

 <b>Independent Verification &amp; Validation Facility</b>	<b>Independent Assessments</b>	<b>IVV 09-2 Revision: Rev H Effective Date: September 2002</b>
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APPROVAL SIGNATURES		DATE
Greg Blaney (original signature on file)	QMS Management Representative	9/18/02

REVISION HISTORY			
Rev No.	Description of Change	Author	Effective Date
Basic	Initial Release	Siamak Yassini IT/332	08/14/97
A	Changed Sections: modified 2.0, 4.0, 5.2.1, 5.2.3, 5.5.1.3, 5.5.1.4, 5.5.2.2, 5.5.2.5, 5.5.2.6, 6.0. Added criteria evaluation under section 5.5, section 5.5.2.1 totally revised Added more references under section 4.0 Section 6.0 is modified to reference to NPG 1441.1	Siamak Yassini IT/332	02/02/98
B	Changed sections: 3.0 added more definitions, 5.2.3 minor wordings, 5.5.1.4, 5.5.1.5 added contents of the IAR, 5.5.3 polished to meet the CRA WI contents, 7.2 and 7.3 minor changes into the flow to match with CRA WI	Siamak Yassini IT/332	04/02/98
C	Format change to be consistent with Ames	Siamak Yassini IT/332	04/29/98
D	Quality Record - format changes	Siamak Yassini IT/332	08/26/98
E	References to Ames Quality Manual replaced with references to IV&V Facility Quality Manual	Siamak Yassini IT/332	09/10/99
F	Format and Number changes; Delete Reference to Ames Research Center	Griggs	12/01/00
G	Update to accommodate changes in actual process	Marinero	8/29/01
H	Update to accommodate new Startup Process	Marinero	9/19/02

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 <b>Independent Verification &amp; Validation Facility</b>	<b>Independent Assessments</b>	<b>IVV 09-2 Revision: Rev H Effective Date: September 2002</b>
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<b>REFERENCE DOCUMENTS</b>	
Document Number	Document Title
NPG 1441.1	NASA Records Retention Schedules
IVV 09-4	Project Management
IVV 09-8	Project Startup
IVV 16	Control of Quality Records

## 1.0 Purpose

The purpose of this procedure is to establish a consistent and documented method of performing Independent Assessments (IA) at the NASA Independent Verification and Validation (IV&V) Facility after it has been determined that an IA is required using procedure IVV 09-8. This documentation will ensure uniformity of the assessment process across a variety of programs.

## 2.0 Scope

This procedure applies to all IV&V Facility personnel who perform Independent Assessments for the IV&V Facility.

## 3.0 Definitions

### 3.1 Independent Assessment (IA)

An Independent Assessment is an analysis of the software development life cycle and/or products, performed to identify critical software risks which could jeopardize mission safety and/or success. Independent Assessments can range from being an analysis of a specific sub-system performed at a specific time during the life cycle to performing assessments of several segments of the system over the entire life cycle of the development activity.

### 3.2 Independent Assessment Team (IAT)

The IV&V Facility Civil Servants and/or subcontractor personnel who perform the Independent Assessment.

### 3.3 Independent Assessment Manager (IAM)

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 <p><b>Independent Verification &amp; Validation Facility</b></p>	<p><b>Independent Assessments</b></p>	<p><b>IVV 09-2 Revision: Rev H Effective Date: September 2002</b></p>
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The IV&V Facility Civil Servant who manages the Independent Assessment task.

### **3.4 Independent Assessment Report (IAR)**

The assessment report that documents the analyses performed, findings and recommendations.

### **3.6 Computer Software Component (CSC)**

A distinct part of a Computer Software Configuration Item (CSCI). CSCs may be further decomposed into other CSCs and Computer Software Units (CSUs).

### **3.7 Computer Software Configuration Item (CSCI)**

A configuration item for computer software. In many projects, CSCIs are defined along processor boundaries, regardless of how many CSCs are involved.

### **3.8 Computer Software Unit (CSU)**

An element specified in the design of a CSC that is separately testable.

## **4.0 Flowchart**

A flow chart is not necessary for this document.

## **5.0 Responsibilities**

Refer to Section 6.0

## **6.0 Procedure**

### **6.1 Initiation of Assessment**

Software assessments are initiated by either a customer request or based upon the results of a project's evaluation from the IV&V criteria tool as performed within the Project Startup procedure, IVV 09-8.

### **6.2 Types of Assessment**

 <p><b>Independent Verification &amp; Validation Facility</b></p>	<p><b>Independent Assessments</b></p>	<p><b>IVV 09-2 Revision: Rev H Effective Date: September 2002</b></p>
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The Independent Assessment Manager (IAM) shall coordinate the assessment activities with the customer. The following types of assessment are considered:

### **6.2.1 Systems Assessment**

When short-term involvement is negotiated with the customer, the IAM shall recommend a system level assessment at any phase of the life-cycle development. The IAT shall perform a systems assessment to evaluate basic requirements, design, testing, and processes of systems under development. The IAT identifies risks associated with the safety and criticality of the mission and makes recommendations for corrective action.

