

KEITH A. REGAN COMPTROLLER KA LUNA HOʻOMALU HANA LAULĀ

CHRISTINE M. SAKUDA
CHIEF INFORMATION OFFICER
LUNA 'ENEHANA

STATE OF HAWAI'I | KA MOKU'ĀINA O HAWAI'I DEPARTMENT OF ACCOUNTING AND GENERAL SERVICES | KA 'OIHANA LOIHELU A LAWELAWE LAULĀ

OFFICE OF ENTERPRISE TECHNOLOGY SERVICES | KE'ENA HO'OLANA 'ENEHANA

P.O. BOX 119. HONOLULU, HAWAII 96810-0119

August 11, 2025

The Honorable Ronald D. Kouchi President of the Senate and Members of the Senate Thirty-Third State Legislature State Capitol, Room 409 Honolulu, Hawai'i 96813 The Honorable Nadine K. Nakamura Speaker and Members of the House of Representatives Thirty-Third State Legislature State Capitol, Room 431 Honolulu, Hawai'i 96813

Aloha Senate President Kouchi, House Speaker Nakamura, and Members of the Legislature:

Pursuant to HRS section 27-43.6, which requires the Chief Information Officer to submit applicable independent verification and validation (IV&V) reports to the Legislature within ten days of receiving the report, please find attached the report the Office of Enterprise Technology Services received for the State of Hawai'i, Department of Human Services, Systems Modernization Project.

In accordance with HRS section 93-16, this report may be viewed electronically at http://ets.hawaii.gov (see "Reports").

Sincerely,

Christine M. Sakuda Chief Information Officer State of Hawai'i

Attachments (2)

Hawai'i Department of Human Services

Child Welfare Services

HITHRIVE (Comprehensive Child Welfare Information System)

IV&V MONTHLY STATUS DASHBOARD July 2025 Final v1



IV&V Monthly Executive Summary

This IV&V Monthly Activity Report (MAR) covers the July 01 - 31 2025 reporting period.

IV&V Project Health Metrics

IV&V Project Health Metrics are based on the HI THRIVE PMO Metrics and Best Practice Metrics developed by IV&V and approved in the IV&V Management Plan.

. Budget RED, Quality RED, Schedule YELLOW, Scope GREEN,

IV&V Focus Area Health

IV&V Focus Area Health are metrics derived from the conformance to the eight IV&V technical focus areas: Technical Project Management, Support, Architecture, Continuous Delivery, Product Increment Planning, Development, Implementation, and Project Closure.

IV&V Technical Project Management Health

- Technical Project Management IV&V Focus Area has continued YELLOW as for this period due to multiple baselined tasks and contract deliverables that are showing as late to finish or late to start.
 The HI THRIVE PMO is reporting YELLOW for the July Monthly Schedule Scorecard.

- The Support Focus Area maintains YELLOW due to poor deliverable quality and continued SI Vendor Deliverable rejections during June
 The HI THRIVE PMO is reporting YELLOW for July Monthly Quality Scorecard as well.

IV&V Architecture Focus Area Health

· The Architecture Focus Area is observed for the first time this reporting period and is rated as GREEN with the approval of the SI-16 System Architecture Deliverable.

All other IV&V Focus Areas are Blue for not enough data to report.

IV&V Observations:

No New Observations Opened OR Closed This Reporting Period.

Active

• One Medium Observation 6.2.2.1 Ineffective Jira Configuration and Setup for HI THRIVE. The Vendor agreed to make updates to the JIRA implementation and IV&V will review and analyze those updates for conformance after SPRINT initiation. Until SPRINT start this observation is in a monitor status.

July 2025 Executive Summary

During the July 2025 reporting period IV&V continued Vendor Deliverable artifact review and collaborative involvement with the HI THRIVE PMO. The SI Vendor continued the development and updates of contract defined deliverables through the reporting period and the HI THRIVE Team have provided adequate performance delivery expectations, assessments of quality and conformity to contract and best practices. The results of the reviews have continued to demonstrate that Vendor deliverable submissions do not meet expected levels of quality or conformity to contract expectations. IV&V has observed that the HI THRIVE PMO is consistently providing appropriate feedback to the Vendor for improvement of timing and content of deliverables. The SI Vendor while improving on some deliverable management activities continue to be unable to consistentles and work products that are acceptable on first or subsequent review passes due to mismatches between Vendor understanding and HI THRIVE expectations. IV&V continues to observe that the HI THRIVE PMO vendor management practices are acceptable for the associated project management tasks, however the Vendor has not been able to demonstrate a consistent ability to meet contract obligations

Vendor Contract deliverables require an average 3.3 iterative updates and reviews prior to HI THRIVE approval and incur an average of 2.2:1 rejections per deliverable. The updates and rejections have degraded from the previous month. The HI THRIVE Project Team has developed Issue 8 related to deliverable quality and is continuing to work with the Vendor to manage this item to closure.

