission success</p>
7.1.2 Performance Assessment a. Monitor performance of technical workforce b. Achieve desired performance level of the technical workforce	<p>Understand and achieve the desired performance level for the assigned technical activities</p> <p>Monitor own technical performance level</p>	<p>Monitor (for a subsystem or simple project) the performance of a subsystem's technical team members</p> <p>Apply appropriate team management techniques and concepts to guide a qualified technical team (for a subsystem or simple project) toward maintaining the desired performance level</p>	<p>Establish (for a system) the desired performance level of the system's technical workforce</p> <p>Establish (for a system) the performance criteria for the system's technical workforce</p> <p>Monitor the subsystems leads' performance</p>	<p>Establish performance criteria for a program's technical workforce to ensure mission success</p> <p>Monitor the program's systems engineers' performance</p> <p>Establish the desired performance level for the Agency's technical workforce</p>
HQ courses				
Center courses				
OJL activities				
Other learning activities				
Assessment				



Competency Area: 7.0 Human Capital Management

Competency: 7.2 Team Dynamics and Management

Competency Elements and Descriptions	Proficiency Level Descriptions			
	Level 1	Level 2	Level 3	Level 4
<p>7.2.1 Team Development</p> <p>a. Motivate and reward technical team members' performance</p> <p>b. Manage relationships among technical team members</p>	<p>Understand team members' roles and responsibilities, how they interact as a unit, and what motivates them to achieve peak performance</p> <p>Understand own roles, responsibilities, and desired performance level for performing technical activities</p> <p>Manage own relationships among technical team members</p>	<p>Employ appropriate team management techniques and concepts to effectively develop and motivate a technical team (for a subsystem or simple project)</p> <p>Understand (for a subsystem or simple project) each technical team member's capabilities, function, and the interrelationships among them</p> <p>Manage the relationships among technical team members (for a subsystem or simple project)</p>	<p>Communicate the technical team's direction and focus to ensure mission success</p> <p>Implement the incentive program for motivating and rewarding the technical team members' performance (for a system)</p> <p>Apply appropriate team management techniques and concepts to build on a technical team members' capabilities and functions in order to facilitate the interrelationships and improve team performance</p>	<p>Establish and communicate the direction and focus of a program's technical leadership team to ensure mission success</p> <p>Establish the incentive program to enhance performance and productivity of a program's technical workforce teams</p> <p>Establish and manage productive relationships among a program's technical leadership team in order to ensure mission success</p>
<p>7.2.2 Team Processes</p> <p>a. Establish and manage interfaces and relationships with technical team members, customers, stakeholders and partners</p> <p>b. Facilitate brainstorming, conflict resolution, negotiation, and problem solving</p> <p>c. Facilitate communication, collaboration and integration</p>	<p>Understand the relationships between technical team members, customers, stakeholders and partners</p> <p>Participate in team brainstorming, conflict resolution, negotiation, and problem solving activities</p> <p>Understand and work within the team's communication, collaboration and integration dynamics</p>	<p>Manage (for a subsystem or simple project) interfaces and relationships with the technical team members, customers, stakeholders and partners</p> <p>Lead (for a subsystem or simple project) brainstorming, conflict resolution, negotiation, and problem solving activities for the technical team</p> <p>Establish and facilitate (for a subsystem or simple project) the communication, collaboration, and integration dynamics for the technical team</p>	<p>Establish and manage (for a system) the interfaces and relationships with the technical team members, customers, stakeholders and partners</p> <p>Create an environment within the technical team (for a system) that fosters opportunities to conduct activities for brainstorming, conflict resolution, negotiation, and problem solving</p> <p>Manage the group dynamics and cooperation of the technical team (for a system) to facilitate communication, collaboration, and integration in order to ensure mission success</p>	<p>Identify and manage the interfaces and relationships among the stakeholders and partners that may impact program and mission success</p> <p>Determine and mitigate long-term consequences of any impacts resulting from interfaces and relationships among the stakeholders and partners</p> <p>Employ a range of conflict resolution techniques to bring about positive change and commitment, build trust and respect, and mitigate the negative effects of conflict</p> <p>Create an open and non-critical environment, that</p>



