

Implementation Challenges of S-Series Specification, S3000L/S2000M

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Integrated Support Systems: Brief Background

- **Established: 1984**
- **Locations: USA / France**
- **Integrated Logistics Support (ILS) / Configuration Management (CM) software development**
- **Related technical services / custom software development / training**
- **ILS engineering consulting**
- **Active involvement with international ILS standards committees**

Integrated Support Systems Deployed Solutions

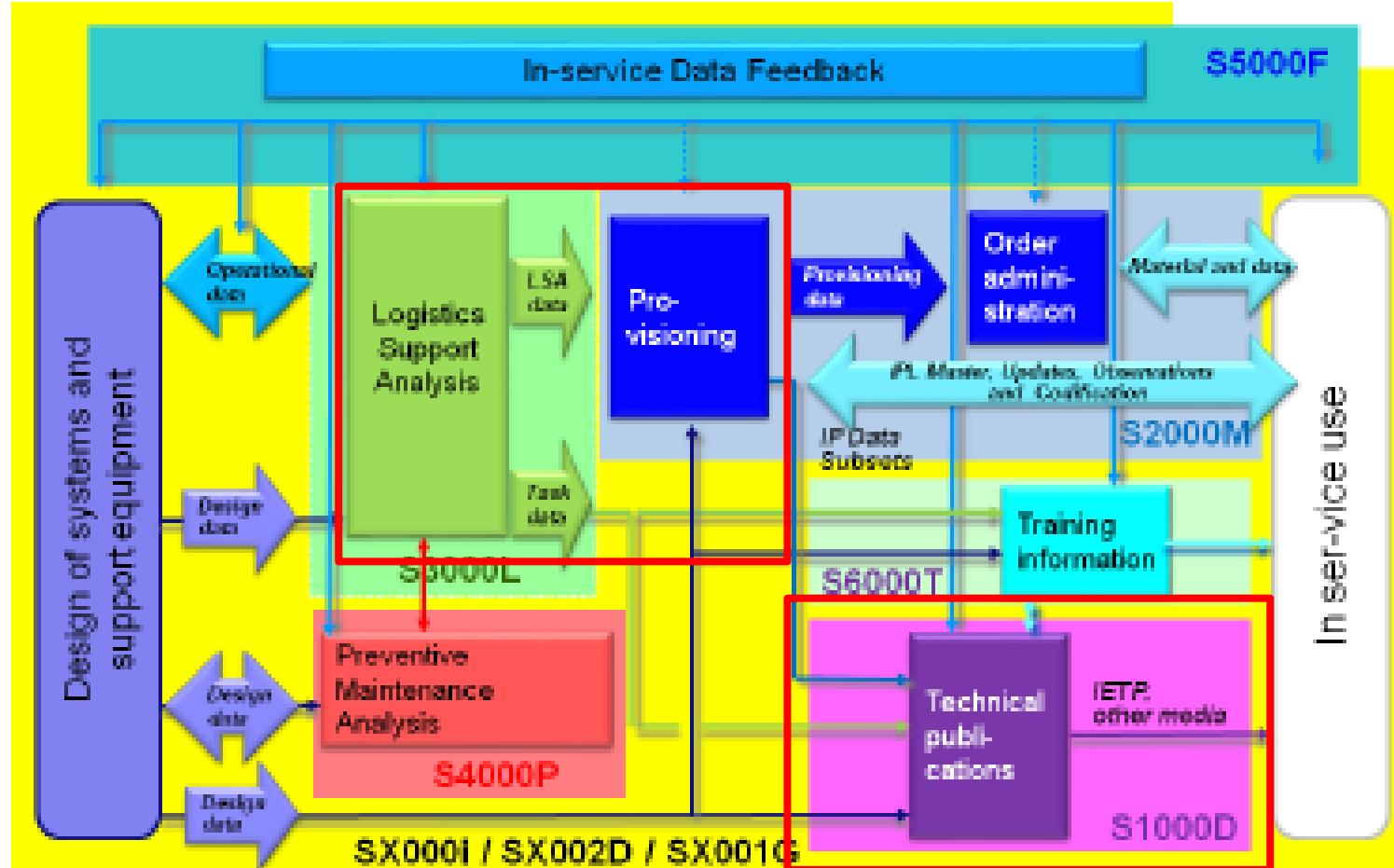
- **Logistics Support Analysis (LSA) and Provisioning**

- Supported Standards: MIL-STD-1388-2B, DefStan 00-60, GEIA-STD-0007, ASD S3000L, ASD S2000M, with interface to ASD S1000D
- Active Participation on:
 - SAE Life Cycle Logistics Support Committee (LCLS)
 - ASD Data Model Exchange Working Group (DMEWG)
 - ASD S3000L Steering Committee
 - ASD PLCS (S2000M) Task Team
 - ASD S1000XTT (S1000D Interface) Task Team

- **Product Definition and Configuration**

- Standards Supported: MIL-STD-973/2549, SAE GEIA-HB 649, EIA-836, AP 203/CC1, AP 232, pdmschema
 - Prior participation on the PDES, Inc. Technical Advisory Committee

