The Consultative Committee for Space Data Systems

POINTING REQUEST MESSAGE TEST PLAN/REPORT

CCSDS RECORD

CCSDS 509.1-Y-1.2

YELLOW BOOK

March 2017

FOREWORD

This document records the plans for prototype testing and results of that testing for the Pointing Request Message, CCSDS 509.0-R-1.2, Red Book. As a record of prototype testing, it is expected that expansion, deletion, or modification of this document will **not** occur. This document is subject to CCSDS document management and change control procedures, which are defined in the *Organization and Processes for the Consultative Committee for Space Data Systems*. Current versions of CCSDS documents are maintained at the CCSDS Web site:

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- Swedish Space Corporation (SSC)/Sweden.
- United States Geological Survey (USGS)/USA.

DOCUMENT CONTROL

Document	Title and Issue	Date	Status
CCSDS 509.1-Y-1	Pointing Request Message Test/Plan Report, CCSDS Record, Issue 1	July 2016	Initial Issue
CCSDS 509.1-Y-1.1	Pointing Request Message Test/Plan Report, CCSDS Record, Issue 1.1	November 2016	First revision after Fall Meeting 2016
CCSDS 509.1-Y-1.2	Pointing Request Message Test/Plan Report, CCSDS Record, Issue 1.2	February 2017	First version after the prototyping campaing

CONTENTS

1 INTRODUCTION

1.1 PURPOSE

The purpose of this document is to describe the prototype testing conducted on the CCSDS Pointing Request Message (PRM), CCSDS 509.0-R-1 (reference [2]).

1.2 SCOPE

The scope of this document is testing of the Pointing Request Message (PRM). The PRM is part of the technical program of the CCSDS Navigation WG (NWG). The PRM document completed a CCSDS Agency Review in January through March 2016, with revisions following this initial review to apply Review Item Discrepancies (RID)s from the review and proofreading changes; this process is described in reference [1].

Note that in applicable places the prototyping includes results based on modifications to the PRM document provided via the Agency Review Item Discrepancy (RID) process. Minor changes not affecting the technical content based on the ongoing working group activity were also incorporated as applicable (e.g., clarifications in the PRM text, minor error corrections, etc.).

1.3 APPLICABILITY

This document applies to the prototype testing required to advance the PRM from Red Book to Blue Book status.

1.4 RATIONALE

The CCSDS Procedures Manual states that for a Recommendation to become a Blue Book, the draft standard must be tested in an operational manner. The following requirements for an implementation exercise were excerpted from reference [1]:

> "At least two independent and interoperable prototypes or implementations must have been developed and demonstrated in an operationally relevant environment, either real or simulated."

This document outlines the NavWG's approach to meeting this requirement for the PRM 509.0 Red Book.

1.5 DOCUMENT STRUCTURE

The first sections of this document describe the Test Plan for the prototyping activity; the last sections of the document provide a Test Report of the realized plan. Acronyms are provided in Annex A.

1.6 REFERENCES

The following documents are referenced in this document. At the time of publication, the editions indicated were valid. All documents are subject to revision, and users of this document are encouraged to investigate the possibility of applying the most recent editions of the documents indicated below. The CCSDS Secretariat maintains a register of currently valid CCSDS documents.

[1] *Organization and Processes for the Consultative Committee for Space Data Systems*. CCSDS A02.1-Y-4. Yellow Book. Issue 4. Washington, D.C.: CCSDS, April 2014.

[2] *Pointing Request Message. Recommendation for Space Data System Standards*, CCSDS 509.0-R-1. Red Book, Washington, D.C.: CCSDS, April 2016.

[3] http://beta.sanaregistry.org/r/pointing_request_message/pointing_request_message.html

2 CONCLUSION/RECOMMENDATION (DRAFT)

[Editor's Note: It is intended that the following draft conclusion/recommendation will be substantiated, with applicable revisions, via the testing process.]

The test plan and test reports documented herein substantiate that the organizations participating in the CCSDS NWG have successfully conducted prototype testing of the Pointing Request Message (PRM) document (reference [2]). During the testing, PRMs were produced by 8 different organizations. Verification that the messages were correctly constructed was conducted by an impartial "Test Judge" who is intimately familiar with the PRM technical content.

The prototype implementations demonstrated the utility of the PRM, and the few minor discrepancies identified helped to improve the quality of the PRM document.

