



Air  
Land  
Sea  
Space  
Cyberspace

Innovation. In all domains.

# 11467 – Guiding the Engineer through the T&E Process

Allen Brailey  
Engineering Fellow  
Raytheon Missile Systems  
520.794.5641  
acbrailey@raytheon.com  
15 March 2011

# Who We Are

---

Raytheon Corporation

Raytheon Missile Systems (RMS)

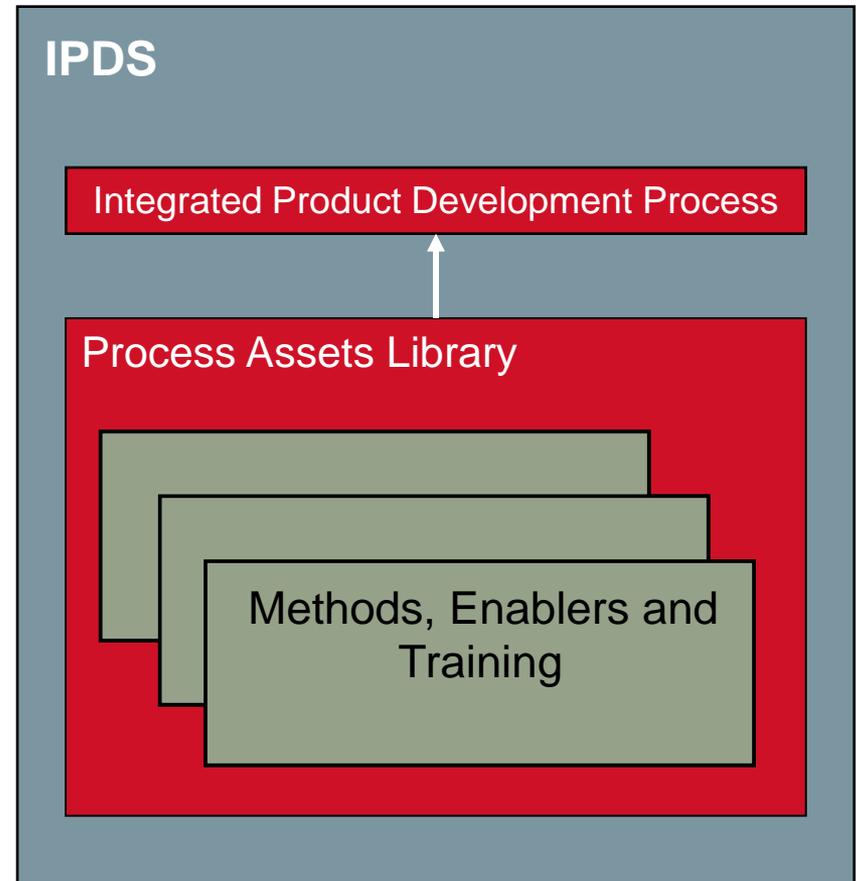
Engineering

Systems Test Directorate

- System Test Director reports to RMS VP of Engineering
- Three Major Elements of Systems Test
  - Hardware in the Loop (HWIL) simulators
  - Special Test Equipment
  - Integration and Verification

