



ENG-301: Leadership in the Engineering
of Defense Systems

Open Systems Architecture and Intellectual Property Rights in Engineering 301

for: NDIA Systems Engineering Symposium October 2014

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Learning Objectives

Given a system development scenario, the student will develop a plan to manage the system technical baselines and product technical data while accommodating Intellectual Property and Open Systems Architecture considerations in accordance with DoD technical data management and configuration management policies and practices as described in the DAG and class discussions.

- Recognize the types of technical data that constitute a typical technical data package (TDP) as described in MIL-STD-31000.
- List examples of typical TDP life cycle management risks and issues from a government program perspective.
- Recognize the Open System Architecture and intellectual property considerations associated with the use of COTS and Non-Developmental Items (NDI)
- Explain the Government's need for rights in technical data and software.
- Given a WBS and acquisition strategy, determine what technical data and computer software is needed to be delivered to the government.
- Given a life cycle competition strategy for a program, determine what type of rights are appropriate for the technical data or computer software.
- Given the life cycle acquisition, engineering and logistics requirements for a product, develop an open systems architecture appropriate to support the product through its planned life.

Module Outline

- Better Buying Power
- Open Systems Architecture
- Vendor Lock
- Technical Data and Data Rights
- Marching Orders
- OSA Implementation, Phases I & II:
 - Provided guidelines on OSA and an acquisition strategy, determine the data and software requirements to support an OSA consistent with the AS, LCSS
- OSA Implementation Phase III,
 - Given the products of Phases I & II, merge these products with those of other teams to develop a project IP/OSA strategy through the use of non-proprietary standards
- Summary and Wrap Up

Introduction to Case Study

- Better Buying Power 2.0 directs that we:
 - Emphasize competition strategies and create and maintain competitive environments
 - Enforce Open Systems Architectures and effectively manage technical data rights
- Data Rights (or the lack thereof) have significantly impacted DoD's costs and acquisition strategies
- Vendor lock
 - Tied into one vendor for the life cycle of a product
 - Reduces or eliminates competition
 - Leads to increased costs over the life cycle

What is an Open System Architecture (OSA)?

- OSA is a strategic “Business and Technical” acquisition approach that leverages the commercial market-place in a way to control and optimize design features to ensure that a level-field of competition provides the best valued product for our war-fighter in a timely basis. Key design features include:

