

DATA REQUIREMENTS DESCRIPTION (DRD)

1. **DPD NO.:** XXX **ISSUE:** Draft
2. **DRD NO.:** **STD/EDAL**
3. **DATA TYPE:** 3
4. **DATE REVISED:**
5. **PAGE:** 1/3

6. **TITLE:** Engineering Drawings and Associated Lists

7. **DESCRIPTION/USE:** To provide engineering data defining the design to the extent required to support manufacturing, test, and logistics support of the vehicle and payload systems and required spare parts. Engineering drawings and associated lists shall be sufficient to depict the detailed configuration of all system, subsystem, and component levels and to include ground support equipment (GSE), electrical ground support equipment (EGSE), and airborne support equipment (ASE). 2D and 3D Computer-Aided Design (CAD) models shall be submitted as supplemental information. A drawing tree shall be submitted for each configuration item that graphically depicts the hierarchical structure of drawings-parts from the configuration item down to assemblies, subassemblies, and components.

8. **OPR:** [Enter Agency organization with technical responsibility for the supported data]

9. **DM:** [Enter Agency organization acquiring the data for a specific program/project/activity]

10. **DISTRIBUTION:** Per Contracting Officer's letter

11. **INITIAL SUBMISSION:** Three weeks prior to Preliminary Design Review (PDR). Parts Marking Plan: 60 days after contract award.

12. **SUBMISSION FREQUENCY:** Three weeks prior to each major review, as part of an Acceptance Data Package (ADP), and as requested. In addition, 3D CAD Models shall be submitted between milestones as requested by the procuring activity, and updated Drawing Trees shall be submitted for the related configuration items Physical Configuration Audit (PCA).

13. **REMARKS:**

14. **INTERRELATIONSHIP:**

15. **DATA PREPARATION INFORMATION:**
- 15.1 **SCOPE:** Engineering Drawings and Associated Lists disclose (directly or by reference) the physical and functional requirements of an item by means of graphics or textual presentation or combinations of both, as supplemented by 3D models. Drawing Trees depict the hardware and software configuration item drawing in graphic, top down, hierarchical structures.
- 15.2 **APPLICABLE DOCUMENTS:**

ASME Y14.100	<i>Engineering Drawing Practices</i>
ASME Y14.24	<i>Types and Applications of Engineering Drawings</i>
ASME Y14.41	<i>Digital Product Definition Data Practices</i>
ASME Y14.5M	<i>Dimensioning and Tolerancing</i>
MIL-STD-130M	<i>Department of Defense Standard Practices, Identification Marking of U.S. Military Property</i>
NASA-STD-6002	<i>Applying Data Matrix Identification Symbols on Aerospace Parts</i>
	<i>Global Drawing Requirements Manual (GDRM) Tenth Edition</i>

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15. DATA PREPARATION INFORMATION (CONTINUED):

15.3 **CONTENTS:** Engineering Drawings and Associated Lists requirements shall include:

- a. Part I - Engineering drawings and associated lists shall meet the requirements of ASME Y14.100. Geometric Dimensioning and Tolerancing shall be implemented in accordance with ASME Y14.5M. Supplemental 2D/3D CAD shall meet the requirements of ASME Y14.41. Engineering drawings and associated lists of end items, elements and/or all components and assemblies shall be provided to define the details necessary for the manufacture, test, inspection, operations and logistic support of the system. This definition shall:
 1. Reflect the end-product at its current level of design maturity.
 2. Provide the engineering data for logistics support products.
 3. Provide the necessary data to permit manufacture and/or acquisition of items identical to the original item(s).
 4. Document directly or by reference the following:
 - (a) Details of unique processes (i.e., not published or generally available to industry) when essential to design and manufacture.
 - (b) Performance ratings.
 - (c) Dimensional and tolerance data (Geometric Dimensioning and Tolerancing (GDT) shall be required between all external and major internal interfaces).
 - (d) Critical manufacturing processes and assembly sequences, and rigging procedures.
 - (e) Diagrams.
 - (f) Mechanical and electrical connections.
 - (g) Physical characteristics, including form and finish.
 - (h) Details of material identification, including heat treatment and protective coatings.
 - (i) Inspection, test, and evaluation criteria.
 - (j) Equipment calibration requirements.
 - (k) Quality assurance requirements.
 - (l) Hardware marking requirements.
 - (m) Requirements for reliability, maintainability, environmental conditions, shock, and vibration testing and other operational or functional tests.
 5. Limited rights-in-data items - Engineering drawings for items which the Government does not have unlimited rights in data shall specify the form, fit, and function requirements of the item and conform to the requirements for a control drawing as defined in ASME Y14.100 or a specification prepared in accordance with project requirements.
- b. Part II - Cable interconnect diagrams (CID's), electrical system schematics, cable harness assembly drawings, and wiring lists. Cable interconnect diagrams, electrical system schematics, cable harness assembly drawings, wiring lists, and fluid system schematics shall be prepared in accordance with ASME Y14.100. Part I drawings shall be utilized to the maximum extent possible in providing the design definition. The drawings shall include the following:
 1. Cable interconnect diagrams shall show graphically the arrangement of external electrical cabling which interconnects electrical assemblies and/or equipment. The CID shall show all cable runs and terminations; each cable shall be identified by reference designation number. The connector short sign shall be identified. The CID shall
 2. Electrical system schematics shall illustrate and describe circuit items with symbols placed such that a circuit may be traced from item to item in the sequence of its function. The placement and arrangement of these circuits shall follow a logical sequence of presentation to provide a clear description of the distribution.
 3. Cable Harness Assembly drawings shall meet the requirements of Global Drawing Requirements Manual (10th Edition) and ASME Y14.24.
 4. Component Level Documentation - Schematics and/or wiring lists for components, including interconnecting cable harnesses, shall be provided.