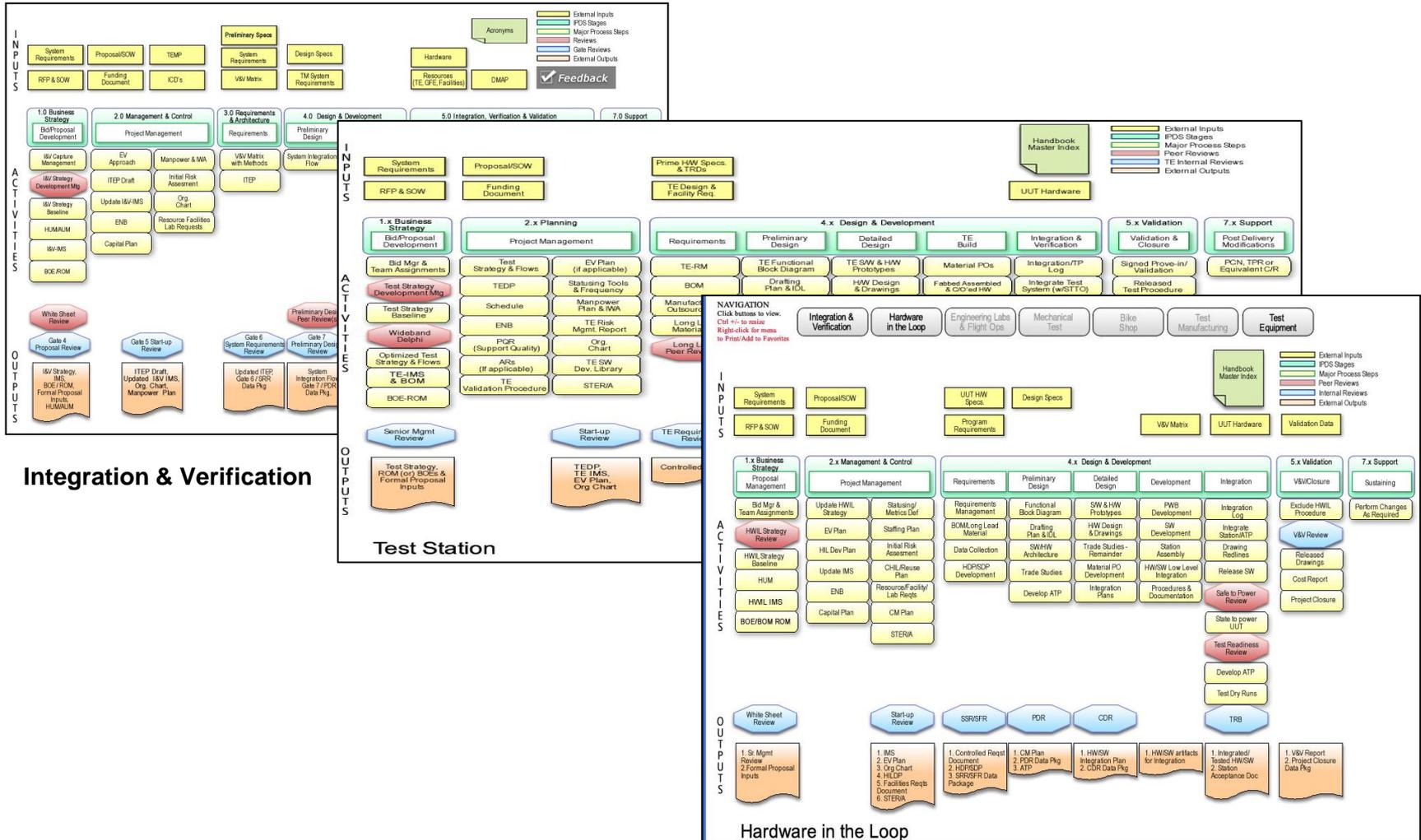
# Command Media

- Numerous sources for command media
  - Corporate: Integrated Product Development System
  - Business Unit (RMS) Directives
  - Organizational Directives
  - Program Directives