BUSINESS

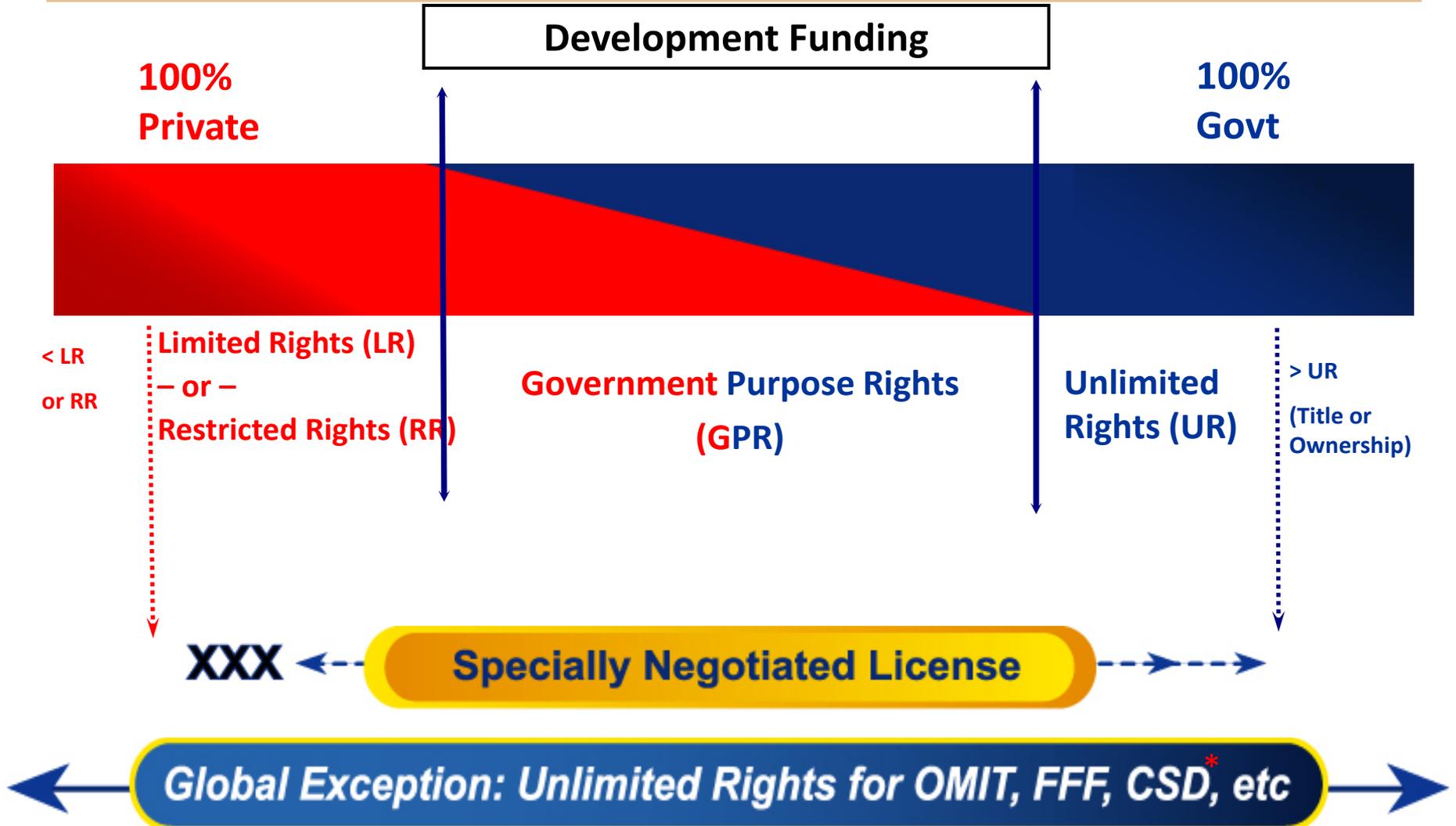
- Create a Competition-focused Environment (A **CULTURE** of Competition)
 - Open Design Disclosure for All Stakeholders (Data Rights)
 - Enterprise Strategy
- Ensure Government Access to Data for Reduced Life-Cycle Sustainment Costs

TECHNICAL

- Use a Modular Design (Loose Coupling with High Cohesion)
- Use of Open Standards (Public, Published and Popular (The Three P’s))
- A successful OSA implementation allows for competition and ease of change that provides the best value to our war-fighters.

Quick Review of Data Rights

Note: CLE 068 IP/DR is a prerequisite



* Operations, Maintenance, Installation, Training; Form, Fit, Function; Computer Software Documentation

What Technical Data and Software Deliverables Does the Gov't need?

- Three places to explore:
 - Acquisition Strategy
 - Plan for future increments (upgrades, tech refresh)
