

Sysnovation Tool Belt



No.	Systems Engineering Competency	Value Added (Why Important?)	Potential Systems Engineering Tools	INCOSE SEH5E
1	Understand problem/opportunity that needs to be addressed and clearly communicate the system purpose (Level n).	The system is not successful unless it fulfills its purpose by addressing a specific problem (or opportunity). If it does not have a viable purpose, it should not be pursued.	Problem/Opportunity Statement System Purpose Statement Five Whys Six Honest Serving Men - What and Why and When and How and Where and Who ConOps - Concept of Operations Project Charter SEMP - Systems Engineering Management Plan	BMA PP
2	Understand and analyze all relevant customer/user stakeholder needs and requirements and needs.	The system is not successful unless it fulfills its customer/acquirer and user/operator/maintainer/etc. needs. Many times the true customer/user needs are not known. Provides the basis for validation.	OpsCon - Operational Concept Use Cases/Scenarios User Stories Personas uc - Use Case Diagram [SysML] VOC - Voice of Customer StRR - Stakeholder Requirements req - Requirements Diagram [SysML]	SNRD
3	Understand and analyze all business and other stakeholder needs and requirements and needs.	There are more stakeholders than the customer/user. The system is not successful unless it fulfills all of its stakeholder needs. Provides the basis for validation.	1 1 2 1 1	SNRD
4	Understand the system (Level n) context within its environment and its boundaries (Level n and Level n+1).	Understanding what is in and out of scope and how actions and decisions in one area affect another is critical.	Black Box/White Box Representations Context Diagram Boundary Diagram ERA - Entity, Relationship, Attribute Diagram Enabling Systems	SNRD SRD SAD
5	Identify, define, and control interfaces across the system boundaries (Level n) and between system elements (Level n+1).	Poor interface management can lead to incompatible systems elements and increased system integration time.	N ² - N-Squared Diagram/DSM - Design Structure Matrix Interface Standards (for open/standard interfaces) ICD - Interface Control Document (for unique interfaces) IWG/ICWG - Interface [Control] Working Group (for new interfaces)	SRD SAD
6	Define, analyze, and manage the system functionality/behavior/logic (Level n) (including nominal/off-nominal scenarios, corner conditions).	Functional/Behavioral/Logical) Analysis is a way to understand what the system has to do. Functions help refine requirements and the physical design.	FFBD - Functional Flow Block Diagram/act - Activity Diagram [SysML] sd - Sequence Diagram [SysML] stm - State Machine Diagram [SysML]	SRD
7	Ensure that the requirements for all lifecycle stages are addressed at the correct times.	Failure to address the lifecycle requirements [also know Quality Characteristics (QCs) and informally as the "ilities"] at the proper time can lead to features never being achieved or achieved at an escalated cost.	Affordability Analysis Agility Engineering Human Systems Integration (HSI) Interoperability Analysis Logistics Engineering Manufacturability/Producibility Analysis Reliability, Availability, and Maintainability (RAM) Engineering Resilience Engineering Sustainability Engineering System Safety Engineering System Security Engineering Loss-Driven Systems Engineering (LDSE)	QCS SNRD SRD SAD DD SA
8	Utilize modeling, analysis, and simulation to provide early indications of system performance, predict emergent properties, and ensure high confidence in the design.	Early modeling, analysis, and simulation can confirm integrated performance, reduce risk, and allow the exploration of alternate scenarios.	Modeling Analyses Simulation Prototyping and Mock-ups	MA&S
9	Define, analyze, and manage the system requirements (Level n).	System requirements provide a clear definition of what the system needs to do, how well, and under what conditions. Provides the basis for verification.	SysR - System Requirements, Including: - Requirements Patterns, Characteristics, and Attributes - Threshold/Objective Requirements - Reserve/Margin - Growth/Spare Requirements - Acceptance Criteria (Up-Front Definition) req - Requirements Diagram [SysML]	SRD



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Version: May 2023

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