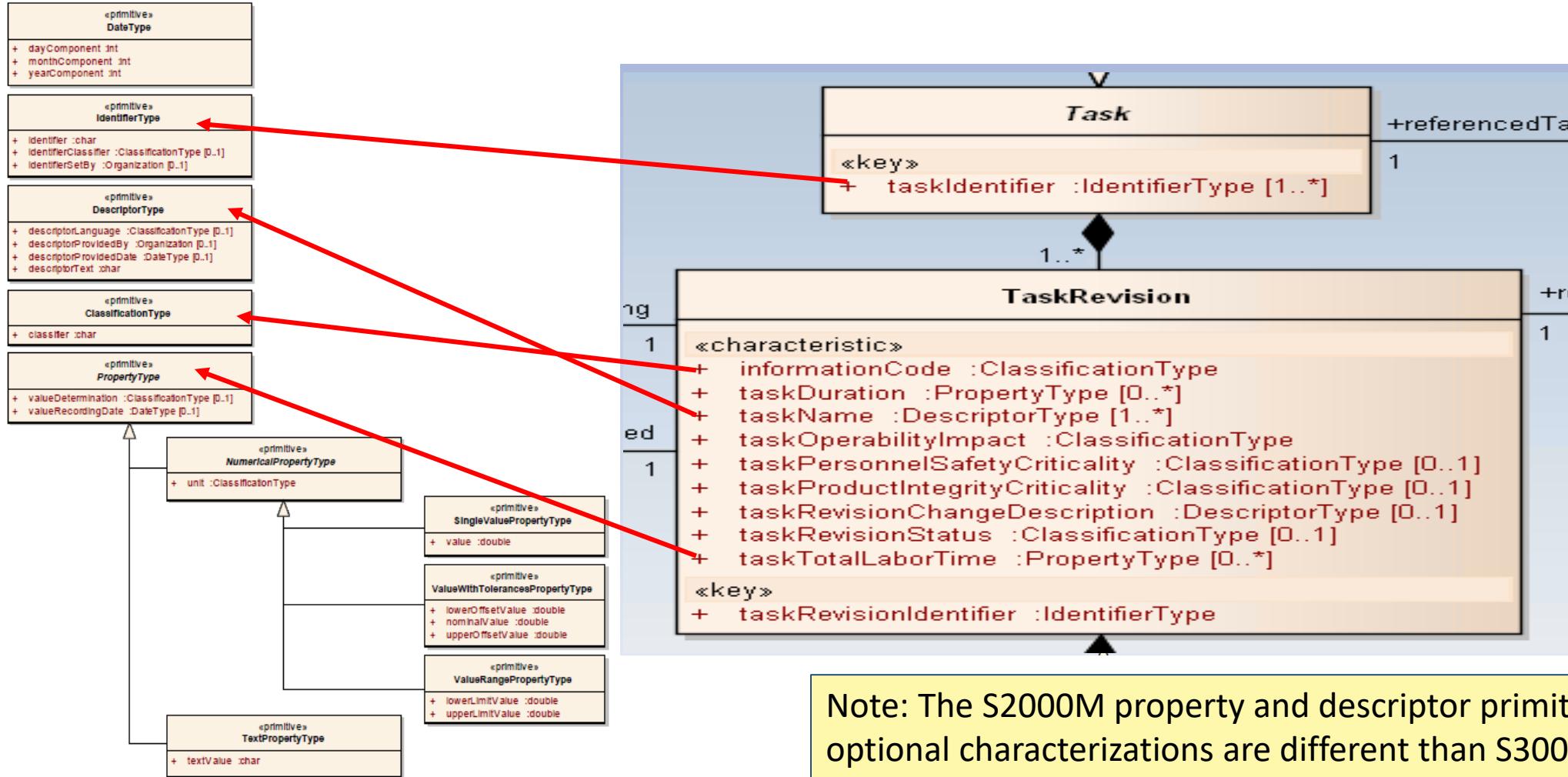
Integrated Logistics Support ASD S Series Specifications



Challenging Areas

- **Support for S Series primitive data types**
 - Identifier
 - Property
 - Descriptor
 - Classification
- **Data Exchange**
- **Common Part definition (HardwarePartAsDesigned) between S3000L and S2000M**
- **Maintenance Task and Initial Provisioning data supporting S1000D DM generation**

Primitive Data Types: Building Blocks for S3000L and S2000M Schema



Note: The S2000M property and descriptor primitive optional characterizations are different than S3000L primitive optional characterizations.

Primitive Data Types: Identifiers

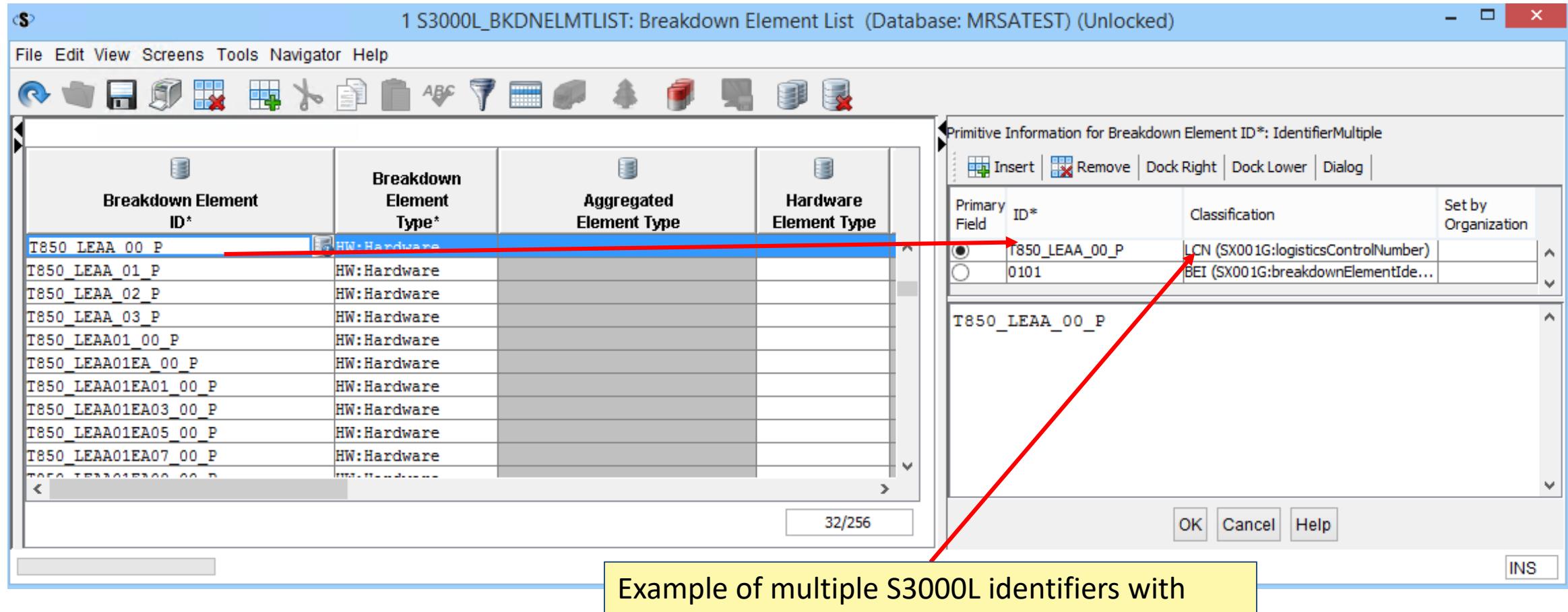
- **ASD S3000L / S2000M:**

- Business object identifiers in the S3000L and S2000M schema may or may not have multiple identifier values, dependent on the class. If multiple identifiers, optional characterizations must differentiate the value of the identifier.
 - Several S3000L classes allow multiple identifiers. S2000M classes only allow a single identifier
- The optional characterizations for identifiers are identifierClassifier and identifierSetBy (Organization)
 - The identifierClassifier is a classification. Note: classifications may be tailored by project