ACADEMY OF PROGRAM/PROJECT & ENGINEERING LEADERSHIP

				facilitates collaboration, communication, and individual empowerment to insure mission success
7.2.3 Team Meetings a. Plan effective technical team meetings b. Facilitate effective technical team meetings	Contribute to the outcomes of technical team meetings to enhance success	Plan, lead and facilitate (for a subsystem or simple project) effective technical team meetings	Establish a system's technical team meeting's requirements that align with the program's requirements Plan, lead and facilitate (for a system) effective technical team meetings	Establish a program's technical team meeting's requirements to ensure mission success Plan, lead and facilitate (for a program) effective technical leadership team meetings
HQ courses				
Center courses				
OJL activities				
Other learning activities				
Assessment				



Competency Area: 8.0 Security, Safety and Mission Assurance

Competency: 8.1 Security

Competency Elements and Descriptions	Proficiency Level Descriptions			
	Level 1	Level 2	Level 3	Level 4
8.1.1 IT Security a. Identify IT security requirements b. Develop and implement IT security plan	Participate in the identification of IT security requirements Aware of the IT security plan and its impact on the team's technical activities	Manage (for a subsystem or simple project): <ul style="list-style-type: none"> • Identification of IT security requirements for the subsystem • Development and implementation of the IT security plan for the subsystem 	Lead and Manage (for a system): <ul style="list-style-type: none"> • Identification of IT security requirements for the system • Development and implementation of the IT security plan for the system Contribute to the establishment of program and/or Agency requirements for IT security for the systems engineering	Establish program requirements for IT security for the systems engineering Lead the development of IT security for the systems engineering
8.1.2 Other Security Related Issues a. Identify other security requirements b. Develop and implement security plan	Participate in the identification of other security requirements related to the subsystem Aware of the security plan for the subsystem and its impact on the team's technical activities	Manage (for a subsystem or simple project): <ul style="list-style-type: none"> • Identification of other security requirements related to the subsystem • Development and implementation of a security plan for the subsystem 	Lead and Manage (for a system): <ul style="list-style-type: none"> • Identification of other security requirements related to the system • Development and implementation of a security plan for the system Contribute to the establishment of program and/or Agency requirements for IT security for the systems engineering	Establish program requirements for other security related to systems engineering Lead the development of other security related to systems engineering
HQ courses				
Center courses				
OJL activities				
Other learning activities				
Assessment				



Competency Area: 8.0 Security, Safety and Mission Assurance				
Competency: 8.2 Safety and Mission Assurance				
Competency Elements and Descriptions	Proficiency Level Descriptions			
	Level 1	Level 2	Level 3	Level 4
8.2.1 System Safety Planning and Management a. Identify relevant safety regulations/ procedures b. Assess potential hazards c. Monitor and control, eliminate, or reduce hazards d. Perform system safety analysis e. Verify system safety f. Conduct failure resolution and reporting	Participate in: <ul style="list-style-type: none"> Identifying relevant safety regulations/ procedures and assessing potential hazards for a subsystem Performing system safety analysis, verifying system safety, and conducting failure resolution and reporting 	Manage the safety planning and implementation (for a subsystem or simple project): <ul style="list-style-type: none"> Identify relevant safety regulations/ procedures Assess potential hazards Monitor and control, eliminate, or reduce identified hazards Perform subsystem safety analysis Verify subsystem safety Conduct failure resolution and reporting 	Lead and manage the system safety planning and implementation for a system Review subsystem safety plans and implementation for the program Employ systems safety concepts and Continuous Risk Management procedures to identify and evaluate systems engineering safety threats Contribute to the development of system safety planning and management policy and procedures (for a program and the Agency)	Establish system safety planning and management policy and procedures for a program Review system safety plans and implementation for a program Ensure that system safety hazards within a program are identified controlled and/or eliminated Provide proactive leadership to improve systems engineering safety in a program Lead the development of system safety planning and management policy and procedures for the Agency
8.2.2 Safety Management a. Identify and manage test safety b. Identify and manage operations safety c. Identify and manage industrial safety	Aware of safety management activities that relate to assigned technical activities and subsystem	Identify and manage (for a subsystem or simple project): <ul style="list-style-type: none"> Test safety for the subsystem Operations safety for the subsystem Industrial safety 	Identify and manage (for a system): <ul style="list-style-type: none"> Test safety for the system Operations safety for the system Industrial safety Review system safety management activities for subsystems	Review system safety management activities for the program Foster a safety culture throughout the program by advocating engineering excellence
8.2.3 Safety and Mission Assurance Planning and Management a. Identify Mission assurance requirements b. Develop Safety and Mission assurance plan,	Understand and comply with NASA safety and mission assurance strategies, policies, and standards Participate in identifying mission assurance requirements	Identify (for a subsystem or simple project) mission assurance requirements for a subsystem Develop (for a subsystem or simple project) Safety and Mission Assurance:	Identify (for a system) mission assurance requirements for the system Develop (for a system) Safety and Mission Assurance: <ul style="list-style-type: none"> Plan for the system, including system quality, 	Identify mission assurance requirements for a program Review system safety and mission assurance activities for a program Develop Safety and Mission



