ENG Competency Model
2013 Refresh

Unit of Competence: Analytical

#	Competency	Sub-Competency Description
1	Mission-Level Assessment	Sub-Competency 1. Assess mission areas end-to-end, across system and platform boundaries, to identify and close integration and interoperability (I&I) gaps in mission critical capabilities. Identify and define the mission problem(s) or opportunity(s), analyze the solution space, and initiate the life cycle of a potential solution that could address the problem or take advantage of
2	Stakeholder Requirements Definition	Sub-Competency 2. Work with the user to establish and refine operational needs, attributes, performance parameters, and constraints that flow from the Joint Capability Integration and Development System described capabilities, and ensure all relevant requirements and design considerations are addressed to establish a set of baseline requirements.
3	Requirements Analysis	Sub-Competency 3. Ensure the requirements derived from the customer-designated capabilities are analyzed, decomposed, functionally detailed across the entire system, feasible and effective.
4	Architecture Design	Sub-Competency 4. Translate the outputs of the Stakeholder Requirements Definition and Requirements Analysis processes into alternative design solutions. The alternative design solutions include hardware, software, and human elements; their enabling processes; and related internal and external interfaces.
		Sub-Competency 5. Track and manage design considerations (boundaries, interfaces, standards, available production process capabilities, performance and behavior characteristics) to ensure they are properly addressed in the technical baselines.
		Sub-Competency 6. Generate a final design or physical architecture based on reviews of alternative designs.
		Sub-Competency 7. Conduct walkthroughs with stakeholders to ensure that requirements will be met and will deliver planned systems results under all combinations of design usage environments throughout the operational life of a system.
		Sub-Competency 8. Develop DoD Architecture Framework products to describe system data exchange requirements, formats and system interfaces for interoperable systems.
5	Implementation	Sub-Competency 9. Manage the design requirements and plan for corrective action for any discovered hardware and software deficiencies
6	Integration	Sub-Competency 10. Manage the technical issues that arise as a result of the integration processes that feed back into the design solution process for the refinement of the design.
7	Verification	Sub-Competency 11. Design and implement a testing process to compare a system against required system capabilities, to link Modeling and Simulation, Developmental Test and Evaluation and Operational Test and Evaluation together, in order to document system capabilities, limitations, and risks.
		Sub-Competency 12. Verify the system elements against their defined requirements (build-to specifications).
8	Validation	Sub-Competency 13. Evaluate the requirements, functional and physical architectures, and the implementation to determine the right solution for the problem in an operationally-representative environment.
9	Transition	Sub-Competency 14. Advance the system elements to the next level in the physical architecture or provide the end item to the user after ensuring integration with other systems and interface management, both internal and external, for use in the operational environment.
10	Design Considerations	Sub-Competency 15. Accessibility (Section 508 Compliance). Assess, design, and implement compliance with Section 508 of the Rehabilitation Act (as amended 36 CFR Part 1194), unless exempt under FAR 39.204 as a military system or National Security System.
		Sub-Competency 16. Affordability – Systems Engineering Trade-Off Analyses. Establish an affordability target at Milestone A. Utilize the affordability target as the basis for the SE trade-offs and sensitivity analyses conducted in support of Milestone B, and subsequent reviews.
		Sub-Competency 17. Anti-Counterfeiting. Assess, design, and implement activities to prevent counterfeit parts from entering the supply chain to reduce cost and prevent negative impacts to program schedule and system performance.
		Sub-Competency 18. Commercial-Off-the-Shelf. Investigate the use of commercial-off-the-shelf items, including Non-Developmental Items, as required by DoDI 5000.02, Enclosure 2, in order to realize the significant opportunities for efficiencies during system development, but also to mitigate potential harmful issues if the program is to realize the expected benefits.
		Sub-Competency 19. Corrosion Prevention and Control. Assess, design, and implement compliance with Section 2228 of title 10, United States Code, DoDI 5000.02 and 5000.67 that requires planning and execution of corrosion prevention and mitigation in DoD systems across the life cycle.
		Sub-Competency 20. Critical Safety Item (CSI). Assess, design, and implement compliance with the statutory requirements are contained in section 802 of Public Law 108-136, enacted to address aviation CSIs, and section 130 of Public Law 109-364, enacted to address ship CSIs, embedded in section 2319 of title 10, United States Code to avoid hazards through mitigating receipt of defective, suspect, improperly documented, unapproved, and fraudulent parts having catastrophic potential.