As reference, the identifiers in GEIA-STD-0007 (and 1388-2B) are explicitly defined in clear text in all usages (all classes)

Identifier Primitive

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The screenshot shows a software application window titled "1 S3000L_BKDNELMTLIST: Breakdown Element List (Database: MRSATEST) (Unlocked)". The main window displays a table of breakdown elements with columns: Breakdown Element ID*, Breakdown Element Type*, Aggregated Element Type, and Hardware Element Type. A red arrow points from the "Breakdown Element ID*" column to the "ID*" field in a modal dialog titled "Primitive Information for Breakdown Element ID*: IdentifierMultiple". The dialog contains two rows of data:

Primary Field	ID*	Classification	Set by Organization
<input checked="" type="radio"/>	T850_LEAA_00_P	LCN (SX001G:logisticsControlNumber)	
<input type="radio"/>	0101	BEI (SX001G:breakdownElementId...	

At the bottom right of the dialog are buttons: OK, Cancel, Help, and INS.

Example of multiple S3000L identifiers with defining classification characterization

Primitive Data Types: Properties

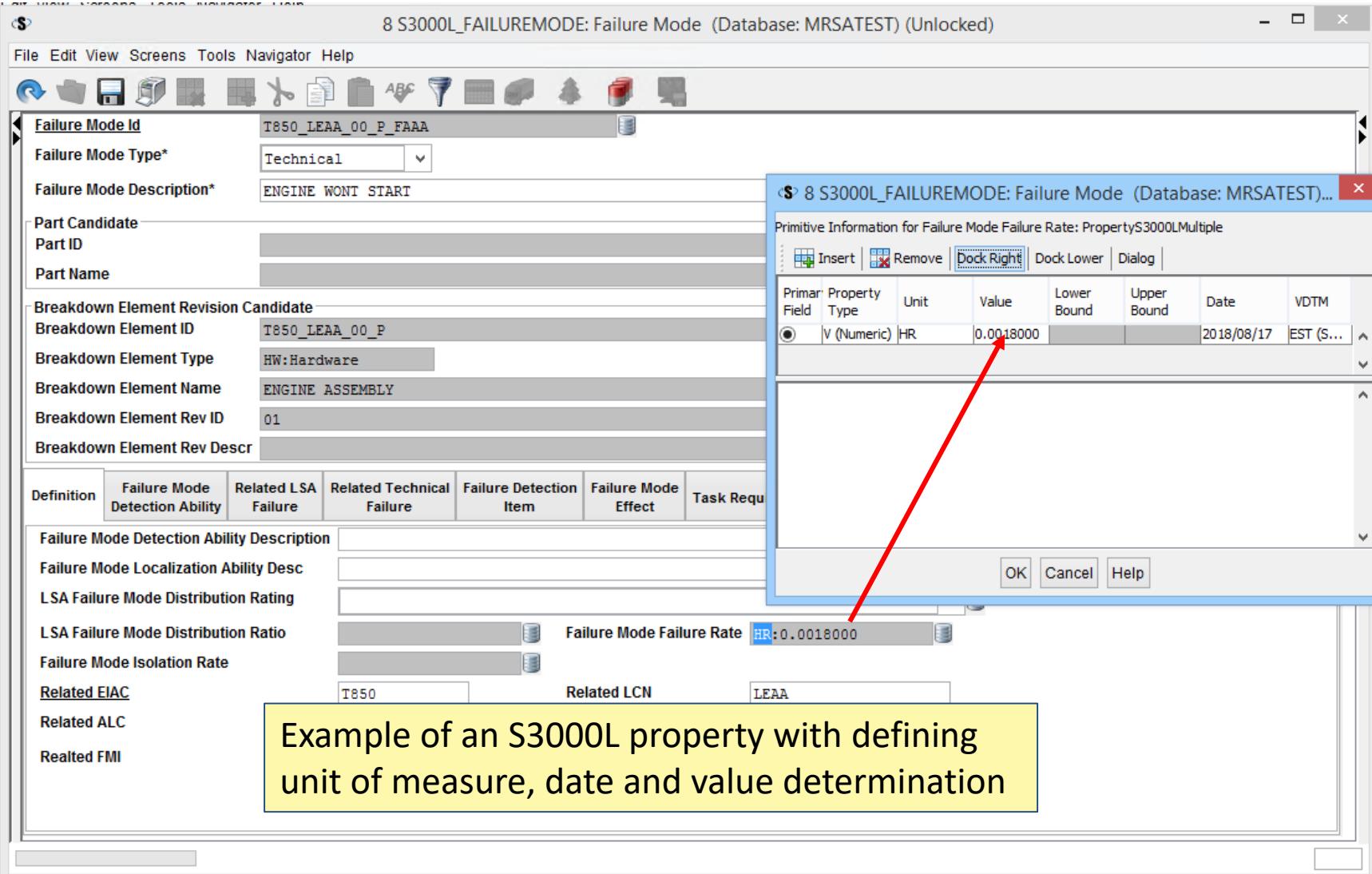
- **ASD S3000L / S2000M:**

- Property values in the S3000L and S2000M schema require a unit of measure. If multiple values, optional characterizations must differentiate the value.
 - All S3000L properties allow multiple values. Almost all S2000M properties only allow a single value.
- S3000L has additional characterization attributes: valueDetermination and valueRecordingDate
- S3000L properties may also be text properties

As reference, the properties in GEIA-STD-0007 (and 1388-2B) are typically numeric values (integer or real) with a related unit

Property Primitive

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The screenshot shows the S3000L FAILUREMODE application interface. A modal dialog titled "Primitive Information for Failure Mode Failure Rate: PropertyS3000LMultiple" is open, displaying a table with one row of data:

Primary Field	Property Type	Unit	Value	Lower Bound	Upper Bound	Date	VDTM
(radio button)	V (Numeric)	HR	0.0018000			2018/08/17	EST (S...)

