Abstract

Exploration Mission-1 (EM-1) is an uncrewed mission that is launching on the Space Launch System (SLS) Block 1 vehicle. This is a critical flight test for the agency’s human deep space exploration goals. Exploration Ground Systems (EGS) Quality (SA-F2) is responsible for providing Quality Assurance Surveillance Plans (QASPs) for NASA contracts and facilities. A QASP assures products and services are provided to EGS in accordance with the contract requirements. In order to encapsulate the multiple KSC Safety and Mission Assurance surveillance and audit activities that need to be accomplished specifically for EM-1 Certificate of Flight Readiness (CoFR), a QASP tool needed to be implemented. This tool would be able to intuitively track Work Authorization Documents (WADs) under development by Test Operations Support Contract (TOSC), reviewed and accepted WADs, Government Mandatory Inspection Points (GMIPs), Nonconformance’s (NC’s), Material Review Board (MRB) Status, Corrective Actions, Alterations, Deviations, and Waivers for flight hardware and Ground Support Equipment (GSE). This would help ensure that all SLS EM-1 flight hardware and related GSE surveillances and requirements are being recognized and completed with zero constraints identified for the mission.

Project Scope

Limited to EM-1 Mission Insight/Oversight/Surveillance activities for SLS EM-1 flight hardware and related GSE. Tool functionality shall be flexible to include EM-2 mission and future ground processing.

ECS Quality Responsibilities


Risk-Based Quality Surveillance Responsibilities: Sample work instructions to verify they meet all requirements, Participate in contractor internal or 3rd party audits to verify compliance with AS9100 aerospace quality standards, Process performance surveillance to evaluate work area cleanliness, Perform GMIPs to verify or perform verification of program identified high risk processes, and Sample NC reports to ensure adherence to process & corrective or preventive actions are documented and appropriate.

Design Approach/Methodology

The quality assurance surveillance tool should:

- Track surveillance activities related to EM-1 and encapsulate information for each individual flight hardware element and related GSE.
- Identify all SLS flight hardware & GSE associated WADs and Work Orders.
- Calculate the percentage of WADs reviewed by NASA EGS.
- Display planned and completed GMIPs.
- Track any alterations, deviations, and or waivers.
- Track NC's and any NC's that went to MRB, and out-of-position work.
- Display auditing information.
- Be as automated and intuitive as possible; pull data from Solumina, SA-F2 SharePoint, and SMA Tracking Operation & Reporting Matrix (STORM) databases.

VBA Code

What Was Learned

QE & SMA roles, disciplines, and requirements. Quality assurance programs. Purpose & implementation of a QASP. Performing surveillances. AS9100. VBA code.