 - Provision for unplanned future increments (responding to new requirements)
 - Plans for future competition (follow-on production, spares, support)
 - Logistics support concept (para 7.4 of AS)
 - Military vs. Civilian vs. Contractor
 - Where work performed (unit, support org. or depot)
 - Other Sources
 - DoDAF 2.02 (viewpoints)
 - Objective architectures
 - Industry standards
 -

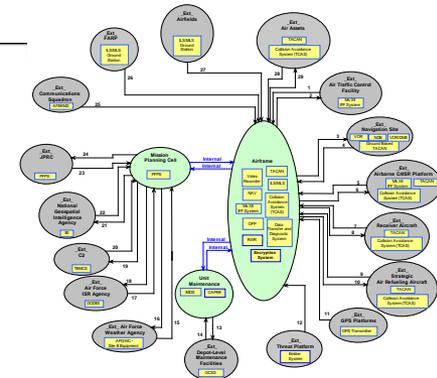


Unclassified

Technical Standards Forecast (TV-2)
Standards Profile for APACHE/HELICOPTER/ARH/AS (BLK)

Technical Standards Forecast (TV-2) - The Technical Standards Forecast contains expected changes in technology-related standards and conventions, which are documented in the TV-1 product. The forecast for evolutionary changes in the standards should be correlated against the time periods as mentioned in the SV-8 and SV-9 products.