### **6.2.2 Life-cycle Assessment**

When long-term involvement is negotiated with the customer, the IAT manager shall recommend a life-cycle assessment. A life-cycle development assessment identifies risks associated with mission success during any software development life-cycle phase and makes recommendations for corrective action. The IAT may also perform a life-cycle assessment of updated systems software changes and anomalies per mission as requested by the customer.

### **6.3 Customer Review**

The IAM shall negotiate the appropriate type of assessment with the customer. If the customer is in agreement, the IV&V Facility shall work with the customer to prepare a Memorandum of Agreement (MOA) in accordance with the MOA section of the IV&V Project Management Process. (see SLP IVV 09-4)

### **6.4 Request Documentation**

Upon approval of the MOA, the IAM shall request all documentation deemed necessary to perform the requested level of assessment. Documentation may include any or all of the documents listed below:

- Software Requirements Specification (SRS)
- Interface Control Document (ICD)
- Software Design Document (SDD)
- Software Test Plan (STP)
- Software Test Description (STD)
- Software Development Plan (SDP)
- Quality Assurance Plan (QA)

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 <p><b>Independent Verification &amp; Validation Facility</b></p>	<p><b>Independent Assessments</b></p>	<p><b>IVV 09-2 Revision: Rev H Effective Date: September 2002</b></p>
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- Configuration Management Manual (CM)
- Project Plan
- Systems Requirements Document
- System and Software Development Schedule
- Software Metrics
- Concept of Operations

## **6.5 Perform Assessment**

Upon receipt of the requested documentation, the IAT shall begin the assessment process. The following evaluation criteria may be considered, depending on the type and level of assessment being performed:

1. Traceability to the indicated documents
  - Traceability, adequacy, consistency of indicated documents for system specification, requirements, and interfaces
2. Appropriate analysis, design, and coding techniques
  - Evaluate design and source code for compliance with established standards, practices and conventions.
3. Adequate test coverage of requirements
  - Adequate detail in specifying test procedures
  - Completeness of testing

### **6.5.1 Systems Assessment**

#### **6.5.1.1 Process Analysis**

The IAT shall review and analyze the program documentation provided, applicable standards, and any other project materials provided by the customer. This analysis approach will identify technical issues that could result in problems with requirements, design, verification and validation testing, and operational readiness.

#### **6.5.1.2 Identify Risks**

The IAT shall assess the acceptability of the life-cycle development process relative to project specifications and accepted standards during the systems assessment. The IAT will then identify any issues which could increase the risk of mission failures.

#### **6.5.1.3 Recommend Corrective Actions**

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 <p><b>Independent Verification &amp; Validation Facility</b></p>	<p><b>Independent Assessments</b></p>	<p><b>IVV 09-2 Revision: Rev H Effective Date: September 2002</b></p>
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The IAT shall recommend a corrective action for each identified risk to the customer in the Independent Assessment Report (IAR).

#### **6.5.1.4 Independent Assessment Report (IAR)**

The IAT shall prepare a draft IAR that documents the findings and recommendations. This draft report shall be submitted to the customer and members of the IV&V Facility technical team selected by IAM for review. The final report shall be an update to the draft assessment report including all of the comments by review team and customer.

The IAR shall contain but is not limited to the following areas:

- Purpose
- Background
- Reference Documents
- Overview
- Process Analysis
- Criticality Risk Assessment
- Conclusions
- Recommendations and or corrective actions
- Acronyms and Abbreviations

### **6.5.2 Life-cycle Assessment**

#### **6.5.2.1 Process Analysis**

The IAT shall analyze new and revised process documentation as they relate to software functions defined in the MOA for each major software review. Analyses shall address the degree to which these process documents meet the goals and/or requirements for which they were produced. The IAT shall perform analyses in each of the following process areas to ensure that the processes are being implemented according to the associated plans, and that the implementation is appropriate for the program environment at the time of the analyses:

- Software Interface Document Control
- Software Configuration Management
- Software Development
- Software Test
- Software Integration

 <b>Independent Verification &amp; Validation Facility</b>	<b>Independent Assessments</b>	<b>IVV 09-2 Revision: Rev H Effective Date: September 2002</b>
--	--------------------------------	--

#### **6.5.2.2 Identify High Criticality CSCIs**

The IAT shall define the high criticality CSCIs and analyze each, focusing on criticality functions where failure could result in mission failure and ultimately jeopardize the safety of the mission.

#### **6.5.2.3 Identify Risks**

The IAT shall assess the acceptability of the life-cycle development process relative to project specifications and accepted standards in order to identify the risks of high criticality CSCIs associated with mission safety and success.

#### **5.5.2.4 Recommend Corrective Actions**

The IAT shall recommend a corrective action for each identified risk to the customer in the IAR.

#### **6.5.2.5 Independent Assessment Report (IAR)**

The IAT shall prepare a draft IAR that documents the findings and recommendations. This draft shall be submitted to the customer and members of the IV&V Facility technical team selected by the IAM for review. The final report shall be an update to the draft IAR including all of the comments by the review team and customer. The IAR shall contain the items on 6.5.1.4.

### **7.0 Metrics**

This section is not applicable to this process.

### **8.0 Records**

Refer to IVV 09-4 for applicable records requirements.