Although the SI-Vendor is now operating under an approved baselined schedule (SI-5) IV&V continues to observe a consistent pattern of missed deliverable and milestone dates. IV&V has identified a total of 350 active tasks (tasks that have previous start dates and are unfinished and/or tasks that are expected to start within 30 days). Out of those 350 active project tasks; 200 active project tasks are late to finish and 210 project tasks are late to start. IV&V questions the rigor applied and the ability by the Vendor to manage the schedule and associated project tasks accurately. IV&V strongly believes the HI THRIVE PMO and Executive Stakeholders should carefully assess the patterns and historical delivery performance of the SI-Vendor to determine if any additional performance or contract management steps are necessary to ensure the success of the HI THRIVE Project.

IV&V continues to recommend that the HI THRIVE Team request that the SI-Vendor provide reporting on the schedule weekly, showing all late to finish tasks and all late to start tasks and all tasks that are at risk of either within a defined future timeframe

IV&V Active	Observations Summary						
IV&V	Observations Summary						
Dbservation Number	Observation Title	IV&V Observation Description	IV&V Recommendation	State Ongoing Update	Priority	Owner	Date Identified
.2.2.1	6.2.2.1 Ineffective Jira Configuration and Setup for HI THRIVE	On June 16, 2025, the IV&V team assessed Cardinality Al HI-THRIVE's current Jira configuration implementation for managing the HI DHS HI THRIVE CWIS COTS solution. The IV&V team submitted a formal Task and Activity Report (TAR) to the DHS HI THRIVE PMO on June 17, 2025. The TAR is related to the IV&V statement of Work tasks in Section 6, Implementation. The Cardinality Al HI-THRIVE Jira setup shows gaps in the following areas: - Observation 6.2.2.1.1 JIRA Project Basics - Observation 6.2.2.1.2 Issue Types and Workflows - Observation 6.2.2.1.4 Permission adcess Control - Observation 6.2.2.1.5 Sprint Boards - Observation 6.2.2.1.7 Automation Rules - Observation 6.2.2.1.8 Dashboards and Reports - Observation 6.2.2.1.9 Jira integration and Add-ons - Observation 6.2.2.1.9 Jira integration and Add-ons - Observation 6.2.2.1.9 Jira integration and Add-ons - Observation 6.2.2.1.10 Governance	Recommendation 6.2.2.1 IV&V General recommendations with detailed recommendations in the observation document. The initial default setting of the Cardinality JIRA setup is sound, with some easily corrected defects before full deployment of the project instance. Cardinality needs to fix these defects, configure sprint boards, clean up unused fields, and enable the basic zero-cost automation and notifications before commencing sprint activity. There are 28 individual recommendations for Jira updates in the Observation.		Medium	marmstrong@dhs.hawa	06/16/25

Project and Focus Area Health Summary

This area provides stoplight indicators of overall IV&V assessed Project Health and also individual Technical Process Areas that are evaluated by the IV&V Team during the reporting period.

The IV&V Team set the metrics Baseline in the 5/25 reporting period, 8 months after Vendor contract execution, due to the late approval of SI-5 Vendor Project Schedule. IV&V is now reporting monthly against the Baseline for Project Health.

Project Health is showing significant risks due to inconsistent delivery of Vendor Deliverables to HI-THRIVE expectations and inconsistent management of project schedule and tasks.

