



Orion IV&V New Analyst Course of Study



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INTRODUCTION

The Orion IV&V Buddy Indoctrination (Buddy INDOC) program is designed to provide new IV&V analysts (trainees) with familiarization of general program topics and more focused knowledge regarding assigned project-specific areas. Additionally, this program will provide project-specific knowledge to seasoned analysts who are transitioning to new projects as means to share best practices across projects to enhance effectiveness and create efficiencies. The purpose of this document is to provide the framework to accomplish this broad objective through the implementation of a managed, structured curriculum for the trainee to accomplish under the oversight/direction of a project-assigned senior IV&V analyst, or “Buddy.” This Buddy not only guides the new analyst through the INDOC “roadmap” (course of study) but also serves as a mentor to the trainee, providing a sounding board and information source for more in-depth discussions of various topics of interest identified within the INDOC program’s curriculum.

PROGRAM OBJECTIVES

The objectives of the program are:

- Utilizing a structured, managed approach, provide new project analysts with the skills, knowledge, and tools to successfully and expeditiously integrate into their new project team
- Provide project team leadership with a means to ensure that newer project work force members possess the highest level of competency possible
- Facilitate enhancement of project team knowledge transfer communication pathways through structured interaction/discussion between senior analysts (Buddies) and newer/less experienced analysts
- Provide a framework for the evolution of “mentor-protégé” relationships

RESPONSIBILITIES

Both the assigned Buddy and the trainee are responsible for the timely completion and documentation of this INDOC curriculum. It is imperative that each individual exercise effective communication with the other with regard to schedule, availability, event completion, etc.

RESPONSIBILITIES – Trainee

Initiative on the part of the trainee is essential! Take advantage of every opportunity to complete this training. Work closely with the assigned Buddy and the training POCs. Complete Appendix A tracking material as described below.



RESPONSIBILITIES – Buddy (Primary Mentor)

The Buddy will be responsible for walking the trainee through the INDOC curriculum. Before the trainee moves through each block, the Buddy should look at the material to ensure their knowledge and the material are up to date. If the material needs to be updated, the Buddy has the authority as an experienced member of the team to perform the updates. She or he can also work with the Training Working Group if additional support is needed in the update.

Generally, most of the blocks are self-study, so the Buddy can meet daily or as needed while the trainee walks through the material. At these meetings, the Buddy and trainee can work through the blocks completed since the last meeting and address any questions or concerns. Also, any classroom type blocks that will be taught by the Buddy can be presented at these. As the trainee progresses in competency, the frequency of the meetings can be decreased. The expectation of the Buddy is to lead the trainee through the INDOC curriculum following the flow suggested by the roadmap in Appendix A and ensure he or she completes it in order to become a competent member of the team. The Buddy will track the progress of the trainee and provide feedback on this training program.

ADMINISTRATION AND DOCUMENTATION

As the trainee completes a training block, he or she should track their training using the roadmap spreadsheet linked in Appendix A. If desired, they can use the printable section contained in Appendix B with space for notes, comments, and questions for the Buddy. After the completion of each training block by the trainee, she or he will mark the date completed in the roadmap spreadsheet and inform the Buddy of their completion. The Buddy will document any interesting discussion and feedback. Once all appropriate training blocks have been completed, the buddy and trainee will provide positive and/or negative feedback to the Training Working Group via a high-level narrative provided in email or at a meeting with the Training Working Group.

LEARNER PARTICIPATION

For most training blocks, materials is available for on-demand viewing through the Lesson Media section of each block's JIRA item. Links are provided to the material stored on Confluence, ECM, Pegasus, JIRA, etc. As mentioned previously, completing the material should be marked in the roadmap spreadsheet and discussed with the Buddy. It is also important for them to be accomplished in the sequence portrayed in the INDOC "Roadmap."

INDOC CHANGES

As with all things, the needs, requirements, and component material will change over time. It is the responsibility of project team leadership, Buddies, and new analysts to work with the Training Working Group to update, replace, and/or add new training blocks as the program develops. As the Buddy and trainee work through the material, the Buddy has the authority as an experienced member of the team to make appropriate updates to the material.



TYPES OF TRAINING

The training developed for new analysts can be identified in the Orion training library by looking for identifiers beginning with NAT (New Analyst Training). The identifier will also contain the training section and individual block ids. For example, the new analyst (NAT) basic training (BTB) block for Orion's IV&V vision (VIS) can be found with NAT-BTB-VIS. The following are examples of the types of training block the trainee and their buddy will use.

- Self-Study Session
- Video Session
- Lab Session
- Classroom Session – a presentation and discussion given by a knowledgeable member of the team and/or the buddy
- On-the-Job Training, based on a very specific need by the analyst or by the IV&V team

Whether or not the buddy is active in the session, they will meet with the trainee after completion of a block or set of blocks to discuss particularly important aspects and answer any questions.