IT Profile:	AH-64D Apache Block III p3 - TV-2 IT Profile						
IT Description:	TV-2 IT Profile						
IT Profile Classification:	Unclassified						
Last Updated:	2009-05-19						
Service Area	Standard Identifier	Title of Standard	Published Status	Sun-set Status	Current Status	Sun-set Status	
Military Messaging	IBS TDP	Integrated Broadcast Service (IBS) Technical Interface Design Plan - Test Edition (TDP-TE)	Emerging		Emerging		
IPv6 Capable Product Class Profiles	ITF RFC 3207	The Use of RSVP with IETF Integrated Services, September 1997	Emerging		Emerging		
Network Technologies	ITF RFC 2794	Mobile IP Network Access Identification Extension for IPv4, March 2000	Emerging		Emerging		
Transport-Oriented (quality of service) Profiles	ITF RFC 3031	Multi-protocol Label Switching Architecture, January 2001	Emerging		Emerging		
Network Technologies	ITF RFC 3175	Aggregation of RSVP for IPv4 and IPv6 Reservations, September 2001	Emerging		Emerging		
Satellite Communications	ML-STD-186-184A	Robust Header Compression (RHC) over RPP, April 2002	Emerging		Emerging		
GEONET: Motion Imagery	MSS RP 0701.0 Common Metadata System Structure	MSS Recommended Practice 0701.0, Common Metadata System: Structure, 8 August 2007	Emerging		Emerging		
Document Interchange	XML 1.1:2004	Extensible Markup Language (XML) 1.1, W3C Recommendation 04 February 2004, revised in place 15 April 2004	Emerging		Emerging		



Product Data & Data Rights Decision Tree

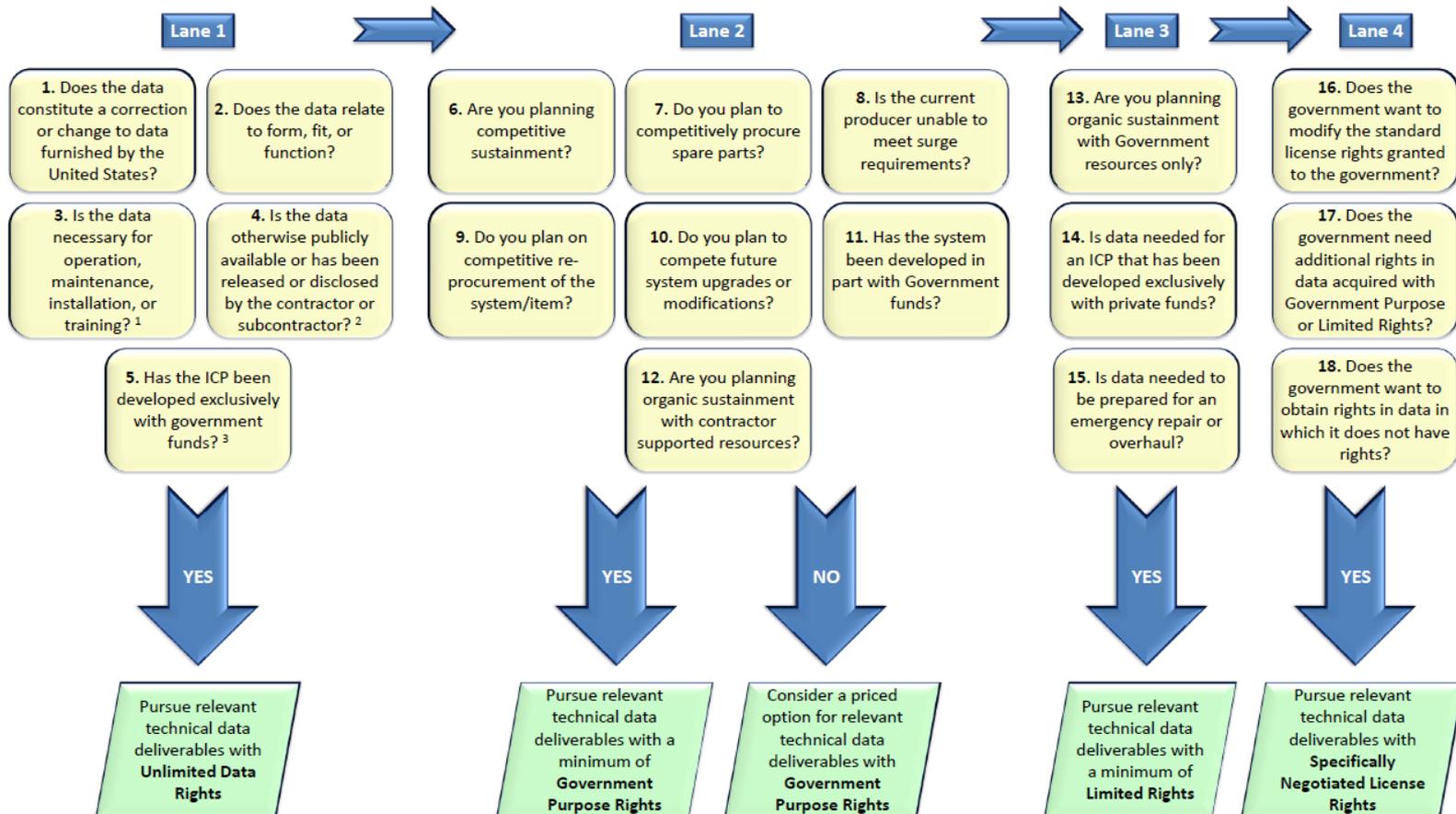
Item, Component or Process (ICP)