Based on the diversity of organizations able to read/write the messages, and the positive test results, the NavWG recommends that the PRM Red Book document be promoted to a Blue Book CCSDS Recommended Standard.

3 POINTING REQUEST MESSAGE (PRM) TESTING GOALS

The tests of the PRM described in Section 4 and Section 5 of this plan will be conducted in order to meet the CCSDS requirements described in Section 2. In Section 6 and Section 7, the results of the testing are presented.

3.1 PRM OVERVIEW

The PRM is an Extensible Markup Language (XML) formatted message. It specifies a standard message format for use in exchanging spacecraft pointing request information between originators of pointing data, satellite owner/operators and other authorized parties. The message is organized into 3 sections: a header section, a metadata/definition section and a data/request section. The header section contains identification information (version, creation date, originator, etc.). The metadata section contains information regarding the objects, the reference frames and other definitions of the basic elements of the pointing request. The data section contains the detailed characteristics of the pointing that combined with the definition complete the pointing request.

4 TEST PLAN OVERVIEW

Prototyping of the PRM will be performed as shown in the following table, which lists by Test Number the participating member agencies of the Navigation Working Group, and their roles in the tests. Because the PRM standard is based on pre-defined templates as well as in a generic procedure using basic PRM building elements, the prototyping is implemented in two steps, one exercising the use of the use of the templates and another one covering the application of the generic procedure. Two independent messages will be produced using each template. For the general procedure (Test #11), an example pointing from ROSETTA mission operations will be converted to the PRM format.

Table 4-1: Pointing Request Message Tests Table

Test#	Type	Message #1	Message #2	Test Judge [Arbitrator?]
1	Template	NASA GRC	NASA GSFC	ESOC GMV
2	Template	NASA GRC	NASA GSFC	ESOC GMV
3	Template	NASA GSFC	NASA JSC	ESOC GMV
4	Template	NASA GSFC	NASA JSC	ESOC GMV
5	Template	CNES	AGI	ESOC GMV
6	Template	CNES	AGI	ESOC GMV
7	Template	NASA GSFC	JAXA	ESOC GMV
8	Template	NASA JPL	NASA GRC	ESOC GMV
9	Template	NASA JPL	NASA GSFC	ESOC GMV
10	Template	NASA JPL	JAXA	ESOC GMV
11	General procedure	ESOC GMV	N/A	ESOC Rosetta

5 TEST PLAN DETAILS

5.1 TEST CASE #1: INERTIAL POINTING

5.1.1 TEST PURPOSE

This test will demonstrate the ability of the PRM to model a request for inertial pointing with boresight offset using the Inertial Pointing Template.

5.1.2 TEST DESCRIPTION

Generate a request based on the Inertial Pointing Template such that:

- General details:
  - Root frame is GCRF
  - Time scale is UTC
  - Satellite is Hipparcos (1989-062B)
- The reference direction for the inertial pointing is the star Vega (RA 18h 36m 56s | Dec +38° 47′ 1″)
- The pointing axis is the spacecraft X-axis (generally towards the direction of Vega).
- The phase angle is defined such that the Y-axis is contained in the plane Vega-Spacecraft-Aldebaran (RA 4h 35m 55s | Dec +16° 30′ 33″)
- The pointing is set with an offset of 10º away from Vega to the half plane containing Aldebaran.
- The attitude is to be maintained during 3 hours after 2016-02-10T23:00:00.000
- A second pointing is to be implemented starting on 2016-02-27T00:00:00.000 for 1.5 hours. This second pointing has no offset with respect to Vega.

5.1.3 EXPECTED RESULTS

Each participant shall provide a complete PRM using the template available on the SANA Registry (see reference [3]).

The requests provided by all participants will provide comparable values in all template fields, as determined by the assigned Test Judge.

5.2 TEST CASE #2: SUN POINTING

5.2.1 TEST PURPOSE

This test will demonstrate the ability of the PRM to model a request for Sun pointing with boresight offset and constant spin around the pointing axis using the Sun Pointing Template.

5.2.2 TEST DESCRIPTION

Generate a request based on the Sun Pointing Template such that:

- General details:
  - Root frame is GCRF
  - Time scale is TDB
  - Satellite is SOHO (1995-065A)

- The pointing axis is the spacecraft X-axis (generally towards the direction of the Sun).
- The phase angle is defined such that the Y-axis is contained in the plane Sun-Spacecraft-Aldebaran (RA 4h 35m 55s | Dec +16° 30′ 33″)
- The pointing is set with an offset of 10º away from the Sun to the half plane containing Aldebaran.
- The spacecraft shall rotate at a rate of 1º per hour around the X-axis.
- The attitude is to be maintained during 3 hours after 2016-02-10T23:00:00.000
- A second pointing is to be implemented starting on 2016-02-27T00:00:00.000 for 1.5 hours. The X-axis points to the Sun, with no offset and no rotation rate around the pointing axis.

