MIL-STD-31000 Technical Data Packages

An Overview

Presented by

Gordon Ney

Purpose

- To set the stage for the TDP Content sub-group's deliberations that will begin shortly by describing:
  - How MIL-STD-31000 defines the content of a TDP
  - Some inconsistencies that we should address during our deliberations
  - How 3D CAD models have been integrated into MIL-STD-31000

Outline

- Definition the content of a TDP involves:
  - Defining the pieces that make up a TDP, which are described in
    - **Scope**
    - **Definition of terms** and
    - **Requirements**
  - Describe the process the standard defines for specifying the content of a specific TDP to be ordered
- Examine how 3D DAD models were introduced into the standard

Scope

- Prescribes the requirements for preparing a technical data package, which is composed of one or more TDP elements and related TDP data management products.
- Selection of TDP levels, types, elements and TDP data management products to make up a TDP must be based on the technical data needed to support acquisition and life cycle support strategies.

Definition of Terms

- **41 Terms are defined**. Some are terms that are not used within the standard (Configuration Item, Cosmetic 3D model, Detailed design data, Physical Configuration Audit, Supplementary Technical Data, Standard Microcircuit Drawing)
- Definitions Relevant to defining the content of a TDP
  - **Technical Data Package** - A technical description of an item adequate for supporting an acquisition strategy, production, and engineering and logistics support. The description defines the required design configuration or performance requirements, and procedures required to ensure adequacy of item performance. It consists of applicable technical data such as models, drawings, associated lists, specifications, standards, patterns, performance requirements, quality assurance provisions, software documentation and packaging details.
  - **TDP element** - A data product that is an actual component of the TDP. A TDP element provides all or part of the information necessary to define the item being documented by the TDP.
  - **Product model data** - A 3 dimensional (3D) geometric representation of a design that includes digital information required for full product definition.
  - **Referenced Document** – Documents referred to in a TDP element, which contain information necessary to meet the information content requirements of the TDP element.

Requirements

- **TDP** shall consist of one or more of the following TDP levels, types and elements . . .
- **TDP level** is defined as an indicator of the natural progression of a design from its inception to production, which has one of three values of conceptual, developmental and production.
- **TDP type** is defined as an indicator that describes the form and format of the technical data, which has one of two values of 2D and 3D (3D has two subsets of 3D only and 3D with associated 2D drawings).
- **TDP element** is defined as a component part of the TDP, which can be one of the following: Conceptual design drawings/models; Developmental design drawings/models and associated lists; Product drawings/models and associated lists; Commercial drawings/models and associated lists; Special Inspection Equipment drawings/models and associated lists; Special Tooling drawings/models and associated lists; Specifications; Software documentation; Special Packaging Instruction documents, drawings/models and associated lists; and Quality assurance provisions.
- **TDP data management products** are defined as products used by the Procuring Activity to control and manage the TDP creation process and consist of Source control drawings/model approval request, Drawing/Model number assignment report, and Proposed critical manufacturing process description.

Analysis of TDP content definitions

- There appear to be inconsistencies among the various parts of the standard
  - Scope states TDP is one or more TDP elements and related TDP data management products.
  - Definition of TDP states that it is a technical description of an item.
  - Requirements state that a TDP shall consist of one or more of TDP levels, types and elements.

Comparing TDP definition to TDP elements

TDP definition (technical data object)

- Models
- Drawings
- Associated lists
- Specifications
- Standards
- Patterns
- Performance requirements
- Quality assurance provisions
- Software documentation
- Packaging details

