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Space systems — Failure reporting, analysis and corrective action (FRACA) process requirements

Systèmes spatiaux — Exigences relatives au processus de notification des défaillances, d'analyse et d'action corrective (FRACA)

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Contents

Page

Foreword

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Introduction

The failure reporting, analysis and corrective action (FRACA) process is a closed-loop process that manages faults, failures and anomalies of deliverable hardware, software, firmware, testing or monitoring devices and maintenance or inspection equipment, which occur after qualification.

This document is a tier-three standard within the ISO TC 20/SC 14 hierarchical framework of space systems requirements, for the following reasons:

a) ISO 14300-2 (product assurance) requires that system safety, dependability and quality assurance programme be implemented during the space system life cycle. ISO 14620-1 (system safety), ISO 23460 (dependability), and ISO 27025 (quality assurance) are tier-two standards under ISO 14300-2, which is a tier-one standard.

b) ISO 14620-1 requires that accidents and safety-critical nonconformances which occur during production, operations and disposal phases in the space system life cycle be reported, investigated and mitigated. ISO 23460 requires that reliability-critical failures which occur during the operations phase in the space system life cycle be reported, analysed and subjected to risk reduction. ISO 27025 requires that nonconformances which occur during the operations phase in the space system life cycle be reported, reviewed and dispositioned via a corrective feedback loop. This document and ISO 23461 are tier-three standards under ISO 14620-1, ISO 23460, and ISO 27025.

The FRACA process as defined in this document and the nonconformance management process as defined in ISO 23461 are often assumed to provide overlapping functions during the space system life cycle. However, the FRACA process and nonconformance management process provide separate and unique functions.

The FRACA process is first applied by the supplier to manage verified failures and anomalies of qualified hardware and software during production acceptance testing. After delivery and deployment of the space system, the space system operator can team-up with the supplier, via an SOW or MOA, to apply the FRACA process during the operations and disposal phases of the space system life cycle.

The nonconformance management process is applied by the supplier to manage verified nonconformances to requirements, from the time of the space system's conceptual development through its delivery. It is important to note that not all verified failures or anomalies are nonconformances and vice versa. When the root cause of a failure or an anomaly during qualification testing is found to be an incorrect design, fabrication, or performance requirement, then a corrective action should be determined and implemented by the FRACA process. When the root cause of a failure or an anomaly during operation is found to be an operator-induced damage, then a corrective action should be determined and implemented by the nonconformance management process.

As in the case of the FRACA process, after delivery and deployment of the space system, the space system operator can team-up with the supplier, via an SOW or MOA, to apply the nonconformance management process during the operations and disposal phases of the space system life cycle.