5.2.3 EXPECTED RESULTS

Each participant shall provide a complete PRM using the template available on the SANA Registry (see reference [3]).

The requests provided by all participants will provide comparable values in all template fields, as determined by the assigned Test Judge.

5.3 TEST CASE #3: TRACK WITH INERTIAL DIRECTION YAW STEERING

5.3.1 TEST PURPOSE

This test will demonstrate the ability of the PRM to model a request using the Track With Inertial Direction Yaw Steering Template.

5.3.2 TEST DESCRIPTION

Generate a request based on the Track with Inertial Direction Yaw Steering Template such that:

- General details:
  - Root frame is GCRF
  - Time scale is TDB
  - Satellite is MEX (2003-022A)
- The spacecraft X-axis points to Mars (target direction).
- The phase angle is the angle in the plane perpendicular to the target direction of the spacecraft Y-axis from the projection of the direction to Aldebaran (RA 4h 35m 55s | Dec +16° 30′ 33″) reckoned positive around the target direction.
- The yaw steering phase angle is 0º.

5.3.3 EXPECTED RESULTS

Each participant shall provide a complete PRM using the template available on the SANA Registry (see reference [3]).

The requests provided by all participants will provide comparable values in all template fields, as determined by the assigned Test Judge.

5.4 TEST CASE #4: TRACK WITH POWER OPTIMIZED YAW STEERING

5.4.1 TEST PURPOSE

This test will demonstrate the ability of the PRM to model a request using the Track with Power Optimized Yaw Steering Template.

5.4.2 TEST DESCRIPTION

Generate a request based on the Track with Power Optimized Yaw Steering Template such that:

- General details:
  - Root frame is GCRF
  - Time scale is TDB
  - Satellite is MEX (2003-022A)
- The spacecraft X-axis points to Mars.
- The phase angle is defined making the spacecraft Y-axis perpendicular to the Sun direction such that the spacecraft Y-axis, the pointing direction and the Sun direction are right handed.

5.4.3 EXPECTED RESULTS

Each participant shall provide a complete PRM using the template available on the SANA Registry (see reference [3]).

The requests provided by all participants will provide comparable values in all template fields, as determined by the Test Judge.

5.5 TEST CASE #5: NADIR WITH POWER OPTIMIZED YAW STEERING

5.5.1 TEST PURPOSE

This test will demonstrate the ability of the PRM to model a request using the Nadir with Power Optimized Yaw Steering Template.

5.5.2 TEST DESCRIPTION

Generate a request based on the Nadir with Power Optimized Yaw Steering Template such that:

- General details:
  - Root frame is ITRF
  - Time scale is UTC
  - Satellite is METOP-1A (2006-044A)
- The central body used to define the nadir direction is the Earth.
- The spacecraft Z-axis points to the nadir direction.
- The phase angle is defined making the spacecraft Y-axis perpendicular to the Sun direction such that the spacecraft Y-axis, the pointing direction and the Sun direction are right handed.

5.5.3 EXPECTED RESULTS

Each participant shall provide a complete PRM using the template available on the SANA Registry (see reference [3]).

The requests provided by all participants will provide comparable values in all template fields, as determined by the Test Judge.

5.6 TEST CASE #6: NADIR WITH GROUNDTRACK ALIGNED YAW STEERING

5.6.1 TEST PURPOSE

This tests will demonstrate to proof the ability of the PRM to model a request using the Nadir with Ground-track Aligned Yaw Steering Template.

5.6.2 TEST DESCRIPTION

Generate a request based on the Nadir with Groundtrack Aligned Yaw Steering Template such that:

- General details:
  - Root frame is ITRF
  - Time scale is UTC
  - Satellite is METOP-1A (2006-044A)
- The central body used to define the nadir direction is the Earth.
- The spacecraft Z-axis points to the nadir direction.
- The Y-axis points perpendicular to the plane defined by the nadir direction and the tangent to the ground track. [1] The spacecraft Y-axis, the nadir direction and the tangent in direction of increasing time shall form a right handed coordinate system.