ACADEMY OF PROGRAM/PROJECT & ENGINEERING LEADERSHIP

<p>including system quality, reliability and maintainability</p> <p>c. Develop Safety and Mission assurance implementation strategies</p>	<p>Able to follow Safety and Mission Assurance plan as it relates to technical activities for a subsystem</p>	<ul style="list-style-type: none"> Plan for the subsystem, including system quality, reliability and maintainability, that complies with NASA safety and mission assurance strategies, policies, and standards Implementation strategies 	<p>reliability and maintainability, that complies with NASA safety and mission assurance strategies, policies, and standards</p> <ul style="list-style-type: none"> Implementation strategies <p>Review system safety and mission assurance activities for subsystems</p>	<p>Assurance policy and procedures (for a program and/or Agency)</p>
<p>8.2.4 Safety and Mission Assurance Reviews</p> <p>a. Prepare for and participate in Safety and Mission Assurance Readiness Review (SMARR)</p> <p>b. Prepare for and participate in Program Audit and Review (PA&R) process</p> <p>c. Prepare for and participate in Certificate of Flight Readiness (CoFR) process</p>	<p>Contribute to:</p> <ul style="list-style-type: none"> Safety and Mission Assurance Readiness Review Program Audit and Review process Certificate of Flight Readiness process 	<p>Contribute to preparing for and participating in:</p> <ul style="list-style-type: none"> Safety and Mission Assurance Readiness Reviews Program Audit and Review process Certificate of Flight Readiness process 	<p>Lead (for a system) the activities to prepare the system for and participate in:</p> <ul style="list-style-type: none"> Safety and Mission Assurance Readiness Reviews Program Audit and Review process Certificate of Flight Readiness process <p>Participate in review boards for other projects and programs</p>	<p>Chair engineering and safety review boards:</p> <ul style="list-style-type: none"> Safety and Mission Assurance Readiness Reviews Program Audit and Review process Certificate of Flight Readiness process
<p>HQ courses</p>				
<p>Center courses</p>				
<p>OJL activities</p>				
<p>Other learning activities</p>				
<p>Assessment</p>				