TDP elements

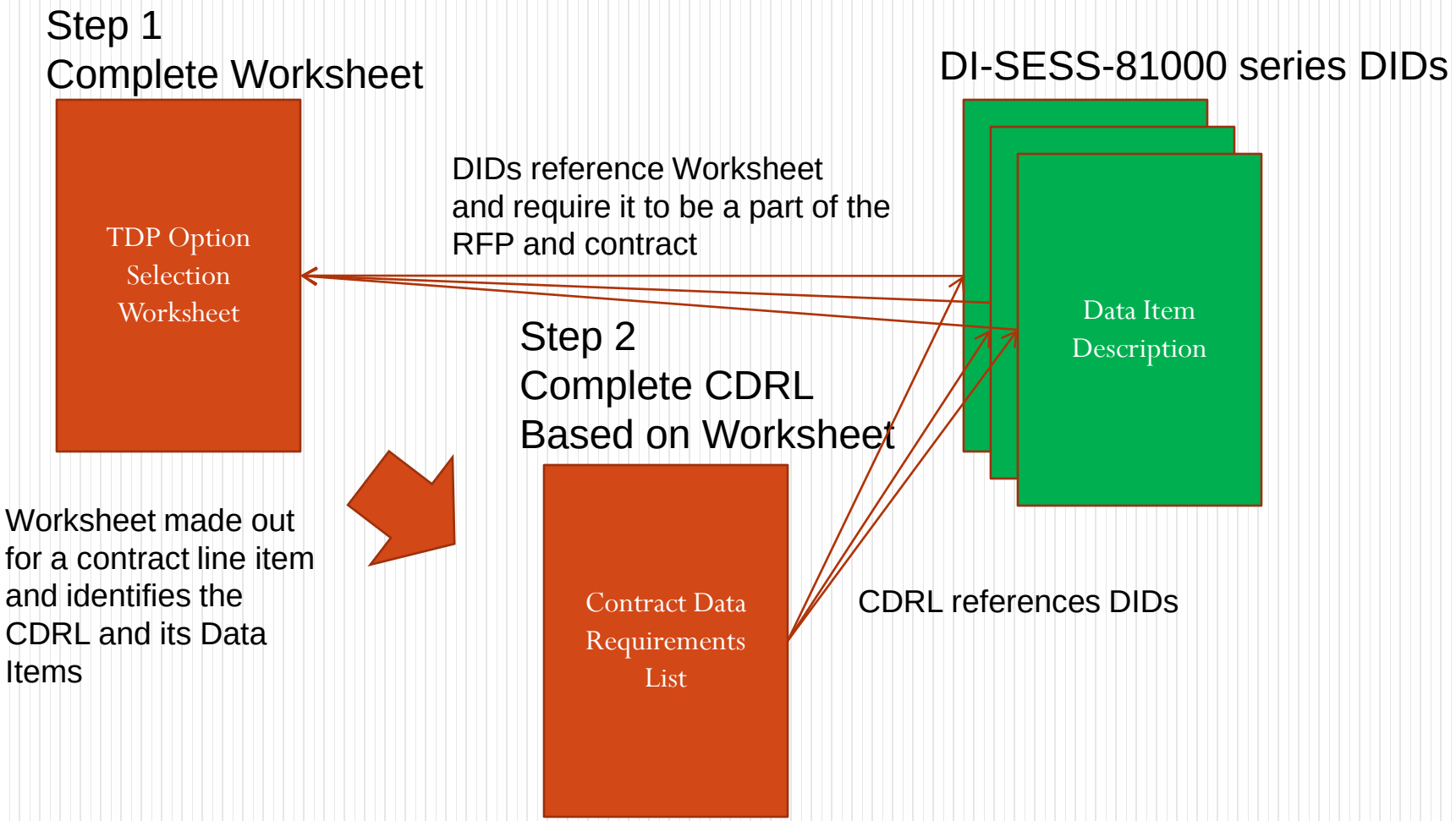
- Conceptual design drawings/models
- Developmental design drawings/models and associated lists
- Product drawings/models and associated lists
- Commercial drawings/models and associated lists
- Special Inspection Equipment drawings/models and associated lists
- Special Tooling drawings/models and associated lists
- Specifications
- Software documentation
- Special Packaging Instruction documents, drawings/models and associated lists
- Quality assurance provisions
- Referenced Documents

Red items may be should not be included in the definition of TDP. Not sure what Patterns are in terms of technical data and Performance requirements are normally expressed in specifications.