5.6.3 EXPECTED RESULTS

Each participant shall provide a complete PRM using the template available on the SANA Registry (see reference [3]).

The requests provided by all participants will provide comparable values in all template fields, as determined by the Test Judge.

[1] The ground track is defined by the set of intersection points of the line along the SC pointed axis with the surface. The tangent to the ground track is defined in the surface fixed frame.

5.7 TEST CASE #7: NADIR WITH ORBITAL POLE ALIGNED YAW STEERING

5.7.1 TEST PURPOSE

This test will demonstrate the ability of the PRM to model a request using the Nadir with Orbital Pole Aligned Yaw Steering Template.

5.7.2 TEST DESCRIPTION

Generate a request based on the Nadir with Orbital Pole Aligned Yaw Steering Template such that:

- General details:
  - Root frame is GCRF
  - Time scale is TDB
  - Satellite is ULYSSES (1990-090B)
- The central body used to define the nadir direction is Jupiter.
- The spacecraft Z-axis points to the nadir direction.
- The spacecraft Y-axis points in the direction of the projection of the orbit pole (direction of the orbit angular momentum) in the plane perpendicular to the nadir.

5.7.3 EXPECTED RESULTS

Each participant shall provide a complete PRM using the template available on the SANA Registry (see reference [3]).

The requests provided by all participants will provide comparable values in all template fields, as determined by the Test Judge.

5.8 TEST CASE #8: LIMB POINTING WITH POWER OPTIMIZED YAW STEERING

5.8.1 TEST PURPOSE

This test will demonstrate the ability of the PRM to model a request using the Limb Pointing with Power Optimized Yaw Steering Template.

5.8.2 TEST DESCRIPTION

Generate a request based on the Limb Pointing with Power Optimized Yaw Steering Template such that:

- General details:
  - Root frame is ITRF
  - Time scale is UTC
  - Satellite is METOP-1A (2006-044A)
- The central body used to define the limb direction is the Earth.
- The spacecraft Z-axis points to a limb direction 10 km above the Earth surface.
- The limb point direction uses as inertial reference direction Aldebaran (RA 4h 35m 55s | Dec +16° 30′ 33″)
- The phase angle is defined making the spacecraft Y-axis perpendicular to the Sun direction such that the spacecraft Y-axis, the pointing direction and the Sun direction are right handed.

5.8.3 EXPECTED RESULTS

Each participant shall provide a complete PRM using the template available on the SANA Registry (see reference [3]).

The requests provided by all participants will provide comparable values in all template fields, as determined by the Test Judge.

5.9 TEST CASE #9: LIMB POINTING WITH INERTIAL DIRECTION YAW STEERING

5.9.1 TEST PURPOSE

This test will demonstrate the ability of the PRM to model a request using the Limb Pointing with Inertial Direction Yaw Steering Template.

5.9.2 TEST DESCRIPTION

Generate a request based on the Limb Pointing with Inertial Direction Yaw Steering Template such that:

- General details:
  - Root frame is ITRF
  - Time scale is UTC
  - Satellite is METOP-1A (2006-044A)
- The central body used to define the limb direction is the Earth.
- The spacecraft Z-axis points to a limb direction 10 km above the Earth surface.
- The limb point direction uses as inertial reference direction Aldebaran (RA 4h 35m 55s | Dec +16° 30′ 33″)
- The phase angle is the angle in the plane perpendicular to the target direction of the spacecraft Y-axis from the projection of the direction to Aldebaran (RA 4h 35m 55s | Dec +16° 30′ 33″) reckoned positive around the target direction.
- The yaw steering phase angle is 45º.

5.9.3 EXPECTED RESULTS

Each participant shall provide a complete PRM using the template available on the SANA Registry (see reference [3]).

The requests provided by all participants will provide comparable values in all template fields, as determined by the Test Judge.

5.10 TEST CASE #10: VELOCITY POINTING WITH ORBITAL POLE YAW STEERING

5.10.1 TEST PURPOSE

This test will demonstrate the ability of the PRM to model a request using the Velocity Pointing with Orbital Pole Yaw Steering Template.