How We Do Our Job

# One Page Process (1PP) tailored to discipline



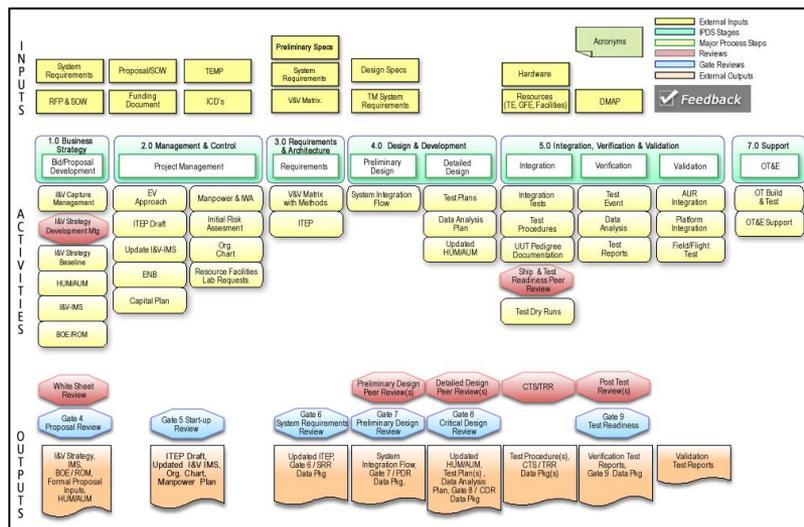
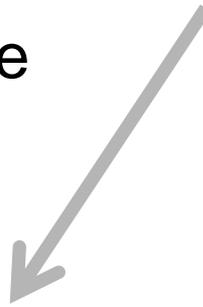
Designed to follow the life cycle of a program from proposal to production

# One Page Process Web Page

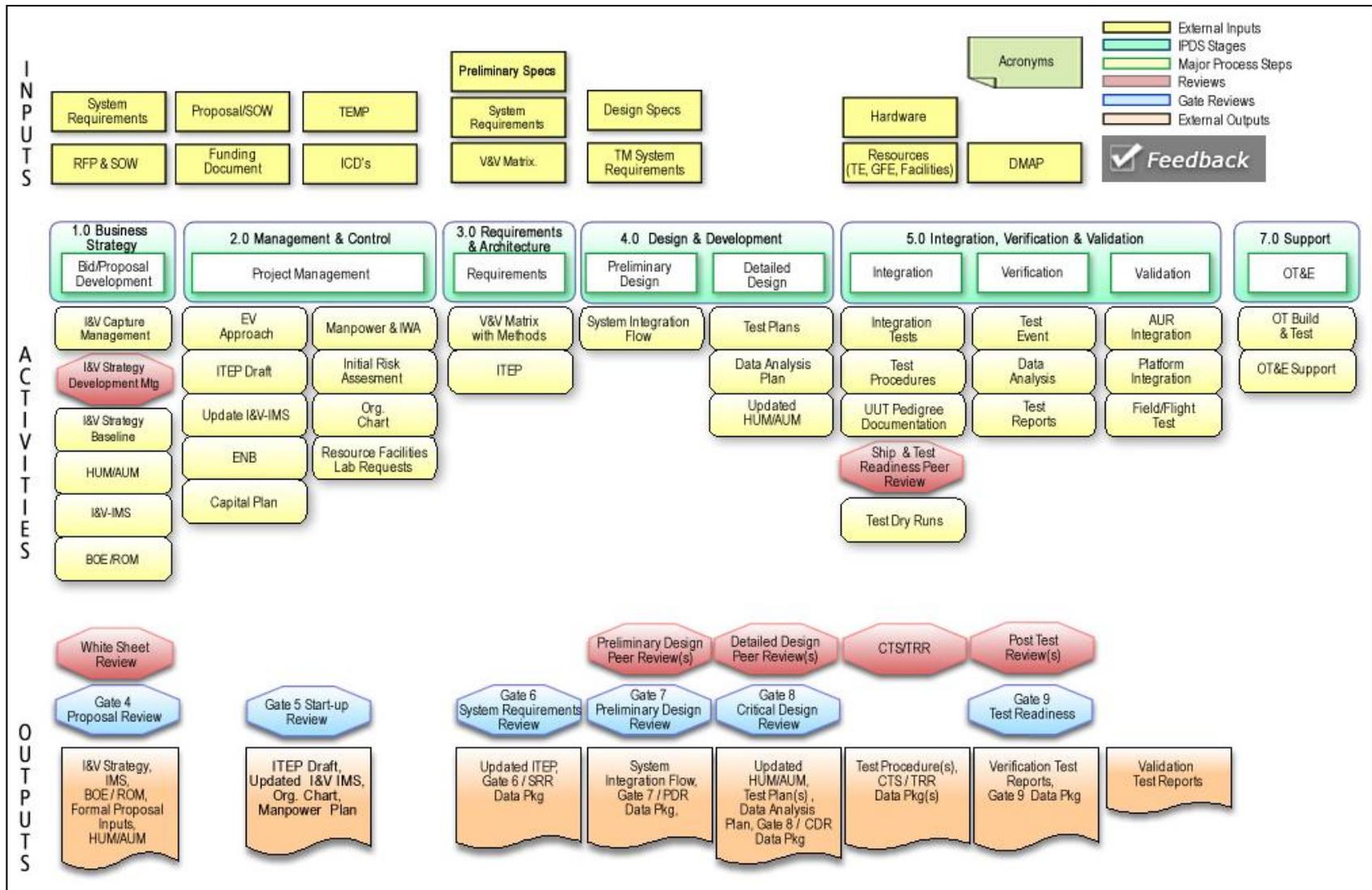
- Acts as a front end that provides linkages back to command media
- Includes Test Equipment, HWIL, I&V
  - continue to work to incorporate all functions in the directorate
- HTML/Web based & accessible from directorate home page

