DATA ITEM DESCRIPTION

Title: RELIABILITY AND MAINTAINABILITY PREDICTIONS REPORT

Number: DI-SESS-81497A
AMSC Number: 9509
DTIC Applicable: Yes
http://www.dtic.mil/dtic/submit
Preparing Activity: AS
Applicable Forms: N/A

Approval Date: 20141219
Limitation: No
GIDEP Applicable: Yes
http://www.gidep.org/data/submit.htm

Use/relationship:

The Reliability and Maintainability (R&M) Predictions Report documents contractor quantitative predictions of reliability, maintainability, and Built-In-Test (BIT). The report is intended as support for feasibility evaluations, comparison of alternative configurations, identification of potential problems, logistics support planning, life cycle cost studies, determination of data deficiencies, tradeoff decisions, allocation (apportionment) of performance requirements, and criteria for growth testing and demonstration. The R&M predictions report will assist in eliminating or managing high risk elements, improving readiness, reducing life cycle cost, and assessing whether the design is capable of meeting specification requirements.

This Data Item Description (DID) contains the format, intended use information, and content preparation instructions for the data product generated by the specific and discrete task described in the solicitation, and should be tailored appropriately.

This DID supersedes DI-RELI-81497.

Requirements:

1. Format. The Reliability and Maintainability (R&M) Predictions Report shall be in contractor's format.

2. Content. The report shall include:

    a. System configuration identification.
    b. Assumptions used in the prediction process.
    c. Documentation or cross-reference to the data used in performing R&M predictions, including the following:
        (1) Hardware parts description, including manufacturer part number and manufacturer CAGE if applicable
        (2) Software Configuration Items description
        (3) Failure rate data source and assumed operational loads
        (4) Failure distributions
        (5) Constraints

(6) Item definition, including assembly indenture
(7) Service use profile
(8) R&M block diagrams and mathematical models
(9) Failure Modes, Effects, and Criticality Analysis (FMECA)
(10) Environmental data, including life cycle loads (e.g. engineering mechanical, electrical, and thermal analysis)
(11) Environmental and operating Stress data, including physics of failure analyses

d. Description of system BIT, maintenance and support concepts.
e. Description of data developed to support system age-reliability relationships (particularly for the identification of life limits) for Reliability-Centered Maintenance (RCM) analysis to develop appropriate life limits or maintenance tasks.
f. Description of the R&M prediction procedures used, including methodology, models and tools.
g. Results of the analysis performed for field reliability (mission and logistics), maintainability and BIT performance of similar and analogous items operating in the same expected environment.
h. Applicable failure rates, failure distributions, failure rate adjustment factors, and reliability variables used in the calculation of each configuration item.
i. The source(s) of the data and the evaluated validity of data used in the reliability predictions.
j. The operating and environmental stress factors and ratios, along with other factors used in determining part failure rates shall be specified in in the report and shall be individually identified as estimated (i.e. documented subject matter expert (SME) engineering opinion), calculated (i.e. reliability analysis from comparable systems), and measured (i.e. historical reliability from predecessor systems and shall include test and field data).
k. How the accumulated operating hours were determined when using field experience data for similar items in a like environment.
l. The reliability prediction for each subdivision of the system breakdown structure for each mission, mode of operation, and periods of non-operation and storage from an items final factory acceptance through its terminal expenditure including removal from inventory.
m. Maintainability predictions shall be identified for each associated level of maintenance, including both unscheduled and scheduled maintenance, and shall also include repair time source data for the prescribed level of maintenance.
n. BIT predictions of the overall system level BIT fault detection, and fault isolation for the overall system.
o. Risk assessment and mitigation plans for each configuration item's reliability, maintainability, and BIT value based upon the data source and maturity of design.
p. Conclusions and recommendations based upon the R&M predictions that coincide with the phase of item development and shall specify any indication of the system's reliability and maintainability status. All R&M deficiencies identified shall be included and shall also contain the course of action to be taken to resolve each deficiency.

End of DI-SESS-81497A.