5.10.2 TEST DESCRIPTION

Generate a request based on the Velocity Pointing with Orbital Pole Yaw Steering Template such that:

- General details:
  - Root frame is GCRF
  - Time scale is TDB
  - Satellite is BEPI-COLOMBO (2018-013A)
- The central body used to define the poiting is Mercury.
- The spacecraft X-axis is pointed towards the spacecraft velocity relative to Mercury.
- The spacecraft Y-axis points in the direction of the projection of the orbit pole (direction of the orbit angular momentum) in the plane perpendicular to the nadir.

5.10.3 EXPECTED RESULTS

Each participant shall provide a complete PRM using the template available on the SANA Registry (see reference [3]).

The requests provided by all participants will provide comparable values in all template fields, as determined by the Test Judge.

5.11 TEST CASE #11: PRM FROM GENERAL BUILD PROCEDURE

5.11.1 TEST PURPOSE

This test will demonstrate the ability of the PRM to model a general request using the procedure described in section 5 of the PRM standard.

5.11.2 TEST DESCRIPTION

Generate a request based on the procedure described in section 5 of the PRM standard:

- The input for the prototype is the Rosetta pointing request example provided by ESA ESOC.
- The conversion into a PRM compliant message is to be implemented for *'SLOT 1'* and *'SLOT 2'* of the provided Rosetta pointing example (the rest of the message is assumed to be recurrently the same as these two slots in the example).
- The generated PRM compliant message will be verified by the ESA ESOC Rosetta expert team.

5.11.3 EXPECTED RESULTS

A PRM compliant message using the procedure described in section 5 of the PRM standard.

The request provided in the conversion of the Rosetta example will be verified the Test Judge (ESA ESOC Rosetta expert team).

6 TEST REPORT OVERVIEW

The Test Judge will provide the Pointing Request Message (PRM) Prototype Test Data Sheets (see next page) to the NWG. The NWG will discuss the results in a teleconference or other working group meeting to determine success.

The test report details will be consolidated in Section 7 of this document. A summary of the test process and the recommendation of the NWG may be found in Section 2 of the report. The report will be submitted to the CCSDS Engineering Steering Group (CESG) and CCSDS Management Council (CMC), along with results of the agency reviews. At that time, a formal request will be submitted to the CMC for progression of the PRM to CCSDS Blue Book status.

The next page contains a format for the test data sheets that will be used to report the results of individual tests.

SAMPLE

Pointing Request Message (PRM) Prototype Test Data Sheet

Report Date	
Test Case Number	
PRM Originator Message #1	
PRM Originator Message #2	
Test Judge	
Test Results Considerations	
Discrepancies from Expected Results	
Test Judge's Recommendation (Pass, Partial Pass, Fail)	
NWG Disposition (To be filled out by NWG)	

7 TEST REPORT DETAILS

7.1 TESTS SUMMARY

#	Template	Type	Title	Message #1	Message #2
1	4_2	Template	INERTIAL POINTING	Dale / NASA GRC	Cheryl / NASA GSFC
2	4_3	Template	SUN POINTING	Dale / NASA GRC	Cheryl / NASA GSFC
3	4_4	Template	TRACK WITH INERTIAL DIRECTION YAW STEERING	Julie / NASA GSFC	Patrick / NASA JSC
4	4_5	Template	TRACK WITH POWER OPTIMIZED YAW STEERING	Julie / NASA GSFC	Patrick / NASA JSC
5	4_6	Template	NADIR WITH POWER OPTIMIZED YAW STEERING	Alain / CNES	Dan / AGI
6	4_7	Template	NADIR WITH GROUND TRACK ALIGNED YAW STEERING	Alain / CNES	Dan / AGI
7	4_8	Template	NADIR WITH ORBITAL POLE ALIGNED YAW STEERING	Julie / NASA GSFC	Kyohei / JAXA
8	4_9	Template	LIMB POINTING WITH POWER OPTIMIZED YAW STEERING	David / NASA JPL	Dale / NASA GRC
9	4_10	Template	LIMB POINTING WITH INERTIAL DIRECTION YAW STEERING	David / NASA JPL	Julie / NASA GSFC
10	4_11	Template	VELOCITY POINTING WITH ORBITAL POLE YAW STEERING	David / NASA JPL	Kyohei / JAXA
11	4_12	General procedure		Fran / ESOC	N/A

