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| Space communicAtions service management Prototype Test plan AND REPORT |

DRAFT CCSDS Record

CCSDS 000.0-Y-0

Draft Yellow Book

July 2009

FOREWORD

[Foreword text specific to this document goes here. The text below is boilerplate.]

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DOCUMENT CONTROL

|  |  |  |  |
| --- | --- | --- | --- |
| **Document** | **Title and Issue** | **Date** | **Status** |
| CCSDS 000.0-Y-0 | [Document Title], Draft CCSDS Record, Issue 0 | October 2008 | Current draft |
|  |  |  |  |
|  |  |  |  |

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# Introduction

## Purpose

## scope

## applicability

## RATIONALE (NOT NEEDED?)

## structure of this report

## definitions (terms, nomenclature, conventions)

## references

## [INTRODUCTORY SUBSECTIONS]

[Insert introductory subsections such as PURPOSE, SCOPE, APPLICABILITY, RATIONALE, etc. See CCSDS A20.0-Y-2, *CCSDS Publications Manual* (Yellow Book, Issue 2, June 2005) for the contents of section 1.]

## 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.

[A list of documents referenced in this document goes here. See CCSDS A20.0-Y-2, *CCSDS Publications Manual* (Yellow Book, Issue 2, June 2005) for reference list format.]

# OVERVIEW

This document provides a record of the prototype interoperations conducted in support of the development of the CCSDS recommendation for Space Communication Cross Support Service Management.

The National Aeronautics and Space Administration (NASA) of the United States, the European Space Agency (ESA), and the Japan Aerospace Exploration Agency (JAXA) each developed prototype implementations of the draft CCSDS recommendation. With regard to the CCSDS SLE reference model (see figure below), the role assignments along with the prototype names for subsequent reference are indicated in the table below. This report deals primarily with the interface indicated by the dotted oval.

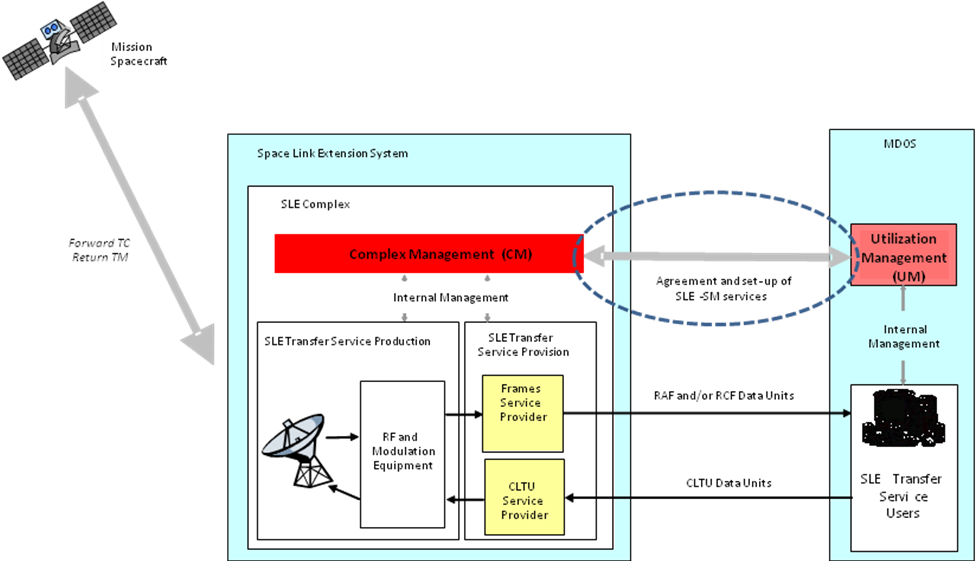


Figure ‑ SLE Reference Model

|  |  |  |
| --- | --- | --- |
| Agency | Designation/Name | Reference Model Role |
| ESA | UMPA | UM |
| JAXA | UMR1 | UM |
| NASA | CSSXP | CM |

Table ‑ Prototype Identifications and Roles

## TEST APPROACH

The general approach for prototype interoperations is to focus on the service management interface and the message exchanges that are defined by the CCSDS recommendation. By definition, this implies that what is being tested is the protocol and data definitions, not a particular UM or CM implementation. Nonetheless, application with regard to real-world spacecraft tracking was tested in a limited sense with respect to requesting and providing service for a JAXA spacecraft to be tracked by the JPL-NADA DSN (arranged via utilization of the draft CCSDS recommendation) in addition to being tracked by a JAXA ground station (arranged via current internal JAXA operational methods). The latter activity (also referred to as “shadow tracking”) was carried out via an earlier round of prototype interoperations and is subsequently referred to as Preliminary Prototype Interoperations or PPI. The former activity was conducted in accordance with the latest draft recommendation and is socially referred to as Final Prototype Interoperations or FPI.

The two rounds of prototype interoperations are summarized in the following table.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Interoperation** | **Parties** | **Goal** | **CCSDS Draft Recommendation** | **XML Schema Version** |
| **PPI** | UMR1/CSSXP | Shadow Tracking | R-1 | 0.3.0-P1 |
| **FPI** | UMPA/CSSXP | Recommendation Verification | R-3 | 0.5.0-e |

Table ‑ PPI and FPI Prototype Interoperations

PPI, by definition, was not focused on complete verification of the recommendation. The approach that was followed was to a) verify the service management interface for those operations needed to support the shadow tracking activity, b) use the verified service management interface for requesting specific instances of telemetry service for the SELENE spacecraft at the DSN, and c) conduct the shadow track activities coordinated via the two prototype partners.

FPI, by definition, was focused on a complete verification of the service management interface specified by the draft recommendation, but judgment was applied given the resources available and in recognition that some aspects of the recommendation had already been successfully tested by the service management interface verification activities of the PPI. Therefore, the FPI activity correspondingly leveraged the PPI activity while substantially deepening the verification aspects of protocol/message exchanges, especially as relates to those operations that were either new or significantly updated in the recommendation via the Red-2 and Red-3 drafts.

## TEST SERIES OVERIVEW

### fpi

FPI test steps and results summaries are in sections 3 through 7. Each of these sections deals with a different aspect of the draft recommendation but is structured along the lines of presenting the goal of the test case, the steps of the test case, and a summary of the messages exchanged. The sections are structured in logical progression of verification of basic communication (section 3 – document exchanges) to the more complex service management validation tests (culminating in section 7, service package tests). Section 8 contains the detailed log of messages exchanged along with correlation meta data for complete verification of UMPA and CSSXP exchanges.

Sections 4 through 7 employ a few rules to facilitate verification/auditing of test executions:

1. Specific service agreements are constructed for the particular case involved to facilitate timely checking of boundary conditions (for example, limits are set artificially small/low so that copious amounts of time/effort are not required for verification purposes)
2. Data sets in the test cases include the test case number as part of their identifier (e.g, “SLEP-53-1” ia SpaceLink Event Profile utilized in test case 5.3), and are identified in sequence relative to their order of appearance in the test case.
3. Data sets identifier include the initials of their formal names in the service management recommendation at the start of their identifiers (e.g, a SpaceCommunicationServiceProfile data set is identified as “SCSP-700-A” in test case 7).
4. The identifiers of data sets that are the objects of the test cases are terminated with a numeric character. For example, as the trajectory prediction is the object of the test case in section 6.1, the trajectory prediction data set is identified as “TP-61-1”.
5. Supporting objects in a test case are terminated with an alphabetic character in their identifier. For example, as the service agreement is a supporting object in test case 6.1, it is identified as “SA-61-A”.

FPI, including development, occurred October 2008 – June 2009, with formal testing occurring April – June 2009.

### ppi

PPI test steps and results are in sections 9 through 11. As noted above, the primary goal of these test steps was to accomplish a series of shadow tracks utilizing the JAXA SELENE spacecraft and NASA-JPL’s Deep Space Network.

In the UM role, JAXA developed the test plan, which was agreed to by NASA-JPL representatives in the CM role. The test plan is included in section 9 and has been inserted verbatim into this report. Section 10 presents the results assessment from JAXA representatives and has been inserted verbatim into this report. Section 11 presents the results from NASA-JPL-DSN representatives, inserted verbatim from received e-mail.

PPI, including development, occurred August 2007 – March 2008, with the shadow tracks occurring in March 2008.

## test Results SUMMARY

### general discussion

One of the key considerations for any CCSDS recommended standard is whether or not it is sufficiently specific to enable two or more parties to develop implementations and achieve interoperability by reading and following what the recommendation states. Although not reported directly in the body of the test report logs, the results, when viewed collectively, clearly indicate that the Service Management recommendation does indeed supply sufficient specificity to enable interoperations. This is evident as the independently developed implementations (to be clear, there was absolutely no sharing of software/code bases) at ESA, JAXA, and NASA achieving successful interoperations over different underlying communications technologies over a variety of tests, and even provided coordination for limited “live” shadow tracking demonstration.

Another key consideration for any CCSDS recommended standard is whether or not it is feasible for implementation. A key finding of the set of prototype interoperations involved is that, in general, today's computing technology is sufficiently advanced to support feasible implementation of the CCSDS Service Management recommendation. Indeed, XML and Web services technologies utilized in the prototypes supported the interoperations quite readily.

The prototype developments and interoperations did not require the use of patented technology.

Although Final Prototype Interoperations did produce corrections to the draft recommendation and XML schema (see 2.3.2), the corrections were not significant in nature. Accordingly, it is the express recommendation of this report that the draft Service Management recommendation is sufficiently mature to be a CCSDS Blue Book.