IV&V Monthly Overall Project Health										
Overall Project Status	Overall Project Status Monthly Budget Health Monthly Quality Health Monthly Schedule Health Monthly Scope Health									
•	•	•	•	•						

Monthly Project Health Do	etail			
Project Health Area	Baseline Health	6/25 Health	7/25 Health	Details and Comments
Health Overall	•	•	•	68% July Worse 34% June Health is averaged across each area
Budget Overall	•	•	•	59.5% July Worse 33% June SPI Driving Poor Budget.
Cost Variance Ratio	•	•	•	.66 July Improvement 0.56 June
Schedule Performance Indicator	•	•	•	19% July Worse 61% June EV= \$1.7M Planned Value = 9.5M
Quality Overall	•	•	•	101% July Worse 72% June Poor Deliverable Processes
Deliverable Quality	•	•	•	9.86% July Improvement 10.21% June Deliverable PMO Metrics
Deliverable Schedule Variance	•	•	•	191.4% Worse July 132.89% June Deliverable Rejections
Requirements Process Quality	•	•	•	These areas will be measured once Sprints start.
Design Process Quality	•	•	•	These areas will be measured once Sprints start.
Sprint Process Quality	•	•	•	These areas will be measured once Sprints start.
Test Process Quality	•	•	•	These areas will be measured once Sprints start.
Schedule Overall	•			13% July Improvement 15% June
Milestone Variance	•	-		12.03% July Improvement 15.28% June
Schedule Variance	•	•	0	14.47% July Worse 14.38% June
Scope Overall	•	•	•	0 No changes to scope that impact budget
Change Request Ratio	•	•	•	0 No defined scope changes

IV&V Monthly Project Health by Focus Area									
IV&V Focus Area	Previous Month's Health	Current Month's Health	Comments						
1.0 Technical Project Management		•	Some Deliverables and Tasks not in date compliance.						
2.0 Support Process IV&V	•		Continued Yellow due to rejections of Deliverables.						
3.0 Solution Architecture	•	•	SI-16 System Architecture Approved						
4.0 Continuous Delivery	•	•							
5.0 Product Increment Planning	•	•							
6.0 Development IV&V	•	•							
7.0 Implementation IV&V	•	•							
8.0 Project Closure	•	•							

Project Health Metric Legend										
Budget	Quality	Schedule	Scope							
Baseline Cost Variance Ratio (CVR)	Baseline Deliverable Quality (DQ)	Approved Baseline 4/1-5/31:	Baseline Change Request Ratio (CRR)							
Baseline Schedule Performance Index (SPI)	Baseline Deliverable Schedule Variance (DSV)	Baseline Schedule Variance (SV)								
		Baseline Milestone Variance (MV)								

IV&V Monthly Project Health Legend			
GREEN	YELLOW	RED	BLUE
Satisfactory – No corrective actions necessary. All life cycle activities conform to requirements. Implemented processes are satisfactory. Risks or issues may exist and contain appropriate mitigation or resolution steps and the project is adequately addressing them. The current technical risk to the project and software quality is low. <10% Variance	soon. Some life cycle activities are not in alignment with requirements. Some processes may require process improvements.	Critical – Escalated for immediate action. Many life cycle activities are not in alignment with requirements. Many processes require corrective action. Risk mitigation is not effective, or issue resolution is not timely. Critical processes are not effective and are resulting in delays or rework. The current technical risk to the project and software quality is significant. >20% Variance	Not enough data is available to make a determination about project health.

Observations Active During Reporting Period

This section provides detail on all IV&V Observations that were opened, closed, or active and their type Risk, Issue, or Neutral. Initial Observations remain Neutral (not issue or risk) until formal agreement is reached with HI THRIVE Project Team.

IV&V Observations Active During the Month											
Observation Title	IV&V Observation Description	IV&V Impact Description	IV&V Recommendation	State Ongoing Update	IV&V Ongoing Update	Status					
6.2.2.1 Ineffective Jira Configuration and Setup for HI THRIVE	On June 16, 2025, the IV&V team assessed Cardinality AI HI-THRIVE's current Jira configuration implementation for managing the HI DHS HI THRIVE CCWIS COTS solution. The IV&V team submitted a formal Task and Activity Report (TAR) to the DHS HI THRIVE PMO on June 17, 2025. The TAR is related to the IV&V Statement of Work tasks in Section 6, Implementation. The Cardinality AI HI-THRIVE Jira setup shows gaps in the following species.	Impact 6.2.2.1 Without an effective Jira configuration, the project risks: • Gaps in verifying that CCWIS requirements are fully implemented and tested. • Difficulty tracking progress of hybrid sprints and fixed-phase milestones. • Weak alignment between development work and COTS configuration tasks. • Incomplete or unclear	Recommendation 6.2.2.1 IV&V General recommendation with detailed recommendations in the observation document. The initial default setting of the Cardinality JIRA setup is sound, with some easily corrected defects before full deployment of the project instance. Cardinality needs to fix these defects, configure sprint boards, clean up unused fields, and enable the basic zero-cost automation and notifications before commencing sprint activity. There are 28 individual recommendations for Jira updates in the Observation.		July IV&V Ongoing Update: IV&V in collaboration with the HI THRIVE Team updated the detailed observations and recommendations associated with this Summary Observation. Those updates are incorporated into the IV&V Task and Activity Report attached to this Smartsheet. The Vendor agreed to most of the recommendations made by IV&V and will update Jira accordingly. IV&V will monitor this observation until SPRINTS start and will resource to the line.						