## Communication

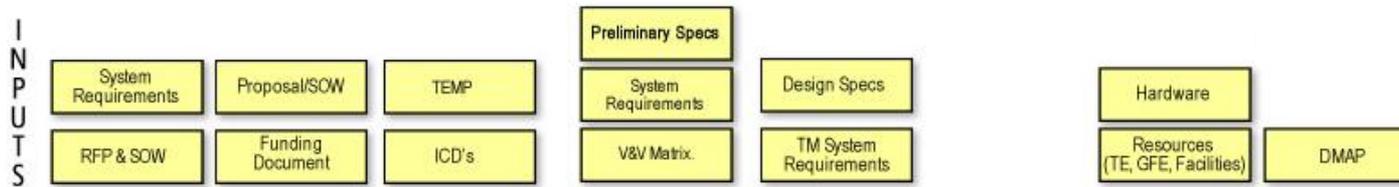
- IVC Design Guide
- IVC Processes and Tools
- IVC One Page Process
- Integration and Test Fundamentals
- 5Why Template



# Details on I&V Process



# Input Across Top

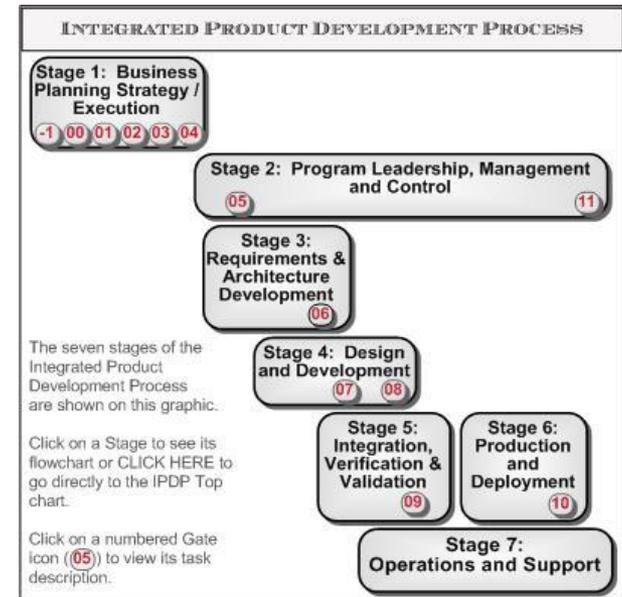


Inputs: Documentation/Products which are expected to be received from **outside** the I&V organization