### TEST RESULTS

#### Results With Respect to Recommendation Operations

The CCSDS Service Management Recommendation defines four management services (Service Agreement, Configuration Profile, Trajectory Prediction, and Service Package) with a total of 24 operations. The following table summarizes the prototype interoperations coverage with respect to the those services/operations. For FPI, all operations were successfully executed.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Management Service | Operation | PPI Coverage | FPI Coverage | FPI Results Successful | Findings Reference (See Findings Table for More Information) |
| Service Package | CSP | Y | Y | Y |  |
| DSP | Y | Y | Y |  |
| CTSP | N | Y | Y | 3 |
| SAS | N | Y | Y |  |
| ANT | N | Y | Y |  |
| QSP | Y | Y | Y |  |
| RSP | N | Y | Y | 6 |
| SPC | Y | Y | Y |  |
| SPM | N | Y | Y |  |
| Configuration Profile | ASLSP | Y, but for equivalent R-1 operation of ACP | Y |  |  |
| ASTSP | Y, but for equivalent R-1 operation of ACP (R-1 configuration profile included both spacelink and ground data transport aspects) | Y |  |  |
| ARTSP | N (operation not present in R-1) | Y |  |  |
| DSLSP | Y, but for equivalent R-1 operations of DCP | Y |  |  |
| QSLSP | Y, but for equivalent R-1 operation of QCP | Y |  |  |
| QTSP | Y, but for equivalent R-1 operation of QCP (R-1 configuration profile included both spacelink and ground data transport aspects) | Y |  |  |
| ASLEP | N (equivalent operation in R-1 of AEP not addressed) | Y |  | 1,2 |
| DSLEP | N (equivalent operation in R-1 of DEP not addressed) | Y |  |  |
| QSLEP | N (equivalent operation in R-1 of QEP not addressed) | Y |  |  |
| Trajectory Prediction | ATP | Y | Y |  | 5, 10 |
| ETP | N (operation not present in R-1) | Y |  |  |
| DTP | Y | Y |  |  |
| QTP | N | Y |  |  |
| Service Agreement | QSA | Y | Y |  |  |

Table ‑ Prototype Interoperations Coverage

#### Key Findings

The following table summarizes the findings of the prototype interoperations.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Finding ID | Description | Operation | Phase | Comments |
| 1 | Missing Diagnostics | ASLEP | FPI | Red-3 + XML Schema corrected; diagnostics re monitonically increasing event identifiers/sequence numbers and consistent use of absolute vs. relative time formats added. |
| 2 | Start time window lag parameter of spacelink available state does not allow zero (0) to be stated. | ASLEP | FPI | XML Schema not in conformance with Red-3; corrected |
| 3 | Not possible to defer antenna selection. | CSP | FPI | XML Schema not in conformance with Red-3; corrected |
| 4 | Clarification of user names re service agreements needed | N/A (General) | FPI | Addition of formal NOTE in Red-3 to provide clarification re interpretation. (Clarify that user names are scoped to particular service agreement instance). |
| 5 | Large trajectory data sets | ATP | PPI | For large trajectory prediction data files, underlying communication technology limits may arise, depending upon local limitations/configurations.  PPI utilized a compressed data bilateral format definition. |
| 6 | Re-specification of retrieval transfer service profile not explicitly tested. | RSP | FPI | Re-specification of more complex/involved spacelink session profile was tested/accomplished successfully. WG consensus is that this does not materially affect validation of the recommendation. |
| 7 | CSSXP did not use UTC timestamps in message compositions. | (All) | FPI | Although this would be operationally significant, for validation of the incorrect setting of the local time zone was not significant/well understood; a committed operational implementation would in fact be operating with a UTC timezone. |
| 8 | XML technology supporting encryption operated well. | (All) | FPI |  |
| 9 | The general bilateral mechanism for standard exchange of bi-lateral data format is feasible | ATP | PPI |  |
| 10 | Trajectory prediction data needs to extend before and after actual tracking time to allow for proper interpolation. | ATP | PPI | Service agreement parameter re trajectory extension window included in original issue of Red-3. |
| 11 | Use of SMTP and SOAP/HTTP communication technologies are viable for carrying SM Recommendation messages. Large data object transport may be a factor in real-world implementations (see 5 above). | ALL | PPI, FPI | FPI exchanges were via e-mail; PPI exchanges were via SOAP/HTTP. |

# document exchange testing

## Webservces communication (soap/http)

### Goals

Verify that communication pathways for Web services protocols (SOAP/HTTP) are functional. Note that this is not an exercise in verification/validation of the draft CCSDS service management recommendation.

[NOTE: document exchange via SMTP has been demonstrated in earlier prototype testing efforts]

### Steps

1. [Precondition: CM has established an endpoint for reception of message sets and an endpoint for reception of exception responses.]
2. [Precondition: UM has established an endpoint for reception of message sets and an endpoint for reception of exception responses.]
3. UM: transmission of a message that does not conform to the syntax of recognized messages defined by the draft recommendation to the CM end point message set end point.
4. CM: transmission of an exception response message to the UM exception response end point.
5. Repeat steps 3, 4, but reversing CM and UM transmission initiations.
6. Verify that messages are received at the end points as expected.

### Log of Messages Exchanged

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **No.** | **Sender** | **Message** | **Timestamp** | **State** | **Comment** |
| 1 | UM | unrecognized | 2009-04-09T14:33:27Z | SENT | ERROR: Line 7, column 16: does not conform to syntax of SM message set - cvc-complex-type.2.4.b: The content of element 'SmMessageSet' is not complete. One of '{"http://www.ccsds.org/SLE/ServiceManagement":Invocation, "http://www.ccsds.org/SLE/ServiceManagement":Return, "http://www.ccsds.org/SLE/ServiceManagement":Notification, "http://www.ccsds.org/SLE/ServiceManagement":Confirmation}' is expected. |
| 2 | CM | ums-er | 2009-04-09T14:33:36Z | UNCORRELATED |  |

|  |  |
| --- | --- |
| **No.** | **File Reference** |
| 1 | 20090409T143327.121Z\_OUTGOING\_invalid.management |
| 2 | 20090409T143336.075Z\_INCOMING\_ExceptionResponse.management |

<?xml version="1.0" encoding="UTF-8"?>

<SmMessageSet xmlns="http://www.ccsds.org/SLE/ServiceManagement">

<sccsSmVersionRef>1.0.0</sccsSmVersionRef>

<smSource>Interop.Red3.ESOC.ESA</smSource>

<smDestination>CSSXP</smDestination>

<serviceAgreementRef>ESOC.ESA:JPL.NASA:Red3:InteropTest-01</serviceAgreementRef>

</SmMessageSet>

<SmExceptionResponse xmlns="http://www.ccsds.org/SLE/ServiceManagement" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">

<sccsSmVersionRef>1.0.0</sccsSmVersionRef>

<messageTimestamp>2009-04-09T07:33:37Z</messageTimestamp>

<privateAnnotation>cvc-complex-type.2.4.b: The content of element 'SmMessageSet' is not complete. It must match '((("http://www.ccsds.org/SLE/ServiceManagement":sccsSmVersionRef)),(("http://www.ccsds.org/SLE/ServiceManagement":smSource),("http://www.ccsds.org/SLE/ServiceManagement":smDestination),("http://www.ccsds.org/SLE/ServiceManagement":serviceAgreementRef),(("http://www.ccsds.org/SLE/ServiceManagement":Invocation){1-UNBOUNDED}|("http://www.ccsds.org/SLE/ServiceManagement":Return)|("http://www.ccsds.org/SLE/ServiceManagement":Notification)|("http://www.ccsds.org/SLE/ServiceManagement":Confirmation))))'.</privateAnnotation>

<erroredItem>SmMessageSet</erroredItem>

<unrecognizedMessageSetResponse>

<diagnostic>does not conform to syntax of SM message set</diagnostic>

<unrecognizedMessageSetInstance></unrecognizedMessageSetInstance>

</unrecognizedMessageSetResponse>

</SmExceptionResponse>

[Reverse message flow direction not explicitly tested, but demonstrated in following tests.]

# service agreement testing

## Service agreement retrieval

### Goals

Verify that a service agreement retrieval is supported by the draft recommendation.

### Steps

1. [Precondition: UM and CM have negotiated SA-41-1, CM has loaded S41-1]
2. UM: QSA-I, in reference to S41-1
3. CM: QSA-SR, serviceAgreementRef == “S41-1”
4. UM: Verify that the service agreement returned by CM matches that previously negotiated.

### Log of Messages Exchanged

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **No.** | **Sender** | **Message** | **Timestamp** | **State** | **Comment** |
| 1 | UM | QSA-I | 2009-04-09T14:45:47Z | SUCCEEDED |  |
| 2 | -- CM | QSA-SR | 2009-04-09T14:45:51Z | Received | CSSXP |

|  |  |
| --- | --- |
| **No.** | **File Reference** |
| 1 | 20090409T144547.274Z\_OUTGOING\_QSA-I.management |
| 2 | 20090409T144551.993Z\_INCOMING\_MessageSet.management |

## Supported operations

### Goals

Verify that the recommendation supports statement of agreed operations.

### Steps

1. [Precondition:SA-42-1 is in place with at least supportedSccsSmOperations of DELETE\_SERVICE\_PACKAGE’; ‘SERVICE\_PACKAGE\_CANCELLED’, ‘CREATE\_SERVICE\_PACKAGE’; specifically excluding ‘ADD\_SPACE\_COMMUNICATION\_SERVICE\_PROFILE’, specifically including QUERY\_SPACE\_COMMUNICATION\_SERVICE\_PROFILE] and an existing Sls Transfer Service Profile.
2. [Precondition:SA-42-2 is in place with at least supportedSccsSmOperations of DELETE\_SERVICE\_PACKAGE’; ‘SERVICE\_PACKAGE\_CANCELLED’, ‘CREATE\_SERVICE\_PACKAGE’; specifically including ‘ADD\_SPACE\_COMMUNICATION\_SERVICE\_PROFILE’, specifically including QUERY\_SPACE\_COMMUNICATION\_SERVICE\_PROFILE] and an existing Sls Transfer Service Profile.
3. UM: ASCSP-I, spaceCommunicationServiceProfileId == ‘SCSP-42-A”, in reference to SA-42-1.
4. CM: InvalidInvocation Exception Response, diagnostic of ‘invoked operation not supported by this Service Agreement’.
5. UM: QSCSP-I, spaceCommunicationServiceProfileId == ‘SCSP-42-A”, in reference to SA-42-1.
6. CM: QSCSP-FR, diagnostic of ‘referenced spaceCommunicationServiceProfileId unknown’
7. UM: ASCSP-I, spaceCommunicationServiceProfileId == ‘SCSP-42-A”, in reference to SA-42-2.
8. CM: ASCP-AR, ASCP-SR.
9. UM: QSCSP-I, spaceCommunicationServiceProfileId == ‘SCSP-42-A”, in reference to SA-42-2.
10. CM: QSCSP-SR.
11. UM: Verify that SCSP-42-A matches that in step 7.

### Log of Messages Exchanged

| **No.** | **Sender** | **Message** | **Timestamp** | **State** | **Comment** |
| --- | --- | --- | --- | --- | --- |
| 1 | UM | ASCSP-I | 2009-04-09T15:43:03Z | INVALID | SCSP-42-A |
| 2 | -- CM | ii-er | 2009-04-09T15:43:07Z | received | invoked operation not supported by this Service Agreement |
| 3 | UM | QSCSP-I | 2009-04-09T15:46:39Z | FAILED | SCSP-42-A |
| 4 | -- CM | QSCSP-FR | 2009-04-09T15:46:43Z | Received | referenced spaceCommunicationServiceProfileId unknown; |
| 5 | UM | ASCSP-I | 2009-04-09T15:48:59Z | SUCCEEDED | SCSP-42-A |
| 6 | -- CM | ASCSP-SR | 2009-04-09T15:49:04Z | Received | SCSP-42-A |
| 7 | -- CM | ASCSP-AR | 2009-04-09T15:49:04Z | received | SCSP-42-A |
| 8 | UM | QSCSP-I | 2009-04-09T15:49:21Z | SUCCEEDED | SCSP-42-A |
| 9 | -- CM | QSCSP-SR | 2009-04-09T15:49:24Z | received | SCSP-42-A |

|  |  |
| --- | --- |
| **No.** | **File Reference** |
| 1 | 20090409T154303.840Z\_OUTGOING\_ASCSP-I-42-A.management |
| 2 | 20090409T154307.075Z\_INCOMING\_ExceptionResponse.management |
| 3 | 20090409T154639.738Z\_OUTGOING\_QSCSP-I-42-A.management |
| 4 | 20090409T154643.254Z\_INCOMING\_MessageSet.management |
| 5 | 20090409T154859.086Z\_OUTGOING\_ASCSP-I-42-A-2.management |
| 6 | 20090409T154904.290Z\_INCOMING\_MessageSet.management |
| 7 | 20090409T154904.743Z\_INCOMING\_MessageSet.management |
| 8 | 20090409T154921.337Z\_OUTGOING\_QSCSP-I-42-B.management |
| 9 | 20090409T154924.540Z\_INCOMING\_MessageSet.management |

## Information entity ownership

### Goals

Verify that information entity ownership is supported as indicated by the service agreement.

