Attachment 0029

Developmental Design Models Technical Data (CAD Models)

07 November 2011

The Development Design Models Technical Data must include the following:

1 - **Engineering Design and Solid Modeling Practices**. The JLTV developmental design data must be developed in accordance with DoD adopted American Society of Mechanical Engineers (ASME) industry standards and Technical Data Packages (MIL-STD-31000).

1.1 - **Item Identification Traceability**. The JLTV developmental design data must reference (top to lowest part item level) all applicable technical data/documents and part or identifying numbers (PIN) (i.e. associated lists, analysis data, test criteria, program-unique and material specifications, standard parts, etc.) within the technical data set for traceability. The JLTV developmental design data includes a Parts List with a complete product structure.

1.2 - **Design and Technology Development.** The JLTV developmental design data must contain configuration item definition documents for parts, assemblies, system levels, three-dimensional (3D) CAD solid models and assembly solid models (per Appendix A of this attachment), specifications, standards, product related documents that include as a minimum, Parts List, Contractor's geometry and CAD data creation standards, and solid model geometric validation reports.

1.2.1 - **Solid Model Data Properties Disclosure.** The JLTV developmental design data must disclose as a minimum, the functional, physical, and interface requirements for each configuration item by means of graphic and textual representation. This includes, but is not limited to geometry, topology, assembly relationship, notes, geometric shape features, tolerances, mass properties (listed on Parts List), material properties, center of gravity (listed on Parts List) and moments of inertia, metadata attributes, information rights, interconnectivity, associativity, unique part identification, CAGE and revision history.

1.2.1.1 - **Metadata Attributes.** All JLTV CAD, CAE, part, assembly, data and documentation must incorporate User-Defined Metadata Attributes (per Appendix B of this attachment) into the 3D CAD solid models of the parameters for Government configuration and data management requirements.

1.2.2- **Solid Model Validation Checks.** The JLTV developmental design data must include a validation check summary report of the 3D CAD models with each contract delivery of the development design data. (Appendix A of this attachment).

1.2.3 - **Geometry CAD Creation Standard.** The JLTV developmental design data must identify a geometry and data creation standard that details the practice, application and requirements in areas of geometry and CAD design, development, control, validation, and management of JLTV developmental design data, and associated technical data/documents.

1.3 – **Lightweight CAD Models.** The JLTV developmental design data must include lightweight models of the complete vehicle in the form of PTC/Productview.

APPENDIX A

TDP OPTION SELECTION WORKSHEET

SYSTEM: JLTV | DATE PREPARED: October 21, 2011

A. CONTRACT NO.	B. EXHIBIT/ATTACHMENT NO.	C. CLIN	D. CDRL DATA ITEM NO(s). A053

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

A.	B. REMARKS:
☐ CONCEPTUAL LEVEL ☒ DEVELOPMENTAL LEVEL ☐ PRODUCTION LEVEL	

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

A.	B.
☐ TYPE 2D: 2D DRAWINGS ☒ TYPE 3D: 3D MODELS ONLY ☐ TYPE 3D: 3D MODELS WITH ASSOCIATED 2D DRAWINGS	☒ CAD (SPECIFY TYPE) Pro/E Wildfire Version 5.0 ☒ ISO 10303 STEP FORMAT (Specify STEP PROTOCOL AP203, AP 214 etc.) AP214 or AP203 ☐ ISO 32000 PORTABLE DOCUMENT FORMAT ☒ OTHER ELECTRONIC FORMAT (SPECIFY TYPE) PTC Productview ☐ 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: 19207	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)

BLOCK 2:

(1) 3-D CAD SOLID MODEL. Data shall be delivered in Pro/Engineer Wildfire Version 5.0 CAD at the Top Level Assembly fully assembled properly. Verify that the Top Level Assembly opens without errors. Digital product data shall be delivered containing a part and associated assembly 3-D representation and attributes - includes user-defined metadata attribute list (Appendix B) and revision information. All CAD files (models/assemblies) will contain mass properties. Distribution Statement shall be installed on contractor's 3D CAD file. A Parts List shall be provided that shows the product structure and states the mass properties and center of gravity of each CAD file.