Note: For future reference

Product Data & Data Rights Decision Tree Item, Component, or Process (ICP)

USAF PDAQ
19 Nov 2013

All questions should be asked during the acquisition planning process prior to any contracting actions.
If any answer in a lane is yes, please take the indicated action for the lane.



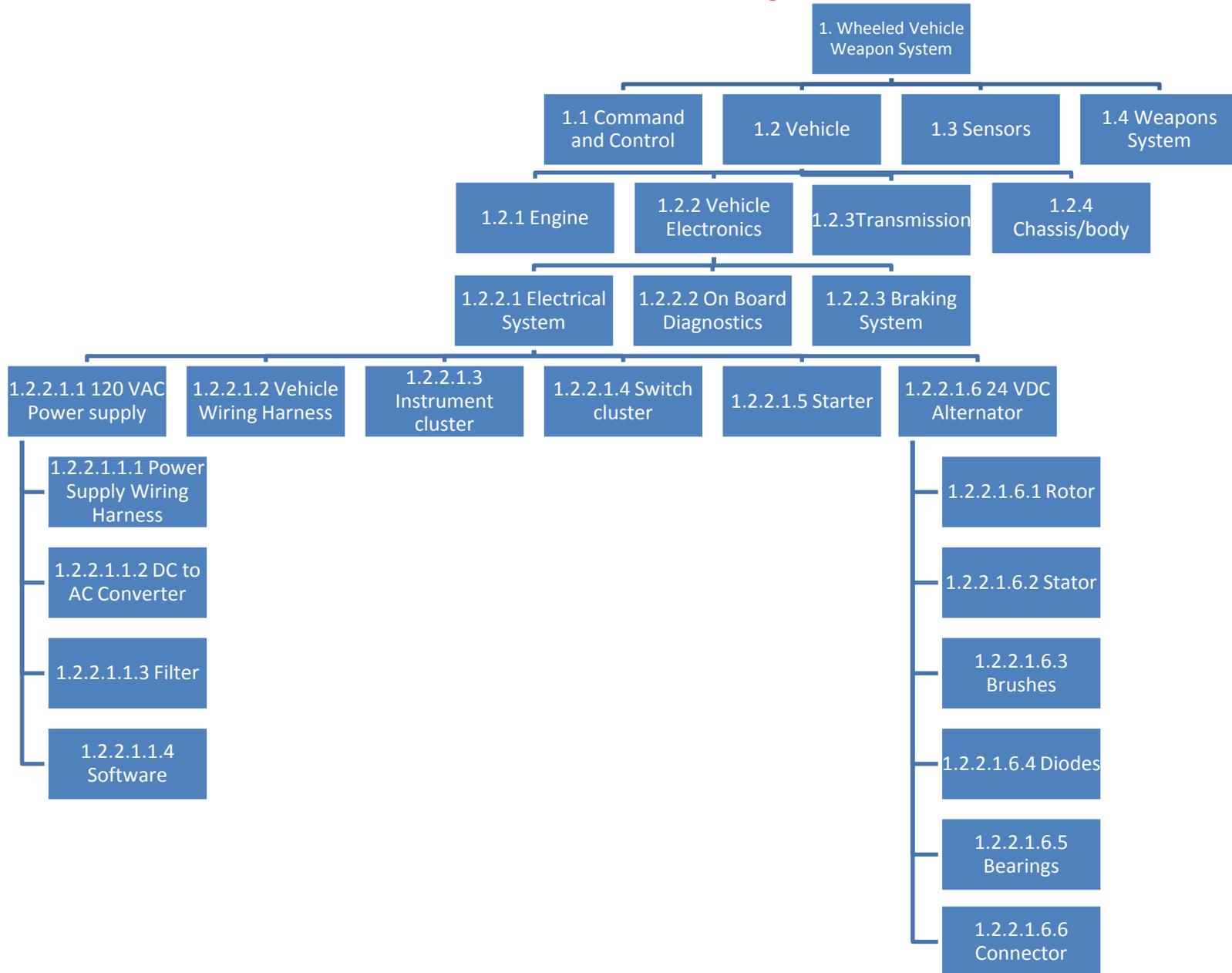
Notes

1. other than detailed manufacturing or process data
2. without restriction on further release or disclosure
3. It is permissible to acquire less than unlimited rights (down to limited rights) for data funded exclusively with government funds as long as that data doesn't fit within boxes #1, #2, #3, or #4.