### Steps

1. [Precondition: SA-43-1 is in place with enforceOwnership == ‘true’, and allowedUmSmEntityNames of “UMN-A”, “UMN-B”]
2. [Precondition: SA-43-2 is in place with enforceOwnership == ‘false’, and allowedUmSmEntityNames of “UMN-A”, “UMN-B”]
3. UM: ATP-I, trajectoryId == “TP-43-A”, in reference to SA-43-1, smSource == “UMN-A”
4. CM: ATP-AR, ATP-SR
5. UM: QTP-I, trajectoryRef == “TP-43-A”, in reference to SA-43-1, smSource == “UMN-A”
6. CM: QTP-SR, trajectoryRef == “TP-43-A”
7. UM: Verify trajectory matches that of step 3.
8. UM: QTP-I, trajectoryRef == “TP-43-A”, in reference to SA-43-1, smSource == “UMN-B”
9. CM: QTP-SR, trajectoryRef == “TP-43-A”
10. UM: Verify trajectory matches that of step 3.
11. UM: DTP-I, trajectoryRef == “TP-43-A”, in reference to SA-43-1, smSource == “UMN-B”
12. CM: DTP-FR, diagnostic == ‘smSource not the owner’
13. UM: ATP-I, trajectoryId == “TP-43-C”, in reference to SA-43-1, smSource == “UMN-C”
14. CM: InvalidInvocationResponse, diagnostic == ‘smSource not authorized for Service Agreement’ or ‘unknown smSource’
15. UM: ATP-I, trajectoryId == “TP-43-A”, in reference to SA-43-2, smSource == “UMN-A”
16. CM: ATP-AR, ATP-SR
17. UM: QTP-I, trajectoryRef == “TP-43-A”, in reference to SA-43-2, smSource == “UMN-A”
18. CM: QTP-SR, trajectoryRef == “TP-43-A”
19. UM: QTP-I, trajectoryRef == “TP-43-A”, in reference to SA-43-2, smSource == “UMN-B”
20. CM: QTP-SR, trajectoryRef == “TP-43-A”
21. UM: DTP-I, trajectoryRef == “TP-43-A”, in reference to SA-43-2, smSource == “UMN-B”
22. CM: DTP-SR
23. UM: QTP-I, trajectoryRef == “TP-43-A”, in reference to SA-43-2, smSource == “UMN-B”
24. CM: QTP-FR, diagnostic == trajectoryRef non-existent
25. UM: ATP-I, trajectoryId == “TP-43-A”, in reference to SA-43-2, smSource == “UMN-C”
26. CM: InvalidInvocationResponse, diagnostic == ‘smSource not authorized for Service Agreement’ or ‘unknown smSource’

### Log of Messages Exchanged

| **No.** | **Sender** | **Message** | **Timestamp** | **State** | **Comment** |
| --- | --- | --- | --- | --- | --- |
| 1 | UM | ATP-I | 2009-04-16T15:20:29Z | SUCCEEDED | TP-43-AA |
| 2 | -- CM | ATP-SR | 2009-04-16T15:20:34Z | received | TP-43-AA |
| 3 | UM | QTP-I | 2009-04-16T15:20:54Z | SUCCEEDED | TP-43-AA |
| 4 | -- CM | QTP-SR | 2009-04-16T15:20:58Z | received | TP-43-AA |
| 5 | UM | QTP-I | 2009-04-16T15:21:31Z | SUCCEEDED | TP-43-AA |
| 6 | -- CM | QTP-SR | 2009-04-16T15:21:34Z | received | TP-43-AA |
| 7 | UM | DTP-I | 2009-04-16T15:22:22Z | FAILED | TP-43-AA |
| 8 | -- CM | DTP-FR | 2009-04-16T15:22:25Z | received | smSource not the owner |
| 9 | UM | ATP-I | 2009-04-16T15:25:45Z | UNRECOGNIZED | smSource: smSource not authorized for Service Agreement - UMN-C not authorized |
| 10 | -- CM | ums-er | 2009-04-16T15:25:54Z | received | unknown smSource |
| 11 | CM | ums-er | 2009-04-16T15:25:54Z | UNCORRELATED | unknown smSource |
| 12 | UM | ATP-I | 2009-04-16T15:30:20Z | SUCCEEDED | TP-43-AAA |
| 13 | -- CM | ATP-SR | 2009-04-16T15:30:25Z | received | TP-43-AAA |
| 14 | UM | QTP-I | 2009-04-16T15:30:44Z | SUCCEEDED | TP-43-AAA |
| 15 | -- CM | QTP-SR | 2009-04-16T15:30:48Z | received | TP-43-AAA |
| 16 | UM | QTP-I | 2009-04-16T15:31:15Z | SUCCEEDED | TP-43-AAA |
| 17 | -- CM | QTP-SR | 2009-04-16T15:31:19Z | received | TP-43-AAA |
| 18 | UM | DTP-I | 2009-04-16T15:32:24Z | SUCCEEDED | TP-43-AAA |
| 19 | -- CM | DTP-SR | 2009-04-16T15:32:29Z | received | TP-43-AAA |
| 20 | UM | QTP-I | 2009-04-16T15:32:54Z | FAILED | TP-43-AAA |
| 21 | -- CM | QTP-FR | 2009-04-16T15:32:59Z | received | trajectoryRef non-existent; |
| 22 | UM | ATP-I | 2009-04-16T15:34:34Z | UNRECOGNIZED | smSource: smSource not authorized for Service Agreement - UMN-C not authorized |
| 23 | -- CM | ums-er | 2009-04-16T15:34:39Z | received | unknown smSource |
| 24 | CM | ums-er | 2009-04-16T15:34:39Z | UNCORRELATED | unknown smSource |

|  |  |
| --- | --- |
| **No.** | **File Reference** |
| 1 | 20090416T152029.120Z\_OUTGOING\_ATP-I-43-A.management |
| 2 | 20090416T152034.791Z\_INCOMING\_MessageSet.management |
| 3 | 20090416T152054.742Z\_OUTGOING\_QTP-I-43-A.management |
| 4 | 20090416T152058.367Z\_INCOMING\_MessageSet.management |
| 5 | 20090416T152131.129Z\_OUTGOING\_QTP-I-43-A-B.management |
| 6 | 20090416T152134.644Z\_INCOMING\_MessageSet.management |
| 7 | 20090416T152222.092Z\_OUTGOING\_DTP-I-43-A-B.management |
| 8 | 20090416T152225.935Z\_INCOMING\_MessageSet.management |
| 9 | 20090416T152545.114Z\_OUTGOING\_ATP-I-43-A-C.management |
| 10 | 20090416T152554.332Z\_INCOMING\_ExceptionResponse.management |
| 11 | 20090416T152554.332Z\_INCOMING\_ExceptionResponse.management |
| 12 | 20090416T153020.845Z\_OUTGOING\_ATP-I-43-A-2.management |
| 13 | 20090416T153025.173Z\_INCOMING\_MessageSet.management |
| 14 | 20090416T153044.905Z\_OUTGOING\_QTP-I-43-A-2.management |
| 15 | 20090416T153048.811Z\_INCOMING\_MessageSet.management |
| 16 | 20090416T153115.307Z\_OUTGOING\_QTP-I-43-A-2-B.management |
| 17 | 20090416T153119.010Z\_INCOMING\_MessageSet.management |
| 18 | 20090416T153224.752Z\_OUTGOING\_DTP-I-43-A-2-B.management |
| 19 | 20090416T153229.063Z\_INCOMING\_MessageSet.management |
| 20 | 20090416T153254.748Z\_OUTGOING\_QTP-I-43-A-2.management |
| 21 | 20090416T153259.794Z\_INCOMING\_MessageSet.management |
| 22 | 20090416T153434.172Z\_OUTGOING\_ATP-I-43-A-2-C.management |
| 23 | 20090416T153439.437Z\_INCOMING\_ExceptionResponse.management |
| 24 | 20090416T153439.437Z\_INCOMING\_ExceptionResponse.management |

# configuration profile testing

## Management of SLS Transfer Service Profile

### Goals

Verify storage, retrieval, and deletion of Space Link Session Transfer Service Profiles.

### Steps

1. UM: Create and invoke an ASTSP for transfer service profile “STSP-51-1” containing an FcltuTransferServiceProfile.
2. CM: Issue ASTSP-SR
3. UM: Issue QTSP for transfer service profile “STSP-51-1” and verify that response in QTSP-SR matches data originally sent
4. UM: Issue DTSP for transfer service profile “STSP-51-1”, verify that DTSP-SR received,
5. UM: Issue QTSP for transfer service profile “STSP-51-1” and verify that QTSP-FR is received, with diagnostic ‘referenced transferServiceProfileId unknown’
6. Repeat steps 1-5 for transfer service profiles “STSP-51-2”, containing an RafTransferServiceProfile, and “STSP-51-3”, containing an RcfTransferServiceProfile.

### Log of Messages Exchanged

| **No.** | **Sender** | **Message** | **Timestamp** | **State** | **Comment** |
| --- | --- | --- | --- | --- | --- |
| 1 | UM | ASTSP-I | 2009-04-09T16:27:34Z | SUCCEEDED | STSP-51-1 |
| 2 | -- CM | ASTSP-SR | 2009-04-09T16:27:39Z | received | STSP-51-1 |
| 3 | -- CM | ASTSP-AR | 2009-04-09T16:27:40Z | received | STSP-51-1 |
| 4 | UM | QTSP-I | 2009-04-09T16:28:47Z | SUCCEEDED | STSP-51-1 |
| 5 | -- CM | QTSP-SR | 2009-04-09T16:28:50Z | received | STSP-51-1 |
| 6 | UM | DTSP-I | 2009-04-09T16:29:01Z | SUCCEEDED | STSP-51-1 |
| 7 | -- CM | DTSP-SR | 2009-04-09T16:29:04Z | received | STSP-51-1 |
| 8 | UM | QTSP-I | 2009-04-09T16:29:08Z | FAILED | STSP-51-1 |
| 9 | -- CM | QTSP-FR | 2009-04-09T16:29:12Z | received | referenced transferServiceProfileId unknown; |

|  |  |
| --- | --- |
| **No.** | **File Reference** |
| 1 | 20090409T162734.759Z\_OUTGOING\_ASTSP-I-51-1.management |
| 2 | 20090409T162739.822Z\_INCOMING\_MessageSet.management |
| 3 | 20090409T162740.119Z\_INCOMING\_MessageSet.management |
| 4 | 20090409T162847.558Z\_OUTGOING\_QTSP-I-51-1.management |
| 5 | 20090409T162850.667Z\_INCOMING\_MessageSet.management |
| 6 | 20090409T162901.417Z\_OUTGOING\_DTSP-I-51-1.management |
| 7 | 20090409T162904.199Z\_INCOMING\_MessageSet.management |
| 8 | 20090409T162908.871Z\_OUTGOING\_QTSP-I-51-1.management |
| 9 | 20090409T162912.605Z\_INCOMING\_MessageSet.management |

## Management of Space Communication Service Profile

### Goals

Verify storage, retrieval, and deletion of Space Communication Service Profiles.