Competency Area: 9.0 Professional and Leadership Development

Competency: 9.1 Mentoring and Coaching

Competency Elements and Descriptions	Proficiency Level Descriptions			
	Level 1	Level 2	Level 3	Level 4
9.1.1 Mentoring and Coaching Tasks a. Provide advice and guidance b. Teach juniors c. Receive periodic personal coaching to improve identified weaknesses	<p>Secure own mentor to receive advice and guidance</p> <p>Receive periodic personal coaching to improve identified weaknesses</p>	<p>Identify technical team members' key strengths and opportunities for development in order to enhance performance</p> <p>Serve as a mentor to at least one team member of a subsystem technical team, meeting on a regular basis to provide advice and guidance</p> <p>Secure own mentor to receive advice and guidance</p> <p>Apply coaching skills to improve, sustain and/or enhance technical performance of team members (for a simple project or subsystem)</p> <p>Receive periodic personal coaching from a systems engineer to improve identified weaknesses</p>	<p>Provide guidance to enhance performance, facilitate success, and build commitment.</p> <p>Serve as a mentor to at least one subsystem engineer, meeting on a regular basis to provide advice and guidance</p> <p>Secure own mentor to receive advice and guidance</p> <p>Apply coaching skills to improve, sustain and/or enhance technical performance of team members for a complex project</p> <p>Receive periodic personal coaching to improve identified weaknesses</p>	<p>Communicate expertise, advice, and knowledge effectively for the purpose of broadening the proficiency of others, positively influencing decision-making, and establishing cooperative relationships</p> <p>Serve as a mentor to at least one system engineer, meeting on a regular basis to provide advice and guidance</p> <p>Advocate for and support mentoring and coaching resources for system engineers</p> <p>Establish a coaching and mentoring climate within the technical team</p> <p>Receive periodic personal coaching to improve identified weaknesses</p>
HQ courses				
Center courses				
OJL activities				
Other learning activities				
Assessment				



Competency Area: 9.0 Professional and Leadership Development

Competency: 9.2 Communication

Competency Elements and Descriptions	Proficiency Level Descriptions			
	Level 1	Level 2	Level 3	Level 4
9.2.1 Technical Communication a. Write technical information b. Present technical information c. Communicate technical decisions	Develop own ability to effectively write and present technical information, as well as communicate technical decisions	Write and present (for a subsystem or simple project) technical information, as well as communicate technical decisions, relating to the subsystem's technical activities Effectively and concisely communicate technical information to provide a comprehensive and concise recommendation	Write and present (for a system) technical information, as well as communicate technical decisions, relating to the system's technical activities Lead and manage (for a system) the communication of technical information and technical decisions relating to the system's technical activities Communicate effectively and concisely technical information to provide a comprehensive and concise recommendation to top management	Write and present to Center and HQ management technical information, as well as communicate technical decisions, relating to technical activities for a program Establish processes and procedures to communicate technical information and technical decisions relating to a program's technical activities Establish processes and procedures to communication of technical information and technical decisions relating to the Agency's technical activities
9.2.2 Reporting Results a. Write reports b. Present reports	Develop own ability to write and present reports that communicate technical status, challenges, problem solutions and/or accomplishments	Write and present reports that effectively communicate technical status, challenges, problem solutions and/or accomplishments for a subsystem in order to provide a comprehensive account of a particular phenomenon Review the technical reports of others to insure quality and accurate reporting of technical information Communicate the results of a technical assessments, analyses, reviews, and/or investigations	Write and present reports that effectively communicate technical status, challenges, problem solutions and/or accomplishments for a system in order to provide a comprehensive account of a particular phenomenon Lead and manage (for a system) the writing and presenting of technical reports that effectively and concisely communicate the results of a technical assessment, analysis and/or investigation and provides evidence based recommendations Review the technical reports of	Write and present reports to Center and HQ management that effectively communicate technical status, challenges, problem solutions and/or accomplishments for a program Communicate the results of a technical assessment, analysis and/or investigation that is targeted to a particular audience and provides a comprehensive account of engineering issues, as well as evidence-based recommendations



			<p>subsystem leads to insure quality and accurate reporting of technical information</p> <p>Communicate technical information from a variety of data sources that is targeted to a particular audience and provides an evidence-based, comprehensive account of a phenomenon concerning systems engineering issues related to a system</p>	
<p>9.2.3 Interpersonal Communication</p> <p>a. Demonstrate skills in speaking and writing (both formally and informally) for understanding</p> <p>b. Demonstrate skills in listening for understanding</p>	<p>Demonstrate skills in:</p> <ul style="list-style-type: none"> • Speaking and writing (both formally and informally) for understanding • Demonstrate skills in listening for understanding 	<p>Apply appropriate skills for using a variety of media to effectively communicate technical information about a subsystem</p> <p>Promote communication approaches that establish an open and positive environment within a subsystem's technical team</p> <p>Model and encourage listening skills that include involving, responding, and appreciating behaviors.</p>	<p>Apply appropriate skills for using a variety of media to effectively communicate technical information about a system</p> <p>Promote communication approaches that establish an open and positive environment within a system's technical team</p> <p>Create an environment in the technical team of a system that encourages listening, involving, responding, and appreciating behaviors</p>	<p>Create an environment that facilitates positive communication approaches within the technical workforce of a program</p> <p>Communicate and advocate information regarding technical information to high levels of Government and public media</p>
HQ courses				
Center courses				
OJL activities				
Other learning activities				
Assessment				



