Systems Engineering Development and Implementation Center (SEDIC)

NAVAIR 4.1
Systems Engineering
SEDIC MISSION

- Increase program success and delivery of superior warfighting capability through improvements in NAVAIR Systems Engineering processes and practices.

- Work is analytical in nature, through the solicitation, development and testing of hypotheses.
  - Researching technical feasibility of transforming NAVAIR SE through MCSE

- Products may include a change in policy or process, recommended improvements in AIR-4.1 training, development of standardized tools or a more comprehensive process improvement effort.
NAVAIRINST 4355.19E

NAVAIR INSTRUCTION 4355.19E
From: Commander, Naval Air Systems Command

Subj: SYSTEMS ENGINEERING TECHNICAL REVIEW PROCESS

Ref: (a) NAVAIR Systems Engineering Technical Review Process Handbook, Ver. 1.0
(b) DoD Directives 5000.01 of 12 May 2003
(c) Interim DoD Instruction 5000.02 of 26 November 2013
(d) Defense Acquisition Guidebook
(e) SECNAVINST 5000.2E
(f) NAVAIR memo of 20 Nov 12
(g) Systems Engineering Plan Outline, Ver. 1.0 of Apr 2013
(h) NAVAIRINST 5000.24
(i) NAVAIRINST 4130.1D
(l) NAVAIRINST 3860.2D
(m) NAVAIRINST 3910.1

Encl: (1) Systems Engineering Technical Review Timing
(2) Systems Engineering Technical Review Entry Criteria


2. Cancellation. This instruction supersedes and cancels NAVAIRINST 4355.190.

   a. Guidance for software development methodologies, including Agile and incremental software development.

   b. SETR tailoring constraints and guidance have been removed for the use of the streamlined SETR checklists.

- Provides the latest policies for the SETR process at NAVAIR.
  - New DoDI 5000.02
- Emphasizes SETR as part of the SE Process
- Discusses Agile software development
  - Incremental Software Spec Review (SSR), Critical Design Review (CDR), Integration Readiness Review (IRR)
  - Requirements Backlog Review (RBR)
- Begins the conversation of Model Centric Systems Engineering (MCSE)
- Supports tailoring, both in breadth and depth
- Defines the required entry criteria to SETR events
SETR Process Handbook

- Expands on NAVAIRINST 4355.19E.
  - Separate handbook facilitates more frequent updates

- Covers SETR Fundamentals

- Expands discussion of emerging processes
  - Architecture
  - Technical Baseline Management
  - Agile software development
  - Incremental software development
  - Model Centric Systems Engineering (MCSE)

- Elaborates process/checklist tailoring

- Describes SETR events and details

- Future revisions will add more detail and new topics
  - Software Design, R&M, and Safety
  - Lead System Integrator
  - Integrate Warfare Capability & SoS SE
  - Security Topics
  - Requirements Development
  - Open Architecture vs Commonality
  - Making SE more agile
Menu-Driven Checklist Tier Characteristics

**Tier 1**
Engineering Technical Review Categories
- General Category that groups review criteria/focus into logical divisions regardless of review phase.
- Common to most Virtual SYSCOM/NAVAIR programs.

1. Tech. Basis for Oper. Effectiveness & Suitability,
2. T&E and Certification of Product,
3. Executability & Process Control

**Tier 2**
Entry Criteria
- "The Tasks That Need to Be Complete"
- Statement describes tasks/work expected to be accomplished during the engineering development phase associated with the review.

**Tier 3**
Products
- "The Products That Show the Tasks are Completed"
- List distinct, tangible Programmatic/Technical Document or other Product essential to the resolution of Entry Criteria for the specific review.

**Tier 4**
SE Level Criteria/Elements
- "What the Competencies & Program's Technical Leaders Need to Know About the System's Maturity"
- Critical high-level question used to assess the associated Tier 3 Product to evaluate the expected system maturity as defined by the Tier 2 Criteria.

**Tier 5**
Competency High Level Criteria/Elements
- "What each SME/TA Needs to Evaluate in order to Assess the Systems Maturity"
- NAVAIR Competency criteria/elements required to assess system maturity.
- Summarizes detailed low-level competency tasks typically captured in SWPs.

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**What to Evaluate**
1.0/2.0/4.0/5.0/6.0/7.0

**How to Evaluate "How Good"**

**Additional Checklist Efforts:**
- Maturing Content
- Verifying Question Ownership
- Verifying Artifacts
- 4.0 Reorganization
- Question Content/Style Guide

= Considerations
**Checklist Content Structure**

The SETR Checklist evaluates whether a program has met the required set of Entry Criteria for a specific review. The Multi-Driven SETR Checklist utilizes a matrix structure employing Entry Criteria, Products, and Technical Authorities (Competencies). A separate matrix of checklist question content exists for each SETR event. Multiple SETR events can be compared side-by-side to see the evolution of a program.