While Reference Documents are not a TDP element, they are a part of TDP elements

MIL-STD 31000 Process for ordering a TDP

MIL-STD-31000 defines what elements make up a TDP; but, relies on other standards to define content and format. The TDP Option Selection Worksheet allows the selection of elements and applicable standards for a specific TDP



DID dependencies on Worksheet

DID	Subject	Paragraphs that reference Worksheet
DI-SESS-81000D	Product	3. **Format**; 6. **CAGE code and document numbers**; 7. **Selection of drawings**
DI-SESS-81001D	Conceptual	3. **Format**; 5. **Selection of** drawings; 6. **CAGE code and document numbers**
DI-SESS-81002E	Developmental	3. **Format**; 5. **CAGE code and document numbers**; 6. **Selection of drawings**; 7. **Control Drawings**
DI-SESS-81003D	Commercial	2. **General**
DI-SESS-81004D	Inspection	5. **CAGE code and document numbers**; 7. **Selection of drawings**
DI-SESS-81008D	Tooling	5. **Selection of drawings**

Example of DID references to Worksheet

- DI-SESS-81002E
  - 3. **Format.** Developmental Design Drawings/Models and Associated Lists shall be in either the contractor's or the Government's format as specified on the TDP Option Selection Worksheet incorporated into the contract or purchase order. (Worksheet item 4.)
  - 5. **CAGE code and document numbers.** Developmental Design Drawings/Models and Associated Lists shall be identified with the contractor's CAGE code and contractor document numbers or with a Government CAGE code and Government document numbers as specified in the TDP Option Selection Worksheet incorporated in the contract or purchase order. (Worksheet item 3.)
  - 6. **Selection of drawings.** The types of drawings to be prepared will vary according to the complexity of the design approach and may range from simple sketches to complex drawings. The TDP Option Selection Worksheet incorporated in the contract or purchase order will specify whether the contractor or the Government is responsible for selecting the types of drawings and Associated Lists to be prepared. (Worksheet item 5.?? – makes no sense)
  - 7. **Control Drawings.** Control drawings need not be prepared for vendor items or nonstandard parts. Applicability of Standards. When specified on the TDP Option Selection Worksheet incorporated into the contract or purchase order, Developmental Design Drawings/Models and Associated Lists shall conform to the requirements of ASME Y14.100, or, if applicable, ASME Y14.100 and Appendices B through E, as required, ASME Y14.34, and ASME Y14.41. (Worksheet item 7. Applicability of Standards?? – most likely formatting error in DID)

Concerns about TDP Worksheet data and the DIDs

TDP OPTION SELECTION WORKSHEET

SYSTEM: DATE PREPARED:

A. CONTRACT NO.	B. EXHIBIT/ATTACHMENT NO.	C. CLIN	D. CDRL DATA ITEM NO(s).

1. TDP Level (X and complete as applicable .)

A. ☐ CONCEPTUAL LEVEL
☐ DEVELOPMENTAL LEVEL
☐ PRODUCTION LEVEL

B. REMARKS:

2. TYPE AND FORMAT (X all that apply and complete as applicable .)

A.
☐ TYPE 2D: 2D DRAWINGS
☐ TYPE 3D: 3D MODELS ONLY
☐ TYPE 3D: 3D MODELS WITH ASSOCIATED 2D DRAWINGS

B.
☐ NATIVE CAD (SPECIFY TYPE) _____
☐ ISO 10303 STEP FORMAT (Specify STEP PROTOCOL AP203, AP 214 etc.) _____
☐ ISO 32000 PORTABLE DOCUMENT FORMAT _____
☐ OTHER ELECTRONIC FORMAT (SPECIFY TYPE) _____
☐ HARDCOPY _____
REMARKS : _____

3. CAGE Code AND DOCUMENT NUMBERS

A. ☐ CONTRACTOR CAGE AND DOCUMENT NUMBERS
☐ GOVERNMENT CAGE (COMPLETE 3B & 3C OR 3D)

D. To Be Assigned By:

B. USE CAGE CODE:

C. USE DOCUMENT NUMBERS:

4. DRAWING FORMATS (X one and complete as applicable)

☐ CONTRACTOR FORMAT.
☐ GOVERNMENT FORMAT.
REMARKS: _____

5. TDP ELEMENTS REQUIRED (X all that apply)

☐ ELEMENTS REQUIRED TO BE DETERMINED BY CONTRACTOR - OR THE FOLLOWING ARE REQUIRED:

☐ CONCEPTUAL DRAWINGS/MODELS AND ASSOCIATED LISTS
☐ DEVELOPMENTAL DESIGN DRAWINGS/MODELS AND ASSOCIATED LISTS
☐ PRODUCT DRAWINGS/MODELS AND ASSOCIATED LISTS
☐ COMMERCIAL DRAWINGS/MODELS AND ASSOCIATED LISTS
☐ QUALITY ASSURANCE PROVISIONS
☐ SPECIAL INSPECTION EQUIPMENT (SIE) DRAWINGS/MODELS AND ASSOCIATED LISTS
☐ SPECIAL TOOLING (ST) DRAWINGS/MODELS AND ASSOCIATED LISTS
☐ SPECIFICATIONS
☐ SOFTWARE DOCUMENTATION
☐ SPECIAL PACKAGING INSTRUCTIONS (SPI) DRAWINGS/MODELS AND ASSOCIATED LISTS

6. ASSOCIATED LIST (X and complete as applicable)

☐ A. PARTS LIST (X ONE)	☐ (1) INTEGRAL	☐ (2) SEPARATE
☐ B. DATA LISTS (X ONE)	☐ (1) NOT REQUIRED	☐ (2) REQUIRED (SPECIFY LEVELS OF ASSEMBLY)
☐ C. INDEX LISTS (X ONE)	☐ (1) NOT REQUIRED	☐ (2) REQUIRED (SPECIFY LEVELS OF ASSEMBLY)
☐ D. WIRING LISTS (X ONE)	☐ (1) NOT REQUIRED	☐ (2) REQUIRED (SPECIFY LEVELS OF ASSEMBLY)
☐ E. INDENTURED DATA LISTS (X ONE)	☐ (1) NOT REQUIRED	☐ (2) REQUIRED (SPECIFY LEVELS OF ASSEMBLY)
☐ F. APPLICATION LISTS (X ONE)	☐ (1) NOT REQUIRED	☐ (2) REQUIRED (SPECIFY LEVELS OF ASSEMBLY)

7. APPLICABILITY OF STANDARDS. The following Standards apply: (X as applicable)

☐ ASME Y14.100 ENGINEERING DRAWING PRACTICES WITH APPENDICES:
☐ B ☐ C ☐ D ☐ E

☐ ASME Y14.24 TYPES AND APPLICATIONS OF ENGINEERING DRAWINGS
☐ ASME Y14.34 ASSOCIATED LIST
☐ ASME Y14.35M REVISION OF ENGINEERING DRAWINGS AND ASSOCIATED LIST
☐ ASME Y14.41 DIGITAL PRODUCT DEFINITION DATA PRACTICES
☐ ASME Y14.5 DIMENSIONING AND TOLERANCING

☐ OTHER STANDARDS APPLY AS DESCRIBED:

COMPANY STANDARDS PERMITTED ☐YES ☐NO

8. OTHER TAILORING (Attach additional sheets as necessary)

It is unclear how some of the data on the worksheet gets incorporated into the DIDs

What DID is associated with this choice?

Each of these is associated with a separate DID

Since Associated Lists are a part of several TDP elements, how does one know which list is to be included with which element?

How were models introduced into MIL-STD-31000

- Inserted model as an example of technical data in the definition of TDP
- A definition of Product model data was added
- A type attribute of a TDP was created to indicate whether the TDP included 3D models
- In general, the word drawing was replaced by drawing/model
- ASME 14.41 was added to define the content of a model.
- ISO 10303 was added for data exchange

Summary

- Have set the stage for our group's deliberations by
  - Describing how MIL-STD-31000 defines TDP content
  - Have shown that some inconsistencies exist
- Need your insight into how well MIL-STD-31000 works for you and your thoughts about how to improve it.