Competency Area: 9.0 Professional and Leadership Development

Competency: 9.3 Leadership

Competency Elements and Descriptions	Proficiency Level Descriptions			
	Level 1	Level 2	Level 3	Level 4
<p>9.3.1 Delegating Function</p> <p>a. Assign, delegate, and reassess technical tasks/ work assignments</p> <p>b. Define success criteria for performing technical tasks/ work assignments</p> <p>c. Track and manage success criteria for performance</p>	<p>Understand own technical tasks / work assignments and performance success criteria</p> <p>Track and manage own performance to insure achievement of success criteria</p>	<p>Assign, delegate, and reassess (for a subsystem or simple project) technical tasks/ work assignments</p> <p>Implement (for a subsystem or simple project) success criteria for performing technical tasks/ work assignments</p> <p>Track and manage (for a subsystem or simple project) success criteria for technical performance</p>	<p>Assign, delegate, and reassess technical tasks/ work assignments (for a system)</p> <p>Contribute to defining the success criteria for performing technical tasks/ work assignments for a system</p> <p>Implement (for a system) success criteria for performing technical tasks/ work assignments</p> <p>Track and manage (for a system) success criteria for technical performance</p>	<p>Develop technical tasks/ work assignments for the leadership team for a program</p> <p>Define success criteria for performing technical tasks/ work assignments for a program</p> <p>Conduct trend analyses of significant trends and/or anomalies concerning technical performance and develop a proactive recommendations for the program</p>
<p>9.3.2 Influencing Role</p> <p>a. Provide vision, direction, and guidance</p> <p>b. Motivate and inspire individuals to perform technical tasks/ work assignments successfully</p> <p>c. Recognize and reward accomplishments</p> <p>d. Establish and maintain collaborative and open work environment</p>	<p>Understand:</p> <ul style="list-style-type: none"> Leadership techniques by focusing on strategies for personal and team professional growth Power of influence, motivation, vision, and resolve, as well as the relationship between leading and managing <p>Function to maintain a collaborative and open work environment</p>	<p>Provide (for a subsystem or simple project) vision, direction, and guidance for technical activities</p> <p>Motivate and inspire (for a subsystem or simple project) members of the subsystem's technical team to perform technical tasks/ work assignments successfully</p> <p>Recognize and reward (for a subsystem or simple project) the accomplishments of members of the subsystem's technical team</p> <p>Establish and maintain (for a subsystem or simple project) a collaborative and open work environment within the subsystem's technical team</p>	<p>Provide vision, direction, and guidance for technical activities for a system</p> <p>Employ leadership techniques that encourage individual empowerment and guides individuals toward the successful obtainment of their goals</p> <p>Motivate and inspire (for a system) members of the system's technical team to perform technical tasks/ work assignments successfully</p> <p>Recognize and reward (for a system) the accomplishments of members of the system's technical team</p> <p>Establish and maintain (for a</p>	<p>Provide vision, direction, and guidance for technical activities for a program</p> <p>Employ empowerment strategies to initiate ideas and actions from others that foster technical innovations to support mission success</p> <p>Communicate expertise, advice, and knowledge effectively for the purpose of broadening the proficiency of others, positively influencing decision-making, and establishing cooperative relationships</p> <p>Establish and maintain an environment within the program's technical workforce that promotes motivation,</p>