Verify referential integrity checks against SLS Transfer Service Profile

### Steps

1. [Precondition: SLS transfer service profiles “SCSP-52-A” and “SCSP-52-B” are available, containing Fcltu and Raf profiles respectively]
2. UM: Create and invoke an ASCSP for service profile “SCSP-52-1” containing an F401SymbolStream with a transferServiceProfileRef to “SCSP-52-A”, and an R401SymbolStream with a transferServiceProfileRef to “SCSP-52-B”.
3. CM: Issue ASCSP-SR
4. UM: Invoke QSCSP for service profile “SCSP-52-1” and verify that response in QSCSP-SR matches data originally sent
5. UM: Invoke DTSP for transfer profile “SCSP-52-A”
6. CM: Issue DTSP-FR with diagnostic ‘referenced SLS Transfer Service Profile bound to available Space Communication Service Profile’
7. UM: Issue DSCSP for service profile “SCSP-52-1”, verify that DSCSP-SR received,
8. UM: Invoke QSCSP for service profile “SCSP-52-1” and verify that QSCSP-FR is received, with diagnostic ‘referenced spaceCommunicationServiceProfileId unknown’
9. UM: Invoke DTSP for transfer profile “SCSP-52-A”, verify that DTSP-SR received.
10. UM: Create and invoke an ASCSP for service profile “SCSP-52-2” containing an F401SymbolStream with a transferServiceProfileRef to (non-existent) “SCSP-52-Z”.
11. CM: Issue ASCSP-FR, with diagnostic ‘no matching Transfer Service Profile for transferServiceProfileRef’

### Log of Messages Exchanged

| **No.** | **Sender** | **Message** | **Timestamp** | **State** | **Comment** |
| --- | --- | --- | --- | --- | --- |
| 1 | UM | ASCSP-I | 2009-04-16T15:45:37Z | SUCCEEDED | SCSP-52-1A |
| 2 | -- CM | ASCSP-AR | 2009-04-16T15:45:42Z | received | SCSP-52-1A |
| 3 | -- CM | ASCSP-SR | 2009-04-16T15:45:43Z | received | SCSP-52-1A |
| 4 | UM | QSCSP-I | 2009-04-16T15:46:49Z | SUCCEEDED | SCSP-52-1A |
| 5 | -- CM | QSCSP-SR | 2009-04-16T15:46:53Z | received | SCSP-52-1A |
| 6 | UM | DTSP-I | 2009-04-16T15:48:23Z | FAILED | SCSP-52-A |
| 7 | -- CM | DTSP-FR | 2009-04-16T15:48:27Z | received | referenced SLS Transfer Service Profile bound to available Space Communication Service Profile; |
| 8 | UM | DSCSP-I | 2009-04-16T15:48:45Z | SUCCEEDED | SCSP-52-1A |
| 9 | -- CM | DSCSP-SR | 2009-04-16T15:48:49Z | received | SCSP-52-1A |
| 10 | UM | DTSP-I | 2009-04-16T15:49:41Z | SUCCEEDED | SCSP-52-A |
| 11 | -- CM | DTSP-SR | 2009-04-16T15:49:44Z | received | SCSP-52-A |
| 12 | UM | QSCSP-I | 2009-04-16T15:50:02Z | FAILED | SCSP-52-1A |
| 13 | -- CM | QSCSP-FR | 2009-04-16T15:50:05Z | received | referenced spaceCommunication-ServiceProfileId unknown; |
| 14 | UM | ASCSP-I | 2009-04-16T15:52:48Z | FAILED | SCSP-52-2 |
| 15 | -- CM | ASCSP-FR | 2009-04-16T15:52:52Z | received | other; |

|  |  |
| --- | --- |
| **No.** | **File Reference** |
| 1 | 20090416T154537.103Z\_OUTGOING\_ASCSP-I-52-1.management |
| 2 | 20090416T154542.399Z\_INCOMING\_MessageSet.management |
| 3 | 20090416T154543.868Z\_INCOMING\_MessageSet.management |
| 4 | 20090416T154649.391Z\_OUTGOING\_QSCSP-I-52-1.management |
| 5 | 20090416T154653.531Z\_INCOMING\_MessageSet.management |
| 6 | 20090416T154823.722Z\_OUTGOING\_DTSP-I-51-1.management |
| 7 | 20090416T154827.909Z\_INCOMING\_MessageSet.management |
| 8 | 20090416T154845.938Z\_OUTGOING\_DSCSP-I-52-1.management |
| 9 | 20090416T154849.422Z\_INCOMING\_MessageSet.management |
| 10 | 20090416T154941.353Z\_OUTGOING\_DTSP-I-51-1.management |
| 11 | 20090416T154944.306Z\_INCOMING\_MessageSet.management |
| 12 | 20090416T155002.366Z\_OUTGOING\_QSCSP-I-52-1.management |
| 13 | 20090416T155005.631Z\_INCOMING\_MessageSet.management |
| 14 | 20090416T155248.742Z\_OUTGOING\_ASCSP-I-52-2.management |
| 15 | 20090416T155252.479Z\_INCOMING\_MessageSet.management |

## Management of Space Link Events Profile

### Goals

Verify storage, retrieval, and deletion of Space Link Events Profiles.

Verify referential integrity checks against Space Communication Service Profile.

Verify semantic validations/checks in Space Link Events Profile construction.

### Steps

1. [Precondition: Space Communication Service Profile “SLEP-53-A” is available, containing forward and return carrier profiles “FCP-53-A” and “RCP-53-B”]
2. UM: Create and invoke an ASLEP for service profile “SLEP-53-1” containing an FSpaceLinkEvents with a carrierProfileRef to “FCP-53-A”, and an RSpaceLinkEvents with a transferServiceProfileRef to “RCP-53-B”.
3. CM: Issue ASLEP-SR
4. UM: Invoke QSLEP for service profile “SLEP-53-1” and verify that response in QSLEP-SR matches data originally sent
5. UM: Invoke DSCSP for transfer profile “SLEP-53-A”
6. CM: Issue DSCSP-FR with diagnostic ‘referenced Space Communication Service Profile contains a carrier profile that is bound to an available Space Link Events Profile’
7. UM: Issue DSLEP for service profile “SLEP-53-1”, verify that DSLEP-SR received.
8. UM: Invoke QSLEP for service profile “SLEP-53-1” and verify that QSLEP-FR is received, with diagnostic ‘referenced spaceLinkEventsProfileId unknown’
9. UM: Invoke DSCSP for transfer profile “SLEP-53-A”, verify that DSCSP-SR received.
10. UM: Create and invoke an ASLEP for service profile “SLEP-53-2” containing an FSpaceLinkEvents with a carrierProfileRef to “FCP-53-Z”.
11. CM: Issue ASLEP-FR, with diagnostic ‘no matching carrierProfileId for carrier­ProfileRef’. .
12. UM: Create and invoke an ASLEP for service profile SLEP-53-3 containing a) an FSpaceLinkEvents with a carrierProfileRef to “FCP-53-A”; b) an RSpaceLinkEvents with a transferServiceProfileRef to “RCP-53-B”; c) at least two RSpaceLinkAvailableState data sets with the same availableStateInstanceNo
13. CM: ASLEP-FR, with diagnostic ‘availableState­InstanceNo not unique’.
14. UM: Create and invoke an ASLEP for service profile SLEP-53-4 containing a) an FSpaceLinkEvents with a carrierProfileRef to “FCP-53-A”; b) an RSpaceLinkEvents with a transferServiceProfileRef to “RCP-53-B”; c) a RSpaceLinkAvailableState data set containing at least two RSpaceLinkChangeEvent data sets with the same eventInstanceNo
15. CM: ASLEP-FR, with diagnostic ‘eventInstanceNo not unique’.
16. UM: Create and invoke an ASLEP for service profile SLEP-53-5 containing a) an FSpaceLinkEvents with a carrierProfileRef to “FCP-53-A”; b) at least two FSpaceLinkAvailableState data sets with the first FSpaceLinkAvailableState containing an availableStateInstanceNo greater than the availableStateInstanceNo of the second FSpaceLinkAvailableState NOTE: the difference needs to be only by 1 (one).
17. CM: ASLEP-FR, with diagnostic ‘availableState­InstanceNo out of sequence’
18. UM: Create and invoke an ASLEP for service profile SLEP-53-6 containing a) timeReference of ‘absolute’ b) an FSpaceLinkEvents with a carrierProfileRef to “FCP-53-A”; c) an RSpaceLinkEvents with a transferServiceProfileRef to “RCP-53-B”; c) at least one each of RSpaceLinkAvailableState and FSpaceLinkAvailableState such that the RSpaceLinkAvailableState contains a stateStartTime stated in seconds and FSpaceLinkAvailableState contains a stateStartTime stated in UTC.
19. CM: ASLEP-FR, with diagnostic ‘inconsistent time reference’.
20. [Precondition: a service agreement, SA-53-A, has been previously defined that minEventTemporalSpacing == 30 (seconds) ]
21. UM: Create and invoke an ASLEP for service profile SLEP-53-7, in reference to SA-53-A containing a) an RSpaceLinkEvents with a transferServiceProfileRef to “RCP-53-B”; b) at least two RSpaceLinkAvailableState data sets with the state[Start|End]TimeWindow[Lead|Lag] parameters all equal to 15 seconds, and the stateStartTime of the second RSpaceLinkAvailableState only 15 seconds later than the stateEndTime of the first RSpaceLinkAvailableState.
22. CM: ASLEP-FR, with diagnostic ‘insufficient time between events’
23. UM: Create and invoke an ASLEP for service profile SLEP-53-8, in reference to SA-53-A containing a) an RSpaceLinkEvents with a transferServiceProfileRef to “RCP-53-B”; b) at least two RSpaceLinkAvailableState data sets with the state[Start|End]TimeWindow[Lead|Lag] parameters all equal to 15 seconds, and the stateStartTime of the second RSpaceLinkAvailableState 60 seconds earlier than the stateEndTime of the first RSpaceLinkAvailableState.
24. CM: ASLEP-FR, with diagnostic ‘time out of order’.