TYPES OF TRAINING – Labs

One very particular type of training is a lab. It will be **interactive** and not just a video, a set of reading material, or a presentation. A lab should have a **general outline and description**. A lab could be a single session in a **classroom** type setting with a teacher and student(s) during which the teacher leads the student(s) through a series of interactive exercises. A lab could be a **multisession** event in which the teacher has a kickoff session to describe the activity and provide materials, followed by a period of hours or days in which the student(s) performs the activity on their own, and concluded with a session with the teacher in which the results of the activity are discussed.



ORION/MPCV INDOCTRINATION (INDOC) ROADMAP

Basic New Analyst Training Blocks

NAT-BTB-VIS: Orion IV&V Vision Overview

JIRA ID: HEOMPCV-1714

Training POC: Project Manager (PM Justin Smith) and/or Project Lead (PL John Bradbury)

Duration: 1.5 hours

Lesson Type: Classroom

Prerequisite: None.

Lesson Description: This is a 1.5 hour overview provided by the Orion IV&V PM and/or PL covering the Orion IV&V Vision.

Lesson Objectives: This session will be an interactive session between the analyst and project leadership reviewing the expectations of Orion IV&V leadership, and the expectations that Orion IV&V leadership will have of the analyst.

NAT-BTB-NAT: New Analyst Training Overview

JIRA ID: HEOMPCV-1715

Training POC: Justin Smith

Duration: 15 minutes

Lesson Type: Classroom

Prerequisite: None

Lesson Description: New analyst Orion Training Approach

Lesson Objectives: New analysts will receive access through the PM to the Orion Confluence pages and ECM. A large amount of material is located on both of these resources. Analysts will gain an understanding of Orion's new analyst training approach. Analysts will gain understanding of acronyms list and concrete terms and examples, location of training material, how to utilize a training flow and answer or add new questions to training objectives, and points of contact within the IV&V Orion team.

NAT-BTB-FTR: Follow The Risk Overview

JIRA ID: HEOMPCV-1716

Training POC: Primary Mentor

Duration: 50 minutes

Lesson Type: Self-Study

Prerequisite: None

Lesson Description: Overview of the Follow the Risk (FTR) 9 step process. This training initiates a new analyst into how Orion IV&V mitigates risk for the NASA Orion project as well as residual risk.

Lesson Objectives: New analysts will gain a high level understanding of Orion functional and non-functional risk categories and the FTR 9 step process. This training includes high level analysis expectations for each step and understanding the process flow or gates between each



step in the process. Define material for this training with concrete examples. The FTR 9 step process includes the following steps:

1. Explore risk landscape.
2. Identify IV&V Question and Concerns.
3. Determine Assurance Objectives (AOs).
4. Identify Evidence needed to satisfy AOs.
5. Determine analysis tasks needed to produce evidence.
6. Perform analysis.
7. Produce evidence.
8. Communicate Assurance Conclusions (ACs).
9. Communicate IV&V value.

NAT-BTB-CBA: Capability Based Assurance

JIRA ID: HEOMPCV-1717

Training POC: Gerek Whitman

Duration: 50 minutes

Lesson Type: Classroom

Prerequisite: None

Lesson Description: Overview of the Orion IV&V capabilities based assurance (CBA) approach. This training initiates a new analyst into capability based assurances in support of Orion's "Follow The Risk" process.

Lesson Objectives: New analysts will gain high level insight into how to focus analysis on software capabilities in the context of mission capabilities. This training includes some high level Orion "Functional Operational Capabilities" (FOC), Orion technical reference expectations, and an overview of IV&V's three questions.

NAT-BTB-ANH: Assurance Network and Heatmap

JIRA ID: HEOMPCV-1784

Training POC: Primary Mentor

Duration: 50 Minutes

Lesson Type: Self-Study

Prerequisite: None

Lesson Description: Overview of the Orion IV&V assurance network and heatmap.

Lesson Objectives: New analysts will gain high level insight into capabilities and their associated assurance network. The heatmap will be discussed allowing a larger picture view of the levels of risk (Critical/red, Major/yellow, and Minor/green).

NAT-BTF-ROI: Review of a High Severity Issue

JIRA ID: HEOMPCV-1808

Training POC: Primary Mentor

Duration: 50 Minutes

Lesson Type: Self-Study



Prerequisite:

If analyst has not been through IV&V Boot Camp:

- Read section 2.1 of S3105: Guidelines for Writing IV&V TIMs:
https://www.nasa.gov/sites/default/files/atoms/files/s3105_guidelines_for_writing_ivv_tims_-_ver_k_-_10-25-2017.pdf
- A quick introduction to Resolve (via screenshot or Primary Mentor showing them)
- Orion Issues in Resolve

If analyst has been through IV&V Boot Camp: None

Lesson Description: A familiarity review of high severity Orion issue.