# Stages

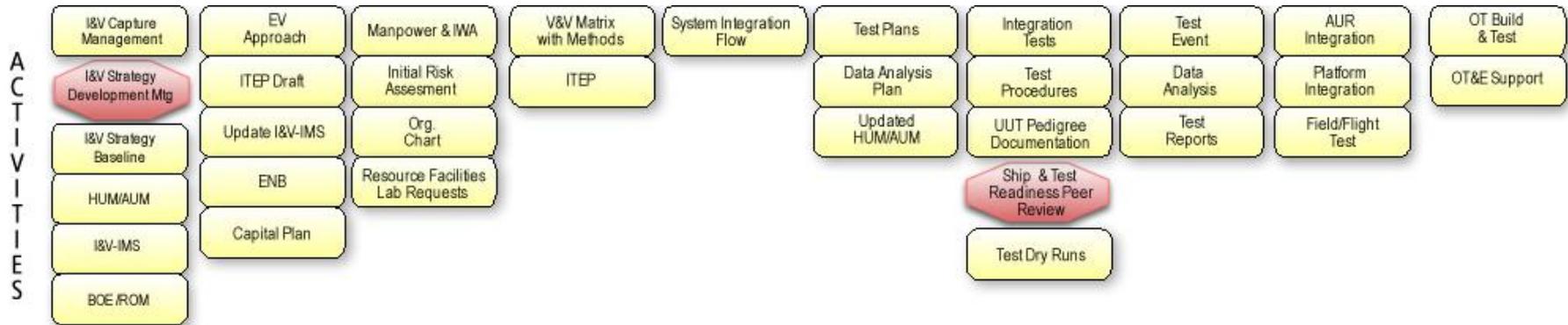


The One Page Process is structured around the existing IPDS process



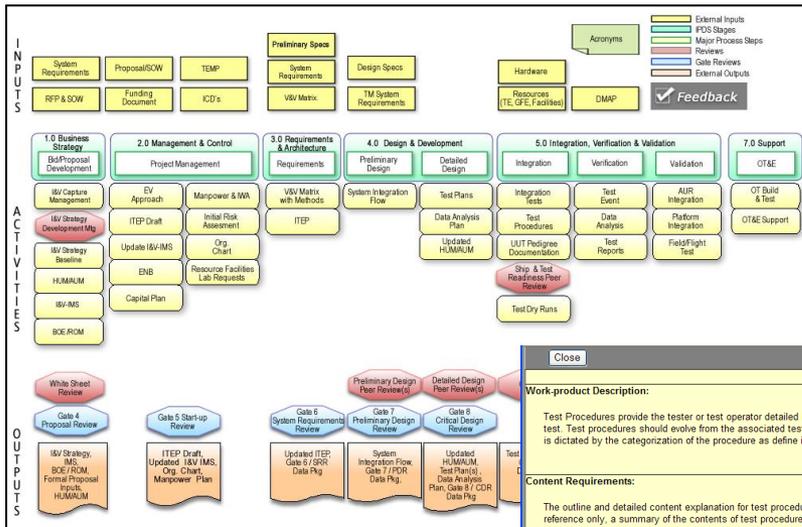
# Activities

Activities: The core tasks that I&V accomplishes during the course of a program.



*Note that activities can be repeated across multiple IPDS stages but are generally listed in the stage in which they are first completed*

# Activity Sheets



- Describe work activities in detail
- Links are provided to command media, templates, examples, etc.