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### Log of Messages Exchanged

First test run: all results correct, except for that no formal diagnostic was defined in the spec for step 11 (message 15 below, with two “other” diagnostics, which correctly explained the situation.

| **No.** | **Sender** | **Message** | **Timestamp** | **State** | **Comment** |
| --- | --- | --- | --- | --- | --- |
| 1 | UM | ASLEP-I | 2009-04-16T16:07:16Z | SUCCEEDED | SLEP-53-1 |
| 2 | -- CM | ASLEP-AR | 2009-04-16T16:07:20Z | received | SLEP-53-1 |
| 3 | -- CM | ASLEP-SR | 2009-04-16T16:07:22Z | received | SLEP-53-1 |
| 4 | UM | QSLEP-I | 2009-04-16T16:07:33Z | SUCCEEDED | SLEP-53-1 |
| 5 | -- CM | QSLEP-SR | 2009-04-16T16:07:36Z | received | SLEP-53-1 |
| 6 | UM | DSCSP-I | 2009-04-16T16:08:48Z | FAILED | SLEP-53-A |
| 7 | -- CM | DSCSP-FR | 2009-04-16T16:08:51Z | received | referenced Space Communication Service Profile contains a carrier profile that is bound to an available Event sequence profile; |
| 8 | UM | DSLEP-I | 2009-04-16T16:18:12Z | SUCCEEDED | SLEP-53-1 |
| 9 | -- CM | DSLEP-SR | 2009-04-16T16:18:15Z | received | SLEP-53-1 |
| 10 | UM | QSLEP-I | 2009-04-16T16:18:19Z | FAILED | SLEP-53-1 |
| 11 | -- CM | QSLEP-FR | 2009-04-16T16:18:22Z | received | referenced SpaceLinkEventsProfile unknown; |
| 12 | UM | DSCSP-I | 2009-04-16T16:18:30Z | SUCCEEDED | SLEP-53-A |
| 13 | -- CM | DSCSP-SR | 2009-04-16T16:18:33Z | received | SLEP-53-A |
| 14 | UM | ASLEP-I | 2009-04-16T16:19:29Z | FAILED | SLEP-53-1 |
| 15 | -- CM | ASLEP-FR | 2009-04-16T16:19:33Z | received | other; other; |

|  |  |
| --- | --- |
| **No.** | **File Reference** |
| 1 | 20090416T160716.859Z\_OUTGOING\_ASLEP-I-53-1.management |
| 2 | 20090416T160720.765Z\_INCOMING\_MessageSet.management |
| 3 | 20090416T160722.312Z\_INCOMING\_MessageSet.management |
| 4 | 20090416T160733.030Z\_OUTGOING\_QSLEP-I-53-1.management |
| 5 | 20090416T160736.342Z\_INCOMING\_MessageSet.management |
| 6 | 20090416T160848.274Z\_OUTGOING\_DSCSP-I-53-A.management |
| 7 | 20090416T160851.618Z\_INCOMING\_MessageSet.management |
| 8 | 20090416T161812.210Z\_OUTGOING\_DSLEP-I-53-1.management |
| 9 | 20090416T161815.836Z\_INCOMING\_MessageSet.management |
| 10 | 20090416T161819.289Z\_OUTGOING\_QSLEP-I-53-1.management |
| 11 | 20090416T161822.367Z\_INCOMING\_MessageSet.management |
| 12 | 20090416T161830.071Z\_OUTGOING\_DSCSP-I-53-A.management |
| 13 | 20090416T161833.165Z\_INCOMING\_MessageSet.management |
| 14 | 20090416T161929.512Z\_OUTGOING\_ASLEP-I-53-2.management |
| 15 | 20090416T161933.762Z\_INCOMING\_MessageSet.management |

Second test run, after addition of ‘no matching carrierProfileId for carrier­ProfileRef’ diagnostic to the spec and the schema, and addition of several more test steps to exercise more diagnostics.

| **No.** | **Sender** | **Message** | **Timestamp** | **State** | **Comment** |
| --- | --- | --- | --- | --- | --- |
| 1 | UM | ASLEP-I | 2009-06-09T16:16:32Z | SUCCEEDED | SLEP-53-1 |
| 2 | -- CM | ASLEP-AR | 2009-06-09T16:16:36Z | received | SLEP-53-1 |
| 3 | -- CM | ASLEP-SR | 2009-06-09T16:16:38Z | received | SLEP-53-1 |
| 4 | UM | QSLEP-I | 2009-06-09T16:16:59Z | SUCCEEDED | SLEP-53-1 |
| 5 | -- CM | QSLEP-SR | 2009-06-09T16:17:04Z | received | SLEP-53-1 |
| 6 | UM | DSCSP-I | 2009-06-09T16:17:25Z | FAILED | SLEP-53-A |
| 7 | -- CM | DSCSP-FR | 2009-06-09T16:17:29Z | received | referenced Space Communication Service Profile contains a carrier profile that is bound to an available Event sequence profile; |
| 8 | UM | DSLEP-I | 2009-06-09T16:17:41Z | SUCCEEDED | SLEP-53-1 |
| 9 | -- CM | DSLEP-SR | 2009-06-09T16:17:44Z | received | SLEP-53-1 |
| 10 | UM | QSLEP-I | 2009-06-09T16:17:59Z | FAILED | SLEP-53-1 |
| 11 | -- CM | QSLEP-FR | 2009-06-09T16:18:03Z | received | referenced SpaceLinkEventsProfile unknown; |
| 12 | UM | DSCSP-I | 2009-06-09T16:18:04Z | SUCCEEDED | SLEP-53-A |
| 13 | -- CM | DSCSP-SR | 2009-06-09T16:18:07Z | received | SLEP-53-A |
| 14 | UM | ASLEP-I | 2009-06-09T16:18:58Z | FAILED | SLEP-53-1 |
| 15 | -- CM | ASLEP-FR | 2009-06-09T16:19:03Z | received | no matching carrierProfileId for carrierProfileRef; no matching carrierProfileId for carrierProfileRef; |
| 16 | UM | ASLEP-I | 2009-06-09T16:23:20Z | FAILED | SLEP-53-3 |
| 17 | -- CM | ASLEP-FR | 2009-06-09T16:23:24Z | received | availableStateInstanceNo not unique; |
| 18 | UM | ASLEP-I | 2009-06-09T16:25:09Z | FAILED | SLEP-53-4 |
| 19 | -- CM | ASLEP-FR | 2009-06-09T16:25:13Z | received | eventInstanceNo not unique; |
| 20 | UM | ASLEP-I | 2009-06-09T16:25:32Z | FAILED | SLEP-53-5 |
| 21 | -- CM | ASLEP-FR | 2009-06-09T16:25:35Z | received | availableStateInstanceNo out of sequence; |
| 22 | UM | ASLEP-I | 2009-06-09T16:30:35Z | FAILED | SLEP-53-6 |
| 23 | -- CM | ASLEP-FR | 2009-06-09T16:30:38Z | received | inconsistent time reference; |
| 24 | UM | ASLEP-I | 2009-06-09T16:31:03Z | FAILED | SLEP-53-7 |
| 25 | -- CM | ASLEP-FR | 2009-06-09T16:31:07Z | received | insufficient time between events; |
| 26 | UM | ASLEP-I | 2009-06-09T16:31:51Z | FAILED | SLEP-53-8 |
| 27 | -- CM | ASLEP-FR | 2009-06-09T16:31:55Z | received | time out of order; |

| **No.** | **File Reference** |
| --- | --- |
| 1 | 20090609T161632.247Z\_OUTGOING\_ASLEP-I-53-1.management |
| 2 | 20090609T161636.498Z\_INCOMING\_MessageSet.management |
| 3 | 20090609T161638.404Z\_INCOMING\_MessageSet.management |
| 4 | 20090609T161659.811Z\_OUTGOING\_QSLEP-I-53-1.management |
| 5 | 20090609T161704.326Z\_INCOMING\_MessageSet.management |
| 6 | 20090609T161725.436Z\_OUTGOING\_DSCSP-I-53-A.management |
| 7 | 20090609T161729.171Z\_INCOMING\_MessageSet.management |
| 8 | 20090609T161741.187Z\_OUTGOING\_DSLEP-I-53-1.management |
| 9 | 20090609T161744.171Z\_INCOMING\_MessageSet.management |
| 10 | 20090609T161759.625Z\_OUTGOING\_QSLEP-I-53-1.management |
| 11 | 20090609T161803.609Z\_INCOMING\_MessageSet.management |
| 12 | 20090609T161804.359Z\_OUTGOING\_DSCSP-I-53-A.management |
| 13 | 20090609T161807.500Z\_INCOMING\_MessageSet.management |
| 14 | 20090609T161858.876Z\_OUTGOING\_ASLEP-I-53-1.management |
| 15 | 20090609T161903.048Z\_INCOMING\_MessageSet.management |
| 16 | 20090609T162320.461Z\_OUTGOING\_ASLEP-I-53-3.management |
| 17 | 20090609T162324.227Z\_INCOMING\_MessageSet.management |
| 18 | 20090609T162509.433Z\_OUTGOING\_ASLEP-I-53-4.management |
| 19 | 20090609T162513.183Z\_INCOMING\_MessageSet.management |
| 20 | 20090609T162532.668Z\_OUTGOING\_ASLEP-I-53-5.management |
| 21 | 20090609T162535.980Z\_INCOMING\_MessageSet.management |
| 22 | 20090609T163035.628Z\_OUTGOING\_ASLEP-I-53-6.management |
| 23 | 20090609T163038.925Z\_INCOMING\_MessageSet.management |
| 24 | 20090609T163103.067Z\_OUTGOING\_ASLEP-I-53-7.management |
| 25 | 20090609T163107.395Z\_INCOMING\_MessageSet.management |
| 26 | 20090609T163151.849Z\_OUTGOING\_ASLEP-I-53-8.management |
| 27 | 20090609T163155.255Z\_INCOMING\_MessageSet.management |

## Management of Retrieval Transfer Service Profile

### Goals

Verify storage, retrieval, and deletion of Space Link Session Transfer Service Profiles.

### Steps

1. UM: Create and invoke an ARTSP for transfer service profile “RTSP-54-1” containing an FcltuTransferServiceProfile.
2. CM: Issue ARTSP-SR
3. UM: Issue QTSP for transfer service profile “RTSP-54-1” and verify that response in QTSP-SR matches data originally sent
4. UM: Issue DTSP for transfer service profile “RTSP-54-1”, verify that DTSP-SR received,
5. UM: Issue QTSP for transfer service profile “RTSP-54-1” and verify that QTSP-FR is received, with diagnostic ‘referenced transferServiceProfileId unknown’

### Log of Messages Exchanged

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **No.** | **Sender** | **Message** | **Timestamp** | **State** | **Comment** |
| 1 | UM | ARTSP-I | 2009-04-09T17:40:12Z | SUCCEEDED | RTSP-54-1 |
| 2 | -- CM | ARTSP-SR | 2009-04-09T17:40:16Z | received | RTSP-54-1 |
| 3 | -- CM | ARTSP-AR | 2009-04-09T17:40:17Z | received | RTSP-54-1 |
| 4 | UM | QTSP-I | 2009-04-09T17:41:12Z | SUCCEEDED | RTSP-54-1 |
| 5 | -- CM | QTSP-SR | 2009-04-09T17:41:16Z | received | RTSP-54-1 |
| 6 | UM | DTSP-I | 2009-04-09T17:41:48Z | SUCCEEDED | RTSP-54-1 |
| 7 | -- CM | DTSP-SR | 2009-04-09T17:41:51Z | received | RTSP-54-1 |
| 8 | UM | QTSP-I | 2009-04-09T17:41:55Z | FAILED | RTSP-54-1 |
| 9 | -- CM | QTSP-FR | 2009-04-09T17:41:58Z | received | referenced transferServiceProfileId unknown; |

|  |  |
| --- | --- |
| **No.** | **File Reference** |
| 1 | 20090409T174012.747Z\_OUTGOING\_ARTSP-I-54-1.management |
| 2 | 20090409T174016.966Z\_INCOMING\_MessageSet.management |
| 3 | 20090409T174017.997Z\_INCOMING\_MessageSet.management |
| 4 | 20090409T174112.968Z\_OUTGOING\_QTSP-I-54-1.management |
| 5 | 20090409T174116.531Z\_INCOMING\_MessageSet.management |
| 6 | 20090409T174148.329Z\_OUTGOING\_DTSP-I-54-1.management |
| 7 | 20090409T174151.298Z\_INCOMING\_MessageSet.management |
| 8 | 20090409T174155.891Z\_OUTGOING\_QTSP-I-54-1.management |
| 9 | 20090409T174158.876Z\_INCOMING\_MessageSet.management |

# trajectory prediction testing

## tRAJECTORY STATUS MAINTENANCE

### goals

Verify that the recommendation supports extension and auto deletion of trajectory prediction data.