Lesson Objectives: New analysts will gain high level insight into an Orion high severity technical issue memorandum (TIM). Possibly done in Resolve, this should give a new analyst the context and description of a principle product that is generated by performing IV&V on the Orion project. A new analyst will gain insight into the drivers of severity 1, 2, and 3 issues. Issues are one of the primary items communicated to the project for correcting Orion flight software deficiencies.

NAT-BTB-OFAM: Orion System Familiarization

JIRA ID: HEOMPCV-1718

Training POC: Primary Mentor

Duration: 50 Minutes

Lesson Type: Self-Study

Prerequisite: None

Lesson Description: New Analyst training, at a high level, of the Orion architecture and artifact hierarchy of system, subsystem and software components.

Lesson Objectives: New analysts will gain insight into the systems composing a nominal EM-1 mission, the subsystem architecture of Orion and the software components. The critical behaviors of unique software components. Call out Scrum team quick links in this training and special confluence pages.



Follow The Risk Training Blocks

NAT-FTR-OSYS: Explore Orion Risk Landscape

JIRA ID: HEOMPCV-1719

Training POC: Primary Mentor

Duration: 50 minute

Lesson Type: Self-Study

Prerequisite: None

Lesson Description: New analyst is provided detailed training in the FTR step 1: Explore Risk Landscape.

Lesson Objectives: New analysis will gain an understanding in finding and utilizing NASA Orion material in-order to understand function and non-functional requirements, design and implementation. IV&V analyst's in general need to understand how to reach out to system experts or subject experts (SME's) at the facility and determine the pedigree of any information that they may utilize. The Technical Reference may come up as a repository for any material developed by the analyst.

NAT-FTR-Q&C: Identify IV&V Questions and Concerns

JIRA ID: HEOMPCV-1720

Training POC: Primary Mentor

Lesson Type: Self-Study

Duration: 50 minute

Prerequisite: None

Co-requisite: FTR-AO

Lesson Description: New analyst is provided detailed training in the FTR step 2: Identify IV&V Question/Concern.

Lesson Objectives: New analysis will gain an understanding of generating questions and concerns for Orion capabilities. This training includes the transitioning from facility concerns to how the Orion IV&V tailors and captures questions and concerns and the determination of an initial risk level. Questions and concerns and an initial risk level are critical inputs into the determination of concrete assurance objectives for analysis.

- Tailored Orion IV&V training addresses the handling of new or modification of existing questions and concerns with the Q&C approach.
- Tailored Orion IV&V training addresses the determination of risk level which is an important output decision for following steps.

NAT-FTR-AO: Determine Assurance Objectives

JIRA ID: HEOMPCV-1722

Training POC: Primary Mentor

Duration: 50 minute

Lesson Type: Self-Study



Prerequisite: None

Co-requisite: FTR-Q&C

Lesson Description: New analysis detailed training in the FTR step 3 Determine Assurance Objectives (AOs)

Lesson Objectives: New Analysts will gain an understanding in the characteristics of assurance objects including the good, bad and the ugly. An understanding in relating the Assurance Objective to providing the answers toward a given IV&V Question/Concern(s). Tailored Orion IV&V training addresses the utilization of system understanding and IV&V questions and concerns in generating an Orion IV&V assurance objective.

NAT-FTR-RIA: Risk Assessment

JIRA ID: HEOMPCV-1818

Training POC: Primary Mentor

Duration: 50 minutes

Lesson Type: Self-Study

Prerequisite: None

Lesson Description: Walk through of an approach utilized for risk assessment of assurance objectives.

Lesson Objectives: The new analyst will be introduced to risk assessment of an assurance objective within the Orion IV&V team. IV&V follow the risk involves re-visiting assurance objectives and determining/estimating the risk level associated with it. The goal in performing analysis is to not only to provide issues against a capability but to drive the capability risk to a lower level providing confidence in the flight software concept, design and implementation.

