

DATA ITEM DESCRIPTION

Title: VIBRATION AND ACOUSTIC ANALYSES REPORTS – AIR VEHICLE

Number: DI-ENVR-82121

Approved Date: 20170428

AMSC Number: F9803

Limitation: N/A

DTIC Applicable: No

GIDEP Applicable: No

Preparing Activity: AF 11 (AFLCMC/EZFS)

Project Number: ENVR-2017-005

Applicable Forms: N/A

Use/Relationship: The Vibration and Acoustic Analyses reports will be developed to describe the analyses and tests used to establish the vibration and acoustic phenomena comprising the environment of structure and equipment which support the design of the air vehicle as required by MIL-STD-1530, *Aircraft Structural Integrity Program (ASIP)*.

(Copies of this document are available online at <http://quicksearch.dla.mil>.)

This Data Item Description (DID) contains the format, content, and intended use information for the data deliverable resulting from the work task described in the solicitation.

Requirements:

1. Reference documents. The applicable issue of the documents cited herein, including their approval dates and dates of any applicable amendments, notices, and revisions, shall be as specified in the contract.
2. Format. The contractor's format is acceptable.
3. Content. The report describes the contractor's analyses and testing activities associated with design for vibrational and acoustic loading environments. The content shall include the following:
 - a. Loads/Environment Analysis: The loads/environment analysis report shall document the approach used to establish the vibration loading, acoustic loading, and environmental exposure of structure and equipment for ground and flight operations. Describe all vibration and acoustic loading sources including, but not limited to: propulsion and other power systems operation, gust loads, boundary layers, wakes, oscillating shocks and other aerodynamic disturbances, ground operations, cavity noise, missile launches and gunfire. Describe the means of substantiation of any design provisions employed to control vibration or acoustic load levels. Predicted levels for harmonic and random vibration and/or acoustic load sources or combinations of sources shall be documented with graphs, calculations, data tables, etc. in sufficient detail to derive the exposure of the system by physical location and with sufficient frequency resolution to evaluate local design features. Vibration and acoustic loading shall be documented with graphs and tables that define the loading as a function of frequency and exposure time. Document temperature and other relevant service environments that contribute to vibration and/or acoustic loading.
 - b. The reports shall document the usage data in terms of mission types, mission mix, storage, and transportation used to develop the repeated loads/environment spectra for use in the service life analysis.

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b. Service Life Analysis: The service life analysis report shall document the fatigue analysis methodology and validation results used to determine the service life of the air vehicle and equipment subjected to vibration and acoustic loading. The reports shall document the fatigue life predictions of all vibration and acoustic sensitive structures and equipment and all supporting calculations and data such as loads to stress transfer functions and material properties.

c. Test: The test report shall document the test methods, test specimens, test spectrum, test durations, and results used to validate the service life analysis and/or to demonstrate the service life capability. Methods used to accelerate testing to represent equivalent service life and its validation shall be documented. The test report shall document conformance to MIL-STD-810, *Environmental Engineering Considerations and Laboratory Tests*, which describes the environmental tailoring process that results in realistic materiel designs and test methods based on materiel system performance requirements.

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d. Analysis and Test Correlation: The analysis and test correlation report shall document pre-test analysis predictions, test data measurements/results, and correlation of analysis predictions to test measurements/results. If the correlation effort identifies the need to revise the service life analysis the report shall document the basis for this conclusion and the updated service life analysis results.

End of DI-ENVR-82121