A red arrow points from the "Value" cell in the table to a text field labeled "Failure Mode Failure Rate" at the bottom of the dialog, which contains the value "HR: 0.0018000".

Example of an S3000L property with defining unit of measure, date and value determination

Primitive Data Types: Descriptor

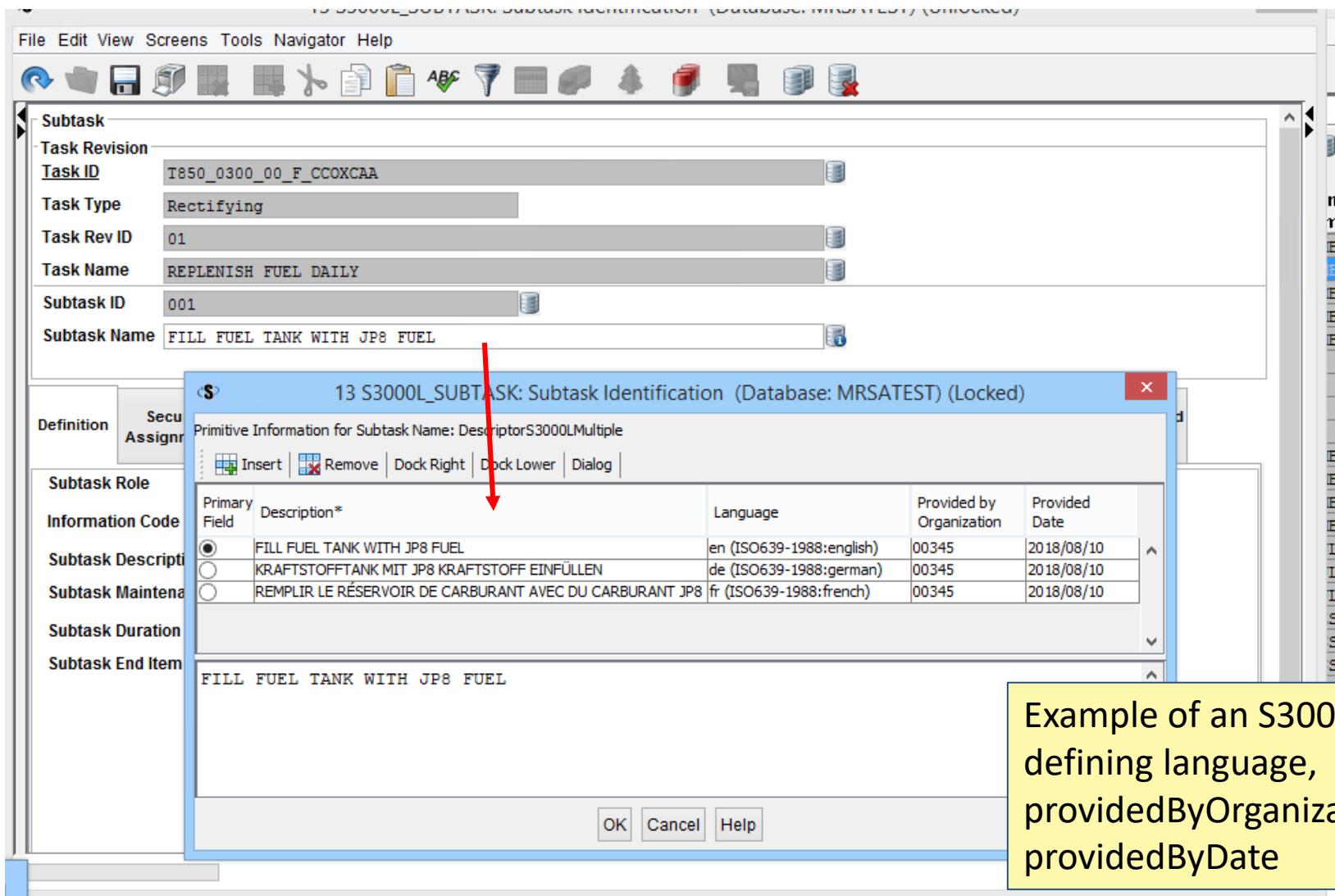
- **ASD S3000L / S2000M:**

- Descriptor values in the S3000L and S2000M schema are string values. If multiple values, optional characterizations must differentiate the value.
 - All S3000L descriptors allow multiple values. S2000M descriptors only allow a single value.
- S3000L has additional characterization attributes: descriptorLanguage, descriptorProvidedBy (Organization) and descriptorProvidedDate.

As reference, the descriptors in GEIA-STD-0007 (and 1388-2B) are single value strings

Descriptor Primitive

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The screenshot shows a software application window titled "13 S3000L_SUBTASK: Subtask Identification (Database: MRSATEST) (Locked)". The main window displays task details:

- Task Revision: Task ID T850_0300_00_F_CCOXCAA
- Task Type: Rectifying
- Task Rev ID: 01
- Task Name: REPLENISH FUEL DAILY
- Subtask ID: 001
- Subtask Name: FILL FUEL TANK WITH JP8 FUEL

A modal dialog box titled "Primitive Information for Subtask Name: DescriptorS3000LMultiple" is open, showing the following table:

Primary Field	Description*	Language	Provided by Organization	Provided Date
<input checked="" type="radio"/>	FILL FUEL TANK WITH JP8 FUEL	en (ISO639-1988:english)	00345	2018/08/10
<input type="radio"/>	KRAFTSTOFFTANK MIT JP8 KRAFTSTOFF EINFÜLLEN	de (ISO639-1988:german)	00345	2018/08/10
<input type="radio"/>	REMPILLER LE RÉSERVOIR DE CARBURANT AVEC DU CARBURANT JP8	fr (ISO639-1988:french)	00345	2018/08/10

Below the table, the text "FILL FUEL TANK WITH JP8 FUEL" is displayed. The dialog has buttons for OK, Cancel, and Help.