NAT-FTR-EVN: Evidence Needed to Satisfy Assurance Objectives

JIRA ID: HEOMPCV-1727

Training POC: Primary Mentor

Duration: 50 minutes

Lesson Type: Self-Study

Prerequisite: General familiarity with Assurance Objectives

Co-requisite: FTR-ANT

Lesson Description: New analyst training for evidence needed to Satisfy Assurance Objectives

Lesson Objectives: New analysts will be introduced to the evidence needed to successfully satisfy an assurance objective, as well support an assurance conclusion. This training block will introduce analysts to the IV&V Products or other items (*evidence*) that are produced in conducting analysis, including pointers to ECM, ATS, JIRA, or other IV&V accessible locations. Analysis within the context of the following will also be discussed:

- Conflicting evidence
- Incomplete evidence
- Inability to collect planned evidence

NAT-FTR-ANT: Analysis Tasks Needed to Produce the Evidence



JIRA ID: HEOMPCV-1728

Training POC: Primary Mentor

Duration: 80 minutes

Lesson Type: Self-Study

Prerequisite: None

Co-requisite: FTR-EVN

Lesson Description: This training block covers FTR step 5 and will provide a more detailed look at the analysis tasks needed to produce evidence.

Lesson Objectives: This training block will demonstrate the need for prioritizing analysis and the natural progression that results. Analysts will learn about common methods used in thread based approach to CBA analysis. The tasks associated with documenting ongoing analysis will be discussed in more detail. An overview of the workflow for creating and assigning Analysis Activities in JIRA and for linking associated JIRA items will also be demonstrated.

NAT-FTR-ANY: Perform Analysis

JIRA ID: HEOMPCV-1729

Training POC: Primary Mentor

Duration: 90 minutes

Lesson Type: Self-Study

Prerequisite: None

Lesson Description: This training block covers FTS step 6 and provides general details on performing IV&V analysis focused on the capability, assurance objective and IV&V questions and concerns being assessed.

Lesson Objectives: This training introduces a new analyst to the high-level process of how Orion IV&V mitigates risk for the NASA Orion project as well as residual risk. Analysis work as detailed here is work that IV&V has always performed but focused on answering the IV&V questions and concerns and ultimately the assurance objective. Discussed will be handling any new system understanding gained as well as identification of possible new IV&V risk concerns. IV&V Products or other outputs (many that can be folded into the Technical Reference or otherwise used as inputs to other Analysis Activities) may also be produced. Identify the evidence and IV&V products, including pointers to ECM or another IV&V accessible location.

If not using the ECM file versioning for the analysis results, move previous versions of the results to an archive file to avoid ambiguity over the latest version(s) of the results. The evidence product(s) should reflect the following characteristics:

NAT-FTR-EVP: Produce Evidence

JIRA ID: HEOMPCV-1730

Training POC: Primary Mentor

Duration: 50 minutes

Lesson Type: Self-Study

Prerequisite: None



Lesson Description: This training block is an introduction to documenting evidence produced while performing analysis and tying it to assurances.

Lesson Objectives: Analysts will learn the importance of documenting analysis evidence as an ongoing task as well as a summary task of updating the status of an AO. This segment will also introduce the importance of evidence in the form of forward work, additional questions /concerns/risks (e.g. testing gaps), and priority rationale. Analysts will be introduced to ATS as the preferred choice for analysis results. But the training will also cover other suitable formats which could also include Design and Implementation (D&I) analysis spreadsheets, flow diagrams or direct to JIRA documentation.

NAT-FTR-AC: Assurance Conclusions

JIRA ID: HEOMPCV-1731

Training POC: Primary Mentor

Duration: 80 minutes

Lesson Type: Self-Study

Prerequisite: None

Lesson Description: New analysts training that outlines how assurance conclusions are used to document IV&V positive and negative assurances related to an assurance objective and any associated mission integrated behaviors.

Lesson Objectives: This training block will help analysts learn how to summarize and document the findings associated with analysis activities, provide an assurance status, and perform roll up to the respective assurance objective. In addition, analysts will see how an assurance conclusion can affect the risk level and priority for an assurance objective.

NAT-FTR-RU: Assurance Roll up

JIRA ID: HEOMPCV-1819

Training POC: Primary Mentor

Duration: 50 minutes

Lesson Type: Self-Study

Prerequisite: None

Lesson Description: Introduction to roll-up of an assurance objective to its parent capability.

Lesson Objectives: Many analysts will need to roll up AGs into a single parent or Functional Operations Capability (FOC). In performing the roll up it is important to understand summarization and to transparently communicate to other teams such as HEO Integration assurance conclusions and state.

NAT-FTR-REP: Communicate IV&V Value

JIRA ID: HEOMPCV-1732

Training POC: Primary Mentor

Duration: 50 Minutes

Lesson Type: Self-Study

Prerequisite: None



Lesson Description: This training provides new analysts with Orion specific communications approaches and processes.

Lesson Objectives: This training block will help analysts learn how effective communicate IV&V products internal and external to the IV&V team. Different types of IV&V products such as formal risks identified, assurance conclusions completed and technical issues produced had varying tracking and workflow responsibilities of the analysis. An incomplete list follows:

- Delivery of assurance conclusions to the project.
- Familiarity with NASA subsystem leads, verification leads, and SFMs.
- Standard project and team meetings and roles.
- Responsibilities in communicating attended meetings.