5. Overall Grounding Documentation - The grounding schematic shall show the details of all grounds and power returns from source to loads. All connections shall be shown. It shall also show details of all Electrical Ground Support Equipment interconnections to facility and safety grounds. Grounding schematics shall meet the requirements of Global Drawing Requirements Manual (10th Edition).

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15. DATA PREPARATION INFORMATION (CONTINUED):

6. The Fluid system schematic shall illustrate and describe all components with symbols and flow designators such that the fluid system may be traced from component to component (such as pumps, valves, meters, regulators, and filters). The schematics shall document the range requirements (flow, temperature, and pressure) for all component external interfaces and line sizes. The placement and arrangement of these components shall follow a logical sequence of presentation to provide a clear description of the flow of fluids in the system. The schematics shall reference engineering drawings and associated lists for configuration details.
 - c. Engineering drawing shall specify marking criteria and methods for identification of parts produced or procured. Markings shall meet criteria of NASA-STD-6002. All parts shall be physically marked. When physical marking or tagging causes a deleterious effect, labels, tags, and nameplates may be considered. MIL-STD-130 shall be used for paper labels, tagging, and nameplates. However, the Data Matrix Symbol format shall be used for Machine Readable Identification on paper labels and tagging.
 - d. The Contractor shall prepare a Parts Marking Plan as described in NASA-STD-6002 to assure compatibility and integrity of the marking effort. The Parts Marking Plan shall provide a holistic approach for marking parts assuring that the preferred methods described in NASA-STD-6002 are fully utilized within best engineering practice.
 - e. A drawing tree shall be submitted for each configuration item that graphically depicts the hierarchical structure of drawings-parts from the configuration item down to assemblies, subassemblies, and components.
- 15.4 **FORMAT:** Format of engineering drawings shall be in accordance with ASME Y14.100. In addition, formats for electrical engineering drawings shall be in accordance with Global Drawing Requirements Manual (10th Edition). All drawings shall be delivered in PDF format. Electrical drawings shall be delivered with the associated *.VSD or *.DWG file formats. 2D/3D CAD shall be in accordance with ASME Y14.41, in the current version of native developed CAD, fully parametric and associative. Originator format is acceptable for drawing trees. The contractor shall deliver ProEngineer compatible 3D models of the components. Alternate formats may be acceptable upon negotiation. All documentation/data shall include the contractor's CAGE code and document numbers. The Contractor may submit electronic files of drawings and CAD models via CD, DVD, or direct electronic transfer (Product Data Management (PDM) Tool, File Transfer Protocol (FTP), etc.) as specified by the Government [Requisitioner: please specify preferred electronic delivery method if known].

For all electronic deliveries the contractor shall include a listing of the creating environment to include:

- a. CAD product name/version/patches.
 - b. Subordinate (plug-in) software/version/patches.
 - c. Description of hardware.
 - d. Operating system/version/patches.
- 15.5 **MAINTENANCE:** All documents produced under this DRD must be maintained current. Changes to and/or updating of engineering drawings, associated lists, and drawing trees shall be in accordance with the contractor's approved drawing system and the provisions herein. Changes to engineering drawings under the Government's Class I change control shall be submitted by Engineering Change Proposal. The contractor shall maintain the capability to restore and modify any engineering data used in the design through the project lifecycle.