			system) a collaborative and open work environment within the system's technical team	positive recognition, and collaboration
9.3.3 Decision-Making and Solving Problems a. Define problem b. Establish solution criteria c. Evaluate alternatives d. Determine solution(s) based on facts, evidence, criteria and risk	Participate in a technical team's decision-making and problem solving activities Understand and follow the technical team's decision-making and problem-solving processes	Manage a subsystem's technical team's decision-making and problem solving processes Lead a subsystem's technical team in decision-making and problem solving activities Evaluate and select among alternative approaches, concepts, architectures, etc.	Manage a system's technical team's decision-making and problem solving processes Lead (for a system) the system's technical team in decision-making and problem solving activities Employ team decision-making techniques that foster consensus building, while allowing for minority opinions, and resulting in evidence-based decisions	Establish the technical workforce decision-making and problem solving processes for technical activities for a program Create an environment that encourages consensus building, as well as minority opinions, and results in decisions that are based on sound evidence Employ analytical decision-making tools and knowledge within a systematic framework to make effective evidence-based decision
HQ courses				
Center courses				
OJL activities				
Other learning activities				
Assessment				



Competency Area: 10.0 Knowledge Management

Competency: 10.1 Knowledge Capture and Transfer

Competency Elements and Descriptions	Proficiency Level Descriptions			
	Level 1	Level 2	Level 3	Level 4
<p>10.1.1 Lessons Learned Documentation</p> <p>a. Identify lessons learned from system engineering activities</p> <p>b. Record lessons learned from system engineering activities</p> <p>c. Evaluate lessons learned/best practices of system engineering activities and related significant studies</p>	<p>Contribute to the technical team's lessons learned activities</p> <p>Aware of lessons learned/best practices from previous programs, projects and significant studies</p>	<p>Manage (for a subsystem or simple project) the identification and documentation of systems engineering activities, including their impact on project history and lessons learned</p> <p>Captures appropriate knowledge and trends relating to engineering issues within the subsystem in order to input into a knowledge management</p> <p>Evaluate lessons learned/best practices from previous programs, projects and significant studies</p>	<p>Manage and integrate (for a system) the identification and documentation of systems engineering activities, including their impact on project history and lessons learned</p> <p>Implement proper knowledge management strategies that provide integration of technical knowledge and information from reports, trend analyses, and lessons learned into a knowledge management system that will enable proactive information use, assist in problem-solving, and improve decision-making.</p> <p>Evaluate lessons learned/best practices from previous programs, projects and significant studies</p> <p>Develop lesson-learned case studies based on NASA engineering experiences that can benefit the Agency and junior engineers</p>	<p>Lead (for a program) the identification and documentation of systems engineering activities, including their impact on project history and lessons learned</p> <p>Establish proper knowledge management strategies that will facilitate communication, enable proactive information use, improve/enhance decision-making, expedite best-practices in engineering, and transfer lessons-learned.</p> <p>Coordinate the development and maintenance of an engineering knowledge management system that is useful for improving decision-making, information sharing, and resolving engineering issues.</p> <p>Promote and require the effective application of lessons learned/best practices from previous programs, projects and significant studies</p>
<p>10.1.2 Work Products</p> <p>a. Capture work products throughout the product life cycle</p> <p>b. Make work products available to appropriate users/stakeholders</p>	<p>Contribute to the technical team's capture of work products</p> <p>Aware of access to work products by appropriate users</p>	<p>Manage (for a subsystem or simple project) the capture of work products, including decision(s) made, supporting rationale and assumptions, and any corrective actions</p> <p>Provide access to the work products of a subsystem to</p>	<p>Manage (for a system) the capture of work products, including decision(s) made, supporting rationale and assumptions, and any corrective actions</p> <p>Provide access to the work products of a system to</p>	<p>Establish processes (for a program) for the capture of and access to work products, including decision(s) made, supporting rationale and assumptions, and any corrective actions</p> <p>Establish policy and</p>



ACADEMY OF PROGRAM/PROJECT & ENGINEERING LEADERSHIP

		appropriate users	appropriate users	processes for the Agency concerning the capture of and access to work products
HQ courses				
Center courses				
OJL activities				
Other learning activities				
Assessment				