NAT-FTR-BKL: Backlog Refinement

JIRA ID: HEOMPCV-1851

Training POC: Primary Mentor

Duration: 50 Minutes

Lesson Type: Self-Study

Prerequisite: None

Lesson Description: This training details the processes and purpose of backlog refinement.

Lesson Objectives: The new analyst will learn about the processes involved in backlog refinement, including AGN restructure, roll-up, high level system understanding, change impact, and more. The analyst will also learn when these activities are performed and the purpose of performing them.



Analysis Training Blocks

NAT-ATB-THR: Thread Based Analysis

JIRA ID: HEOMPCV-1737

Training POC: Primary Mentor

Lesson Type: Self-Study/Classroom

Duration: 50 Minutes

Prerequisite: None

Lesson Description: This training provides the new IV&V team member with information about the use of agile analysis threads on the Orion IV&V project.

Lesson Objectives: Analysts will learn about the background of the agile analysis threads and how they are used on Orion IV&V. The analyst will see the relationship between TF elements, methods, and the threads. They will be introduced to the typical work instructions for each of the 5 traditional threads: Correct and Complete, Emergent Behavior, Hazard, Test, and Dependability.

NAT-ATB-TR: Supporting Tech Reviews

JIRA ID: HEOMPCV-1852

Training POC: Primary Mentor/TR Coordinator

Duration: 30 min

Lesson Type: TBD

Lesson Type: Classroom

Prerequisite: CC-001

Lesson Description: Provide descriptions of the different types of tech reviews and how IV&V supports them.

Lesson Objectives: There are several types of tech reviews that Lockheed Martin (LM) holds. The ones that IV&V watches are Incremental Detailed Design Reviews (IDDR), Engineering Change Requests (ECR), Requirements Change Notices (RCNs), and test reviews. The analyst should understand the purpose and types of materials received through each of these reviews and the type and depth of analysis provided by IV&V. Also, this should include a quick review of the purpose and role of the TR Coordinator.

NAT-ATB-SCA: Intro to Static Code Analysis

JIRA ID: HEOMPCV-1736

Training POC: Jacob Cox

Duration: 50 minutes

Lesson Type: Classroom

Prerequisite: None

Lesson Description: Overview of the Static Code Analysis process.



Lesson Objectives: Analysts will gain a high level understanding of Static Code Analysis process. This training includes high level analysis expectations for each step and understanding the tools and process flow between each step.

NAT-ATB-DYA: Intro to Dynamic Testing

JIRA ID: HEOMPCV-1853

Training POC: Ricky Beamer

Duration: 50 minutes

Lesson Type: Classroom

Prerequisite: None

Lesson Description: Overview of the Orion IV&V dynamic testing approach

Lesson Objectives: The new analyst will gain a high level understanding of the Orion IV&V dynamic testing approach, also known as independent testing. The analyst will learn the Orion IV&V team's approach and plan for independent testing for the Orion FSW and the role of the Orion IV&V testing team and those analysts not on the test team.

NAT-ATB-OIA: Orion Information Assurance

JIRA ID: HEOMPCV-1854

Training POC: Mike Kalata

Duration: 50 min

Lesson Type: Classroom

Prerequisite: None

Lesson Description: Overview of the Orion Information Assurance approach

Lesson Objectives: The new analyst will gain a high level understanding of the Orion IV&V Information Assurance (IA) approach and how all analysts support the IA process.



Tool Training Blocks

NAT-TOOL-CON: Orion IV&V Confluence Training

JIRA ID: HEOMPCV-1855

Training POC: Primary Mentor

Duration: 1.0 hours

Lesson Type: Self-Study

Prerequisite: None.

Lesson Description: Provides the learner with an overview of navigation and high-level functionality of the Confluence Collaboration Software.

Lesson Objectives:

- Explore navigational menus and become familiar with the system user interface.
- Discuss user permissions and review the concepts of space and page visibility.
- Examine the user profile and learn how to configure and manage user preferences.
- Observe the actions necessary to create and edit pages within the system user interface.
- Gain basic knowledge of how to create dynamic page content using Confluence macros.

NAT-TOOL-ECM: Orion IV&V ECM Training

JIRA ID: HEOMPCV-1856

Training POC: Primary Mentor

Duration: 30 minutes

Lesson Type: Self-Study

Prerequisite: None

Lesson Description: Training includes the prerequisites to access the Orion MPCV ECM repository as well as the organization of materials. The business rules and naming conventions for placing artifacts or analysis files and evidence into ECM are also covered.