(2) 3D CAD Solid Model FD&T, Views, and Units of Measure. 3-D CAD models shall contain functional dimensioning and tolerancing views (assigned in Contractor's geometry and CAD data creation standards). All 3-D CAD solid model dimensions shall be in Metric (millimeters) or English (inches), complying with ASME Y14.5M for dimensions, tolerances and datum's requirements.

(3) ISO 10303 STEP AP 214 or AP 203, 3-D CAD Solid Model. Data shall be delivered in ISO 10303 STEP AP 214 or AP 203 STEP files of the WBS subsystem level 4. The contractor will perform STEP file validation before deliverable to ensure that STEP data translated matches contractors Native 3D CAD models. STEP assemblies must be in body position.

BLOCK 5:

Solid Model Validation Checks. Contractor shall conduct 3-D CAD model data validation checks on data as a quality function to identify part, assembly, and installation shape and fit (geometry and topology), dimension and tolerance problems that will affect downstream applications, such as analysis, simulation, rapid prototype, and NC manufacturing and data exchange.

APPENDIX B

Product Data-User Defined Metadata Attribute List

The following part, assembly and product structure user-defined metadata attributes shall be permanently incorporated into delivered JLTV Development Design, Models and Related Technical Data (content items).

	Parameter Name	Parameter Description	Format Example	Input
01	AGENCY	Agency or service	US ARMY	*
2	CAGE_CODE	Original design activity CAGE code	19207	REQ
3	CATALOG_NOMENCLATURE	Nomenclature assigned by supply	SPRING, HELICAL	
4	CHECKER_NAME	Person that checked the original drawing	K.BALL	REQ
	CENTER_OF_GRAVITY	Center of gravity of the model		REQ
5	CONTRACT_NUMBER	Contract #-original design contract	DAAE20-03-C-S023	REQ
6	DESIGN_ACTIVITY	Design activity	Tank Automotive & Armaments Command	REQ
7	DESIGN_ACTIVITY_LOCATION	Design activity city, state and zip code	Warren, MI 48397-5000	REQ
8	DESIGN_APPROVAL_NAME	Person who approved design	A.TAYLOR	REQ
9	DESIGN_CONTRACTOR	Original design contractor	STEWART & STEVENSON SERVICES, SEALY TEXAS U.S.A.	-
10	DISTRIBUTION_CODE	Distribution Statement (A, B, C, D, E, X)	A	REQ
11	DRAWING_APPROVAL_NAME	Person who approved drawing	A.TAYLOR	REQ
12	DRAWING_DATE	Date original drawing created	YY-MM-DD	REQ
13	DRAWING_NUMBER	Drawing number the part/assembly is defined on	12414568	REQ
14	DRAWING_REV	Revision of current drawing	B	REQ
15	DRAWN_BY	Person who created original drawing	J.WENNER	REQ
16	ENGINEER_NAME_1	Primary design engineer	A.WURFEL	REQ

17	ENGINEER_NAME_2	Secondary design engineer	J.ZEBROWSKI	-
18	ERR_ECP_APPROVAL	Approving official of latest ECP	N.TAUBE	-
19	ERR_ECP_DATE	Date current revision was released	YY-MM-DD	REQ
20	ERR_ECP_NUMBER	ECP that caused current revision	TACV1234	REQ
21	ITAR	Controlled by International Traffic in Arms Regulation	YES	REQ
22	JEWEL_BEARING	YES-NO PARAMETER, contains jewel bearing	NO	-
23	MATERIAL_ENGINEER	Person who approved material for design	M.CHURCH	REQ
24	MATL_CLASS	Automatically filled out		-
25	MATL_GRADE	Automatically filled out		-
26	MATL_HEAT_TREAT	Automatically filled out		-
27	MATL_NAME	Automatically filled out		-
28	MATL_SHAPE	Automatically filled out		-
29	MATL_SPECNO	Automatically filled out		-
30	MATL_TYPE	Automatically filled out		-
31	MATL_UNS_NO	Automatically filled out		-
32	MODEL_REV	Revision of current model	B	REQ
33	MODELER_NAME_1	Primary Pro/E modeler	J.WENNER	REQ
34	NEXT_ASSY_1	First next higher assy part no. (shall match USED_ON_1 above)	12419847-001	REQ
35	NEXT_ASSY_2	Second next higher assy part no.		-
36	NEXT_ASSY_3	Third next higher assy part no.		-
37	NEXT_ASSY_4	Fourth next higher assy part no.		-
38	NEXT_ASSY_5	Fifth next higher assy part no.		-
39	NEXT_ASSY_6	Sixth next higher assy part no.		-