### steps

1. [Precondition: a service agreement, SA-61-A, has been previously defined that includes ‘ADD\_TRAJECTORY\_PREDICTION’, ‘DELETE\_TRAJECTORY\_PREDICTION’, ‘QUERY\_TRAJECTORY\_PREDICTION’, and ‘EXTEND\_TRAJECTORY\_PREDICTION’ supported SCCSM operations, with trajectoryPredictionDeletionMode == ‘invoked deletion only’ ]
2. [Precondition: service agreement, SA-61-B has been previously defined that includes ‘ADD\_TRAJECTORY\_PREDICTION’, ‘DELETE\_TRAJECTORY\_PREDICTION’, ‘QUERY\_TRAJECTORY\_PREDICTION’, and ‘EXTEND\_TRAJECTORY\_PREDICTION’ supported SCCSM operations, with trajectoryPredictionDeletionMode == ‘auto segment deletion’]
3. [Precondition: service agreement, SA-61-C has been previously defined that includes ‘ADD\_TRAJECTORY\_PREDICTION’, ‘DELETE\_TRAJECTORY\_PREDICTION’, ‘QUERY\_TRAJECTORY\_PREDICTION’, and ‘EXTEND\_TRAJECTORY\_PREDICTION’ supported SCCSM operations, with trajectoryPredictionDeletionMode == ‘auto TP deletion’]
4. UM: ATP-I trajectoryId == TP-61-1, in reference to SA-61-A, trajectoryStartTime == t1, trajectoryStopTime == t2, t2 > t1 by at least 5 minutes, such that the trajectoryStartTime is consistent with epoch of the first vector in the OEM, and trajectoryStopTime is consistent with the last vector of the OEM.

[NOTE: OEM data is used as the trajectory format rationale: OEM validation is superset of OPM service management validation]

[NOTE: An OEM of two vectors is sufficient for this test]

[NOTE: the trajectory segment grade information is not checked as part of this test; rationale: the recommendation defines trajectory segment grade checking as bilateral.]

1. CM: ATP-SR
2. UM: QTP-I, trajectoryId == TP-61-1, reference to SA-61-A.
3. CM QTP-SR; subsequent verification by UM that trajectory matches invocation.
4. UM ETP-I, trajectoryRef == TP-61-1, in reference to SA-61-A, trajectoryStartTime == t3, trajectoryStopTime == t4, t4 > t3 by at least 5 minutes, with the trajectoryStartTime is inconsistent with epoch of the first vector in the OEM, and trajectoryStopTime is consistent with the last vector of the OEM.
5. CM: ATP-FR, with diagnostic ‘incompat­ible time’
6. Repeat steps 6, 7; verify that only single segment (original) OEM is returned.
7. UM ETP-I, trajectoryRef == TP-61-1, in reference to SA-61-A, trajectoryStartTime == t3, trajectoryStopTime == t4, t4 > t3 by at least 5 minutes, with the trajectoryStartTime is consistent with epoch of the first vector in the OEM, and trajectoryStopTime is consistent with the last vector of the OEM.
8. Repeat steps 6, 7; verify that a two segment OEM is returned, spanning time t1 through t4
9. UM: Allow wall clock time to elapse such that Tc (current time) > t2 for TP-61-1 (in reference to SA-61-A).
10. Repeat step 12.
11. Repeat steps 4 through 7, but in reference to SA-61-B, adjusting t1, t2, t3, and t4 for current time as needed.
12. Repeat steps 11 through 12, but in reference to SA-61-B.
13. Repeat step 13, but in reference to SA-61-B.
14. UM: QTP-I, trajectoryId == TP-61-1, reference to SA-61-B.
15. CM: QTP-SR; subsequent verification by UM that the trajectory contains only a single segment OEM
16. Repeat step 17, but allow wall clock time to elapse such that Tc (current time) > t4 for TP-61-1 (in reference to SA-61-B).
17. Repeat step 19, but with verification by UM that the trajectory contains 0 (zero) OEM segments (ie., TP-61-1 exists in name only).
18. Repeat steps 15 and 16, but in reference to SA-61-C.
19. UM: Allow wall clock time to elapse such that Tc (current time) > t4 for TP-61-1, in reference to SA-61-C.
20. UM: QTP-I, trajectoryId == TP-61-1, reference to SA-61-C.
21. CM: QTP-FR, with diagnostic ‘trajectoryRef non-existent’

### LOG OF MESSAGE EXCHANGED

Note that the order of test steps was slightly altered to reduce waiting time. For all Trajectory Predictions, all steps up to ETP and the subsequent QTP were executed, using the same trajectoryStopTime. After this, and waiting for that wall clock time to elapse, the Trajectory Predictions were queried again.

| **No.** | **Sender** | **Message** | **Timestamp** | **State** | **Comment** |
| --- | --- | --- | --- | --- | --- |
| 1 | UM | ATP-I | 2009-04-16T16:36:42Z | SUCCEEDED | TP-61-1-A |
| 2 | -- CM | ATP-SR | 2009-04-16T16:36:58Z | received | TP-61-1-A |
| 3 | UM | QTP-I | 2009-04-16T16:36:42Z | SUCCEEDED | TP-61-1-A |
| 4 | -- CM | QTP-SR | 2009-04-16T16:37:00Z | received | TP-61-1-A |
| 5 | UM | ETP-I | 2009-04-16T16:36:42Z | FAILED | TP-61-1-A |
| 6 | -- CM | ETP-FR | 2009-04-16T16:37:00Z | received | incompatible time; |
| 7 | UM | QTP-I | 2009-04-16T16:36:42Z | SUCCEEDED | TP-61-1-A |
| 8 | -- CM | QTP-SR | 2009-04-16T16:36:59Z | received | TP-61-1-A |
| 9 | UM | ETP-I | 2009-04-16T16:36:42Z | SUCCEEDED | TP-61-1-A |
| 10 | -- CM | ETP-SR | 2009-04-16T16:36:55Z | received | TP-61-1-A |
| 11 | UM | QTP-I | 2009-04-16T16:36:42Z | SUCCEEDED | TP-61-1-A |
| 12 | -- CM | QTP-SR | 2009-04-16T16:36:57Z | received | TP-61-1-A |
| 13 | UM | ATP-I | 2009-04-16T16:37:12Z | SUCCEEDED | TP-61-1-B |
| 14 | -- CM | ATP-SR | 2009-04-16T16:37:19Z | received | TP-61-1-B |
| 15 | UM | QTP-I | 2009-04-16T16:37:12Z | SUCCEEDED | TP-61-1-B |
| 16 | -- CM | QTP-SR | 2009-04-16T16:37:21Z | received | TP-61-1-B |
| 17 | UM | ETP-I | 2009-04-16T16:37:12Z | SUCCEEDED | TP-61-1-B |
| 18 | -- CM | ETP-SR | 2009-04-16T16:37:19Z | received | TP-61-1-B |
| 19 | UM | QTP-I | 2009-04-16T16:37:12Z | SUCCEEDED | TP-61-1-B |
| 20 | -- CM | QTP-SR | 2009-04-16T16:37:22Z | received | TP-61-1-B |
| 21 | UM | ATP-I | 2009-04-16T16:37:33Z | SUCCEEDED | TP-61-1-C |
| 22 | -- CM | ATP-SR | 2009-04-16T16:37:42Z | received | TP-61-1-C |
| 23 | UM | QTP-I | 2009-04-16T16:37:33Z | SUCCEEDED | TP-61-1-C |
| 24 | -- CM | QTP-SR | 2009-04-16T16:37:43Z | received | TP-61-1-C |
| 25 | UM | ETP-I | 2009-04-16T16:37:33Z | SUCCEEDED | TP-61-1-C |
| 26 | -- CM | ETP-SR | 2009-04-16T16:37:43Z | received | TP-61-1-C |
| 27 | UM | QTP-I | 2009-04-16T16:37:33Z | SUCCEEDED | TP-61-1-C |
| 28 | -- CM | QTP-SR | 2009-04-16T16:37:40Z | received | TP-61-1-C |
| 29 | UM | QTP-I | 2009-04-16T16:41:11Z | SUCCEEDED | TP-61-1-A |
| 30 | -- CM | QTP-SR | 2009-04-16T16:41:14Z | received | TP-61-1-A |
| 31 | UM | QTP-I | 2009-04-16T16:41:40Z | SUCCEEDED | TP-61-1-B |
| 32 | -- CM | QTP-SR | 2009-04-16T16:41:43Z | received | TP-61-1-B |
| 33 | UM | QTP-I | 2009-04-16T16:42:13Z | FAILED | TP-61-1-C |
| 34 | -- CM | QTP-FR | 2009-04-16T16:42:16Z | received | trajectoryRef non-existent; |