Lesson Objectives: The analyst should understand the basic organization of artifacts and analysis files, how to navigate and find items, and the naming conventions used to place a file in the proper place on ECM.

NAT-TOOL-JIRA: Orion IV&V JIRA Training

JIRA ID: HEOMPCV-1857

Duration: 1.0 hours

Lesson Type: Self-Study

Prerequisite: None.

Lesson Description: Provides the learner with an overview of navigation and high-level functionality of the JIRA Record Tracking System.

Lesson Objectives:



- Explore navigational menus and become familiar with the system user interface.
- Examine the user profile and learn how to configure user preferences.
- Observe the actions necessary to create and edit records within the system user interface.
- Become familiar with common record types and fields that may be encountered within the system user interface.
- Review general workflow concepts and become familiar with how to transition records through a workflow.
- Explore the filter user interface and become familiar with creating basic filter syntax to locate data.
- Discover how to locate and use existing dashboards to identify assigned work and action items.

NAT-TOOL-ATS: Orion IV&V ATS Training

JIRA ID: HEOMPCV-1858

Training POC: Primary Mentor

Duration: 50 minutes

Lesson Type: Self-Study

Prerequisite: None.

Lesson Description: ATS training includes a brief overview of the tool and it uses and specific uses of ATS for Orion IV&V. Training should include examples and a space in the ATS Pre-Production project to experiment and explore.

Lesson Objectives: The analyst should understand the relationship between the data in Orion ATS, LM DOORS (Kedalion), and IV&V DOORS. Knowledge of how the data is structured in Orion ATS and how to view and analyze an SRS artifact using the Methods available in ATS is essential. Training should also include the following: searching, filtering, exporting to a spreadsheet, and creating a graphical view of traces.

NAT-TOOL-RPS: Rhapsody Introduction

JIRA ID: HEOMPCV-1817

Training POC: Primary Mentor

Duration: 30 minutes

Lesson Type: Self-Study

Prerequisite: None

Lesson Description: An overview of LM's use of Rhapsody models and how IV&V uses them to perform analysis. The lesson should include examples and navigation exercises.

Lesson Objectives: The IV&V Team currently provides assurance for flight/Orion software, architecture and behaviors and this confluence page provides new analyst's a Rhapsody modeling walk thru with additional Orion ECM or Pegasus linkages. Rhapsody modeling at the architecture level consists of the SysArch model and at the CSCI level as TopProject models.



NAT-TOOL-SIM: Matlab/Simulink Introduction

JIRA ID: HEOMPCV-1820

Training POC: Primary Mentor

Duration: 50 minutes

Lesson Type: Self-Study

Prerequisite: None

Lesson Description: Introduction to Simulink and Orion GNCP design approach.

Lesson Objectives: New analyst will get an introduction into utilizing the Matlab/Simulink tool to load flight software design and implementation for GNCP. Most GNCP requirements are related to specific Computer Software Units that are completely written in Matlab. These capabilities require analysis and assurances from the IV&V team.

NAT-TOOL-LMTOOL: Introduction to Lockheed Martin Tools and Tools Access

JIRA ID: HEOMPCV-1810

Training POC: Paul Relyea (LM Access); Primary Mentor (LM Tool usage)

Duration: 30 minutes

Lesson Type: Self-Study

Prerequisite: None

Lesson Description: Overview of the project tools available from LM and the application process to obtain access

Lesson Objectives: The analyst should have a cursory knowledge of available tools and how they are used, by both the LM and IV&V. Additionally, the analyst should have an outline of the process and forms necessary to obtain access to these tools. Information concerning contacts for assistance in completing this process should also be imparted.

NAT-TOOL-CC: Code Collaborator

JIRA ID: HEOMPCV-1814

Training POC: Primary Mentor or designated analyst

Duration: 50 minutes

Lesson Type: Self-Study

Prerequisite: None

Lesson Description: Overview of the Code Collaborator tool. How LM uses the tool and how IV&V uses the tool to interact with Test Reviews and ECRs.

Lesson Objectives: The analyst should know how to log into Code Collaborator and search for a specific review by CC number. The analyst should be able to add themselves as a reviewer to a review, download artifacts for review, and enter comments or defects against the artifacts.

NAT-TOOL-AGL: Agile IV&V

JIRA ID: HEOMPCV-1859

Training POC: Primary Mentor

Duration: 50 minutes

Lesson Type: Self-Study



Prerequisite: None

Lesson Description: An overview of the Scaled Agile Framework Software Development Lifecycle. Training includes the specific adaptation of Scrumban used by Orion IV&V. Examples should be used and a dummy Kanban Board and tasks should be set up for analyst practice.

