Host (on behalf of ASD): Spanish Association for Defence, Security and Space Technology Companies (TEDAE)

S1000D 1.8 to 4.1 conversion – A real case

Name of presenter: Rubén MARTÍN SÁNCHEZ
Rank/title of presenter: Business Management Technical Data
Company/organization: Airbus Defence and Space / TASST

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1 INTRODUCTION

But…

We appreciate S1000D 1.8 benefits.

… we need improved performance!!

S1000D 1.8 → **S1000D 4.1**

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This presentation is NOT intended to be an S1000D Master Class regarding upgrading TID.

But the other way round:

It is intended to show a practical approach from a TID team performing such an upgrade to their TID:

- Identified steps,
- Problems founds and (maybe)
- Lessons learnt

during the process.

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In some occasions aerospace Industry needs to upgrade their Technical Publications to develop new products or meet some new contractual obligations (light 3D models, systems tracing, animations, etcetera).

C-295 program, originally under S1000D 1.8 specification, is currently in an upgrading process towards S1000D 4.1.

WHY?

The ***FWSAR*** (***F****ixed-****W****ing* ***S****earch* ***A****nd* ***R****escue*) project, recently contracted by the *Royal Canadian Air Force*, requires so, and specifies the need for advanced functionalities incorporated within the TID IETP, iaw S1000D 4.1 Functionality Matrix.

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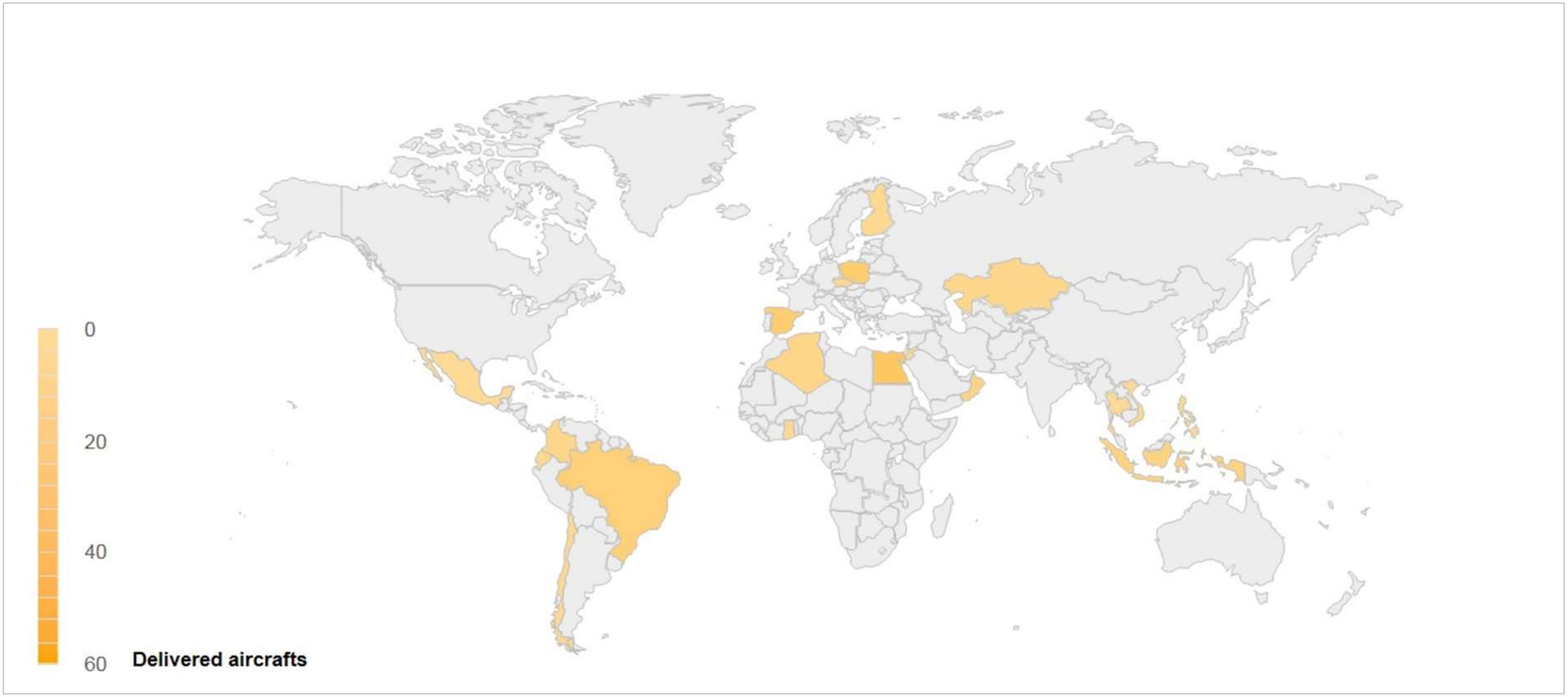
It is key for the migration project from S1000D 1.8 to 4.1 that we take the opportunity to enhance the final resulting IETP for all *existing C-295 customers*:



Currently 25 Customers from 22 different countries maintain their 160 operative A/C supported by the C-295 stand-alone IETP

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2 S1000D 1.8 LIMITATIONS

1. Limitations due to the *applicability model*:
   - *Applicability* can not be provided to all useful elements (*circuit breakers*, *access panels*, *table rows*…) → less efficient authoring is obtained (applicability allocated in parent elements implies authoring redundancies).
   - *Container* concept not yet incorporated to the specification: references cannot point out to an "intermediate" DM (container) driving the user to the right referenced solution (alternate) depending on the applicability of the calling DM, but the alternate itself needs to be called explicitly.
   - …

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S1000D 1.8 LIMITATIONS

2. SGML inherent disadvantages vs XML, being XML a simplified subset of SGML (restrictions applied to some of the SGML non-trivial features). As a result:
    - SGML is “harder to parse” than XML, due to its higher complexity (implicit closing tags…).
    - XML allows the use of schemas (with namespaces and datatypes, content model can be declared locally), but SGML does NOT.
3. Lack of BREX DM to support automatic parsing of most business rules.
4. Lack of Common Information Repository (CIR concept).
5. No multimedia objects.
6. And many others...

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PREPARE XSLT TRANSFORMATION

Business Rules/BREX generation

GENERATE PRODUCT DEFINITION HIGH LEVEL DOCUMENTS

S1000D VERSIONS MAPPING (XSLT):

Map 1.8 to 4.1 schemas used in the project

Identify specific use cases with specificities

Convert data per XSLT transformations iaw segregated data (use cases)

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3.1 PREPARE XSLT TRANSFORMATION

1. ***<u>SGML to XML</u>***: Convert SGML documentary units into well-formed XML instances:
   - Closure of all the elements (end tags)
   - Lowercase (XML is case sensitive)
   - Empty tags must contain a slash-character
   - …
2. ***<u>Generate "master S1000D 1.8</u>"*** schema definition(s) valid for all obtained XML instances, as a basis for the mapping to S1000D 4.1.

   <u>LESSON LEARNT</u>:

   Use of COTS software to obtain schema definitions by inference from multiple XML instances. Manual refinement by experts needed.

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3.2 ELABORATE BUSINESS RULES

Part of the business rules decisions for the FWSAR project are already inherited from the S1000D **C-295 program** itself (model identifier, SNS breakdown…).

Other ***BRDP*** are directly provided by the Customer within the **FWSAR Contract**.

Nevertheless, **additional BR decisions** are to be taken for a real enhancement of the final products based on S1000D 4.1 Spec.:

1. Decision to develop the BUSINESS RULES by using **S1000D 4.2** *brex* and *brDoc* schemas, for a better BRDP traceability and control.

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3.2 ELABORATE BUSINESS RULES

2. Decision to enhance the applicability model by using *ACT*, *CCT* and *PCT* for C-295.

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<enumeration applicPropertyValues="
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</productAttribute>
```

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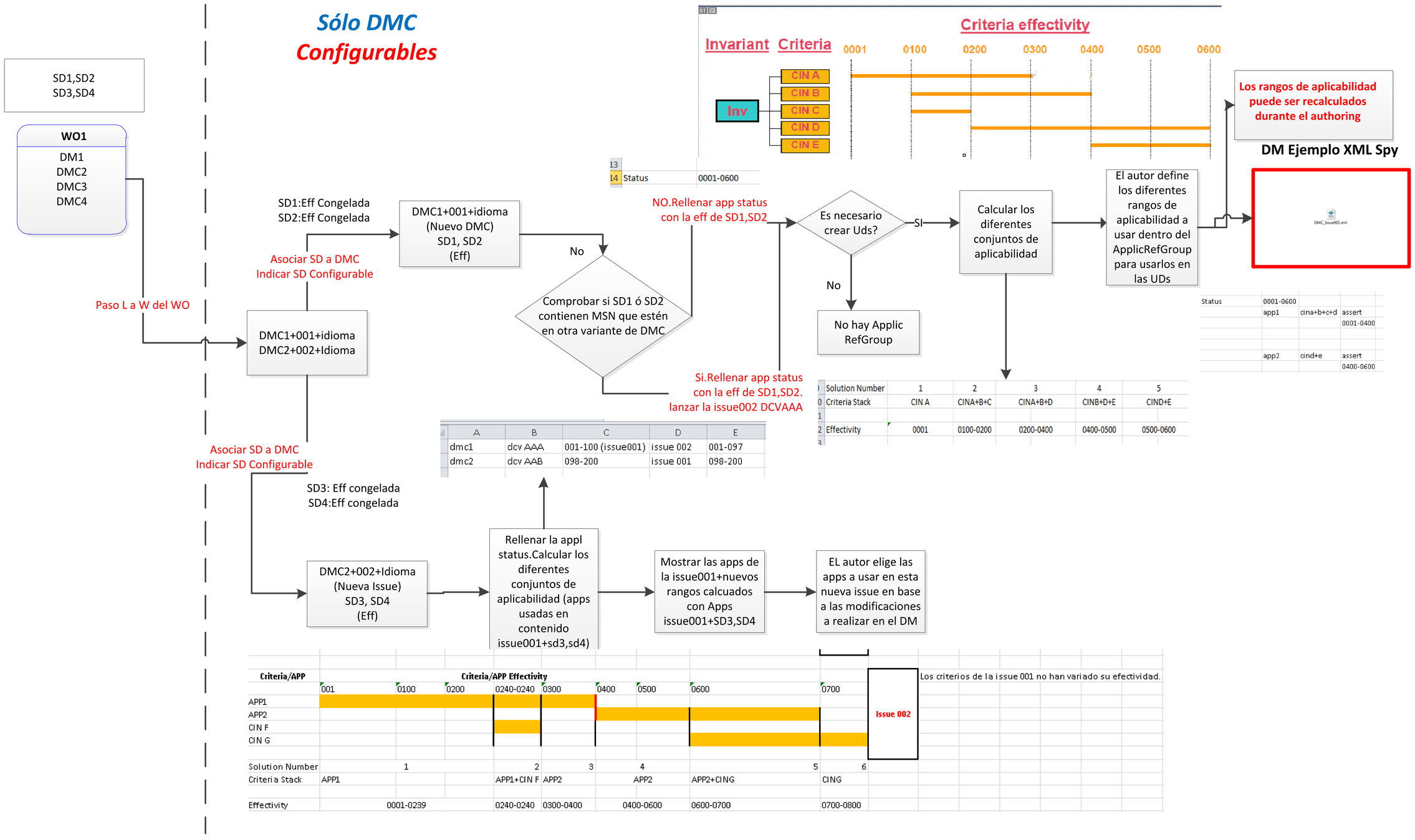

C-295 Applicability enhancement analysis

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3.2 ELABORATE BUSINESS RULES

3. Decision to generate certain CIR from existing databases (CBs, zones, access panels…).

4. Generate Product Definition High Level (PDHL) documents integrating key project business rules decisions.

A ***P****roduct* ***D****efinition* ***H****igh* ***L****evel* is a document developed for each of the Information Sets (IS) being generated as a deliverable, for a given program and customer, containing the following information:

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PRODUCT DEFINITION HIGH LEVEL CONTENT:

- ***Designation*** of the given Information Set.

- ***Scope*** of the Information Set. Which kind of information can be found in the referred IS, that's it:
  - The ***purpose*** of the IS
  - The maintenance levels covered
  - A mapping to contractual clauses specifying necessary TID to generate (which ones are included in the given IS).
  - …

- ***Limitations***. Which potentially expected information is NOT included in the given IS. In most cases, it is stated in which other IS the referred information is available.

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- ***Characteristics***. Basic characteristics of the IS. Such as:

CHARACTERISTIC	VALUE
IS Standard	S1000D version for the DM in the IS
Publication Module Code	CA-0177B-XXXXX-XX
Domain	[Maintenance/Repair/Operations/…]
DM contained	Type of DM (schema definition) contained within the given IS (*proced*, *descript*…)
Customized	[Yes/No]
SB criteria	[Yes/No]
Revision cycle	Every XXX months for scheduled revisions
Data formatting	[XML/SGML/…]
Language	Language(s) used for the content of the given IS
Security Classification	[Unclassified/Restricted]
Revision change	[Yes/No]
Illustration	[Yes/No]
Color	[Yes/No]
Hotspot	[Yes/No]
Multimedia	[Yes/No] and Type

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CHARACTERISTIC	VALUE
Role Management	[Yes/No]
Military Certification	[Yes/No]
Civil Certification	[Yes/No]
References	*FROM*: List of main IS which make references to DMC in this given IS. *TO*: List of IS to which this given IS mainly refer.

- ***Structure***: General structure of the given Information Set, describing how the IS organized, as well as some relevant complementary information.
- ***Content***. Details on the content of each type of information in the Information Set (including coding of the DMC):
  - Front matter.
  - Introduction data modules.
  - Technical Repositories (CIR): Zones, Access points…

  …

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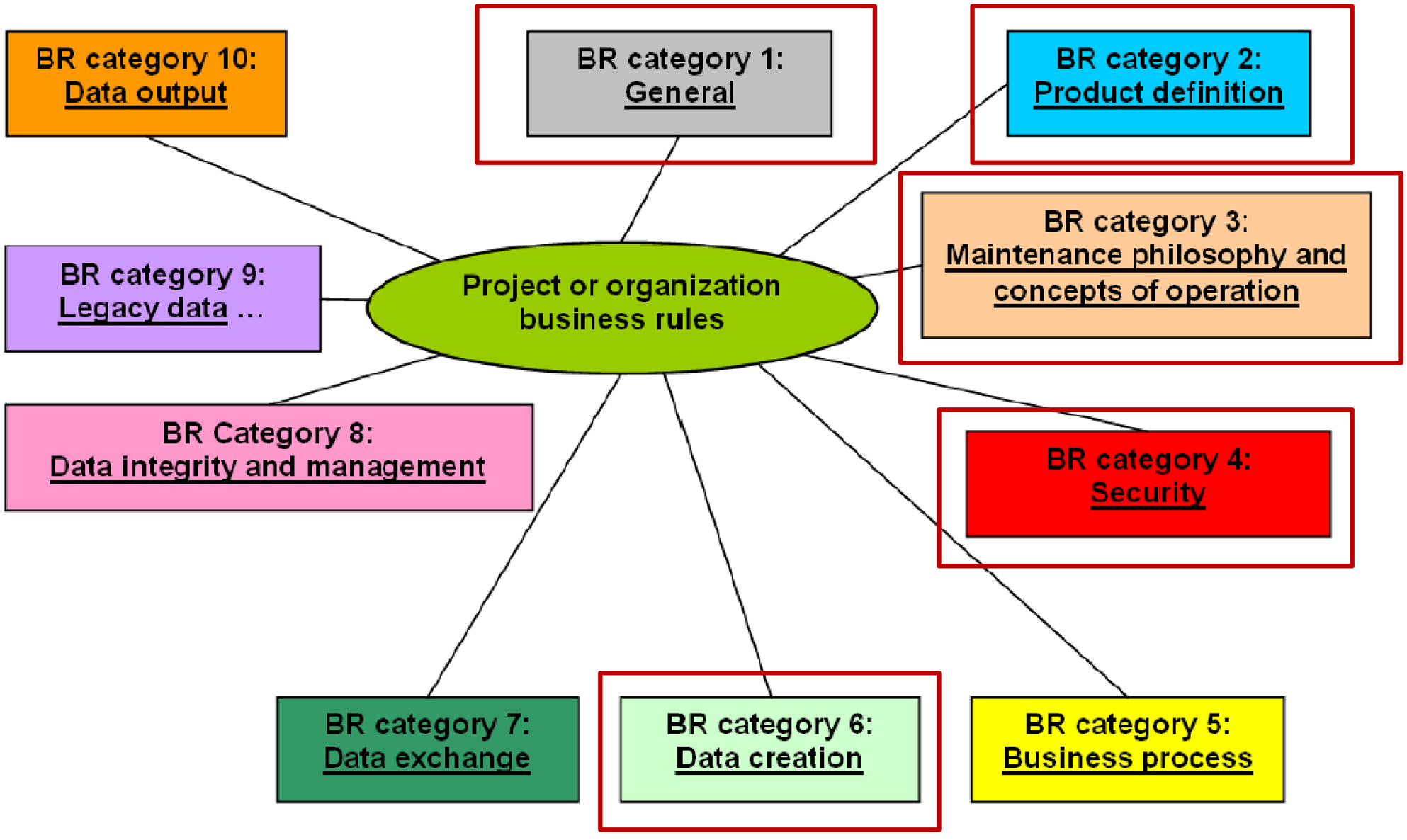

Main S1000D business rules decisions categories partly covered by the PDHL

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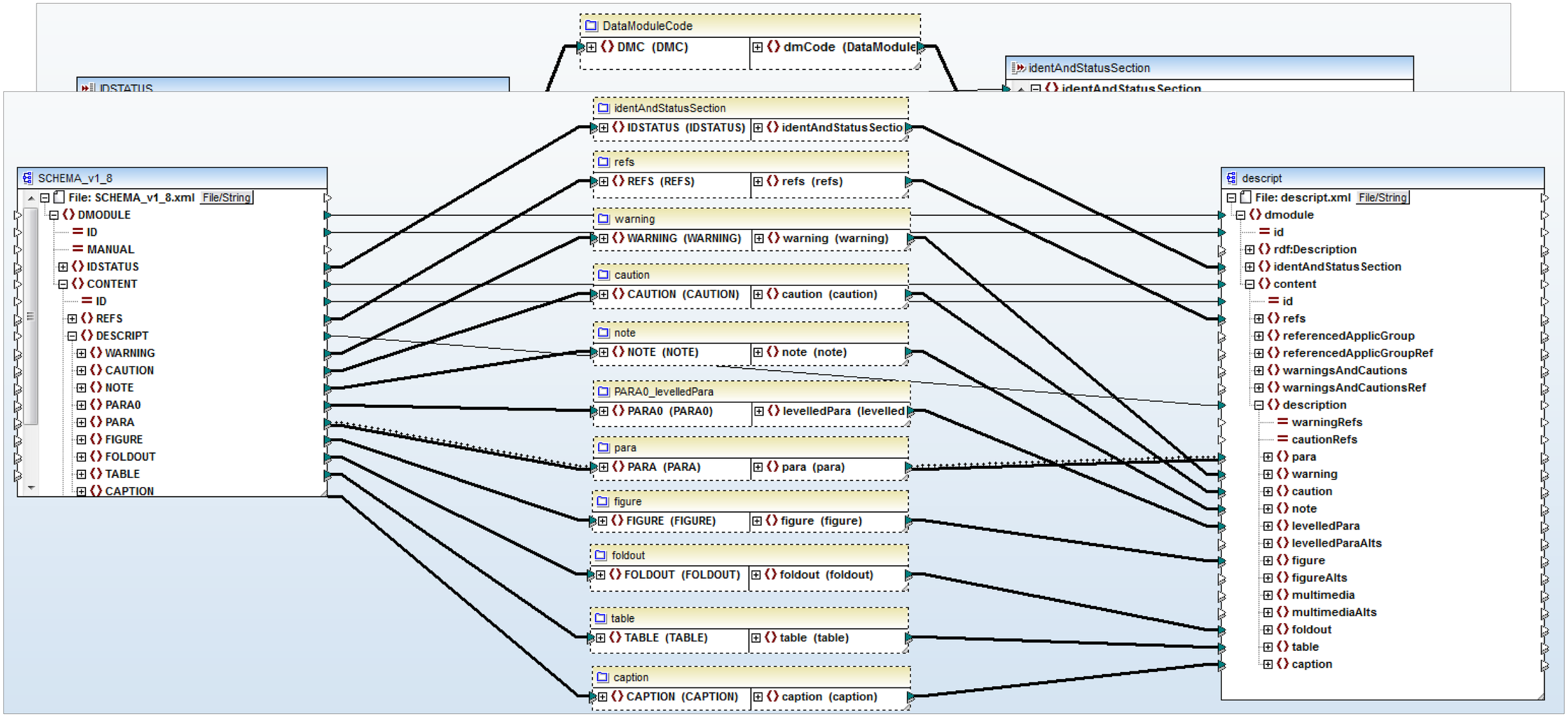
3.4 S1000D VERSIONS MAPPING

For all the types of DM (XML schema) to be used in the project, ***define proper XSLT transformations***:



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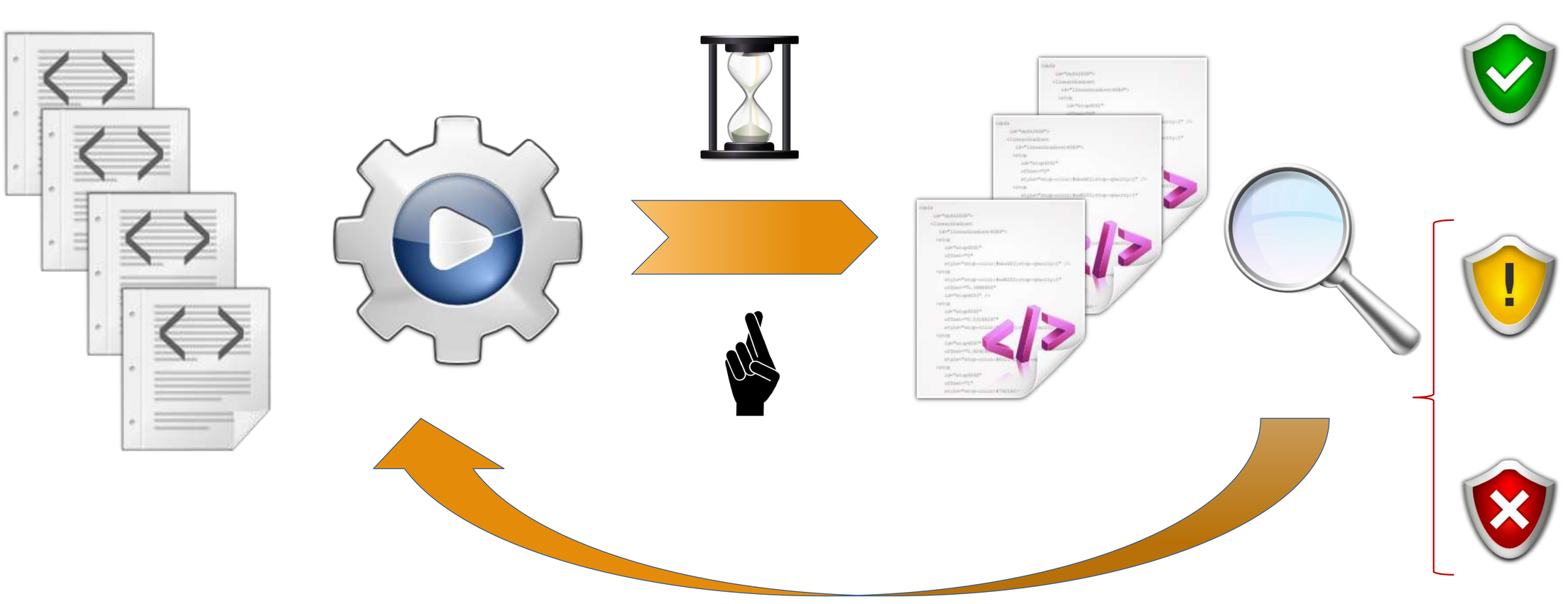
3.4 EXECUTE XSLT TRANSFORMATIONS

For all use cases take the XSLT transformations identified and defined in the project, ***execute*** them and obtain final DMs converted to S1000D 4.1:



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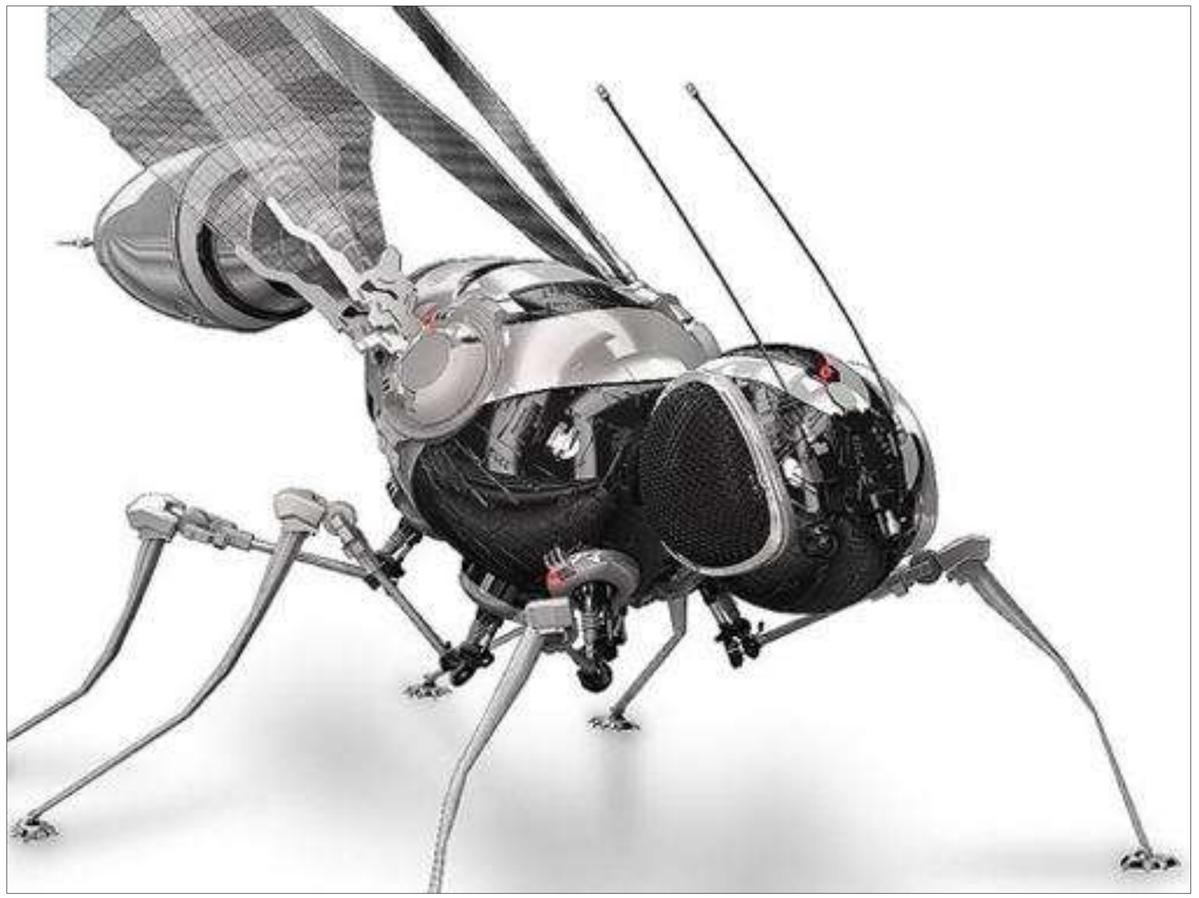
COMING SOON…



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NO ANIMALS WERE HARMED DURING THE MAKING OF THIS PRESENTATION

Thank you

for your attention!

Questions?

Rubén Martín Sánchez
Technical Publications Business Management Manager
Engineering Services - Transport Services

T +34 954 594 042
M +34 648 749 213
E ruben.martin@airbus.com

Airbus Defence and Space S.A.
San Pablo Norte
T Bldg – Ground Floor – Room NT006
Av. Aeropuerto de San Pablo, s/n
41020 Seville
SPAIN