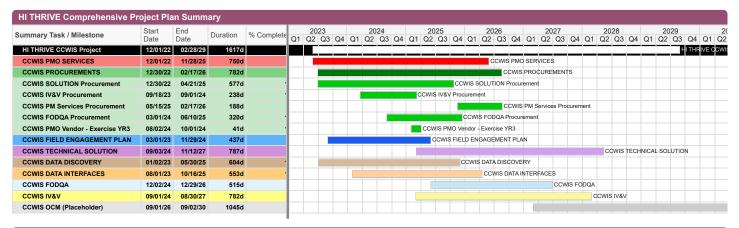
Observation 6.2.2.1.1 JIRA
Project Basics Observation 6.2.2.1.2 Issue
Types and Workflows Observation 6.2.2.1.3 Fields and
Screens Observation 6.2.2.1.5 Sprint
Boards Observation 6.2.2.1.6
Notifications Observation 6.2.2.1.7 Automation
Rules Observation 6.2.2.1.8
Dashboards and Reports Observation 6.2.2.1.8
Dashboards and Reports Observation 6.2.2.1.9 Jira
integration and Add-ons Observation 6.2.2.1.0
Governance

IV&V Activity Status

The 5 activity sections provide a summary of IV&V budget, planning, and task activities for the reporting period.

IV&V Monthly B	IV&V Monthly Budget Summary												
Development Project Costs	Total Contract Amount	Actual To Date	Remaining on Contract	Quarter 1 Oct - Dec Total	Quarter 2 Jan - March Total	Quarter 3 Apr - Jun	July	August	Sept	Quarter 4 July - Sept	Reason for Variance or Action Plan to Correct		
	Total Contract Amount	Actual To Date FFY 2025	Remaining on Contract	Q1 Oct - Dec 2024	Q2 Jan - March 2025	Q3 April - Jun 2025	July 2025	August 2025	Sept 2025	Q4 July - Sept 2025	Reason for Variance		
Contractor: TMS IV&V	\$2,095,322	\$793,046	\$1,302,276	\$201,529	\$192,277	\$324,246	\$74,993		\$0	\$74,993			

IV&V Mont	&V Monthly Project Summary								
Year/Month	Monthly Summary								
	PROJECT PLAN SUMMARY: WORK COMPLETED: June IVV.5, IVV.70 Report Deliverables Submitted and Approved Deliverable Re-Review SI-9, SI-11, SI-12, SI-13, SI-16, SI-17, SI-20, SI-24, SI-30 DED Review: SI-18, SI-25, SI-31								
2025 -	WORK IN PROGRESS: July/August IVV.5, IVV.7, IVV.10 Report Deliverables Review of DEDs and Deliverables								
	UNPLANNED OR AD-HOC WORK: No unplanned work.								
	PLANNED WORK NOT ACCOMPLISHED:								
	ACTIVITIES PLANNED FOR THE NEXT REPORTING PERIOD: August IVV.5, IVV.7, IVV.10 Review of Vendor artifacts as delivered.								



IV&V Calendar and Meetings Attended

This area provides a summary of IV&V out of office dates, ongoing meetings, and scheduled ad-hoc meetings.

IV&V Monthly Calendar														
Resource	Start Date	End Date	Days	Forward Contact	Jun	Jul 6	Jul Jul 13	Jul 20	Jul 27	Aug 3	Aug 10	Aug 17	Aug 24	
Independence Day	07/04/25	07/04/25		N/A	_ inc	dependenc	e Day							

IV&V Monthly Meeting Register											
Meeting Name	Туре	Purpose / Topics Discussed	Meeting Minutes	Minutes Approved	Feedback & Follow-ups	Mandatory Attendance	Optional Attendance	Date - Time			
No Additional Meetings Held								07/01/25 - 10:00 - 11:00 AM HST			