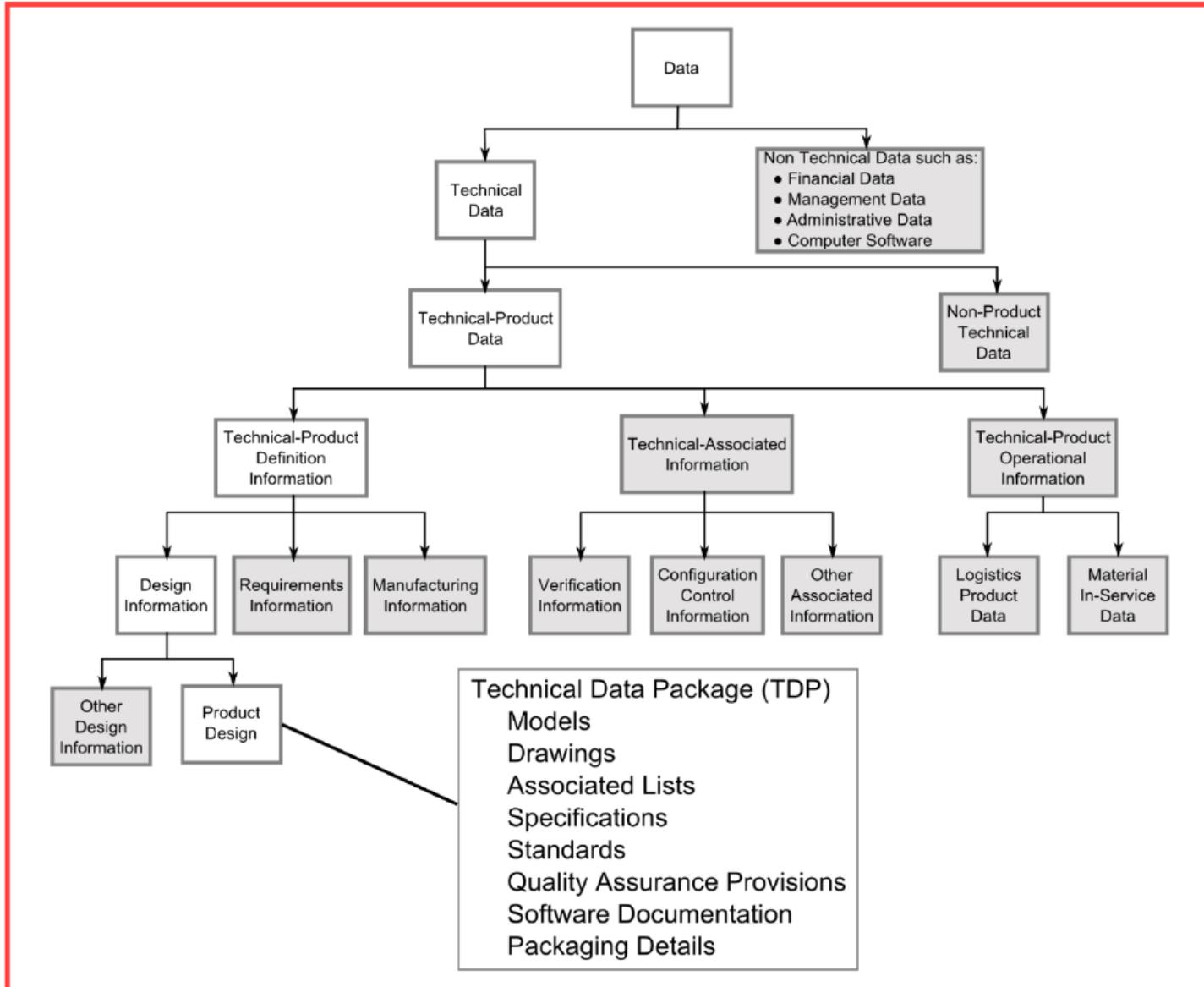
Sources

- 10 USC 2320 – Rights in Technical Data
- DFARS Subpart 227.71 – Rights in Technical Data
- DODI 5000.02 – Operation of the Defense Acquisition System

Instructor Example - Alternator



Technical Data Package (Relationship to other Technical Data)



Technical Data Package (TDP)

(Definition from MIL-STD-31000a)

- Technical Data Package (TDP): A technical description of an item adequate for supporting an acquisition, production, engineering and logistics support (e.g. Engineering Data for Provisioning, Training and Technical Manuals). 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, performance requirements, QAP, software documentation and packaging details.

Note what is not included: Software source code, manufacturing processes

Key Definitions from MIL-STD 31000A

- Computer software: Computer programs, source code, source code listings, object code listings, design details, algorithms, processes, flow charts, formulae and related material that would enable the software to be reproduced, recreated or recompiled. Computer software does not include computer data bases or computer software documentation.
- Computer software documentation: Owner's manuals, user's manuals, installation instructions, operating instructions, and other similar items, regardless of storage medium, that explains the capabilities of the computer software or provide instructions for using the software.
- Both of the above are from DFARS Clause 252.227-7014