40	NEXT_ASSY_7	Seventh next higher assy part no.		-
41	NEXT_ASSY_8	Eighth next higher assy part no.		-
42	NOMENCLATURE	Drawing name. (See paragraph 3.12.3)	BODY ASSEMBLY, CARGO, MTV LWB	REQ
43	NOMENCLATURE_1	First line of drawing nomenclature	BODY ASSEMBLY,	-
44	NOMENCLATURE_2	Second line of drawing nomenclature	CARGO, MTV LWB	-
45	NOMENCLATURE_3	Third line of drawing nomenclature		-
46	OZONE_DEPLETING_CHEMICAL	YES-NO PARAMETER, ozone depleting chemical	NO	-
47	PART_NUMBER	Item part number	12423205	REQ
48	PMIC	Precious Metal Indicator Code	A	-
49	QA_ENGINEER_NAME	Quality assurance engineer	P.FIESTER	REQ
50	REMARKS	See paragraph 3.12.2	PRELIMINARY	REQ
51	SOURCE_CONTROL	YES-NO PARAMETER, source control	NO	-
52	SPEC_CONTROL	YES-NO parameter, spec control	NO	-
53	SPECIALTY_METAL	YES-NO PARAMETER, specialty metal	NO	-
54	TOLERANCE_1_PLACE	Default tolerance if indicated on drawing	0.1	-
55	TOLERANCE_2_PLACE	Default tolerance if indicated on drawing	0.03	-
56	TOLERANCE_3_PLACE	Default tolerance if indicated on drawing	0.02	-
57	TOLERANCE_ANG	Default angular tolerance if indicated on drawing	0.5	-
58	UNIT_WEIGHT	Mass value. (See paragraph 3.12.4)	1.25	REQ
59	USED_ON_1	First used on item	FMTV A1R	REQ
60	USED_ON_2	Second used on item		-
61	USED_ON_3	Third used on item		-

62	USED_ON_4	Fourth used on item		-
63	USED_ON_5	Fifth used on item		-
64	USED_ON_6	Sixth used on item		-
65	USED_ON_7	Seventh used on item		-
66	USED_ON_8	Eighth used on item		-
67	WEIGHT_UNIT	Automatically filled out - toolkit application	kg	REQ
68	CAD_FORMAT_TYPE	CAD system used, version and release	UG NX4.0.5. Wildfire 3.0M040	REQ
69	DATA_RIGHTS_CODE	Code ID for rights-in-data (see Data Rights Legend below)	U	REQ
70	CRITICAL_SAFETY_ITEM	Part Criticality to System Operation (section 7, ASME Y14.100) DoD definition: A part, assembly, installation, or production system with one or more essential characteristics that, if not conforming to the design data or quality requirements, would result in an unsafe condition that could cause loss or serious damage to the end item or major components, loss of control, or serious injury to personnel. Also called CSI.	TRUE (TRUE OR FALSE)	REQ
71	DOC_TYPE	Type of item being defined in accordance with doc types listed below	DP	REQ
72	UID_MARKABLE	In accordance with contract requirements, indicate if part requires Unique Identification (UID) marking	TRUE (TRUE OR FALSE)	REQ
73	MBD_MODEL	Compliant to ASME Y14.41 AND 3D MBD standards	TRUE (TRUE OR FALSE)	REQ
74	NSN	National Stock Number	2510-01-330-2249	-

Calendar Date Convention: yyyy-mm-dd (year-month-day)

Marking Requirements

All technical data delivered as part of this CDRL submission shall have affixed the appropriate distribution statement, appropriate data rights legend, and export control warning.