Date du Poc : Septembre 2017

Objectif : La mise en œuvre rapide pour le "Use Case 25, Big Data for test data" sur la partie: Automatisation de scenarios d'analyse de données de Tests et plus particulièrement sur le scenario  3- Vérification de télémétries de service

VCF (validation chaine fonctionnelle) du satellite ExoMars. C’est **l’Application process** ?

ICD Interface Control Document (must be defined)

OBT On-Board Time

OBCP ON-BOARD CONTROL PROCEDURES

Services are defined in generic PUS ICD. Each instantiation of the PUS STD will define the applicability of these services. Also new services can also be added depending on the DHS (Data Handling System) requirements

SERVICE 1 : TELECOMMAND VERIFICATION

This service allows the command source to verify identified commands at acceptance and/or execution by asking the addressed application to generate service type 1 reports in the telemetry stream.

**PUS= Packet utilization standard**

PUS relates to the utilisation of telecommand and telemetry source packets for the purpose of monitoring and remote control of subsystems and payloads. PUS is also used to manage onboard monitoring and control functions for manned missions.

PUS packets are used in conjunction with specific Packet Utilisation Standard Services, which correspond to particular monitoring and control functions.

Service specifications define:

* what can be requested of the Service;
* what can be issued by the Service to notify the user of the success or failure of this request and to report events detected during the execution of the Service activities;
* what internal activities the Service should perform to process a request or to detect or process events related to the Service

PUS packets are used to control and monitor these services via **a well-defined** set of interactions between the provider of the Service (i.e. an onboard Application Process) and the user of the Service (i.e. a ground system).

PUS standard uses service 1 (PUS SVC 1) for TC acknowledgment purposes. The goal is to achieve fully automatic validation of TC acknowledgments received during a sequence

The standard previews 4 different level of TC acknowledgment:

 TC Acceptance

 TC Execution Start

 TC Execution Progress

 TC Execution Complete

|  |  |
| --- | --- |
| **SVC/sub SVC** | **Description** |
| TM(1,1) | TC acceptance report - success |
| TM(1,2) | TC acceptance report - failure |
| TM(1,3) | TC execution started report - success |
| TM(1,4) | TC execution started report - failure |
| TM(1,5) | TC execution progress report - success |
| TM(1,6) | TC execution progress report - failure |
| TM(1,7) | TC execution complete report - success |
| TM(1,8) | TC execution complete report - failure |

For each TC executed a set of acknowledgment telemetries TM should be received. The expected set depends on:

* The PUS instantiation (cf. **3.4**) of the system/component
* The requested ACK on the command (TC ACK field)

## TC Origin

|  |  |
| --- | --- |
| **Source** | **Description or SVC** |
| Ground TC | TC received from ground (except HPTC)\* |
| MTL | PUS svc 11 |
| OBCP | PUS svc 18 |
| EA | PUS svc 19 |
| OBCP | PUS svc 131 |
| AcSeq | PUS svc 132 |

**TC to TM mapping**

Any TC acknowledgment telemetry must contain information sufficient to uniquely identify the TC that generated it 🡪 source ID (in **PUS TC Header)** = Destination ID (in **PUS TM Header)**

The execution of TC File is then triggered by TC request or by an internal event.

Faire le mapping entre le TC et le TM ?

How the TCs are build : identification of the different sources (**ground TC**  and **onBoard TC** comme AcSeq, MTL, EA, OBCP**,** file and the services

How the associated TM are generated (Direct/MM TM ACK)

How the verification of the acknowledgments is done

AcSeq waits verification

Voici le type de résultat que nous calculions manuellement sur le sujet des Télémétries d’acceptance pour un test relativement simple (pas tous les cas possibles):

            Test VCF Exomars : VT\_EXM\_GNC\_MODES\_OCM\_001 - EXM-OM-TRP-AF-2499 - issue 01 – Execution: 2014/09/19  19h00

**Normal Asynchronous TM analysis:**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **Nb of TC sent** | | | **Acceptance reports** | | **Start reports** | | **Execution reports** | |
| **CSW TC** | **Direct TC** | **AcSeq TC** | **TM 1.1** | **TM 1.2** | **TM 1.3** | **TM 1.4** | **TM 1.7** | **TM 1.8** |
| **Total** | 494 | 190 | 9 | 503 | 0 | 502 | 0 | 502 | 0 |
| 693 | | | 503 | | 502 | | 502 | |

**TM(1,1) (Telecommand Acceptance Success Report):**

693 TC have been sent during the test:

         190 are HPTC/Direct TC not giving rise to acceptance TM (1, 1)

         494 are CSW TC, they have given rise to 494 acceptance TM (1, 1)

         9 are CSW TC generated by Action Sequence, they have given rise to 9 acceptance TM (1, 1)

  503 TM (1, 1 – 3 – 7) are expected.

**TM(1,3) (Telecommand Successful Execution Start Report):**

503 CSW TC have been sent and accepted during the test:

         502 of them have given rise to a successful start TM(1,3)

         1 TC was coded in raw format in the procedure and did not requested a start execution report.

**TM(1,7) (Telecommand ExecutionSuccess Report):**

503 CSW TC have been sent, accepted and executed during the test:

         502 of them have given rise to a successful execution TM(1,7)

         1 TC was coded in raw format in the procedure and did not requested a successful execution report.

Est-ce que les données sont justes ? je n’ai pas vérifié tous les rapports manuellement en refaisant les calculs et vérifications  nous avons vraiment besoin d’outiller tout cela 

Maintenant que le problème est posé, il reste la problématique du format des données.

Les données nécessaires pour ce cas simple sont :

-       Les TC envoyées durant le test

-       Le contenu des Action Sequence déclenchées (43 + 47)

-       Les TM (1, x) reçues

Je vous donne joint, des fichiers exemples pour le format des fichiers dont nous disposons.

Cette semaine, je n’ai pas accès aux données sources du test qui servira de référence.

Pour la liste des TM (1, x) reçues, nous avons en sortie d’un de nos outils le fichier Acceptance\_TC\_list.txt.

Pour les TC envoyées depuis le sol (n’apparaissent pas celles des Action Sequence), nous avons le fichier tct.ana\_info.

Pour le contenu des AcSeq, on doit avoir un fichier texte ou un fichier xml (pas dispo sur mon PC).

Dites-moi ce que vous en pensez ? ce qui vous serez le plus pratique pour vous ?