Top Level Vehicle

Component from WBS	Technical Data Package?	Source Code?	COTS?	Mechanical I/F	Connector	Data Format	Power I/F	Thermal I/F	Test data
1.2.1 Engine									
1.2.3 Transmission									
1.2.4 Chassis/ body	Yes/GPR	TBD		Yes/UR	N/A	TBD			Yes/GPR
1.2.2 Vehicle Electronics	Yes/GPR	Yes/GPR				TBD			Yes/GPR
1.2.2.2 On Board Diagnostics									
1.2.2.3 Braking System									
1.2.2.1.2 Vehicle Wiring Harness	Yes/GPR	Yes/GPR		Yes/UR	Yes/Mil/Ind Std	TBD	Yes/UR	Yes/UR	Yes/GPR
1.2.2.1.3 Instrument Cluster	TBD	TBD	Yes/Non-proprietary only	Yes/UR	Yes/Mil/Ind Std	TBD	Yes/UR	Yes/UR	Yes/GPR
1.2.2.1.4 Switch Cluster	TBD	TBD	Yes/Non-proprietary only	Yes/UR	Yes/Mil/Ind Std	TBD	Yes/UR	Yes/UR	Yes/GPR
1.2.2.1.5 Starter/ Ignition System	TBD	TBD	TBD	Yes/UR	Yes/Mil/Ind Std	TBD	Yes/UR	Yes/UR	Yes/GPR

1.2.2.1.6 Alternator Example

Component from WBS	Technical Data Package?	Source Code?	COTS?	Mechanical I/F	Connector	Data Format	Power I/F	Thermal I/F	Test data
1.2.2.1.6 24VDC Alternator									
1.2.2.1.6.1 Rotor									
1.2.2.1.6.2 Stator									
1.2.2.1.6.3 Brushes									
1.2.2.1.6.4 Diodes									
1.2.2.1.6.5 Bearings									
1.2.2.1.6.6 Connector									

Alternator Example

(spare/repair with alternator as LRU – assumes neither Government or support contractor will repair bad alternators)

Component from WBS	Technical Data Package?	Source Code?	COTS?	Mechanical I/F	Connector	Data Format	Power I/F	Thermal I/F	Test data
1.2.2.1.6 24VDC Alternator	FFF/UR & Perf Spec (GPR)	N/A	Option/N on-proprietary	Yes/UR	Yes/Mil/Ind Std	Yes - Gov't Format	Yes/UR	Yes/UR	Yes/UR
1.2.2.1.6.1 Rotor	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
1.2.2.1.6.2 Stator	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
1.2.2.1.6.3 Brushes	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
1.2.2.1.6.4 Diodes	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
1.2.2.1.6.5 Bearings	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
1.2.2.1.6.6 Connector	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Alternator Example

Repair/rebuild alternator with contractor personnel

Component from WBS	Technical Data	Source Code?	COTS?	Mechanical I/F	Connector	Data Format	Power I/F	Thermal I/F	Test data
1.2.2.1.6 24VDC Alternator	FFF/UR & Perf Spec (GPR)	N/A	Option/Non-proprietary	Yes/UR	Yes/Mil/Ind Std	Yes - Gov't Format	Yes/UR	Yes/UR	Yes/UR
1.2.2.1.6.1 Rotor	FFF/UR & Perf Spec (GPR)	N/A	Option/Non-proprietary	Yes/UR	Yes/Mil/Ind Std	N/A	N/A	N/A	N/A
1.2.2.1.6.2 Stator	FFF/UR & Perf Spec (GPR)	N/A	Option/Non-proprietary	Yes/UR	Yes/Mil/Ind Std	N/A	N/A	N/A	N/A
1.2.2.1.6.3 Brushes	FFF/UR & Perf Spec (GPR)	N/A	Option/Non-proprietary	Yes/UR	Yes/Mil/Ind Std	N/A	N/A	N/A	N/A
1.2.2.1.6.4 Diodes	FFF/UR & Perf Spec (GPR)	N/A	Option/Non-proprietary	Yes/UR	Yes/Mil/Ind Std	N/A	N/A	N/A	N/A
1.2.2.1.6.5 Bearings	FFF/UR & Perf Spec (GPR)	N/A	Option/Non-proprietary	Yes/UR	Yes/Mil/Ind Std	N/A	N/A	N/A	N/A
1.2.2.1.6.6 Connector	FFF/UR & Perf Spec (GPR)	N/A	Option/Non-proprietary	Yes/UR	Yes/Mil/Ind Std	N/A	N/A	N/A	N/A