Delivered; comments pending
Delivered
Passed
Passed with comment
Failed

Table 7-1: TEST CASE #1: INERTIAL POINTING

Report Date	**2017-04-23**
Test Case Number	#1
PRM Originator Message #1	NASA GRC
PRM Originator Message #2	NASA GSFC
Test Judge	GMV
Test Results Considerations	Aspects related to detail knowledge of XML have been removed from the test assessment.
Discrepancies from Expected Results	Message#1: Fail. The provided XML file does not conform to the input template. Message #2: Pass.
Test Judge's Recommendation (Pass, Partial Pass, Fail)	
NWG Disposition (To be filled out by NWG)	

Table 7-2: TEST CASE #2: Sun Pointing

Report Date	**2017-04-23**
Test Case Number	#2
PRM Originator Message #1	NASA GRC
PRM Originator Message #2	NASA JPL
Test Judge	GMV
Test Results Considerations	Aspects related to detail knowledge of XML have been removed from the test assessment.
Discrepancies from Expected Results	Message#1: Pending Message #2: Pass.
Test Judge's Recommendation (Pass, Partial Pass, Fail)	
NWG Disposition (To be filled out by NWG)	

Table 7-3: TEST CASE #3: TRACK WITH INERTIAL DIRECTION YAW STEERING

Report Date	**2017-04-23**
Test Case Number	#3
PRM Originator Message #1	NASA GSFC
PRM Originator Message #2	NASA JSC
Test Judge	GMV
Test Results Considerations	Aspects related to detail knowledge of XML have been removed from the test assessment.
Discrepancies from Expected Results	Message#1: Pass. Message #2: Pass.

Test Judge's Recommendation (Pass, Partial Pass, Fail)	Passed
NWG Disposition (To be filled out by NWG)	

Table 7-4: TEST CASE #4: TRACK WITH Power Optimized YAW STEERING

Report Date	**2017-04-23**
Test Case Number	#4
PRM Originator Message #1	NASA GSFC
PRM Originator Message #2	NASA JSC
Test Judge	GMV
Test Results Considerations	Aspects related to detail knowledge of XML have been removed from the test assessment.
Discrepancies from Expected Results	Message#1: Pass. Message #2: Partial Pass. The template used is not the reference one. There is a fixed block (not filled during template instantiation) missing.
Test Judge's Recommendation (Pass, Partial Pass, Fail)	Partial pass
NWG Disposition (To be filled out by NWG)	

Table 7-5: TEST CASE #5: NADIR WITH POWER OPTIMIZED YAW STEERING

Report Date	**2017-04-23**
Test Case Number	#5
PRM Originator Message #1	CNES

PRM Originator Message #2	AGI
Test Judge	GMV
Test Results Considerations	Aspects related to detail knowledge of XML have been removed from the test assessment.
Discrepancies from Expected Results	Message#1: Partial Pass. Template used is not the latest. Tags START and STOP are used instead of the corresponding START_TIME and STOP_TIME The requested reference frame (ITRF) has been replaced by EME2000 led by the incorrect terminology in the template definition of the field. The template requests the intertialFrameName whereas it should request baseFrameName to cover when it is inertial or otherwise. Message #2: Fail. The appropriate template has not been used. The following fields are missing: OBJECT_ID, blockStart and blockEnd.
Test Judge's Recommendation (Pass, Partial Pass, Fail)	Fail
NWG Disposition (To be filled out by NWG)	

Table 7-6: TEST CASE #6: NADIR WITH GROUNDTRACK ALIGNED YAW STEERING

Report Date	**2017-04-23**
Test Case Number	#6
PRM Originator Message #1	CNES
PRM Originator Message #2	AGI
Test Judge	GMV

Test Results Considerations	Aspects related to detail knowledge of XML have been removed from the test assessment.
Discrepancies from Expected Results	Message#1: Partial Pass. Template used is not the latest. Tags START and STOP are used instead of the corresponding START_TIME and STOP_TIME The requested reference frame (ITRF) has been replaced by EME2000 led by the incorrect terminology in the template definition of the field. The template requests the intertialFrameName whereas it should request baseFrameName to cover when it is inertial or otherwise. Message #2: Fail. The appropriate template has not been used. The following fields are missing: OBJECT_ID, blockStart and blockEnd.
Test Judge's Recommendation (Pass, Partial Pass, Fail)	Fail
NWG Disposition (To be filled out by NWG)	