| **No.** | **File Reference** |
| --- | --- |
| 1 | 20090416T163642.640Z\_OUTGOING\_ATP-ETP-QTP-I-61-1.management |
| 2 | 20090416T163658.561Z\_INCOMING\_MessageSet.management |
| 3 | 20090416T163642.640Z\_OUTGOING\_ATP-ETP-QTP-I-61-1.management |
| 4 | 20090416T163700.218Z\_INCOMING\_MessageSet.management |
| 5 | 20090416T163642.640Z\_OUTGOING\_ATP-ETP-QTP-I-61-1.management |
| 6 | 20090416T163700.921Z\_INCOMING\_MessageSet.management |
| 7 | 20090416T163642.640Z\_OUTGOING\_ATP-ETP-QTP-I-61-1.management |
| 8 | 20090416T163659.561Z\_INCOMING\_MessageSet.management |
| 9 | 20090416T163642.640Z\_OUTGOING\_ATP-ETP-QTP-I-61-1.management |
| 10 | 20090416T163655.015Z\_INCOMING\_MessageSet.management |
| 11 | 20090416T163642.640Z\_OUTGOING\_ATP-ETP-QTP-I-61-1.management |
| 12 | 20090416T163657.718Z\_INCOMING\_MessageSet.management |
| 13 | 20090416T163712.858Z\_OUTGOING\_ATP-ETP-QTP-I-61-1-B.management |
| 14 | 20090416T163719.905Z\_INCOMING\_MessageSet.management |
| 15 | 20090416T163712.858Z\_OUTGOING\_ATP-ETP-QTP-I-61-1-B.management |
| 16 | 20090416T163721.530Z\_INCOMING\_MessageSet.management |
| 17 | 20090416T163712.858Z\_OUTGOING\_ATP-ETP-QTP-I-61-1-B.management |
| 18 | 20090416T163719.530Z\_INCOMING\_MessageSet.management |
| 19 | 20090416T163712.858Z\_OUTGOING\_ATP-ETP-QTP-I-61-1-B.management |
| 20 | 20090416T163722.202Z\_INCOMING\_MessageSet.management |
| 21 | 20090416T163733.983Z\_OUTGOING\_ATP-ETP-QTP-I-61-1-C.management |
| 22 | 20090416T163742.482Z\_INCOMING\_MessageSet.management |
| 23 | 20090416T163733.983Z\_OUTGOING\_ATP-ETP-QTP-I-61-1-C.management |
| 24 | 20090416T163743.889Z\_INCOMING\_MessageSet.management |
| 25 | 20090416T163733.983Z\_OUTGOING\_ATP-ETP-QTP-I-61-1-C.management |
| 26 | 20090416T163743.326Z\_INCOMING\_MessageSet.management |
| 27 | 20090416T163733.983Z\_OUTGOING\_ATP-ETP-QTP-I-61-1-C.management |
| 28 | 20090416T163740.498Z\_INCOMING\_MessageSet.management |
| 29 | 20090416T164111.463Z\_OUTGOING\_QTP-I-61-1.management |
| 30 | 20090416T164114.947Z\_INCOMING\_MessageSet.management |
| 31 | 20090416T164140.477Z\_OUTGOING\_QTP-I-61-1-B.management |
| 32 | 20090416T164143.555Z\_INCOMING\_MessageSet.management |
| 33 | 20090416T164213.382Z\_OUTGOING\_QTP-I-61-1-C.management |
| 34 | 20090416T164216.928Z\_INCOMING\_MessageSet.management |

# service package testing

Unless otherwise explicitly stated, for the following test cases, the service packages are for a single scenario, reference a generic spaceCommunicationServiceProfile of “SCSP-700-A”, do not reference spacelink events profiles, and reference a generic TrajectoryPrediction of “TP-700-A”.

## cOMPLETION OF service package in stages

### Goals

Verify that the recommendation properly supports creation of incomplete service packages and subsequent modification for their full definition.

Verify that the recommendation properly supports cancellation of service packages that are not created within the agreed time limits.

### sTEPS

1. UM: Create and invoke a CSP for service package “SP-71-1” with transferServicesDeferred == ‘true’, and sequenceOfEventsDeferred == ‘true’
2. CM: Issue CSP-AR and CSP-SR
3. UM: issue QSP for service package SP-71-1, and verify service package has deferred information as indicated in the invocation (no SlsTsInstanceResult nor [F|R]SpacelinkEventsResult data sets present)
4. UM: Invoke an RSP for service package SP-71-1 with transferServicesDeferred == ‘false’, and sequenceOfEventsDeferred == ‘true’
5. CM: Issue RSP-AR, RSP-SR
6. UM: issues QSP for SP-71-1 and verify that the service package has SlsTsInstanceResult dataset(s) in conformance with the spaceCommunicationServiceProfileRef indicated in the RSP-I for SP-71-1 in step 4.
7. UM: Invoke an RSP for SP-71-1 with transferServicesDeferred == ‘false’, and sequenceOfEventsDeferred and sequenceOfEventsDeferred == ‘false’, with a reference to a predefined event sequence.
8. CM: Issue RSP-AR, RSP-SR
9. UM: issues QSP for SP-71-1, and verify that the service package has SlsTsInstanceResult dataset(s) in conformance with the spaceCommunicationServiceProfileRef indicated in the RSP-I and that event sequence information is returned in conformance with the spaceLinkEventsProfile referenced in the RSP-I for SP-71-1 in step 7.
10. [Preconditions: definition of a service agreement, SA-71-B that has a very short minServiceDefinitionLeadTime is in place and referenced in subsequent steps]
11. UM: Repeat step 1, for SP-71-2 in reference to SA-71-B
12. CM: Issue CSP-AR, CSP-SR
13. UM: Allow lead time to elapse
14. CM: Issue SPC-N in reference to SP-71-2
15. UM: Verify proper SPC-N diagnostic, and issue SPC-C for SP-71-2

### log of messages exchanged

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **No.** | **Sender** | **Message** | **Timestamp** | **State** | **Comment** |
| 1 | UM | CSP-I | 2009-04-08T17:14:15Z | SUCCEEDED | SP-71-1 |
| 2 | -- CM | CSP-AR | 2009-04-08T17:14:21Z | received | SP-71-1 |
| 3 | -- CM | CSP-SR | 2009-04-08T17:14:22Z | received | SP-71-1 |
| 4 | UM | QSP-I | 2009-04-08T17:14:36Z | SUCCEEDED | SP-71-1 |
| 5 | -- CM | QSP-SR | 2009-04-08T17:14:40Z | received | SP-71-1 |
| 6 | UM | RSP-I | 2009-04-08T17:15:12Z | SUCCEEDED | SP-71-1 |
| 7 | -- CM | RSP-AR | 2009-04-08T17:15:18Z | received | SP-71-1 |
| 8 | -- CM | RSP-SR | 2009-04-08T17:15:19Z | received | SP-71-1 |
| 9 | UM | QSP-I | 2009-04-08T17:15:33Z | SUCCEEDED | SP-71-1 |
| 10 | -- CM | QSP-SR | 2009-04-08T17:15:36Z | received | SP-71-1 |
| 11 | UM | RSP-I | 2009-04-08T17:16:08Z | TIMEDOUT | SP-71-1 |
| 12 | -- CM | RSP-AR | 2009-04-08T17:16:13Z | received | SP-71-1 |
| 13 | CM | unrecognized | 2009-04-08T17:16:15Z | UNRECOGNIZED | stateStartTimeWindowLag: does not conform to syntax of SM message set - contains a bad value |
| 14 | -- UM | ums-er | 2009-04-08T17:16:15Z | uncorrelated | does not conform to syntax of SM message set |
| 15 | UM | QSP-I | 2009-04-08T17:16:48Z | TIMEDOUT | SP-71-1 |
| 16 | CM | unrecognized | 2009-04-08T17:16:51Z | UNRECOGNIZED | stateStartTimeWindowLag: does not conform to syntax of SM message set - contains a bad value |
| 17 | -- UM | ums-er | 2009-04-08T17:16:52Z | uncorrelated | does not conform to syntax of SM message set |
| 18 | UM | CSP-I | 2009-04-08T17:17:42Z | SUCCEEDED | SP-71-2 |
| 19 | -- CM | CSP-AR | 2009-04-08T17:17:47Z | received | SP-71-2 |
| 20 | -- CM | CSP-SR | 2009-04-08T17:17:48Z | received | SP-71-2 |
| 21 | CM | SPC-N | 2009-04-08T17:22:56Z | CONFIRMED | SP-71-2 |
| 22 | -- UM | SPC-C | 2009-04-08T17:22:57Z | received | SP-71-2 |

|  |  |
| --- | --- |
| **No.** | **File Reference** |
| 1 | 20090408T171415.511Z\_OUTGOING\_CSP-I-71-1.management |
| 2 | 20090408T171421.308Z\_INCOMING\_MessageSet.management |
| 3 | 20090408T171422.777Z\_INCOMING\_MessageSet.management |
| 4 | 20090408T171436.949Z\_OUTGOING\_QSP-I-71-1.management |
| 5 | 20090408T171440.949Z\_INCOMING\_MessageSet.management |
| 6 | 20090408T171512.950Z\_OUTGOING\_RSP-I-71-1.management |
| 7 | 20090408T171518.888Z\_INCOMING\_MessageSet.management |
| 8 | 20090408T171519.794Z\_INCOMING\_MessageSet.management |
| 9 | 20090408T171533.076Z\_OUTGOING\_QSP-I-71-1.management |
| 10 | 20090408T171536.388Z\_INCOMING\_MessageSet.management |
| 11 | 20090408T171608.592Z\_OUTGOING\_RSP-I-71-1-b.management |
| 12 | 20090408T171613.342Z\_INCOMING\_MessageSet.management |
| 13 | 20090408T171615.577Z\_INCOMING\_MessageSet.management |
| 14 | (not recorded) |
| 15 | 20090408T171648.437Z\_OUTGOING\_QSP-I-71-1.management |
| 16 | 20090408T171651.765Z\_INCOMING\_MessageSet.management |
| 17 | (not recorded) |
| 18 | 20090408T171742.626Z\_OUTGOING\_CSP-I-71-2.management |
| 19 | 20090408T171747.360Z\_INCOMING\_MessageSet.management |
| 20 | 20090408T171748.266Z\_INCOMING\_MessageSet.management |
| 21 | 20090408T172256.978Z\_INCOMING\_MessageSet.management |
| 22 | 20090408T172257.212Z\_OUTGOING\_Confirmation.management |

Steps 7-9 (messages 11-17): Note that the message content corresponds to the specification, but a Schema error has caused the RSP-SR and QSP-SR to be rejected. (Correction must be applied to Schema for final issue.)

## antenna selectION

### goals

Verify that selection of antennas is in conformance with the criteria stated, in turn verifying that criteria is implementable.

### steps

1. [Preconditions: service agreements SA-72-A has been defined with the list of legal antenna identifiers -- at least 2 such identifiers are defined]
2. UM: CSP-I, for SP-72-1 with no AntennaConstraints data set CM: Issue CSP-AR and CSP-SR with an antenna identified in the referenced service agreement
3. UM: verify that an antenna identifier among those that are included in the SA-72-A is returned
4. UM: CSP-I, for SP-72-2 with acceptabilityConstraintsType == ‘unacceptable’ and antennaRef of the first antenna identified in the service agreement and constraintType ==’ unacceptable’
5. CM: Issue CSP-AR and CSP-SR with an antenna identified in the reference service agreement SA-72-A, excluding that indicated as unacceptable
6. UM: verify that the CSP-SR received does not include the antenna indicated as unacceptable
7. UM: issue QSP, and verify service package has an antenna identifier other than that indicated as being unacceptable and that it is the same as that returned by CM in the CSP-SR
8. UM: CSP-I, SP-72-3 with acceptabilityConstraintsType == ‘acceptable’ and antennaRef of the first antenna identified in the service agreement and constraintType ==’ preferred’
9. CM: Issue CSP-AR and CSP-SR with the id of the first antenna identified in the referenced service agreement,
10. UM: issue QSP, and verify service package has an antenna identifier of the first antenna in the referenced service agreement and that it is the same as that returned by CM in the CSP-SR
11. UM: Issue CSP-I, SP-72-4 with acceptabilityConstraintsType == ‘none’ with one Antenna data set, antennaRef == the second antenna in the service agreement, constraintType == ‘preferred’.
12. CM: Issue CSP-AR and CSP-SR with the id of the second antenna in the referenced service agreement.