IV&V Recurring Meeting Register										
Meeting Name	Purpose / Topics Discussed	Туре	Mandatory Attendance	Optional Attendance	Cadence (Frequency)	Meeting Length (Minutes)				
IV&V Observations	Weekly Check-In with TMS (IV&V) vendor to discuss weekly observations and if applicable adhoc items	Recurring	Core Team PMO IV&V Vendor		Weekly Tuesdays 9:00-9:30 am HST & Thursdays 10:00 - 10:30 am HST	30				
	Review of all observations for the month and discussion of items to be included in the Monthly		Core Team		Thursday of the 1st week of the					

IVAV REVIEW OF MORTHLY REPORT	Report that will be distributed to ACF/ETS/DHS Executive Leadership/HI THRIVE project team	Recurring	IV&V Vendor		10110Wing month 9:00 - 9:50 am HST	ວບ
LI TURNE Core OFT & Cordy Technical	Meeting to discuss technical topics relating to the HI THRIVE project. Agenda will be created for each meeting with topics for discussion and sent to attendees before hand. Agenda topics may include architecture, access and controls, interfaces, standards and protocols, etc. Security will be discussed in a separate meeting.	Recurring	Executive Core Team PMO SME - System IV&V Vendor		Every Wednesday 11:00 - 11:50 am HST	50
TMS IV&V - Mark Choi	Discuss CCWIS technical topics with Mark Choi	Recurring	Executive IV&V Vendor	Core Team PMO	Every other Friday 07:30 - 08:00 AM HST	30

						Meeting Longth
eting Name	Purpose / Topics Discussed	Туре	Mandatory Attendance	Optional Attendance	Meeting Date	Meeting Length (Minutes)
I-9 V.3 IV&V Comments review	Address any outstanding IV&V comments from the V3 submission of SI-9	Topic	Core Team PMO IV&V Vendor Technical Vendor		06/03/25	
configuration Changes Review (Case lanagement)	Review the final list of configuration changes, workflows, and notifications one more time in preparation for the user discovery closeout	Topic	Core Team PMO SME - Business SME - System IV&V Vendor Technical Vendor		06/03/25	
ntegration of Outlook	Notifications: Confirm cost associated (each notification has a cost associated with it) Provide DHS with cost details, including pricing breakdown w/functionality, other associated costs Functionality: Two-way - integration discussion	Topic	Core Team PMO IV&V Vendor Technical Vendor		06/03/25	
I-15 Deliverable (Comments Review)	Review of Comments for SI-15 Deliverable.	Торіс	Core Team PMO IV&V Vendor Technical Vendor		06/03/25	
21 DED (Data Mapping Document) eview	Clarify outstanding questions on the SI 21 (Data Mapping Document) DED.	Topic	Core Team PMO IV&V Vendor Technical Vendor		06/04/25	
onfiguration Changes Review (Program evelopment)	Review the final list of configuration changes, workflows, and notifications one more time in preparation for the user discovery closeout	Topic	Core Team PMO SME - Business SME - System IV&V Vendor Technical Vendor		06/04/25	
onfiguration Changes Review icensing)	Review the final list of configuration changes, workflows, and notifications one more time in preparation for the user discovery closeout	Topic	Core Team PMO SME - Business SME - System IV&V Vendor Technical Vendor		06/04/25	
onfiguration Changes Review (IV E igibility, External Portals, Reporting/BI)	Review the final list of configuration changes, workflows, and notifications one more time in preparation for the user discovery closeout	Торіс	Core Team PMO SME - Business SME - System IV&V Vendor Technical Vendor		06/05/25	
1 25 DED Review	Clarify outstanding questions on the SI 25 (Test Cases) DED.	Торіс	Core Team PMO IV&V Vendor Technical Vendor		06/06/25	
amazon Connect Security Review - CTI	AGENDA: - Conduct walk-through of AWS Connect Security documentation (attached) - Q&A - Decision on CTI for HI THRIVE or determine if additional information is needed	Topic	Executive Core Team PMO SME - System IV&V Vendor Technical Vendor		06/06/25	
linti Data Discussion Regroup	AGENDA: Discuss HI Data in Binti for data migration extract	Topic	Core Team PMO SME - System IV&V Vendor Technical Vendor		06/06/25	
il 30 - Stakeholder Matrix (Regroup)	Review the updated matrix - SI_30_Stakeholder_Analysis_Report_v09.xlsx.	Topic	Core Team PMO SME - Business IV&V Vendor Technical Vendor		06/06/25	
il 12 (RTM Matrix) - Review before Resubmission	Review the feedback received and the changes made to the SI-12 document before resubmitting the deliverable	Торіс	Core Team PMO IV&V Vendor Technical Vendor		06/09/25	
Sprint 0 (Planning Sprint - Kick Off) I/II	- Welcome and Level-Setting (15 min): Introductory remarks & overview of session objectives Agile & Scrum 101 (15 min): Introduction to Agile principles and Scrum framework Configuration Lifecycle Overview (30 min): Explanation of the configuration lifecycle and its role in project delivery Sprint Lifecycle (30 min): Detailed walkthrough of sprint phases, from planning to review Working Session (20 mins): HI THRIVE's Roles in Sprints (20 min): Interactive discussion on team roles and contributions during sprints Q&A and Day 2 Prep (10 min)	Topic	Core Team PMO SME - Business SME - System IV&V Vendor Technical Vendor		06/10/25	
I-14 - Deliverable Walkthrough & Review	Review comments and feedback on SI-14 (complete document, all modules)	Торіс	Core Team PMO SME - Business IV&V Vendor		06/09/25	
print 0 (Planning Sprint - Kick Off) II/II	Day 1 Recap (10 min): Summary of key takeaways from the morning session. Backlog Management & Sprint Planning (25 min): Managing the backlog and preparing for upcoming sprints. JIRA Walkthrough and Simulation (50 min): Step-by-step simulation of using JIRA o Review of Intake module user stories as an example Collaboration Cadence (15 min): Overview of how teams can collaborate regularly and effectively. Q&A + Close Out (10 min): Final questions and a wrap-up for the day.	Торіс	Core Team PMO SME - Business SME - System IV&V Vendor Technical Vendor		06/12/25	
31-24 Test Plan Deliverable Resubmission	Pavious changes addresses from CL24 Test Dian Deliverable before	Topic	Core Team PMO SME - System IV&V Vendor Technical Vendor		06/13/25	
SI-16 HI THRIVE Architecture Doc Deliverable	Preview the SI-16 System Architecture Deliverable prior to the initial submission	Topic	Core Team PMO SME - System IV&V Vendor		06/13/25	