Table 7-7: TEST CASE #7: NADIR WITH ORBITAL POLE ALIGNED YAW STEERING

Report Date	**2017-04-23**
Test Case Number	#7
PRM Originator Message #1	NASA GSFC
PRM Originator Message #2	JAXA
Test Judge	GMV
Test Results Considerations	Aspects related to detail knowledge of XML have been removed from the test assessment. Note: it is necessary to properly stablish in

	the PRM book in section 3.3.2.12 the definition of a, b and c. It is not clear whether they refer to radius or semimajor-axes (taken as diameters).
Discrepancies from Expected Results	Message#1: Pass. Message #2: Pass.
Test Judge's Recommendation (Pass, Partial Pass, Fail)	Passed
NWG Disposition (To be filled out by NWG)	

Table 7-8:TEST CASE #8: Limb Pointing with Power Optimized YAW STEERING

Report Date	**2017-04-23**
Test Case Number	#8
PRM Originator Message #1	NASA JPL
PRM Originator Message #2	NASA GRC
Test Judge	GMV
Test Results Considerations	Aspects related to detail knowledge of XML have been removed from the test assessment.
Discrepancies from Expected Results	Message#1: Pass. Message #2: Pending.
Test Judge's Recommendation (Pass, Partial Pass, Fail)	
NWG Disposition (To be filled out by NWG)	

Table 7-9: TEST CASE #9: LIMB POINTING WITH INERTIAL DIRECTION YAW STEERING

Report Date	**2017-04-23**
Test Case Number	#9
PRM Originator Message #1	NASA JPL
PRM Originator Message #2	NASA GSFC
Test Judge	GMV
Test Results Considerations	Aspects related to detail knowledge of XML have been removed from the test assessment.
Discrepancies from Expected Results	Message#1: Fail. There is an error in the inertial direction used for the phase angle (Inertial reference direction for phase angle → <baseFrameDir>) Message #2: Partial Pass. Whereas the block rotation seem superfluous in this particular case, its removal breaks the structure of the file. If an XML schema existed, this block would be mandatory leading to not passing the schema check.
Test Judge's Recommendation (Pass, Partial Pass, Fail)	Partial Pass.
NWG Disposition (To be filled out by NWG)	

Table 7-10: TEST CASE #10: VELOCITY POINTING WITH ORBITAL POLE YAW STEERING

Report Date	**2017-04-23**
Test Case Number	#10
PRM Originator Message #1	NASA JPL

PRM Originator Message #2	NASA GSFC
Test Judge	GMV
Test Results Considerations	Aspects related to detail knowledge of XML have been removed from the test assessment.
Discrepancies from Expected Results	Message#1: Fail. Phase and is set to 90º whereas its value should 0º. Message #2: Pass.
Test Judge's Recommendation (Pass, Partial Pass, Fail)	Fail
NWG Disposition (To be filled out by NWG)	

Table 7-11: TEST CASE #11: PRM FROM GENERAL BUILD PROCEDURE

Report Date	**2017-04-23**
Test Case Number	#11
PRM Originator Message #1	GMV
PRM Originator Message #2	N/A
Test Judge	ESA / ESOC
Test Results Considerations	Test case has been delivered. ESOC review pending.
Discrepancies from Expected Results	Message#1: Pending.
Test Judge's Recommendation (Pass, Partial Pass, Fail)	
NWG Disposition (To be filled out by NWG)	

ANNEX A

ABBREVIATIONS AND ACRONYMS

(INFORMATIVE)

AGI	Analytical Graphics Incorporated
ASCII	American Standard Code for Information Interchange
CCSDS	Consultative Committee for Space Data Systems
CESG	CCSDS Engineering Steering Group
CMC	CCSDS Management Council
CNES	Centre National d'Etudes Spatiales
DEC	Declination
ESA/ESOC	European Space Agency/European Space Operations Center
GCRF	Geocentric Celestial Reference Frame
GMV	GMV
ITRF	International Terrestrial Reference Frame
JAXA	Japan Aerospace Exploration Agency
N/A	Not Applicable or Not Available
NASA/GRC	National Aeronautics and Space Administration/Glenn Research Center
NASA/GSFC	National Aeronautics and Space Administration/Goddard Space Flight Center
NASA/JPL	National Aeronautics and Space Administration/Jet Propulsion Laboratory
NASA/JSC	National Aeronautics and Space Administration/Johnson Space Flight Center
NWG	CCSDS Navigation Working Group
PRM	Pointing Request Message
RA	Right Ascension
RID	Review Item Discrepancy
SANA	Space Assigned Numbers Authority
TDB	Barycentric Dynamic Time
UTC	Universal Time Coordinated
XML	Extensible Markup Language