Sub-Competency 21. Demilitarization and Disposal. Assess, design, and implement compliance with demilitarization and disposal requirements in the initial system design to ensure compliance with (1) DoDI 4160.28, Volume I, Defense Demilitarization; Program Administration, (2) DoD 4140.1-R, Supply Chain Materiel Management Regulation and DoD 4160.21-M, Defense Materiel Disposition Manual, and (3) all legal and regulatory requirements and policies relating to safety (including
Sub-Competency 22. Diminishing Manufacturing Sources and Material Shortages (DMSMS). Assess, develop, and incorporate a technology management strategy into design activities as a best practice to reduce DMSMS cost and readiness impacts throughout the life cycle.
Sub-Competency 23. Environment, Safety, and Occupational Health (ESOH). Identify and analyze hazards, and mitigate ESOH risks provide information needed for informed design decisions and development of ESOH-related documentation for milestone decisions.
Sub-Competency 24. Human Systems Integration. Assess, develop, and implement Human Systems Integration and Human Factors Engineering design criteria, principles, and practices described in MIL-STD-1472, Human Engineering and MIL-STD-46855A, Human Engineering Requirements for Military Systems, Equipment and Facilities in system.
Sub-Competency 25. Insensitive Munitions. Assess, design, and implement compliance with explosive ordnance safety requirements described in section 2389 of title 10, United States Code, which specifies that it is the responsibility of DoD to ensure insensitive munitions under development or procurement are safe, to the extent practicable, throughout development and fielding when subjected to unplanned stimuli, e.g., electro-magnetic interference, vibration, or shock.
Sub-Competency 26. Intelligence (Life-Cycle Mission Data Plan). Ensure Intelligence Mission Data (IMD) is considered, identified, and applied throughout the life cycle of IMD-dependent programs by informing the Analysis of Alternatives (AoA) and continuing through disposal. IMD provides essential data for building system models, developing algorithms, optimizing sensor design, system testing and evaluation, and validating sensor functionality.
Sub-Competency 27. Interoperability and Dependencies. Oversee the planning, analyzing, organizing, and integrating the capabilities of a mix of existing and new systems into a system-of-systems (SoS) capability greater than the sum of the capabilities of the constituent parts. SoS engineering is an activity that spans the entire system's life cycle; from pre-Milestone A
Sub-Competency 28. Item Unique Identification. Assess, design, and implement Item Unique Identification-enabled Serialized Item Management to provide a capability that allows DoD to locate, control, value, and manage its assets throughout the life cycle as required by DoDI 8320.04, DoDI 5000.02, and DoDI 4151.19.
Sub-Competency 29. Open Systems Architecture (OSA). Assess, design, and implement OSAs to produce modular, interoperable systems allowing components to be added, modified, replaced, removed, and/or supported by different vendors throughout the life cycle in order to afford opportunities for enhanced competition and innovation.
Sub-Competency 30. Operational Energy. Incorporate energy demand in design, technology, materials, and related issues into the system trade space along with other performance issues, so that energy resupply needs are not inadvertently introduced in the attempt to achieve other performance goals (e.g., survivability, lethality).
Sub-Competency 31. Packaging, Handling, Storage, and Transportation (PHS&T). Assess, design, and implement PHS&T principles/methods to ensure the necessary equipment reaches the warfighter while minimizing risk of damage to the equipment
Sub-Competency 32. Producibility, Quality, and Manufacturing Readiness. Assess, develop, and implement in system design (1) Producibility (the relative ease of manufacturing), (2) Quality consisting of (A) Quality Management Systems to ensure efficiency in processes and (B) Statistical Process Control to eliminate defects and control variation, and (3) Manufacturing Readiness in design activities to reduce system risk and ensure manufacturing process reliability and producibility.
Sub-Competency 33. Reliability and Maintainability Engineering. (1) Integrate Reliability and Maintainability (R&M) Engineering design analysis, test and demonstrations within the program's systems engineering processes and document R&M inputs to the Reliability, Availability and Maintainability – Cost (RAM-C) Rationale Report, Systems Engineering Plan (SEP) and other acquisition documentation throughout all life cycle phases. (2) Evaluate government and contractor R&M engineering and design analysis to include R&M feasibility assessments, Failure Definition and Scoring Criteria, environmental study report, mission profile definition, R&M allocations, block diagrams, predictions, Failure Modes and Effects Criticality Analysis and the Failure Reporting, Analysis and Corrective Action System. (3) Ensure that R&M analysis, tests and demonstrations influencing product support planning are fully coordinated and commence early in the life cycle while verifying that technical data is adequate, timely and complete. (4) Evaluate government and contractor R&M subsystem and system level test and demonstrations, including reliability growth, to verify achievement of R&M requirements. (5) Evaluate the adequacy of contractual R&M design and test provisions and the sufficiency of requirements, tasks and processes defined in procurement information documentation throughout all life cycle phases.
Sub-Competency 34. Spectrum Management. Ensure systems that mount multiple emitters and receivers obtain spectrum access for each emitter and ensure that those emitters and receivers do not produce mutual interference, or interact with ordnance (see DoDD 3222.3, MIL- STD-461, MIL STD-464, and MIL-HDBK-235-1, 237,and 240A, and "Joint Services Guide for Development of a Spectrum Supportability Risk Assessment") in compliance with the US and any host nation's requirements.
Sub-Competency 35. Standardization. Balance the use standardized agreements, practices, products, parts, processes, interfaces, and methods with required capabilities, operational environment, technology feasibility and growth, and cost-effectiveness in system design.
Sub-Competency 36. Supportability. Identify and mitigate the supportability life-cycle cost drivers in system design to ensure a system is affordable across the life cycle.
Sub-Competency 37. Survivability and Susceptibility. Ensure system is designed with a balanced survivability and susceptibility approach to ensures operational crew and personnel safety while satisfying mission effectiveness and operational readiness requirements.
Sub-Competency 38. System Security Engineering. Apply and execute the appropriate systems engineering, program