Example of an S3000L descriptor with defining language, providedByOrganization and providedByDate

Primitive Data Types: Classification

- **ASD S3000L / S2000M:**

- Classification values in the S3000L and S2000M schema are defined in schemas.
- The classifications are able to be updated for project specific requirements
 - Classification values are used in the unique identification of business object identifiers and the multiple value elements within a business object

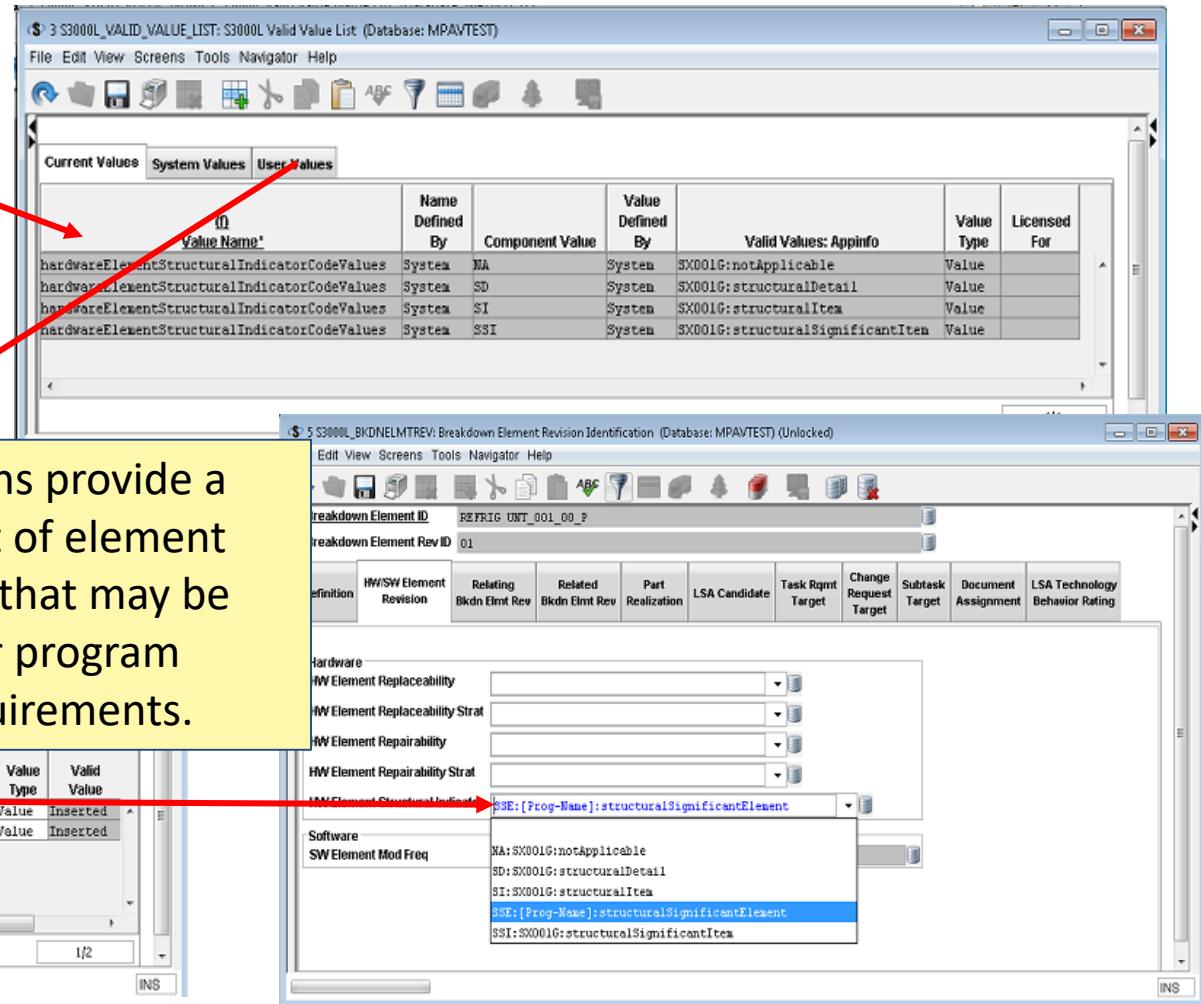
Classification Primitive

s3000l_1-1_valid_values_xsd.xml

```

</xsd:simpleType>
- <xsd:simpleType name="hardwareElementStructuralIndicatorCodeValues">
  - <xsd:restriction base="xsd:string">
    <!-- S3000L Data Element Examples -->
    - <xsd:enumeration value="SSI">
      - <xsd:annotation>
        <xsd:appinfo>SX001G:structuralSignificantItem</xsd:appinfo>
      </xsd:annotation>
    </xsd:enumeration>
    - <xsd:enumeration value="SI">
      - <xsd:annotation>
        <xsd:appinfo>SX001G:structuralItem</xsd:appinfo>
      </xsd:annotation>
    </xsd:enumeration>
    - <xsd:enumeration value="SD">
      - <xsd:annotation>
        <xsd:appinfo>SX001G:structuralDetail</xsd:appinfo>
      </xsd:annotation>
    </xsd:enumeration>
    - <xsd:enumeration value="NA">
      - <xsd:annotation>
        <xsd:appinfo>SX001G:notApplicable</xsd:appinfo>
      </xsd:annotation>
    </xsd:enumeration>
  </xsd:restriction>
</xsd:simpleType>
- <xsd:enumeration value="SSI">
  - <xsd:annotation>
    <xsd:appinfo>SX001G:structuralSignificantItem</xsd:appinfo>
  </xsd:annotation>
</xsd:enumeration>
- <xsd:enumeration value="SI">
  - <xsd:annotation>
    <xsd:appinfo>SX001G:structuralItem</xsd:appinfo>
  </xsd:annotation>
</xsd:enumeration>
- <xsd:enumeration value="SD">
  - <xsd:annotation>
    <xsd:appinfo>SX001G:structuralDetail</xsd:appinfo>
  </xsd:annotation>
</xsd:enumeration>
- <xsd:enumeration value="NA">
  - <xsd:annotation>
    <xsd:appinfo>SX001G:notApplicable</xsd:appinfo>
  </xsd:annotation>
</xsd:enumeration>
</xsd:simpleType>

```



The screenshot shows two windows from the S3000L VALID_VALUE_LIST application. The top window displays a table of valid values for 'hardwareElementStructuralIndicatorCodeValues' with rows for SSI, SI, SD, and NA. The bottom window shows a breakdown element revision dialog for 'REFRIG UNIT_001_00_F' with a dropdown menu displaying classification values.