			recrimoar venuor		
JIRA Office Hours (Optional)	support for anyone who needs help logging into the HI THRIVE JIRA	Ad Hoc	Core Team PMO SME - Business SME - System IV&V Vendor Technical Vendor	06/16/25	60
CTI Demo (HI THRIVE System)	in-depth AWS Connect walkthrough (CTI)	Topic	Core Team PMO SME - Business SME - System IV&V Vendor Technical Vendor	06/17/25	60
Discuss SI-14 Review & Feedback	Review the insights from TMS on SI-14	Topic	Core Team PMO IV&V Vendor	06/17/25	60

IV&V Scope and Purpose

This seport documents observations that the Technology Management Solutions, Inc. (TMS) Independent Verification and Validation team (IV&V) made on the HI THRIVE Comprehensive Child Welfare Information System (CCWIS) Project during the current reporting period.

The objective of the IV&V efforts is to review and/or test selected HI THRIVE Project processes and products to assure that the associated systems meet functional and non-functional requirements, and are successfully implemented within the processes, time frames, and constraints identified in the HI THRIVE Project contracts. The IV&V team determines whether project staff members are following planned processes, and whether contractor work meets project requirements. The IV&V team provides independent testing and auditing of project deliverables against requirements, and a special emphasis on deliverable quality assurance and reviews of information security control.

- The TMS IV&V team approach encourages these positive outcomes:

 1. Collaborative identification and communication of successes and recommended improvements.

 2. Detection and correction of errors early in the project life cycle.

- Reduction in development risks, costs and adverse schedule impacts.
 Enhancement of project products' quality, integrity, and security.
 Increased visibility into and greater understanding of the project and processes.

- IV&V evaluations will include:

 1. Review of content quality
 2. Review of conformance to standards and best practices
 3. Quality assessments of work products
 4. Quality assessments of work practices
 5. Process improvement identification
 6. Recommendations for deficiency remediation

For the detailed scope and approach of the IV&V reviews, assessments and evaluations refer to the IV&V Deliverable: IVV.1 IV&V Management Plan and the IV&V guiding process document IEEE 1012-2016 Standard for System, Software, and Hardware Verification and Validation.