**Product Threats Evaluation**

Defining what threats to consider during the design phase enables entry criteria and the products/technical artifacts that should be referenced during the evaluation.

**Entry Criteria**

Defining what Entry Criteria are supported by the specific product/technical artifact and what competencies are involved in the development and/or evaluation of the product.

**Competency Assessment Evaluation**

Some assessment criteria require assessment of “summarized” competencies across the project, sometimes across the entire development effort.

**Tier 1**

Tier 1 is a high-level summary of reviewed Tier 2 Entry Criteria. The three Tier 1 categories are: Technical Basis, Operational Effectiveness, and Operational Suitability, Test, Evaluation, and Acceptance, and Certification of Product, and Exercitability & Process Control.

**Tier 2 - Entry Criteria**

Defining what Entry Criteria should be evaluated by this specific competency, and the product/technical artifact that should be referenced by the competency during the evaluation of these entry criteria.

**Tier 3 - Products**

Defining the competencies that should evaluate the specific entry criteria, and the products/technical artifacts that should be referenced during the evaluation.

**System Specification**

Subsystem Design Documents, Test Readiness Assessment, Test Verification Reports/Products.

**System Design Compliance**

Allocation of Test Verification, System Level analysis, etc.

**Strategy Roll-up Reports**

These are presented to the system stakeholders. They are map-up to a tier-equivalent tier 2 + tier 1.

**Final Roll-up Report**

The Tier 2 Roll-up Report provides an inclusion and summary of products and artifacts that map to the tier. These products are reviewed by the Chief Engineer, program subject, and technical system stakeholders to determine if the program is ready to contact the industrial reviewer.
• Launched 24 November 2014
  – Web-based, online, real-time, collaborative environment with CAC access
• Already proven to be a valuable tool to evaluate development maturity against SETR event Entry Criteria
  – Influencing checklist behaviors
  – Over 1,500 users today and growing
• Plan to share tool across SYSCOMs
ISEE SETR Manager Benefits

• Reduces Barriers to SETR Tool Use
  – Eliminates NMCI desktop CLM deployment issues
  – Reduces user startup time from 1-48 hours to < 5 minutes

• Greater Flexibility & Speed of Checklist Execution
  – Alignment with real-world processes (e.g. parallel tailoring/scoring)
  – Easier collaboration with entire acquisition community – via web/social media like features
  – Dramatically improves tailoring capabilities (properties, tags, filtering, searching)

• Improved Reporting
  – Customizable search criteria
  – Ready to use formats like Excel, PPT, PDF

• Targeting User Communities
  – Automated reporting and auditing to APMSE, SME, or other audiences
  – Different roles can use different views

• Transparency
  – Facilitates independent audits by the appropriate Technical Authority

• Easier Content Updates
  – Utilizes streamlined SETR checklist content vetted by the owning competencies

• Introduces the Integrated Systems Engineering Environment (ISEE) vision
  – Future requirements manager and risk manager integrated modules
  – First step towards MCSE at NAVAIR
Integrated Systems Engineering Environment (ISEE)

ISEE - web-based collaborative integrated environment for knowledge sharing and transfer – “Single Source of Technical Truth”

- SETR Manager: First step
  - SETR events preparation including checklist tailoring and scoring
  - Share knowledge, lessons learned, and facilitates assessment of design compliance, maturity and related risk

- Requirements Manager: Next step
Cross SYSCOM SE

- NAVAIR’s SETR process is an instantiation of the overall Navy SETR instruction.
- SESG (Systems Engineering Stakeholders Group)
  - Collaborating to implement common policies processes, tools, training and certifications
- NSEG (Naval SE Guide) WG
  - Reports to SESG
  - All NAVAL SYSCOMs

DOD Instruction 5000.02
Operation of the Defense Acquisition System

NAVAIRINST 5000.24
Naval SYSCOM Systems Engineering Policy
Includes: MARCOM, SPAWAR, NAVFAC, NAVSUP, NAVSEA

NAVAIR Instruction 4355.19E
Systems Engineering Technical Review Process
Summary – Policy, Processes, Tools, & Training

- NAVAIRINST 4355.19E & SETR Handbook
- Cross-SYSCOM Policies & Tools
- Model Centric-System Engineering (MCSE) Research
- Integrated SE Environment (ISEE)
- SETR Manager Execution, Maintenance, & Maturation
- Requirements Manager Concept Definition
Questions?