		protection (including supply chain risk management cybersecurity, hardware assurance, software assurance, anti-tamper, exportability protections) and certification-related policies, principles, and practices across all levels and phases of an acquisition program to increase the level of confidence that a system functions as intended, is free from exploitable vulnerabilities, and
11	Tools and Techniques	Sub-Competency 39. Technical Basis for Cost. Provide technical basis for comprehensive cost estimates and program budgets that reflect program phase requirements and best practices using knowledge of Earned Value Management, cost drivers, risk factors, and historical documentation (e.g. hardware, operational software, lab/support software).
		Sub-Competency 40. Modeling and Simulation. Plan, develop, integrate, employ, and evolve the authoritative model of the system under development, and/or interpret modeling or simulation results to more fully explore concepts, refine system characteristics/designs, assess overall system performance, and better inform acquisition program decisions.
		Sub-Competency 41. Sustainability Analysis. Perform sustainability analyses to reduce system total ownership cost by uncovering previously hidden or ignored life-cycle costs, leading to more informed decisions earlier in the acquisition life cycle.
		Sub-Competency 42. Value Engineering. Perform Value Engineering, an organized, systematic technique to analyze the functions of systems, equipment, facilities, services, and supplies to ensure they achieve their essential functions at the lowest life-cycle cost consistent with required performance, reliability, quality, and safety.

Unit of Competence: Technical Management

#	Competency	
12	Decision Analysis	Sub-Competency 43. Employ procedures, methods, and tools for identifying, representing, and formally assessing the important aspects of alternative decisions (options) to select an optimum (i.e., the best possible) decision.
13	Technical Planning	Sub-Competency 44. Address the scope of the technical effort required to develop, field, and sustain the system using the mandated tool, the Systems Engineering Plan.
14	Technical Assessment	Sub-Competency 45. Develop and/or use Technical Assessment metrics (i.e., Technical Performance Measures, Measures of Effectiveness, requirements compliance, and risk assessments) to measure technical progress, review life-cycle costs, and assess the effectiveness of plans and requirements.
15	Configuration Management	Sub-Competency 46. Apply sound program practices to establish and maintain consistency of a product or system's attributes with its requirements and evolving technical baseline over its life-cycle.
16	Requirements Management	Sub-Competency 47. Use Requirements Management to incorporate new requirements and to trace back to user-defined capabilities and other sources of requirements, and to document all changes and the rationale for those changes.
17	Risk Management	Sub-Competency 48. Create and implement a Risk Management Plan encompassing risk identification, analysis, mitigation planning, mitigation plan implementation, and tracking throughout the total life-cycle of the program.
		Sub-Competency 49. Apply risk management at the earliest stages of program planning and continue throughout the total life cycle of the program through the identification of risk drivers, dependencies, root causes, and consequence management.
18	Data Management	Sub-Competency 50. Apply policies, procedures and information technology to plan for, acquire, access, manage, protect, and use data of a technical nature to support the total life cycle of the system.
19	Interface Management	Sub-Competency 51. Ensure interface definition and compliance among the elements that compose the system, as well as with other systems with which the system or system Sub-Competencies will interoperate (i.e., system-of-systems) by implementing interface management control processes and measures to ensure all internal and external interface requirement changes are properly documented in accordance with the configuration management plan and communicated to all affected configuration
		Sub-Competency 52. Evaluate how Interface Management techniques ensure that all internal and external interface changes in requirements are properly documented and communicated in accordance with the configuration management plan.
20	Software Engineering Management	Sub-Competency 53. Use quantitative methods and measures to assess and track software progress against a baseline (planned vs. actual) and provide status updates in order to make timely program decisions.
		Sub-Competency 54. Integrate essential software acquisition and SE sustainment activities related to software through the use of multidisciplinary teams to optimize design, manufacturing, and supportability processes.
		Sub-Competency 55. Determine software-related considerations, impacts and risks that must be addressed as part of the system acquisition strategy. Use Agile methods, where possible, to reduce the duration and cost of the software development lifecycle.
		Sub-Competency 56. Evaluate inputs from relevant stakeholders that translate into functional and technical requirements that are documented, managed, traceable and verifiable through the software life-cycle process and describe the desired behavior of the software system to be built to satisfy the intended user(s).
		Sub-Competency 57. Understand the software architectural structure of the system, including the definition of software components, and the relationships between software components, the system, and the operational architectures.
21	Acquisition	Sub-Competency 58. Determine the appropriate amount of systems engineering and the resources, needed during each acquisition phase to achieve acceptable levels of risk for entry into the next acquisition phase. Determine the appropriate system acquisition strategy and life cycle model to include considering agile, rapid, and other optimization approaches.