Top Level Vehicle

Component from WBS	Technical Data Package?	Source Code?	COTS?	Mechanical I/F	Connector	Data Format	Power I/F	Thermal I/F	Test data
1.2.1 Engine	Yes/GPR								Yes/GPR
1.2.3 Transmission	Yes/GPR								Yes/GPR
1.2.4 Chassis/ body	No								Yes/GPR
1.2.2 Vehicle Electronics									
1.2.2.2 On Board Diagnostics	Yes/GPR	Yes/GPR	Yes/Non-proprietary only	Yes/Mil/Ind Std	Yes/Mil/Ind Std	Yes/GPR	Yes/GPR	N/A	Yes/GPR
1.2.2.3 Braking System	Yes/GPR	Yes/GPR	Yes/Non-proprietary only	Yes/Mil/Ind Std	Yes/Mil/Ind Std	Yes/GPR	Yes/GPR	Yes/GPR	Yes/GPR
1.2.2.1.2 Vehicle Wiring Harness	No	N/A	No	Yes/GPR	Yes/GPR	N/A	Yes/GPR	Yes/GPR	Yes/GPR
1.2.2.1.3 Instrument Cluster	Yes/GPR	No	Yes	Yes/GPR	Yes/GPR	Yes/GPR	Yes/GPR	Yes/GPR	Yes/GPR
1.2.2.1.4 Switch Cluster	Yes/GPR	No	Yes	Yes/GPR	Yes/GPR	Yes/GPR	Yes/GPR	Yes/GPR	Yes/GPR
1.2.2.1.5 Starter/ Ignition System	Yes/GPR	No	Yes	Yes/GPR	Yes/GPR	N/A	Yes/GPR	N/A	Yes/GPR

Interface definition - Alternator

Component from WBS	Interface Exists	Existing commercial/industry standard	Prime contractor defined	Government requires to perform OMIT?	Interface definition delivery required?	When needed	Priced option?	Comments
1.1 Command and Control								
1.3 Sensors								
1.4 Weapons Systems								
1.2 Vehicle								
1.2.1 Engine								
1.2.3 Transmission								
1.2.4 Chassis/ body								
1.2.2 Vehicle Electronics								
1.2.2.2 On Board Diagnostics								
1.2.2.3 Braking System								
1.2.2.1.2 Vehicle Wiring Harness								
1.2.2.1.3 Instrument Cluster								
1.2.2.1.4 Switch Cluster								
1.2.2.1.5 Starter/ Ignition System								

Interface definition - Alternator

Component from WBS	Interface Exists	Existing commercial/industry standard	Prime contractor defined	Government requires to perform OMIT?	Interface definition delivery required?	When needed	Priced option?	Comments
1.1 Command and Control	No							
1.3 Sensors	No							
1.4 Weapons Systems	No							
1.2 Vehicle								
1.2.1 Engine	Yes	TBD	Yes	Yes	Yes	CDR	No	
1.2.3 Transmission	No							
1.2.4 Chassis/ body	No							
1.2.2 Vehicle Electronics	Yes	TBD	Yes	Yes	Yes	CDR	No	
1.2.2.2 On Board Diagnostics	Yes	Yes	N/A					
1.2.2.3 Braking System	Yes	TBD	Yes	Yes	Yes	CDR		
1.2.2.1.2 Vehicle Wiring Harness	Yes	No	Yes	Yes	Yes	CDR		
1.2.2.1.3 Instrument Cluster	TBD	No						
1.2.2.1.4 Switch Cluster	No							
1.2.2.1.5 Starter/ Ignition System	Yes	No	Yes	Yes	Yes	CDR		

Note: All interface control documents (ICDs) should be delivered with Unlimited Rights (as they define Form, Fit and Function)

- The acquisition strategy (AS) drives the requirements for technical data and software
 - Plans for future increments
 - Plans for/provisions for upgrades and technology refresh
 - Life cycle support strategy
 - Hardware
 - Software
 - Intellectual Property Strategy is component of AS
- The AS enables the implementation of OSA:
 - Ensuring the technical data and software is delivered
 - Ensuring the Government has sufficient rights to implement the AS
 - Avoiding vendor lock

Where to get help

- <https://acc.dau.mil/osaguidebook>
- <https://acc.dau.mil/osa>