Lesson Objectives: The analyst should have a working understanding of the Scrumban process. This includes how the process is tracked using JIRA's Kanban Board capability, the various roles, and the activities. Training includes pulling a task from the Kanban Board, updating the state and correct fields in the JIRA ticket, and suspending or closing an activity. Other needs: Experiential Learning (application/role playing, etc.)

NAT-TOOL-MES: Mission Event Sequencing Tool

JIRA ID: HEOMPCV-1963

Training POC: Primary Mentor or designated analyst

Duration: 50 minutes

Lesson Media: Self-Study

Prerequisite: None

Post-requisite: None

Lesson Description: Overview of the Lockheed Martin (LM) Mission Event Sequencing Viewer Java tool incorporated as the Mission Design Databook (MDD), Volume 3, and the adjunct Phase, Segment, Activity, Mode (PSAM) IV&V-developed Access database, that can be used to facilitate Orion mission event analysis. Lesson covers what the MES and PSAM tools are and how they can be used to assist in CBA analyses.

Lesson Objectives: The analyst should know how to run and navigate the MES Viewer tool to identify mission phase, segment, and activity events for all Orion FSW CSCIs and to use the PSAM Access database tool to identify Mode level event data unique to the GNCP CSCI. The analyst should be able to use one or both tools to assist in analysis of PSAM transitions and mission event use case scenarios during CBA analyses of Orion FSW.

NAT-TOOL-ACAT: Adverse Condition Awareness Tool

JIRA ID: HEOMPCV-1965

Training POC: Primary Mentor or designated analyst

Duration: 50 minutes

Lesson Media: Self-Study

Prerequisite: None

Post-requisite: None

Lesson Description: Overview of the IV&V-developed Adverse Condition Awareness Tool (ACAT) to facilitate identification and management of off-nominal internal and external conditions and environments that can adversely impact Orion spacecraft FSW or Orion FSW interface to spacecraft hardware. Lesson covers how the ACAT can be used to identify adverse conditions to assist in the CBA Q2, Q3, and hazard analyses of Orion FSW and how newly identified adverse condition records can be added to the ACAT database for future reference.



Lesson Objectives: The analyst should know how to run and navigate the ACAT, both as a standalone application or as an integrated component of the IV&V Analyst Tool Set (ATS). The analyst should be to search and utilize the information on adverse conditions to assist in off-nominal CBA Q2, Q3, and hazard analyses of Orion FSW assurance objectives to reach well-informed assurance conclusions. If new adverse conditions and scenarios impacting Orion FSW during analysis conducted using the CBA FTR approach are discovered, the analyst should know how to add new adverse conditions to the ACAT database and understand the purpose and content of all adverse condition record fields in ACAT.



Lab Blocks

NAT-FTR-AC-LAB: Writing Assurance Conclusions

JIRA ID: [HEOMPCV-2308](#)

Training POC: Primary Mentor

Duration: 50 min

Lesson Type: Lab

Prerequisite: NAT-FTR-AC – Assurance Conclusions

Lesson Description: Lab to build on the Assurance Conclusion (AC) formats, styles, and other information learned in the NAT-FTR-AC training block. This lab provides example AO analysis results and expects the trainee to write an AC. After each example, the training POC and trainee compare the trainee's AC with provided example AC. The training POC provides constructive critiques and advice on how to improve their AC writing skills. All examples are pulled from real, completed AOs.

Outline for Training POC:

NOTE: Even though there are provided examples, you could apply your own examples to this framework.

1. Answer any questions regarding AC formats, styles and other information learned in the NAT-FTR-AC training block.
2. Walk through the AO analysis and results summary for Example 1.
3. Allow trainee(s) to write their own AC from the example. *NOTE: This could be good practice for the training POC to write her/his own AC.*
4. Compare against provided AC example. Provide constructive critiques and advice on how to improve their AC before moving on to the next example.
5. Repeat for the remaining examples.
6. Conclude the session with final thoughts and suggestions.