		Sub-Competency 59. Assess the proposed solution's operational viability and costs of alternative systems during the Materiel Solution Analysis Phase, taking into account the design considerations to achieve a balanced system design.
		Sub-Competency 60. During the Technology Development Phase, integrate proven technologies, develop new hardware/software prototypes, evaluate solutions, and determine performance requirements to ensure that the cost, schedule, and other constraints are met and that risks are reduced.
		Sub-Competency 61. Integrate hardware, software, and human systems, protect critical program information, ensure safety and affordability, and reduce manufacturing risks during the Engineering and Manufacturing Development Phase to demonstrate supportability and interoperability within incremental stages of system development.
		Sub-Competency 62. Apply a Low-Rate Initial Production approach to attain Initial Operational Capability and Full-Rate Production and Deployment, considering Diminishing Manufacturing Sources and Material Shortages; assess changes in the design of manufacturing processes, and apply continuous testing and evaluation practices during the Production and Deployment Phase to reveal manufacturing and production problems and ensure continuous enhancements to the product.
		Sub-Competency 63. Plan the Logistics Management system manpower needs and support plans, and apply within a Performance-Based Logistics environment, for the full system life-cycle, to ensure effective use of the system.
		Sub-Competency 64. During contract development, recognize and properly define technical aspects of desired "end user's needs" to draft technical elements of the solicitation to ultimately meet stakeholder requirements.