Value Name*	Name Defined By	Component Value	Valid Values: Appinfo	Value Type	Licensed For
hardwareElementStructuralIndicatorCodeValues	System	SSE	SX001G:notApplicable	Value	
hardwareElementStructuralIndicatorCodeValues	System	SD	SX001G:structuralDetail	Value	
hardwareElementStructuralIndicatorCodeValues	System	SI	SX001G:structuralItem	Value	
hardwareElementStructuralIndicatorCodeValues	System	SSI	SX001G:structuralSignificantItem	Value	

Classification Primitive Definition:

Classifications provide a standard set of element valid values that may be modified for program specific requirements.

Data Exchange

- The **SX005G: S Series ILS specifications XML schema implementation guidance defines how the exchange files for the S Series specifications (S2000M, S3000L, S4000P, S5000F, S6000T) are implemented**
 - Full file exchange, as well as net change is defined

S-Series ILS specifications XML schema implementation guidance

SX005G-B6865-05000-00

Issue No. 1.0



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SX005G-B6865-05000-00

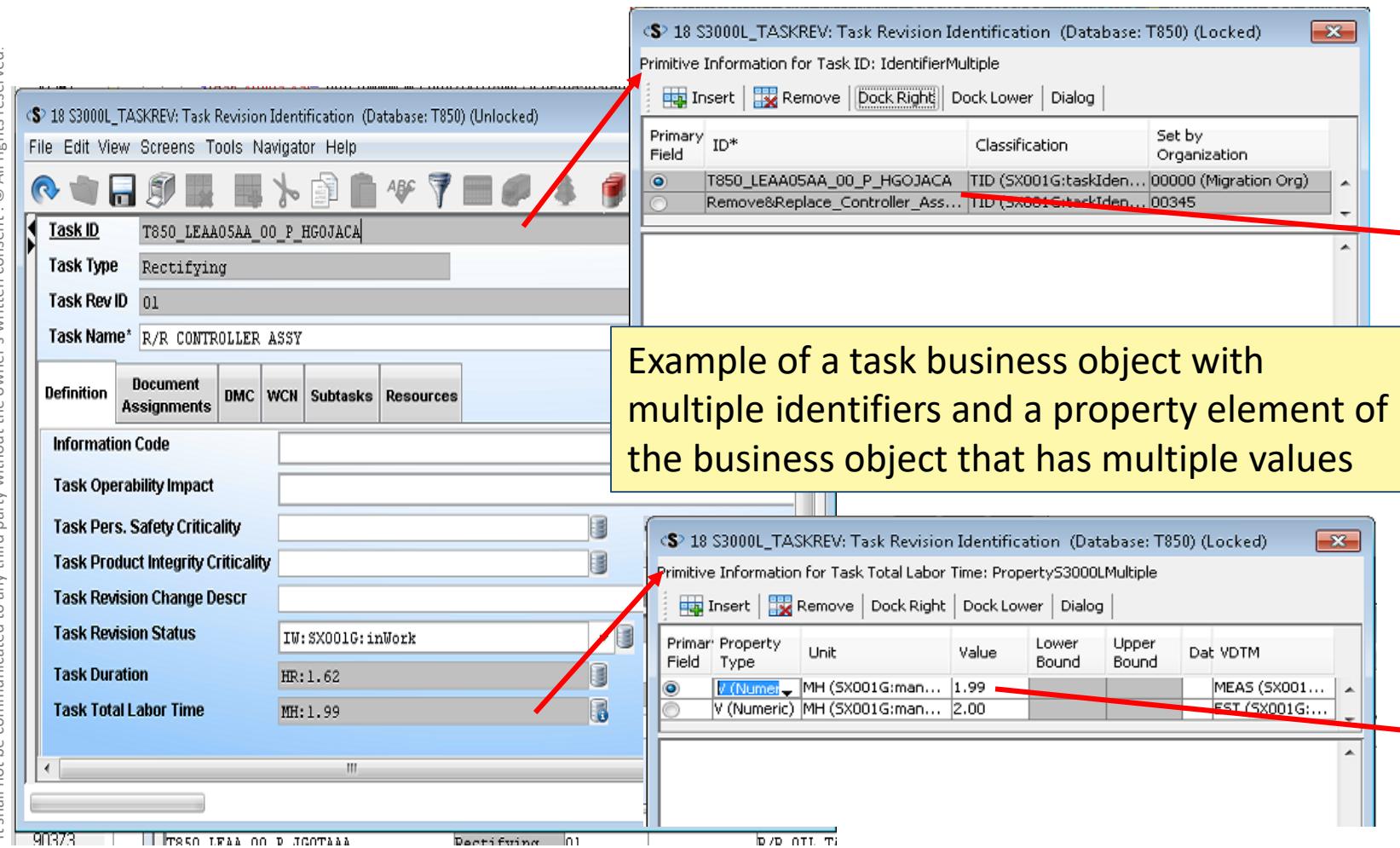
Chapter 2.2

XML schema implementation guidance - A simple UML class

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Data Exchange: The support/management of the primitive data type, optional characterizations enable the accurate exchange of the data