Close		5.02
Work-product Description:		Ref Document(s)
Test Procedures provide the tester or test operator detailed instructions on how to perform the test. Test procedures should evolve from the associated test plans. The approval of test procedures is dictated by the categorization of the procedure as define in INST-ST-103.		INST-ST-103
Content Requirements:		
The outline and detailed content explanation for test procedures is contained in INST-ST-103A. For reference only, a summary of the contents of test procedures is below:		INST-ST-103A
<ol style="list-style-type: none"> <li>INTRODUCTION                             <ol style="list-style-type: none"> <li>General</li> <li>References</li> <li>Scope</li> <li>Test Flow</li> <li>Test Responsibilities</li> </ol> </li> <li>CONFIGURATION                             <ol style="list-style-type: none"> <li>Unit Under Test (UUT) Configuration</li> <li>Test Equipment Configuration</li> </ol> </li> <li>SAFETY                             <ol style="list-style-type: none"> <li>Warnings, Cautions and Notes</li> <li>Personnel Safety Concerns</li> <li>UUT/ITE Safety Concerns</li> </ol> </li> <li>SPECIAL TEST INSTRUCTIONS                             <ol style="list-style-type: none"> <li>Security</li> <li>Test Records</li> <li>Procedure Changes</li> <li>Original Procedure Development</li> <li>List of Participants</li> <li>Test Briefings</li> </ol> </li> <li>Unique Test Preparations</li> <li>Test Operations</li> <li>Post Test Operations</li> <li>Data Sheets</li> </ol> <p>Appendixes</p>		
Run Rules:		
a. Procedures should be peer reviewed before submission for approval. Approval is defined in INST-ST-103.		INST-ST-103

**Raytheon**  
Missile Systems

**Instructions**

ISSUED BY: 0103

**Hard Copies Uncontrolled - Verify Effective Date Prior to Use**

**Title:** I&V Test Procedure Outline

**Document Number:** INST-ST-103A

**Effective Date:** 14/05/10

**Function:** Integration and Verification

**Instruction Owner:** Center Manager

The following is a recommended outline for a generic procedure. Additional procedure outlines are provided in the appendix of this document.

**0.0 COVER SHEET**

Instruction INST-ST-103 covers the sign off requirements for test procedures

**1.0 INTRODUCTION**

**1.1 General**

This is a brief overview of the program and purpose of this document.

**1.2 References**

A listing of all references that are used within the procedure is included. Typical references may include: source requirements (plans), configuration disclosure, test equipment data, test requirements documents, etc. The reference list should include document numbers, title, version, date, security classification, and a description of the data content and use if it is not obvious from the title.

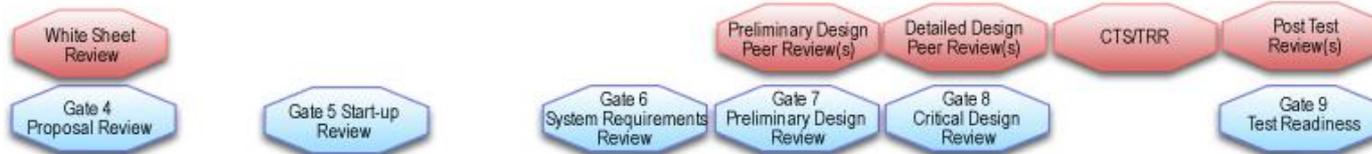
**1.3 Scope**

Scope - The test procedure contains a scope or purpose that defines the product configurations and tests covered by the procedure. If any of the uses have not been proofed, this condition is clearly stated.

# Reviews

Reviews are conducted before and after major activities and stages

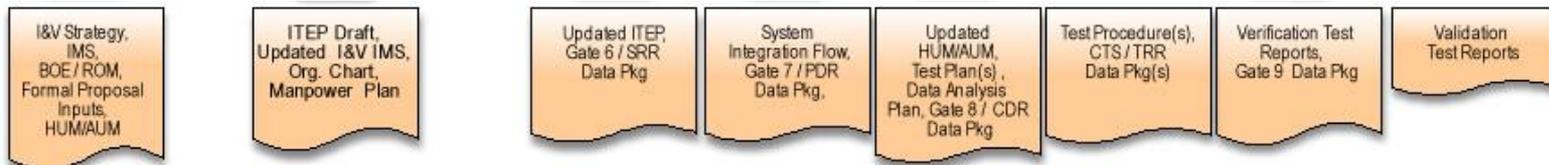
*Note that some reviews such as CTS/TRR can be repeated multiple times during the course of the program*



# Outputs

The products which are created during the course of the given stage

O  
U  
T  
P  
U  
T  
S



# Conclusion

---

- All linked material is controlled and approved by management before release
- Future is to expand it to expand its use in the directorate and to other areas of engineering