Unit of Competence: Professional

#	Competency	Sub-Competency Description
22	Problem Solving	Sub-Competency 65. Make recommendations using technical knowledge and experience, developing a clear understanding of the system, identifying and analyzing problems using a Total Systems approach, weighing the relevance and accuracy of information, accounting for interdependencies, and evaluating alternative solutions.
23	Strategic Thinking	Sub-Competency 66. Formulate and ensure the fulfillment of objectives, priorities, and plans consistent with the long-term business and competitive interests of the organization in a global environment.
24	Professional Ethics	Sub-Competency 67. Maintain strict compliance to governing ethics and standards of conduct in engineering and business practices to ensure integrity across the acquisition life-cycle.
25	Leading High-Performance Teams	Sub-Competency 68. Lead teams by providing proactive and technical direction and motivation to ensure the proper application of systems engineering processes and the overall success of the technical management process. Builds and maintains effective team performance by creating an environment of trust, respect, and esprit de corps: (1) Builds successful teams, (2) Develops trust and respect, (3) Builds team cohesion, and (4) Understands the human dynamics of a team gains respect
26	Communication	Sub-Competency 69. Facilitates an open and supportive environment using effective two-way communication, both verbally and in writing, including active listening, ensuring understanding and providing constructive feedback: (1) Effectively communicates and checks for understanding, (2) Translates complex information into a clear and organized manner, and (3) Persuades others to adopt and act on specific ideas.
27	Coaching and Mentoring	Sub-Competency 70. Develops and advances the capabilities of others through use of coaching, mentoring, and leading: (1) Possesses skills to lead others, (2) Effectively manages conflict, (3) Attracts followers (charisma), (4) Develops and empowers others (including effecting career advancement), (5) Appreciates/recognizes others , (6) Helps others advance, (7) Advances ideas, (8) Coaches and mentors, (9) Effectively delegates, and (10) Respects the level of knowledge and skills of others, and
28	Managing Stakeholders	Sub-Competency 71. Builds and manages effective relationships with all stakeholders through use of influencing skills, negotiating, collaborating and a value-added approach to partnerships: (1) Accurately identifies all stakeholders along program/product/service life-cycle, (2) Possesses influencing skills, (3) Builds collaborative relations with partners, (4) Focuses on continuous improvement, (5) Possesses negotiating skills, (6) Builds consensus/buy-in, and (7) Skillfully deals with political
29	Mission and Results Focus	Sub-Competency 72. Aligns goals and work efforts toward fulfillment of the overall organizational mission through effective requirements identification, prioritization, measurement, and results orientation: (1) Prioritizes tasks, (2) Creates a shared vision and direction, (3) Effectively identifies and sets priorities, (4) Seeks/holds systems view in all efforts, (5) Possesses a positive attitude and dedication to mission success, (6) Results, mission requirements and strategic goals oriented, and (7) Knowledge
30	Personal Effectiveness/Peer Interaction	Sub-Competency 73. Takes responsibility for knowing ones strengths and weaknesses, seeks to maintain currency on issues impacting ones work environment, working and collaborating with peers, is open to feedback and instills these qualities in others: (1) Takes the initiative, (2) Ability to recognize and effectively leverage emotional intelligence, (3) Knows appropriate boundaries, (4) Learns and applies from successes and failures, and (5) Remains open minded and objective.
31	Sound Judgment	Sub-Competency 74. Seeks out and uses appropriate information and subject matter expertise to make effective decisions that balances policy, systemic needs and risks, trade-offs, and creativity, and accepts accountability for decisions: (1) Possesses decisiveness, (2) Takes accountability, (3) Makes sacrifices/trade-offs, (4) Takes calculated risks, (5) Makes evidence-based decisions, and (6) Possesses creativity and problem solving abilities.

Unit of Competence: Business Acumen

#	Competency	Sub-Competency Description
32	Industry Landscape	Sub-Competency 75. Apply knowledge of the defense industry market environment to contribute to the preparation of appropriate acquisition strategies and solicitations, and to provide necessary technical oversight of contract execution.

33	Organization	Sub-Competency 76. Apply knowledge of how company organization varies with business strategy and resource capacity (size) to inform necessary technical oversight of contract execution.
34	Cost, Pricing, and Rates	Sub-Competency 77. Apply knowledge of cost accounting basics defense companies use to manage direct and indirect costs and the use of rates to contribute to the preparation of appropriate acquisition strategies and solicitations, and to provide necessary technical oversight of contract execution.
35	Cost Estimating	Sub-Competency 78. Apply knowledge of defense company cost estimating requirements, methods, and key process elements to contribute to the preparation of government cost estimates, appropriate acquisition strategies and solicitations, and to provide necessary technical oversight of contract execution.
36	Financial Reporting and Metrics	Sub-Competency 79. Apply knowledge of company financial reports and metrics to measure company health to better enable best value program decisions.
37	Business Strategy	Sub-Competency 80. Apply knowledge of defense company strategic planning, marketing, and business development to contribute to the preparation of appropriate acquisition strategies and solicitations.
38	Capture Planning and Proposal Process	Sub-Competency 81. Apply knowledge of the company scope of work during the capture planning and proposal response development process to contribute to the preparation of appropriate acquisition strategies and solicitations.
39	Supplier Management	Sub-Competency 82. Apply knowledge of management challenges between a prime contractor and its supply chain to contribute to the preparation of appropriate acquisition strategies and solicitations, and to provide necessary technical oversight of contract execution.
40	Industry Motivation, Incentives, Rewards	Sub-Competency 83. Apply knowledge of how defense companies incentivize their workforce at various levels and that drives corporate decisions and capture strategies that could impact program execution and future competition to contribute to the preparation of appropriate acquisition strategies and solicitations, and to provide necessary technical oversight of contract
41	Negotiations	Sub-Competency 84. Apply knowledge of successful negotiations from both a government and business perspective to get a better deal for the taxpayer and promote a fair profit to contribute to the preparation of appropriate acquisition strategies and solicitations, and to provide necessary technical oversight of contract execution.