The screenshot shows a task management application interface. At the top, there is a toolbar with various icons. Below it, a main panel displays task details: Task ID (T850_LEAA05AA_00_P_HGOJACA), Task Type (Rectifying), Task Rev ID (01), and Task Name (R/R CONTROLLER ASSY). A navigation bar below these includes tabs for Definition, Document Assignments, DMC, WCN, Subtasks, and Resources. On the left, there are sections for Information Code, Task Operability Impact, Task Pers. Safety Criticality, Task Product Integrity Criticality, Task Revision Change Descr, Task Revision Status (IW:SX001G:inWork), Task Duration (HR:1.62), and Task Total Labor Time (MH:1.99). Two floating windows are overlaid on the interface. The top window is titled "Primitive Information for Task ID: IdentifierMultiple" and lists two entries: T850_LEAA05AA_00_P_HGOJACA (TID (SX001G:taskIdentifiers)) and Remove&Replace_Controller_Assembly (TID (SX001G:taskIdentifiers)). The bottom window is titled "Primitive Information for Task Total Labor Time: PropertyS3000LMultiple" and shows a table with two rows of data. The first row has a primary field of "V (Numeric)" and a value of "1.99". The second row also has a primary field of "V (Numeric)" and a value of "2.00". Red arrows point from the text in the slide to the "Task ID" field in the main panel, the "IdentifierMultiple" window, and the "PropertyS3000LMultiple" window.

Example of a task business object with multiple identifiers and a property element of the business object that has multiple values

```

<task xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xmlns:ns2="http://www.asd-eu
<taskId>
  <id>T850_LEAA05AA_00_P_HGOJACA</id>
  <class>TID</class>
  <setBy>
    <orgId>
      | <id>00000</id>
    </orgId>
  </setBy>
</taskId>
<taskId>
  <id>Remove&Replace_Controller_Assembly</id>
  <class>TID</class>
  <setBy>
    <orgId>
      | <id>00345</id>
    </orgId>
  </setBy>
</taskId>
<taskRev uid="taskrev0001">
  <taskRevId>...</taskRevId>
  <name>
    | <desc>R/R CONTROLLER ASSY</desc>
  </name>
  <status>...</status>
  <duration>...</duration>
  <laborTime>
    <vdtm>MEAS</vdtm>
    <unit>MH</unit>
    <value>1.99</value>
  </laborTime>
  <laborTime>
    <vdtm>EST</vdtm>
    <unit>MH</unit>
    <value>2.00</value>
  </laborTime>
</taskRev>

```

Common Part Definitions between S3000L and S2000M

- Both the S3000L and the S2000M specifications use a common definition of **HardwarePartAsDesigned**
 - The S3000L allows multiple identifier values
 - The S2000M allows one identifier value
 - Both the identifiers have the same optional characterizations of partIdentifierClass and organizationReference
 - The partIdentifierClass value (PNO: partNumber) may be used to determine which partIdentifier is used in the S2000M exchange file.

Common Part Definitions between S3000L and S2000M

S 7 S3000L_PART: Part Definition Identification (Database: MPAV_SLIC) (Unlocked)

File Edit View Screens Tools Navigator Help

Part ID: 05DA500153

Part Name*: GASKET, VALVE PLATE

Contained Substances	HW/SW Element Realization	Alt Part	Part As Designed Parts List Data	Task Rqmt Target	Change Request Target	Subtask Target
Definition	SW Parts	HW Part Design Data	HW Part Support Data	Security Assignment	Maturity Class	HW Part Operational A
Part Special Handling Rqmt						
Part Obs Risk Assessment						
Part Demilitarization Class						

Primitive Information for Part ID: IdentifierMultiple

Primary Field	ID*	Classification	Set by Organization
<input checked="" type="radio"/>	05DA500153	PNO (SX001G:partNumber)	10855
<input type="radio"/>	05DA500153A	OEM (SX001G:oemPartNumber)	00345

05DA500153

OK Cancel Help

S 5 S2000M_PART: Part Definition Identification (Database: MPAV_SLIC) (Unlocked)

File Edit View Screens Tools Navigator Help

Part ID: 05DA500153

Part Name*: GASKET, VALVE PLATE

Commerce Data	NATO Stock Number	Contained Parts	Container Parts
Definition	Design Data		Support Data
Part Special Handling Rqmt			
Part Obs Risk Assessment			
Part Type*: HW:Hardware			

Primitive Information for Part ID: IdentifierMultiple

Primary Field	ID*	Classification	Set by Organization
<input checked="" type="radio"/>	05DA500153	PNO (SX001G:partNumber)	10855
<input type="radio"/>	05DA500153A	OEM (SX001G:oemPartNumber)	00345

05DA500153

OK Cancel Help

INS

```

<xsd:simpleType name="partIdentifierClassValues">
  - <xsd:restriction base="xsd:string">
    - <xsd:enumeration value="CPNO">
      - <xsd:annotation>
        <xsd:appinfo>SX001G:customerPartNumber</xsd:appinfo>
      </xsd:annotation>
    </xsd:enumeration>
  - <xsd:enumeration value="OEM">
    - <xsd:annotation>
      <xsd:appinfo>SX001G:oemPartNumber</xsd:appinfo>
    </xsd:annotation>
  </xsd:enumeration>
  - <xsd:enumeration value="PNO">
    - <xsd:annotation>
      <xsd:appinfo>SX001G:partNumber</xsd:appinfo>
    </xsd:annotation>
  </xsd:enumeration>
  - <xsd:enumeration value="SPNO">
    - <xsd:annotation>
      <xsd:appinfo>SX001G:supplierPartNumber</xsd:appinfo>
    </xsd:annotation>
  </xsd:enumeration>
  - <xsd:enumeration value="REF">
    - <xsd:annotation>
      <xsd:appinfo>SX001G:referencePartNumber</xsd:appinfo>
    </xsd:annotation>
  </xsd:enumeration>
  - <xsd:enumeration value="NSN">
    - <xsd:annotation>
      <xsd:appinfo>SX001G:natoStockNumber</xsd:appinfo>
    </xsd:annotation>
  </xsd:enumeration>
  - <xsd:enumeration value="STD">
    + <xsd:annotation>
    </xsd:enumeration>
  </xsd:restriction>
</xsd:simpleType>

```

```

- <xsd:simpleType name="partIdentifierClassValues">
  - <xsd:restriction base="xsd:string">
    - <xsd:enumeration value="PNO">
      - <xsd:annotation>
        <xsd:appinfo>SX001G:partNumber</xsd:appinfo>
      </xsd:annotation>
    </xsd:enumeration>
  </xsd:restriction>
</xsd:simpleType>

```

Maintenance Task and Initial Provisioning data supporting S1000D DM generation

- **IPD DM generation from S2000M source data:**

- All S1000D data modules require a data module code
- S2000M does not have a data module code defined in it's schema; S3000L does have a document of type "Data Module" defined
- An S3000L document may be classified as a data module, therefore it makes sense to use the S3000L document of data module type as the data module code for the S1000D IPD data module generated from the S2000M source data.

- **Procedural DM generation from S3000L source data:**

- Information Control Numbers (ICNs) may be referenced in to S1000D Procedural data modules
- S3000L does not have an ICN defined in it's schema; ICNs are defined in the S2000M schema
- An S2000M ICN may be referenced into an S3000L subtask description to support the generation the S1000D data module.

IPD DM generation from S2000M and S3000L source data

S* 1 S2000M_IPD: IPD Data Module Code (Database: MPAV_SLIC) (Unlocked)

Document ID	MPAV-AAA-A20-21-0000-00A-941A-A					
Data Module Info Name	Illustrated Parts Data					
Information Code	941:SX001G:IllustratedPartsData					
Document Issue ID						
Figure	S2000M Figure Identifier					
Fig. No.	01					
Figure Name	Front Wheel Assembly					
IPD Figure No Variant	A					
IPD Figure Title	Front Wheel Assembly					
IPD Figure Type						
Provisioning Project Identifier (IPP)	MPAV_IPPN					
Provisioning Project Subject (IPS)						
Language Code						
Illustrations IPD Parts List						
Figure Item Identifier (CSN)	Figure Item Description (DFL)	Figure Item Indenture Level (IND)	Figure Item Sequence Number (ISN)	Part ID	Part Name	Figure Item ILS Reference (ILS)
A2021000001A004A	Tire Rim	200A	976523410216	RIM,TIRE		
A2021000001A001A	Wheel Retainer	200A	345997566021	RETAINER,WHEEL		
A2021000001A003A	Spokes	200A	976523410208	SPOKES		
A2021000001A000A	Front Wheel Assembly	100A	345997565070	WHEEL ASSY,FRONT		
A2021000001A002A	Spoke Adjuster	200A	976523410204	ADJUSTERS,SPOKE		
A2021000001A005A	Inner Tube	200A	976523410117	INNER TUBE		

S* S3000L_DOCUMENT: Document Identification (Database: MPAV_SLIC)

Document ID	MPAV-AAA-A20-21-0000-00A-941A-A
Document Type	
Document Title	
Data Module Info Name	Illustrated Parts Data
Document Location	
EXT PM DM Type*	DM:Data Module
Information Code	941:SX001G:IllustratedPartsData
Document Issue ID*	
Date	

Example of an S3000L document used as a DMC for an S1000D IPD DM sourced from S2000M data

Procedural DM generation from S3000L and S2000M source data

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S 7 CC07: Sequential Subtask Description (Database: S1000DAUTO)

File Edit View Screens Tools Navigator Help

EIAC	MPAV	LCN	AAEUIQ	ALC 00	
LCN Type	P:PHYSICAL	LCN Nomen.	FRONT TIRE		
Task Code	G60AAAA	Task ID	INSTALL TIRE		
Subtask No.	020	Subtask ID	ATTACH NEW TIRE TO WHEEL		
Extended Subtask ID		Task Reference	No	Subtask Reference	No

Seq. Sub. Descr. [CC07]

Bead onto the rim around the wheel. Update

E Step #6

With a few inches of bead left to pop onto the rim, the tire will resist. Let all the air out. Crouch and rest the wheel on your knee to have something to push against. Now, hold the bead in place with one hand and with your stronger hand, push down to roll the stubborn section onto the rim with the heel of your hand. Install Tire

If Loctite, Adhesive Threadlocker, Updated (8256007) is required for any step, please note that it is a hazardous material. Use solvent to clean excess loctite from surface.

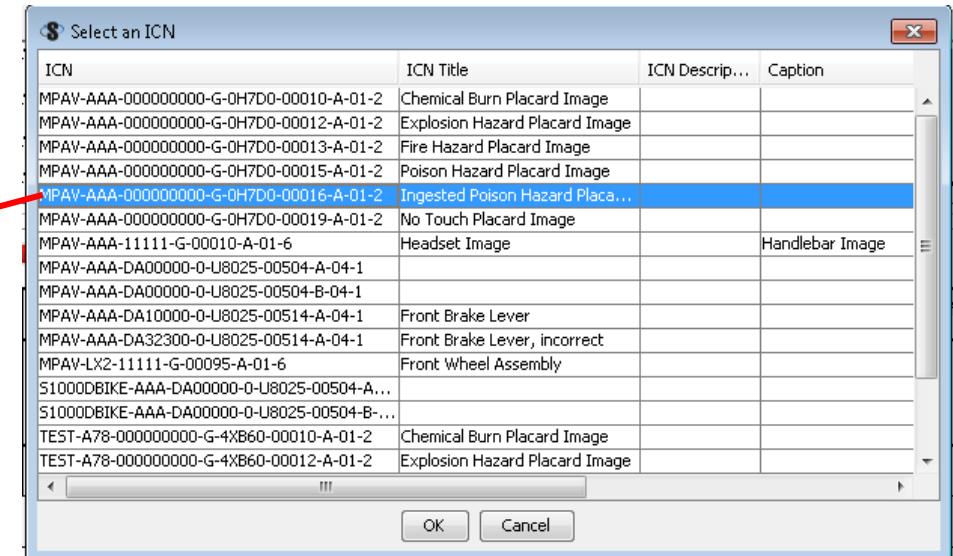


MPAV-AAA-A20-21-0000-00A-941R-A

Cautions [CL] Warnings [CL] Notes [CL] Special Requirements [CL] Task Support Subtask Support Task Spares [CI] Subtask Spares [CS] Subtask System Parts [HA] Subtask Documents [CQ] Subtask Acronyms Part Selection

Reference Index Doc. ID Originator Code Issue Number Security Classification

1MPAV-AAA-00000000-G-00016-A OH7DO 001 01



Example of an ICN being referenced into a subtask.

Thank you
for your attention!

Questions?