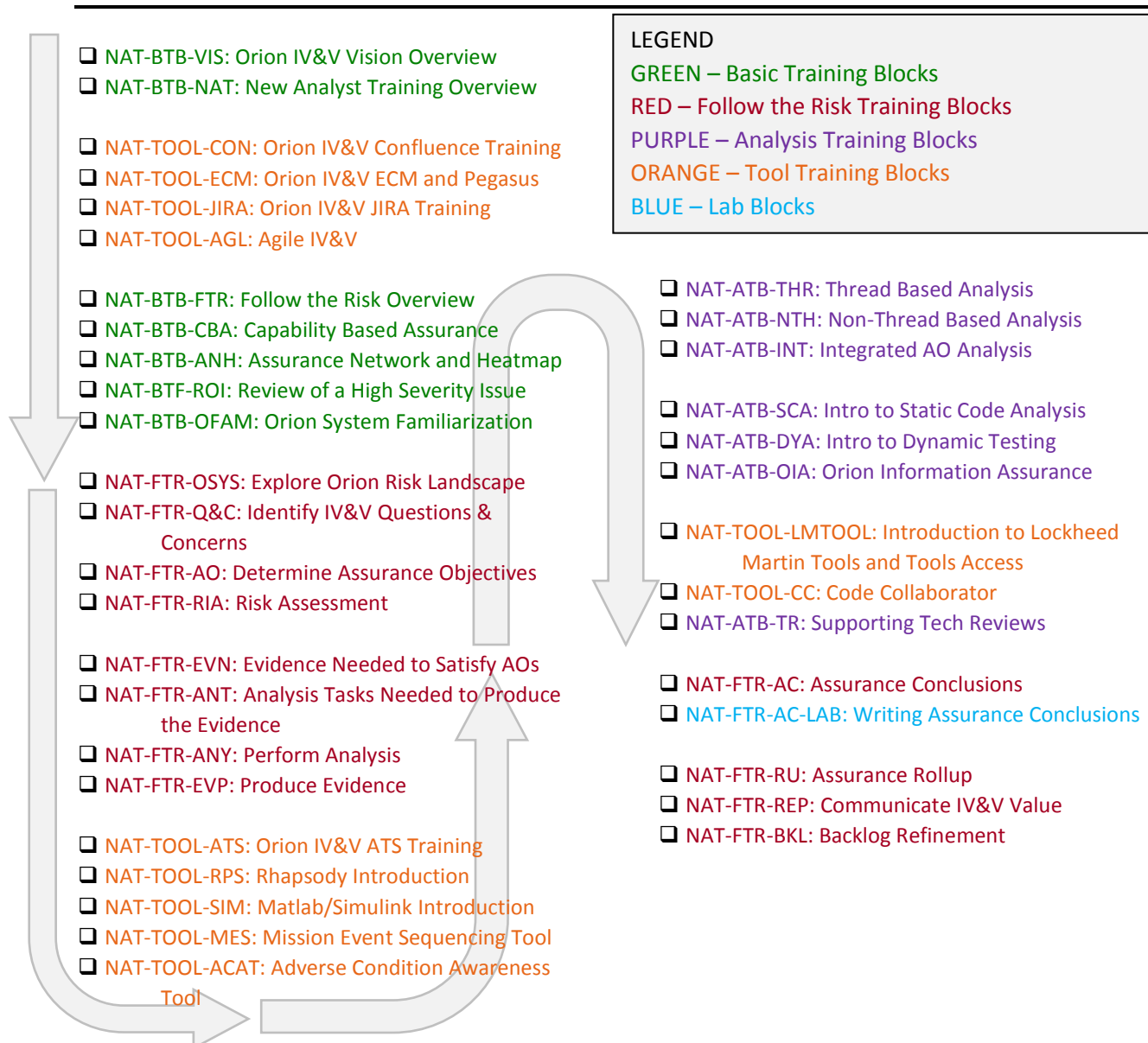


Appendix A: Training Block Roadmap

This appendix details a roadmap that the Buddy and Trainee can follow to best utilize the content of the blocks in an order that makes most sense. If there is specific lesson media that the trainee has studied previously (i.e. via boot camp or on another IV&V project), skip those portions and only focus on the Orion IV&V specific material in the given block. Blocks are grouped to indicate sets that can be studied in concurrently between Buddy/Trainee tagups. Checkboxes are provided to mark completed blocks.

See tracking Excel spreadsheet here: <https://ecm.msw.faircon.net/OTCS/llisapi.dll/open/24588364>

THE ROADMAP





Appendix B: Printable Trainee Notes and Questions

As the trainee completes the training blocks, she or he should keep notes to remember, notes for how to improve the block, questions for the buddy to be addressed at their next tagup, and answers to the deeper understanding questions found in each block's JIRA ticket. The trainee should print as many copies of these pages as needed.

Block:

Notes:

Questions for Buddy:

Answers to Questions from JIRA Ticket:

Block:

Notes:

Questions for Buddy:

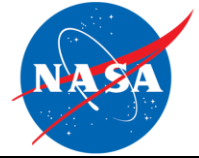
Answers to Questions from JIRA Ticket:

Block:

Notes:

Questions for Buddy:

Answers to Questions from JIRA Ticket:



Block:

Notes:

Questions for Buddy:

Answers to Questions from JIRA Ticket:

Block:

Notes:

Questions for Buddy:

Answers to Questions from JIRA Ticket:

Block:

Notes:

Questions for Buddy:

Answers to Questions from JIRA Ticket: