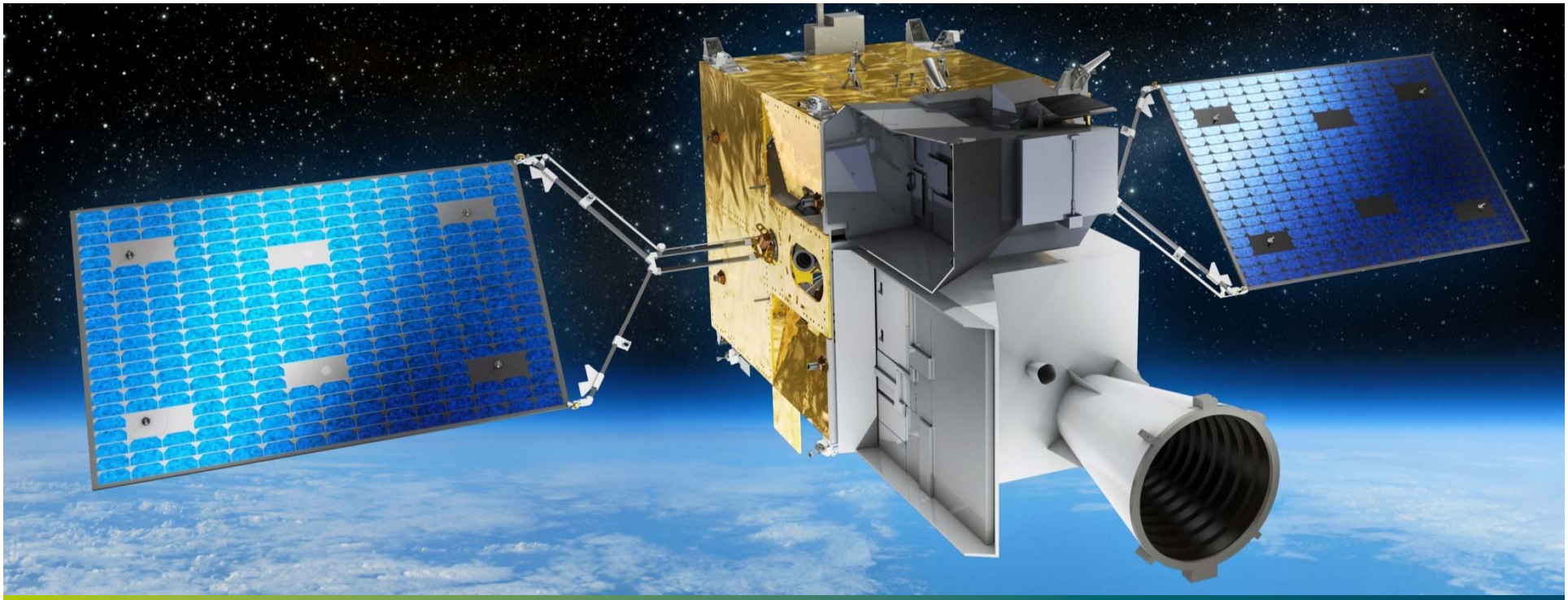
Michael Eimke
Airbus Defence & Space

Laurent Cohen
Thales Alenia Space

Erik Dehnhardt
OHB System



SPACE SYSTEMS

Results of the ESA Study “Development of a Test Report Standard“

ESA Presentation Days
December 12, 2017

Agenda

- Introduction
- Test Reporting: The Current Situation
- Test Report Standardisation: Objectives
- Test Report Standardisation: Tasks
  - Task 1: Survey of Current State
  - Task 2: Requirements Analysis
  - Task 3: Interface Definition, Creation of a Data Model
  - Task 4: Definition of a Test Report Standard
- Results of the Study
  - Results of Task 1 (Test Report Survey)
  - Results of Task 2 (Requirements Analysis)
  - Results of Task 3 (Data Model)
  - Results of Task 4 (ECSS Change Proposal)
- Conclusion and Outlook

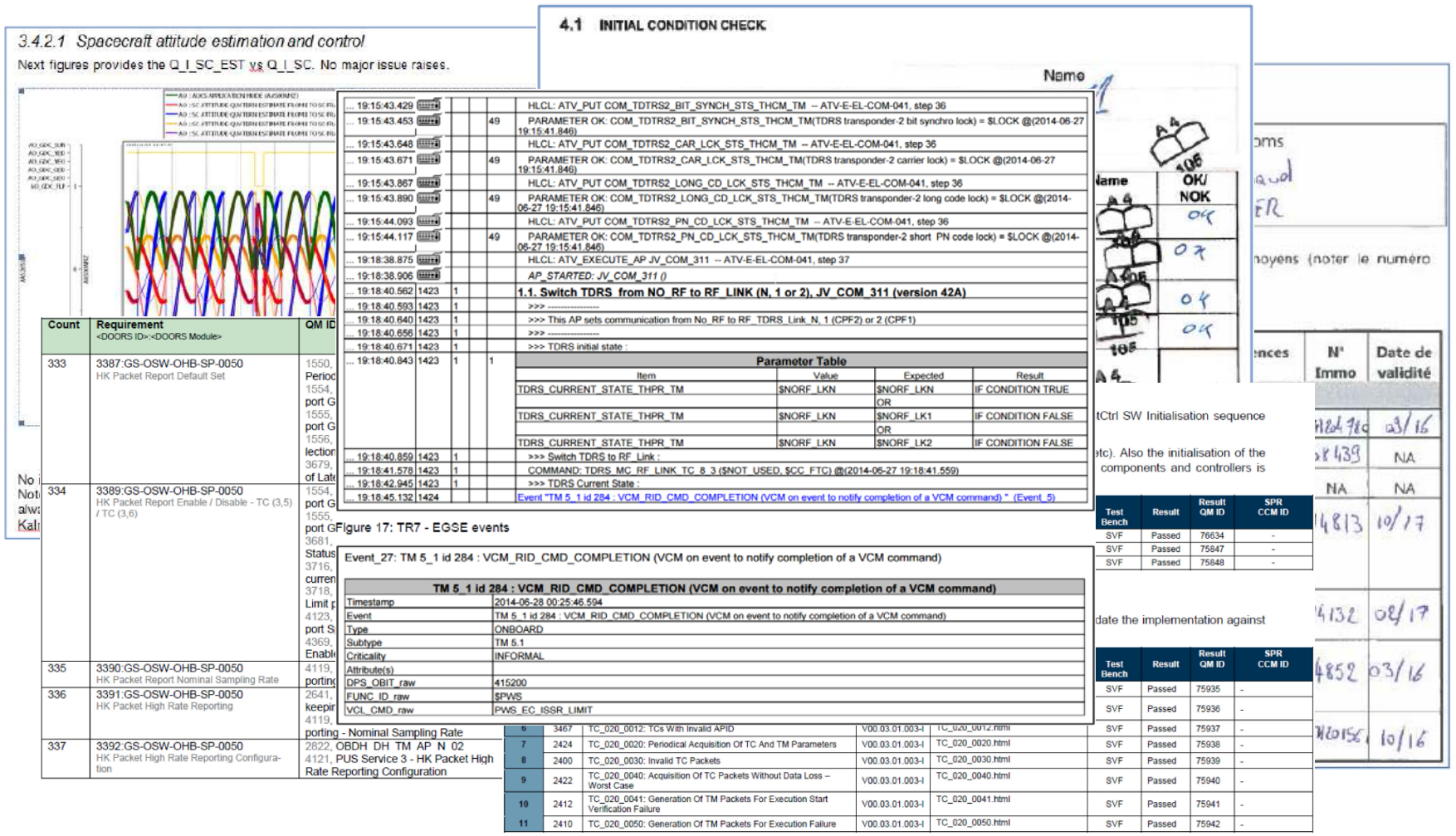
Introduction

Objective of the study: Definition of an ECSS standard for test reports

Participating companies & technical leads:

- **ESA** – Alexander Heim (Technical Officer)
- **Airbus Defence & Space** – Michael Eimke
- **Thales Alenia Space** – Laurent Cohen
- **OHB** – Erik Dehnhardt

Test Reporting: The Current Situation



3.4.2.1 *Spacecraft attitude estimation and control*

Next figures provides the Q_I_SC_EST vs Q_I_SC. No major issue raises.

Figure 17: TR7 - EGSE events

4.1 INITIAL CONDITION CHECK

Name

Count	Requirement <DOORS ID>:<DOORS Module>	QM ID
333	3387:GS-OSW-OHB-SP-0050 HK Packet Report Default Set	1550, Period 1554, port G 1555, port G 1556, lection 3679, of Late
334	3389:GS-OSW-OHB-SP-0050 HK Packet Report Enable / Disable - TC (3,5) / TC (3,6)	1554, port G 1555, port G 3681, Status 3716, curren 3718, Limit p 4123, port S 4369, Enabl
335	3390:GS-OSW-OHB-SP-0050 HK Packet Report Nominal Sampling Rate	4119, portin
336	3391:GS-OSW-OHB-SP-0050 HK Packet High Rate Reporting	2641, keepir 4119, porting - Nominal Sampling Rate
337	3392:GS-OSW-OHB-SP-0050 HK Packet High Rate Reporting Configuration	2822, OBDH DH TM AP N 02 4121, PUS Service 3 - HK Packet High Rate Reporting Configuration

... 19:15:43.429				HLCL: ATV_PUT COM_TDTRS2_BIT_SYNCH_STS_THCM_TM -- ATV-E-EL-COM-041, step 36	
... 19:15:43.453			49	PARAMETER OK: COM_TDTRS2_BIT_SYNCH_STS_THCM_TM(TDRS transponder-2 bit synchro lock) = $LOCK @(2014-06-27 19:15:41.846)	
... 19:15:43.648				HLCL: ATV_PUT COM_TDTRS2_CAR_LCK_STS_THCM_TM -- ATV-E-EL-COM-041, step 36	
... 19:15:43.671			49	PARAMETER OK: COM_TDTRS2_CAR_LCK_STS_THCM_TM(TDRS transponder-2 carrier lock) = $LOCK @(2014-06-27 19:15:41.846)	
... 19:15:43.867				HLCL: ATV_PUT COM_TDTRS2_LONG_CD_LCK_STS_THCM_TM -- ATV-E-EL-COM-041, step 36	
... 19:15:43.890			49	PARAMETER OK: COM_TDTRS2_LONG_CD_LCK_STS_THCM_TM(TDRS transponder-2 long code lock) = $LOCK @(2014-06-27 19:15:41.846)	
... 19:15:44.093				HLCL: ATV_PUT COM_TDTRS2_PN_CD_LCK_STS_THCM_TM -- ATV-E-EL-COM-041, step 36	
... 19:15:44.117			49	PARAMETER OK: COM_TDTRS2_PN_CD_LCK_STS_THCM_TM(TDRS transponder-2 short PN code lock) = $LOCK @(2014-06-27 19:15:41.846)	
... 19:18:38.875				HLCL: ATV_EXECUTE_AP JV_COM_311 -- ATV-E-EL-COM-041, step 37	
... 19:18:38.906				*AP_STARTED: JV_COM_311 ()*	
... 19:18:40.562	1423	1		**1.1. Switch TDRS from NO_RF to RF_LINK (N, 1 or 2), JV_COM_311 (version 42A)**	
... 19:18:40.593	1423	1		>>> ----------	
... 19:18:40.640	1423	1		>>> This AP sets communication from No_RF to RF_TDRS_Link_N, 1 (CPF2) or 2 (CPF1)	
... 19:18:40.656	1423	1		>>> ----------	
... 19:18:40.671	1423	1		>>> TDRS initial state :	
... 19:18:40.843	1423	1	1	**Parameter Table**	

Item	Value	Expected	Result
TDRS_CURRENT_STATE_THPR_TM	$NORF_LKN	$NORF_LKN OR	IF CONDITION TRUE
TDRS_CURRENT_STATE_THPR_TM	$NORF_LKN	$NORF_LK1 OR	IF CONDITION FALSE
TDRS_CURRENT_STATE_THPR_TM	$NORF_LKN	$NORF_LK2	IF CONDITION FALSE

... 19:18:40.859	1423	1		>>> Switch TDRS to RF_Link :
... 19:18:41.578	1423	1		COMMAND: TDRS_MC_RF_LINK_TC_8_3 ($NOT_USED, $CC_FTC) @(2014-06-27 19:18:41.559)
... 19:18:42.945	1423	1		>>> TDRS Current State :
... 19:18:45.132	1424			Event "TM 5_1 id 284 : VCM_RID_CMD_COMPLETION (VCM on event to notify completion of a VCM command) " (Event_5)

Event_27: TM 5_1 id 284 : VCM_RID_CMD_COMPLETION (VCM on event to notify completion of a VCM command)

TM 5_1 id 284 : VCM_RID_CMD_COMPLETION (VCM on event to notify completion of a VCM command)	
Timestamp	2014-06-28 00:25:46.594
Event	TM 5_1 id 284 : VCM_RID_CMD_COMPLETION (VCM on event to notify completion of a VCM command)
Type	ONBOARD
Subtype	TM 5.1
Criticality	INFORMAL
Attribute(s)	
DPS_OBIT_raw	415200
FUNC_ID_raw	$PWS
VCL_CMD_raw	PWS_EC_ISSR_LIMIT

6	3467	TC_020_0012: TCs With Invalid APID	V00.03.01.003-I	TC_020_0012.html	SVF	Passed	75937	-
7	2424	TC_020_0020: Periodical Acquisition Of TC And TM Parameters	V00.03.01.003-I	TC_020_0020.html	SVF	Passed	75938	-
8	2400	TC_020_0030: Invalid TC Packets	V00.03.01.003-I	TC_020_0030.html	SVF	Passed	75939	-
9	2422	TC_020_0040: Acquisition Of TC Packets Without Data Loss – Worst Case	V00.03.01.003-I	TC_020_0040.html	SVF	Passed	75940	-
10	2412	TC_020_0041: Generation Of TM Packets For Execution Start Verification Failure	V00.03.01.003-I	TC_020_0041.html	SVF	Passed	75941	-
11	2410	TC_020_0050: Generation Of TM Packets For Execution Failure	V00.03.01.003-I	TC_020_0050.html	SVF	Passed	75942	-

tCtrl SW Initialisation sequence

etc). Also the initialisation of the components and controllers is

Test Bench	Result	Result QM ID	SPR CCM ID
SVF	Passed	76634	-
SVF	Passed	75847	-
SVF	Passed	75848	-

date the implementation against

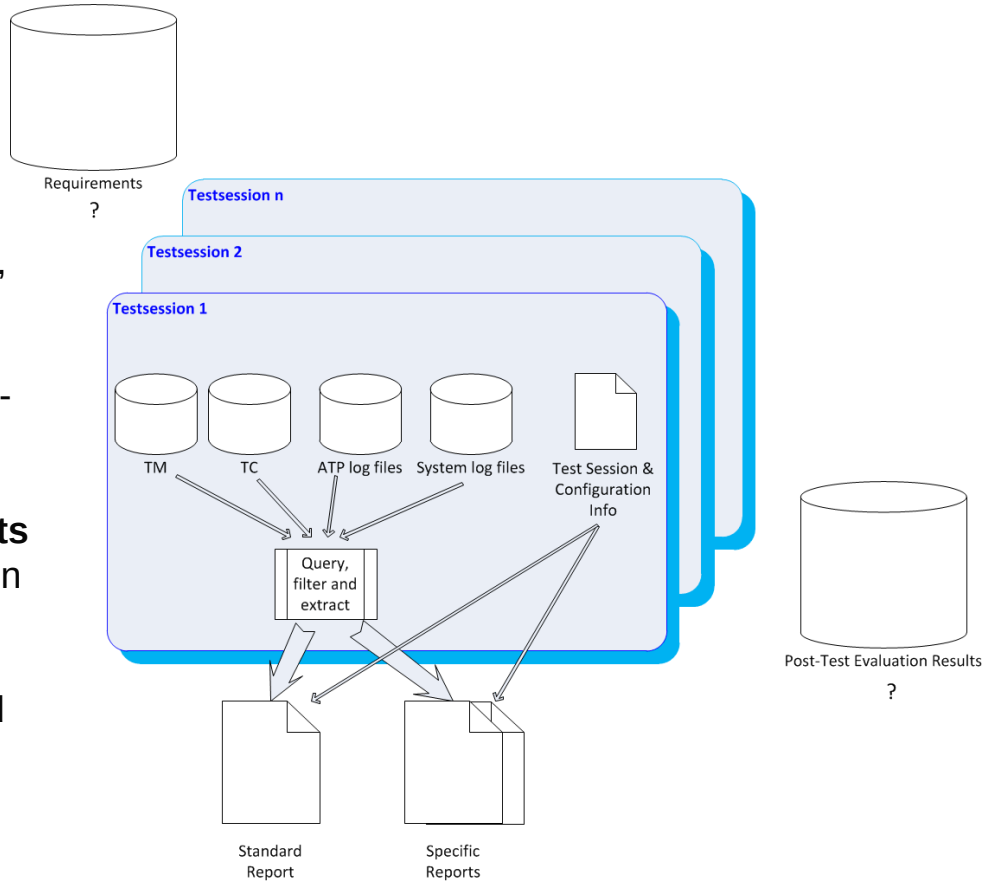
Test Bench	Result	Result QM ID	SPR CCM ID
SVF	Passed	75935	-
SVF	Passed	75936	-

Name	OK/ NOK
A4	OK
A4	OK
A4	OK
A4	

Nances	N° Immo	Date de validité
		03/16
	NA	
	NA	
	14813	10/17
	4132	08/17
	4852	03/16
		10/16

Test Reporting: The Current Situation

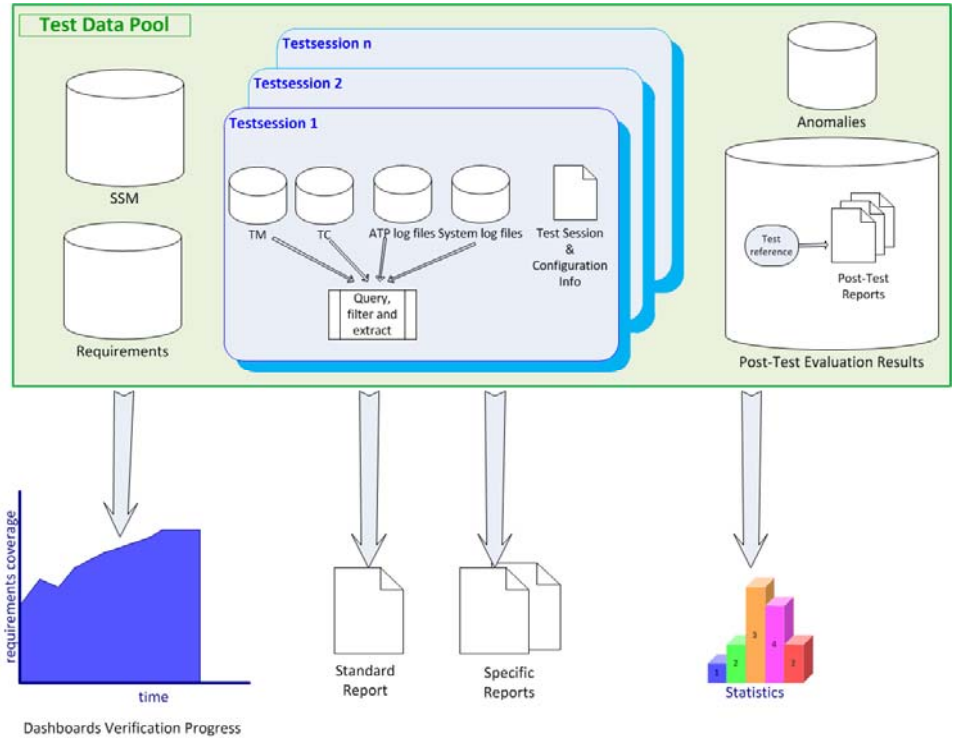
- Diverse **test report formats** with **different content**
- **Comparison** of test results is **difficult**
- Report generation **tools** often **project specific**, **limited re-use** possibilities
- High **preparation effort** due to manual or semi-automated generation methods
- Weak **coupling of test results to requirements** in case of manual or semi-automated generation methods
- **Exploitation of test results** could be improved



Test Report Standardisation: Objectives

The definition of a **standard for test reports** together with the underlying **test artefacts and data interfaces** shall help to

- Reduce **reconfiguration/adaptation effort** of tools for a new mission
- Improve **verification chain** for space systems
- Reduce the **report generation effort** (enable fully automated generation)
- Enlarge the **scope of test reports**:
  - **VCD** (verification close-out etc.)
  - Investigation of **anomalies**
  - **Test data extraction** covering **complete** test campaign
  - **Life-Limited Item (LLI) logbook**
  - Support of **test campaign management**
- Enable **comparison of test results** between different missions



Agenda

- Introduction
- Test Reporting: The Current Situation
- Test Report Standardisation: Objectives
- Test Report Standardisation: Tasks
  - Task 1: Survey of Current State
  - Task 2: Requirements Analysis
  - Task 3: Interface Definition, Creation of a Data Model
  - Task 4: Definition of a Test Report Standard
- Results of the Study
  - Results of Task 1 (Test Report Survey)
  - Results of Task 2 (Requirements Analysis)
  - Results of Task 3 (Data Model)
  - Results of Task 4 (ECSS Change Proposal)
- Conclusion and Outlook

Task 1: Survey of Current State

- Survey considering a diversity of **different test reports** from different teams
- **Different projects** considered: ARIANE 5, ATV, Galileo, MTG, etc.
- **Different domains** considered: system departments, AIT, software, ground segment, etc.

A	B	C	D	E	F	G
Readability, document structure and electronic processing						
Electronic document	Is the TRPT an **electronic document** at all and not a (scanned) paper document?		✓ Fulfilled,			
Readability	If it is a scanned document, does it have a good **readability**, not degraded due to scanning process?		NA			
Document structure	Has the document a **unique Id**?		✓ Fulfilled,	C		
	Does the **document id** come **from a central pool**?	e.g. document id assigned from central Document Management System	✓ Fulfilled,			
	Does the **document id follow a certain structure**?	e.g. containing project, document type and a sequential number	✓ Fulfilled,			
	Follows the document structure the ECSS DRD (above)?	Meaning the required content is not only present but also the chapters are aligned to the ECSS DRD	✗ Not fulfilled,			Chapter numbering slightly different
Electronic processing	Is the document in **standard PDF format**?	Specify other formats in Remark column	✓ Fulfilled,			
	Is whole **document contents searchable by standard tools**?	i.e. not only graphical representation of texts	✓ Fulfilled,			
	Is the document **electronically signed**?		✗ Not fulfilled,			signed and scanned

Outputs:

3 documents

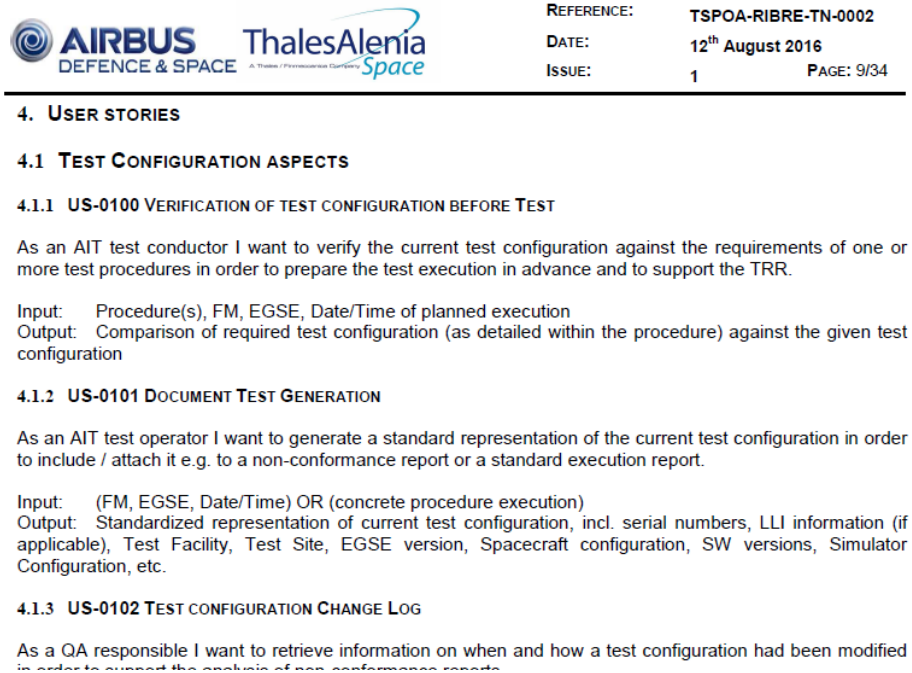
- TSPOA-RIBRE-TN-0001 *"Results of Task 1"* (ADS)
- 200870994L *"ESA Test Report Standard Task 1: Survey Technical Note"* (TAS)
- TN-0022-SYS *"Development of a Test Report Standard: Results of Task 1"* (OHB)

Task 2: Requirements Analysis

Definition of **requirements** (based on user stories) for an **automated test report generation tool**

Output:

Document TSPOA-RIBRE-TN-0002 *"Test Report Generator Requirements"*



AIRBUS DEFENCE & SPACE ThalesAlenia Space

REFERENCE: TSPOA-RIBRE-TN-0002
DATE: 12th August 2016
ISSUE: 1 PAGE: 9/34

4. USER STORIES

4.1 TEST CONFIGURATION ASPECTS

4.1.1 US-0100 VERIFICATION OF TEST CONFIGURATION BEFORE TEST

As an AIT test conductor I want to verify the current test configuration against the requirements of one or more test procedures in order to prepare the test execution in advance and to support the TRR.

Input: Procedure(s), FM, EGSE, Date/Time of planned execution
Output: Comparison of required test configuration (as detailed within the procedure) against the given test configuration

4.1.2 US-0101 DOCUMENT TEST GENERATION

As an AIT test operator I want to generate a standard representation of the current test configuration in order to include / attach it e.g. to a non-conformance report or a standard execution report.

Input: (FM, EGSE, Date/Time) OR (concrete procedure execution)
Output: Standardized representation of current test configuration, incl. serial numbers, LLI information (if applicable), Test Facility, Test Site, EGSE version, Spacecraft configuration, SW versions, Simulator Configuration, etc.

4.1.3 US-0102 TEST CONFIGURATION CHANGE LOG

As a QA responsible I want to retrieve information on when and how a test configuration had been modified

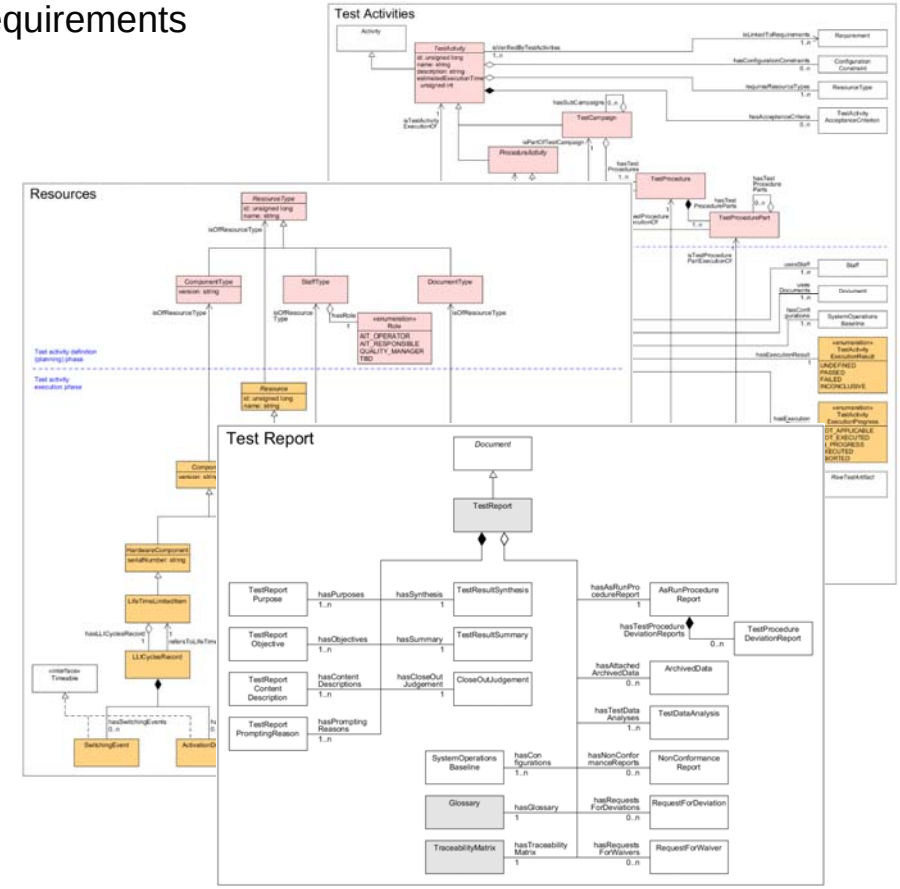
Task 3: Interface Definition, Creation of a Data Model

Definition of a **semantic data model** based on the requirements previously specified within the scope of task 2

Outputs:

- **Data model**
  - Semantic data model in OWL
  - Additional UML representation (for documentation purposes)

- **Document** TN-0103-SYS *"Development of a Test Report Standard: Results of Task 3 (Description of the Data Model)"*

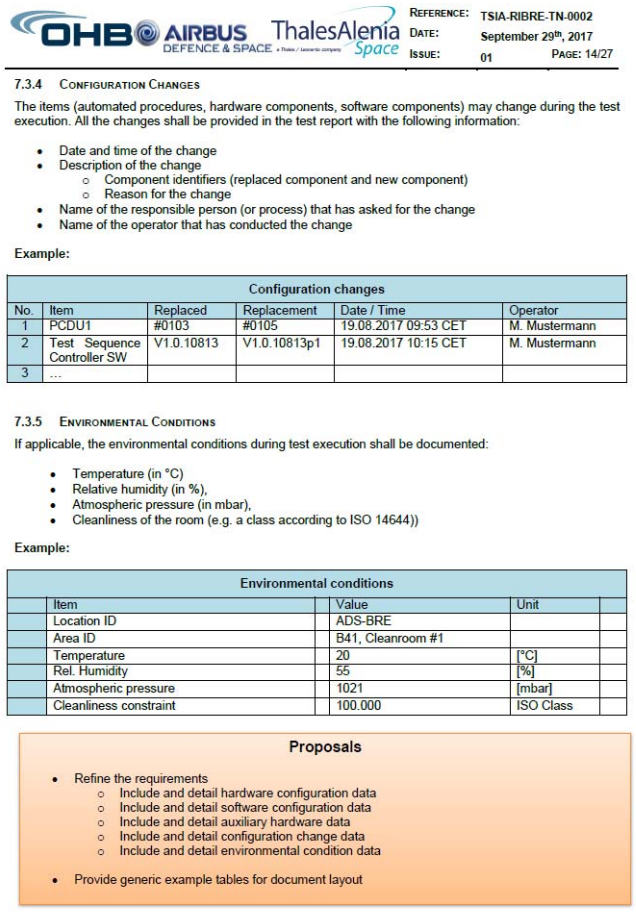


Task 4: Definition of a Test Report Standard

- **Change proposal** for the ECSS-E-ST-10-02C
- List of changes to be applied to the current ECSS document

Output:

Document TSIA-RIBRE-TN-0002 *"Test Report Standard – Task 4 – Change Proposal for ECSS-E-ST-10-02C"*



OHB AIRBUS DEFENCE & SPACE ThalesAlenia Space — REFERENCE: TSIA-RIBRE-TN-0002 — DATE: September 29th, 2017 — ISSUE: 01 — PAGE: 14/27

7.3.4 CONFIGURATION CHANGES

The items (automated procedures, hardware components, software components) may change during the test execution. All the changes shall be provided in the test report with the following information:

- Date and time of the change
- Description of the change
  - Component identifiers (replaced component and new component)
  - Reason for the change
- Name of the responsible person (or process) that has asked for the change
- Name of the operator that has conducted the change

Example:

Configuration changes					
No.	Item	Replaced	Replacement	Date / Time	Operator
1	PCDU1	#0103	#0105	19.08.2017 09:53 CET	M. Mustermann
2	Test Sequence Controller SW	V1.0.10813	V1.0.10813p1	19.08.2017 10:15 CET	M. Mustermann
3	…				

7.3.5 ENVIRONMENTAL CONDITIONS

If applicable, the environmental conditions during test execution shall be documented:

- Temperature (in °C)
- Relative humidity (in %),
- Atmospheric pressure (in mbar),
- Cleanliness of the room (e.g. a class according to ISO 14644))

Example:

Environmental conditions		
Item	Value	Unit
Location ID	ADS-BRE	
Area ID	B41, Cleanroom #1	
Temperature	20	[°C]
Rel. Humidity	55	[%]
Atmospheric pressure	1021	[mbar]
Cleanliness constraint	100.000	ISO Class

Proposals

- Refine the requirements
  - Include and detail hardware configuration data
  - Include and detail software configuration data
  - Include and detail auxiliary hardware data
  - Include and detail configuration change data
  - Include and detail environmental condition data
- Provide generic example tables for document layout

Agenda

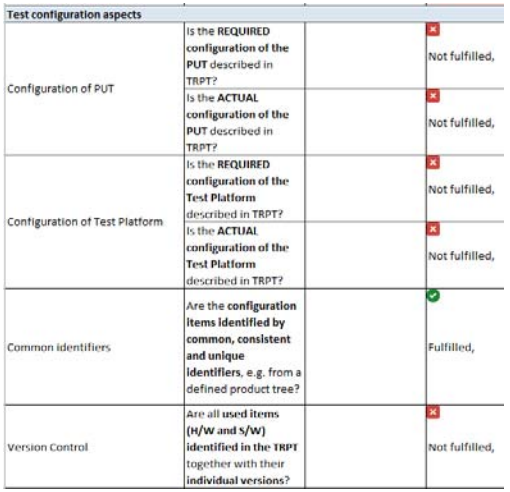
- Introduction
- Test Reporting: The Current Situation
- Test Report Standardisation: Objectives
- Test Report Standardisation: Tasks
  - Task 1: Survey of Current State
  - Task 2: Requirements Analysis
  - Task 3: Interface Definition, Creation of a Data Model
  - Task 4: Definition of a Test Report Standard
- Results of the Study
  - Results of Task 1 (Test Report Survey)
  - Results of Task 2 (Requirements Analysis)
  - Results of Task 3 (Data Model)
  - Results of Task 4 (ECSS Change Proposal)
- Conclusion and Outlook

Results of Task 1 (Test Report Survey)

(1) **None** of the analysed test reports is **100% compliant** to the ECSS-E-ST-10-02C DRD (each test report contains only the **parts** that are **relevant** for the respective **domain/context)**

(2) **Large diversity** of **quantity and quality** of test reports

- **Content missing** in many reports (compared to expectations), e.g.:
  - Generated file artifacts (or references to them)
  - Screenshots and other images
  - Telemetry extracts
  - Log files
  - Requirements tracing and close-out data
  - Life Limited Items (LLI) logbook data
  - Particular information about anomalies (anomaly status etc.)



Test configuration aspects			
Configuration of PUT	Is the **REQUIRED configuration of the PUT** described in TRPT?		Not fulfilled,
	Is the **ACTUAL configuration of the PUT** described in TRPT?		Not fulfilled,
Configuration of Test Platform	Is the **REQUIRED configuration of the Test Platform** described in TRPT?		Not fulfilled,
	Is the **ACTUAL configuration of the Test Platform** described in TRPT?		Not fulfilled,
Common identifiers	Are the **configuration items identified by common, consistent and unique identifiers**, e.g. from a defined product tree?		Fulfilled,
Version Control	Are all **used items (H/W and S/W) identified in the TRPT** together with their **individual versions?**		Not fulfilled,

- **None** of the analysed test reports contains an **automatically generated** change log
- Only a **part** of the analysed test reports has got an **electronic signature**
- **None** of the analysed test reports supports an **automated retrieval of information** (e.g. anomaly data) for further processing

Results of Task 1 (Test Report Survey)

(3) **Clear relation** between **grade of automation** and **quantity/quality/preparation effort** of the test reports

- **<u>Manually</u> created** test reports (e.g. hand-written reports, MS Word, etc.):

  → **High effort** for collecting and processing information from different sources
  → **Lower quantity and quality** (w.r.t. required content)

- **<u>Automatically</u> generated** test reports (e.g. using e-TDHS or IBM toolchain)

  → **Much less preparation effort** due to automation of data processing
  → **Higher quantity and quality** (w.r.t. required content)

Results of Task 1 (Test Report Survey)

Conclusion:

The situation could be improved by…

I. Introducing a **harmonisation** of the test reporting activities

- Improvement of the current **test report standard**

II. Introducing an **automation** of the test reporting activities

- Automation of **test report preparation**
  - Improves **quantity *and* quality** of the test reports
  - Reduces **preparation effort**

III. Considering the **different test report needs** according to the specific domain/context

- Example: Manual test procedure for AIT has a different scope than software tests on an SVF platform

Agenda

- Introduction
- Test Reporting: The Current Situation
- Test Report Standardisation: Objectives
- Test Report Standardisation: Tasks
  - Task 1: Survey of Current State
  - Task 2: Requirements Analysis
  - Task 3: Interface Definition, Creation of a Data Model
  - Task 4: Definition of a Test Report Standard
- Results of the Study
  - Results of Task 1 (Test Report Survey)
  - Results of Task 2 (Requirements Analysis)
  - Results of Task 3 (Data Model)
  - Results of Task 4 (ECSS Change Proposal)
- Conclusion and Outlook

Results of Task 2 (Requirements Analysis)

User Stories: How do users expect to work with test reports in future applications?

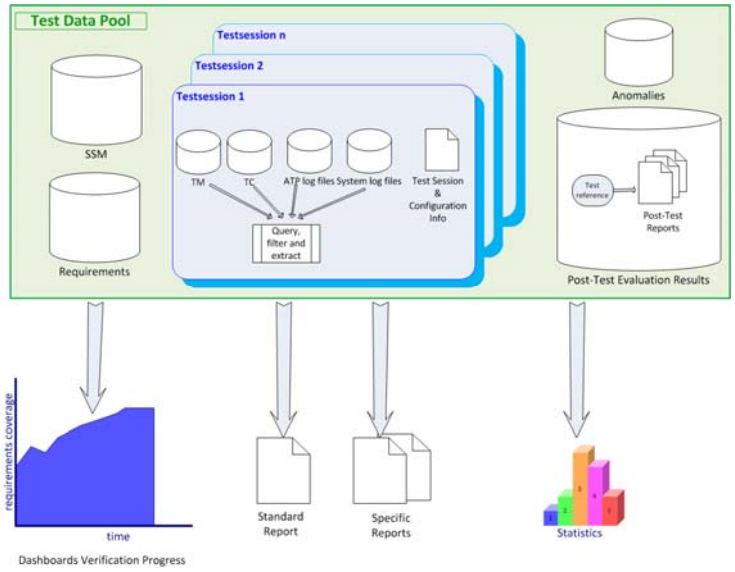
Some **key elements:**

- **Flexible definition** of test reports, independent from actual data
- **Automated generation** of test reports using data from selected time frames/activities
- Ability to **re-generate** a test report from the same data (e.g. after modifications to the test report definition)
- **Secure, centralised access** to test reports and data archive
- **Integration** with referenced **external data** (test artifacts etc.)

Conclusion: Not only the reports itself but **several aspects** like

- Data archive
- Report generator
- Report management

will have to be **taken into account**.



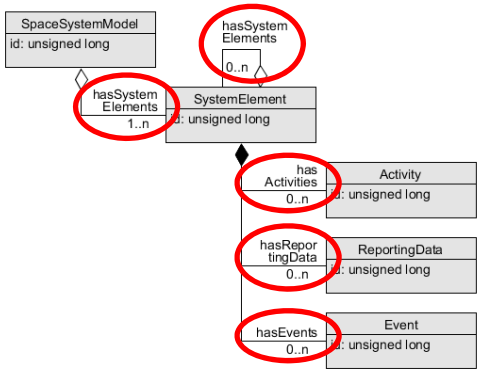
Agenda

- Introduction
- Test Reporting: The Current Situation
- Test Report Standardisation: Objectives
- Test Report Standardisation: Tasks
  - Task 1: Survey of Current State
  - Task 2: Requirements Analysis
  - Task 3: Interface Definition, Creation of a Data Model
  - Task 4: Definition of a Test Report Standard
- Results of the Study
  - Results of Task 1 (Test Report Survey)
  - Results of Task 2 (Requirements Analysis)
  - Results of Task 3 (Data Model)
  - Results of Task 4 (ECSS Change Proposal)
- Conclusion and Outlook

Results of Task 3 (Data Model)

Semantic data model, based on the previously defined **requirements** (output of task 2)

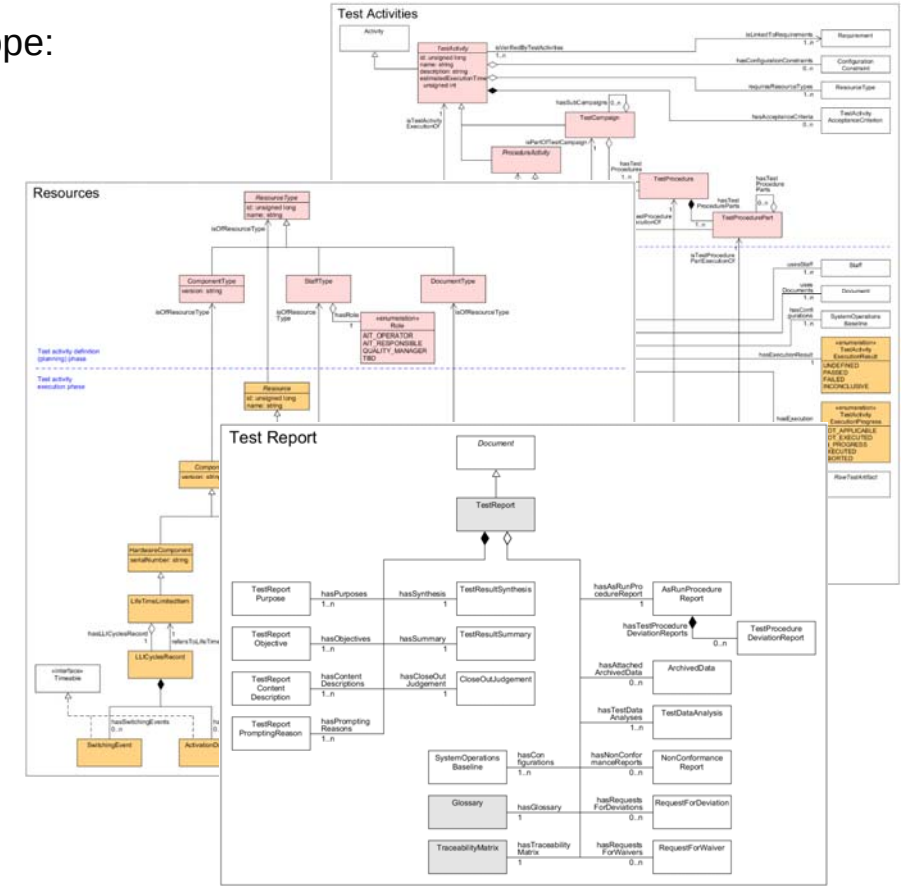
- **Ontology** using the **Ontology Web Language (OWL)** standard
  - Formal definition of **entities** and their properties and interrelationships
- Additional **UML representation** (class diagrams) for documentation purposes
  - **Modified UML notation** to illustrate **semantic aspects** (relations)



- Description of **logical structure**, basis for further development of the software system

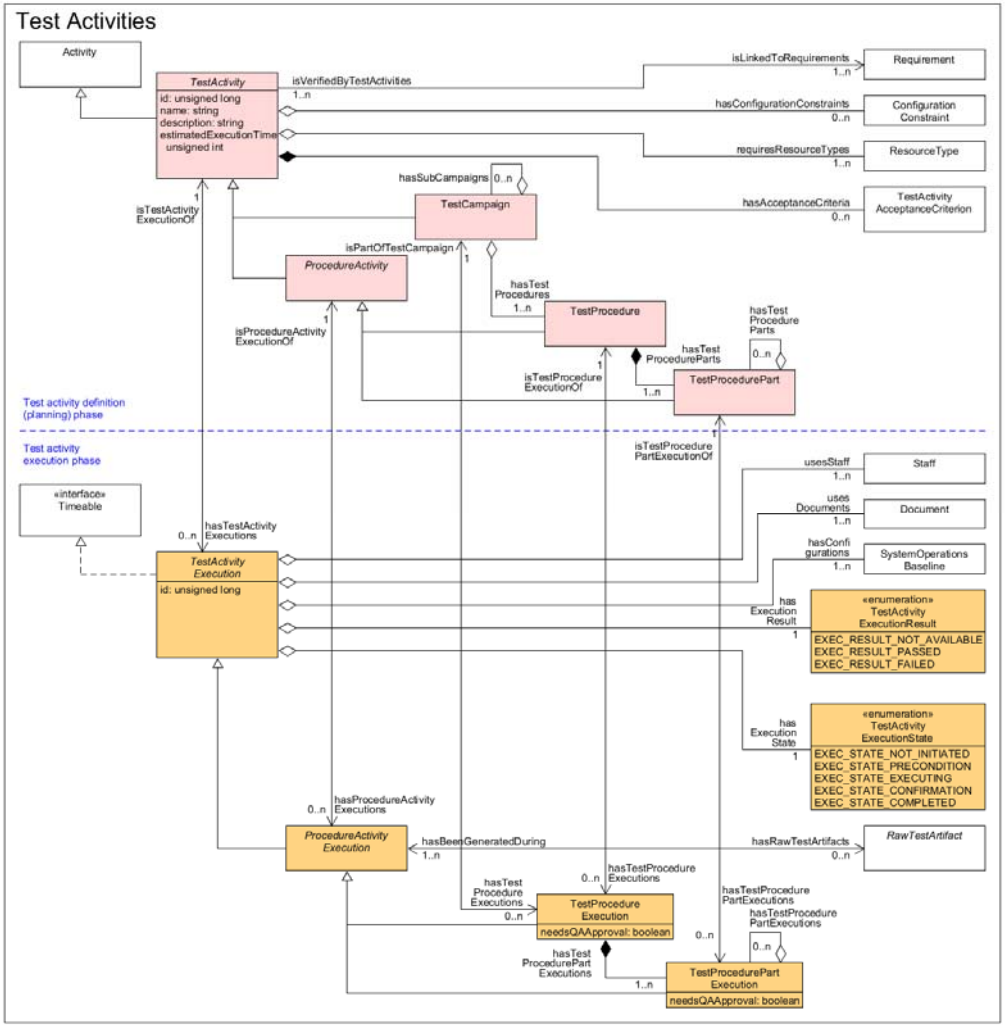
Results of Task 3 (Data Model)

- **<u>9 class diagrams</u>**, each covering a particular scope:
  - **Resources**
  - **Test activities**
  - **Acceptance (pass/fail) criteria** for test activities
  - **Requirements**
  - **System model**
  - **System Operations Baseline (SOB)**
  - **Test artifacts (1)**: raw test artifacts
  - **Test artifacts (2)**: test report input artifacts
  - **Test report**



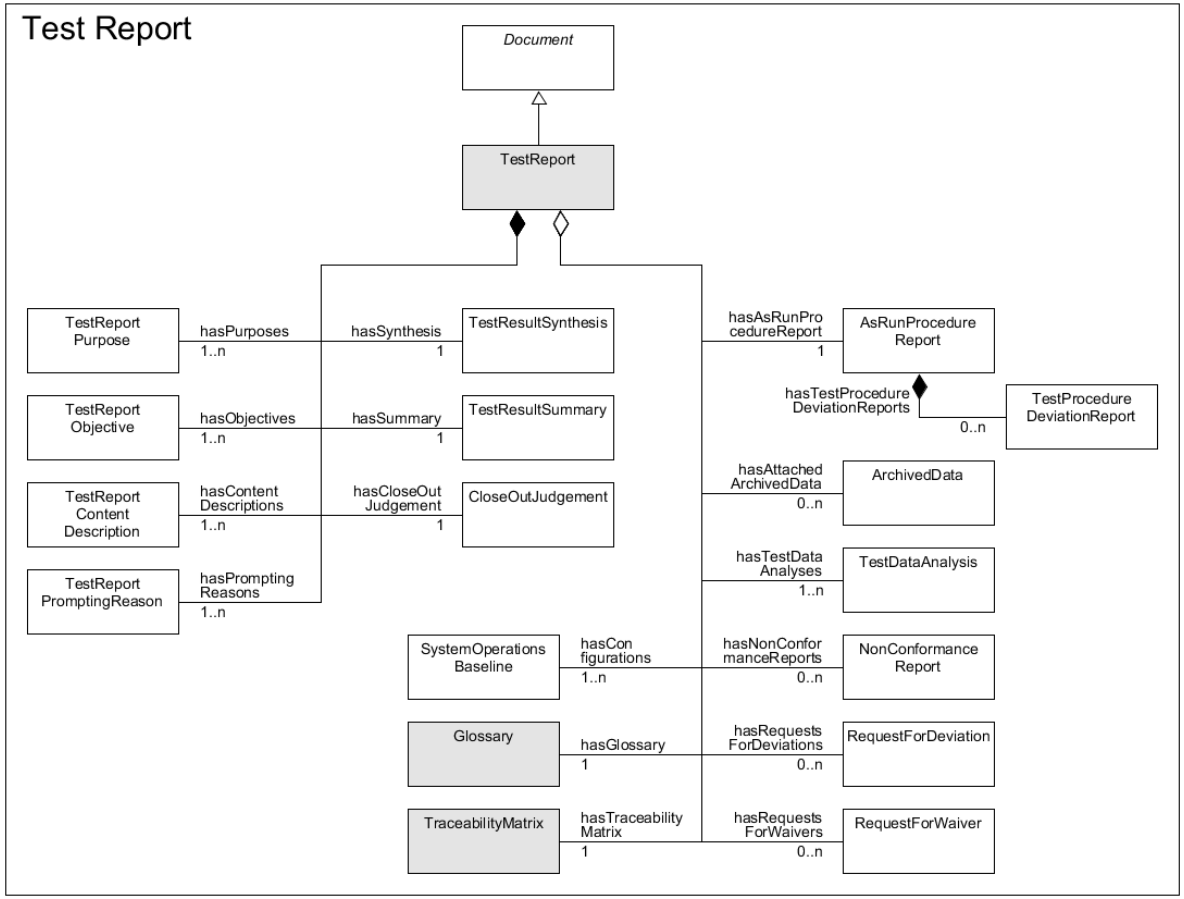
Results of Task 3 (Data Model)

Example #1:
Test activities



Results of Task 3 (Data Model)

Example #2:
Test Report



Agenda

- Introduction
- Test Reporting: The Current Situation
- Test Report Standardisation: Objectives
- Test Report Standardisation: Tasks
  - Task 1: Survey of Current State
  - Task 2: Requirements Analysis
  - Task 3: Interface Definition, Creation of a Data Model
  - Task 4: Definition of a Test Report Standard
- Results of the Study
  - Results of Task 1 (Test Report Survey)
  - Results of Task 2 (Requirements Analysis)
  - Results of Task 3 (Data Model)
  - Results of Task 4 (ECSS Change Proposal)
- Conclusion and Outlook

Results of Task 4 (ECSS Change Proposal)

Finally, a number of **proposed changes** against the current ECSS document have been **derived from the previous results** of the study.

In a nutshell, the proposals are focused on the following main topics:

- **Refine, clarify, and detail** the definition of content elements already defined in the current ECSS version
- Promote the application of **template-based workflows**
- Consider **additional content elements** (e.g. test configuration aspects, monitoring plan and events, inputs for Life-Limited Item logbooks, etc.)
- Promote the application of **digital Content Management Systems** for accessing test reports, referenced documents, and other resources
- Consider **different types of test reports** tailored towards specific domain needs

7.4 Life-Limited Items Logbook

In the context of the test reports, Life Limited Items (LLIs) are hardware components meant to be embedded in a space system and used during the test with a limited allowed number of on/off cycles or a specified usage duration.

Each test report shall provide the following information about each LLI hardware component used during the test:

- The hardware LLI identifier
- A serial number or similar unique identifier
- The number of cycles/power-on duration used during the execution of the test
- The total number of cycles/power-on duration of the component including this test
- The maximum number of activations/duration allowed for the particular LLI item
- The method how the information had been acquired has to be mentioned (e.g. manual acquisition, automated acquisition through given TM measurement)
- If the LLI information has been automatically acquired, the processed TM items and the algorithm for their processing should be described

The test report shall mention any replacement of an LLI component during the test and provide the information specified above for each LLI component used. It shall also specify the reason for the replacement.

Example:

Date: 29/09/2017		LLI data summary					
	Item	SN	Value	Total	Limit	Unit	Acqusition type
	LV102	#43	4	32	100	Cycle(s)	TM
	PCDU1	#0103	3,8	109,2	1000	[h]	TM
	…						

Proposals

- Include Life-Limited Items Logbook in required content elements (either directly or by reference)
- Provide generic example table

Results of Task 4 (ECSS Change Proposal)

Test Report Content \ Test Report Category	Satellite On-Board Software (OBSW) tests		Non-satellite software tests		AIT tests		Ground segment tests
	OBSW tests with satellite HW involved	OBSW tests without satellite HW involved	SRDB SW tests	Simulator SW tests (e.g. SVF)	Integration tests	System tests	
Introduction	+	+	+	+	+	+	+
Applicable & reference documents	+	+	+	+	+	+	+
Definitions & abbreviations	+	+	+	+	+	+	+
Test configuration (SOB)	+	+	+	+	+	+	+
Test results							
As-run procedure	(+)*	(+)*	(+)*	(+)*	+	+	+
Results & execution dates	+	+	+	+	+	+	+
Monitoring configuration & events	o	o	o	o	o	+	o
Analysis	(+)**	(+)**	(+)**	(+)**	+	+	+
Assessment	+	+	+	+	+	+	+
Synthesis	+	+	+	+	+	+	+
Life-Time Limited Items (LLI) report	(+)***	--	--	--	o	o	--
Anomalies	+	+	+	+	+	+	+
Conclusions							
Test result summary	+	+	+	+	+	+	+
Traceability matrix	+	+	+	+	+	+	+
Open issues	+	+	+	+	+	+	+
Non-conformances & deviations from test procedure	+	+	+	+	+	+	+
Requirements close-out	+	+	+	+	+	+	+
Cross-references to other (test related) documents	o	o	o	o	o	o	o
Preparation and distribution as a digital document	+	+	+	+	+	+	+
Support for VCD Generation	+	+	+	+	+	+	+

Table 8-2: Test report content depending on the test report category

Agenda

- Introduction
- Test Reporting: The Current Situation
- Test Report Standardisation: Objectives
- Test Report Standardisation: Tasks
  - Task 1: Survey of Current State
  - Task 2: Requirements Analysis
  - Task 3: Interface Definition, Creation of a Data Model
  - Task 4: Definition of a Test Report Standard
- Results of the Study
  - Results of Task 1 (Test Report Survey)
  - Results of Task 2 (Requirements Analysis)
  - Results of Task 3 (Data Model)
  - Results of Task 4 (ECSS Change Proposal)
- Conclusion and Outlook

Conclusion and Outlook

- The entire study was an opportunity to understand the **difficulties to obtain comprehensive information** on a particular subject (e.g. test related data) in a huge company like TAS, ADS, or OHB.
- The proposed enhancement of the ECSS-E-ST-70-31C gives a **common understanding** of the term **“test report“**.

Next steps:

- The provided **data model** could be used as a basis for the development of a **standard data model**.
- Implementation of **generic tools for supporting test report generation** according to the standard

Good collaboration between ESA, ADS, TAS, and OHB…

… now it is up to ESA to take a decision about the **further steps**.