### log OF messages exchanged

First test run according to original test plan:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **No.** | **Sender** | **Message** | **Timestamp** | **State** | **Comment** |
| 1 | UM | CSP-I | 2009-04-08T18:00:16Z | SUCCEEDED | SP-72-1 |
| 2 | -- CM | CSP-AR | 2009-04-08T18:00:22Z | received | SP-72-1 |
| 3 | -- CM | CSP-SR | 2009-04-08T18:00:23Z | received | SP-72-1 |
| 4 | UM | CSP-I | 2009-04-08T18:26:28Z | SUCCEEDED | SP-72-2 |
| 5 | -- CM | CSP-AR | 2009-04-08T18:26:32Z | received | SP-72-2 |
| 6 | -- CM | CSP-SR | 2009-04-08T18:26:33Z | received | SP-72-2 |
| 7 | UM | CSP-I | 2009-04-08T18:36:52Z | SUCCEEDED | SP-72-3 |
| 8 | -- CM | CSP-AR | 2009-04-08T18:36:57Z | received | SP-72-3 |
| 9 | -- CM | CSP-SR | 2009-04-08T18:36:58Z | received | SP-72-3 |
| 10 | UM | QSP-I | 2009-04-08T18:37:25Z | SUCCEEDED | SP-72-2 |
| 11 | -- CM | QSP-SR | 2009-04-08T18:37:29Z | received | SP-72-2 |
| 12 | UM | QSP-I | 2009-04-08T18:43:21Z | SUCCEEDED | SP-72-3 |
| 13 | -- CM | QSP-SR | 2009-04-08T18:43:25Z | received | SP-72-3 |

| **No.** | **File Reference** |
| --- | --- |
| 1 | 20090408T180016.849Z\_OUTGOING\_CSP-I-72-1.management |
| 2 | 20090408T180022.271Z\_INCOMING\_MessageSet.management |
| 3 | 20090408T180023.646Z\_INCOMING\_MessageSet.management |
| 4 | 20090408T182628.109Z\_OUTGOING\_CSP-I-72-2.management |
| 5 | 20090408T182632.609Z\_INCOMING\_MessageSet.management |
| 6 | 20090408T182633.735Z\_INCOMING\_MessageSet.management |
| 7 | 20090408T183652.328Z\_OUTGOING\_CSP-I-72-3.management |
| 8 | 20090408T183657.532Z\_INCOMING\_MessageSet.management |
| 9 | 20090408T183658.297Z\_INCOMING\_MessageSet.management |
| 10 | 20090408T183725.845Z\_OUTGOING\_QSP-I-72-2.management |
| 11 | 20090408T183729.048Z\_INCOMING\_MessageSet.management |
| 12 | 20090408T184321.557Z\_OUTGOING\_QSP-I-72-3.management |
| 13 | 20090408T184325.120Z\_INCOMING\_MessageSet.management |

Second test run after test plan revision, to reflect correct AntennaConstraints and acceptabilityConstraintsType usage (this summary does not show any difference except for the addition of a test, but changes can be seen by examination of the message file referenced):

| **No.** | **Sender** | **Message** | **Timestamp** | **State** | **Comment** |
| --- | --- | --- | --- | --- | --- |
| 1 | UM | CSP-I | 2009-06-09T16:44:27Z | SUCCEEDED | SP-72-1 |
| 2 | -- CM | CSP-AR | 2009-06-09T16:44:31Z | received | SP-72-1 |
| 3 | -- CM | CSP-SR | 2009-06-09T16:44:32Z | received | SP-72-1 |
| 4 | UM | CSP-I | 2009-06-09T16:45:20Z | SUCCEEDED | SP-72-2 |
| 5 | -- CM | CSP-AR | 2009-06-09T16:45:24Z | received | SP-72-2 |
| 6 | -- CM | CSP-SR | 2009-06-09T16:45:26Z | received | SP-72-2 |
| 7 | UM | CSP-I | 2009-06-09T16:45:57Z | SUCCEEDED | SP-72-3 |
| 8 | -- CM | CSP-AR | 2009-06-09T16:46:02Z | received | SP-72-3 |
| 9 | -- CM | CSP-SR | 2009-06-09T16:46:03Z | received | SP-72-3 |
| 10 | UM | QSP-I | 2009-06-09T16:46:36Z | SUCCEEDED | SP-72-2 |
| 11 | -- CM | QSP-SR | 2009-06-09T16:46:40Z | received | SP-72-2 |
| 12 | UM | QSP-I | 2009-06-09T16:46:50Z | SUCCEEDED | SP-72-3 |
| 13 | -- CM | QSP-SR | 2009-06-09T16:46:54Z | received | SP-72-3 |
| 14 | UM | CSP-I | 2009-06-09T16:47:19Z | SUCCEEDED | SP-72-4 |
| 15 | -- CM | CSP-AR | 2009-06-09T16:47:24Z | received | SP-72-4 |
| 16 | -- CM | CSP-SR | 2009-06-09T16:47:25Z | received | SP-72-4 |

| **No.** | **File Reference** |
| --- | --- |
| 1 | 20090609T164427.087Z\_OUTGOING\_CSP-I-72-1.management |
| 2 | 20090609T164431.759Z\_INCOMING\_MessageSet.management |
| 3 | 20090609T164432.744Z\_INCOMING\_MessageSet.management |
| 4 | 20090609T164520.135Z\_OUTGOING\_CSP-I-72-2.management |
| 5 | 20090609T164524.229Z\_INCOMING\_MessageSet.management |
| 6 | 20090609T164526.136Z\_INCOMING\_MessageSet.management |
| 7 | 20090609T164557.168Z\_OUTGOING\_CSP-I-72-3.management |
| 8 | 20090609T164602.480Z\_INCOMING\_MessageSet.management |
| 9 | 20090609T164603.168Z\_INCOMING\_MessageSet.management |
| 10 | 20090609T164636.981Z\_OUTGOING\_QSP-I-72-2.management |
| 11 | 20090609T164640.356Z\_INCOMING\_MessageSet.management |
| 12 | 20090609T164650.903Z\_OUTGOING\_QSP-I-72-3.management |
| 13 | 20090609T164654.075Z\_INCOMING\_MessageSet.management |
| 14 | 20090609T164719.795Z\_OUTGOING\_CSP-I-72-4.management |
| 15 | 20090609T164724.373Z\_INCOMING\_MessageSet.management |
| 16 | 20090609T164725.811Z\_INCOMING\_MessageSet.management |

## re-specification of configuration parameters

### goals

Verify that parameters of configuration profiles may be changed on a per service package basis.

### steps

1. [Preconditions: SpaceCommunicationsServiceProfile SCSP-73-A, SlsTsProfile, STP-73-A and RetrievalTsProfile RTP-73-A have been defined]
2. UM: CSP-I, SP-73-1 with a SpaceCommunicationServiceProfileRespecification data set with modification of a single space communication profile parameter, minimally rPolarization
3. CM: CSP-AR, CSP-SR with SpaceCommunicationServiceProfileInEffect data set returned indicating changed parameter
4. UM: issue QSP, and verify service package has attached SpaceCommunicationServiceProfileInEffect with changed parameters
5. UM: QSCSP-I, SCSP-73-A.
6. CM: QSCP-SR, SCSP-73-A with unchanged configuration information relative to the respecified service package
7. UM: Verify that the space communication service profile is unchanged and is in effect for only the service package
8. Repeat the above steps, for
9. Re-specifying the SlsTsProfile (STP-73-A)
10. Re-specifying the RetrievalTsProfile (RTP-73-A)

### log OF messages exchanged

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **No.** | **Sender** | **Message** | **Timestamp** | **State** | **Comment** |
| 1 | UM | CSP-I | 2009-04-08T18:47:25Z | SUCCEEDED | SP-73-1 |
| 2 | -- CM | CSP-AR | 2009-04-08T18:47:30Z | received | SP-73-1 |
| 3 | -- CM | CSP-SR | 2009-04-08T18:47:31Z | received | SP-73-1 |
| 4 | UM | QSP-I | 2009-04-08T18:47:41Z | SUCCEEDED | SP-73-1 |
| 5 | -- CM | QSP-SR | 2009-04-08T18:47:45Z | received | SP-73-1 |
| 6 | UM | QSCSP-I | 2009-04-08T18:49:06Z | SUCCEEDED | SCSP-73-A |
| 7 | -- CM | QSCSP-SR | 2009-04-08T18:49:09Z | received | SCSP-73-A |
| 8 | UM | RSP-I | 2009-04-08T18:51:55Z | SUCCEEDED | SP-73-1 |
| 9 | -- CM | RSP-AR | 2009-04-08T18:52:01Z | received | SP-73-1 |
| 10 | -- CM | RSP-SR | 2009-04-08T18:52:01Z | received | SP-73-1 |
| 11 | UM | QSP-I | 2009-04-08T18:52:16Z | SUCCEEDED | SP-73-1 |
| 12 | -- CM | QSP-SR | 2009-04-08T18:52:21Z | received | SP-73-1 |
| 13 | UM | CSP-I | 2009-04-08T18:52:23Z | SUCCEEDED | SP-73-2 |
| 14 | -- CM | CSP-AR | 2009-04-08T18:52:27Z | received | SP-73-2 |
| 15 | -- CM | CSP-SR | 2009-04-08T18:52:28Z | received | SP-73-2 |
| 16 | UM | QSP-I | 2009-04-08T18:52:33Z | SUCCEEDED | SP-73-2 |
| 17 | -- CM | QSP-SR | 2009-04-08T18:52:36Z | received | SP-73-2 |
| 18 | UM | QSCSP-I | 2009-04-08T18:53:10Z | SUCCEEDED | SCSP-73-A |
| 19 | -- CM | QSCSP-SR | 2009-04-08T18:53:14Z | received | SCSP-73-A |

|  |  |
| --- | --- |
| **No.** | **File Reference** |
| 1 | 20090408T184725.798Z\_OUTGOING\_CSP-I-73-1.management |
| 2 | 20090408T184730.845Z\_INCOMING\_MessageSet.management |
| 3 | 20090408T184731.704Z\_INCOMING\_MessageSet.management |
| 4 | 20090408T184741.658Z\_OUTGOING\_QSP-I-73-1.management |
| 5 | 20090408T184745.126Z\_INCOMING\_MessageSet.management |
| 6 | 20090408T184906.035Z\_OUTGOING\_QSCSP-I-73-A.management |
| 7 | 20090408T184909.441Z\_INCOMING\_MessageSet.management |
| 8 | 20090408T185155.695Z\_OUTGOING\_RSP-I-73-1.management |
| 9 | 20090408T185201.664Z\_INCOMING\_MessageSet.management |
| 10 | 20090408T185201.992Z\_INCOMING\_MessageSet.management |
| 11 | 20090408T185216.696Z\_OUTGOING\_QSP-I-73-1.management |
| 12 | 20090408T185221.055Z\_INCOMING\_MessageSet.management |
| 13 | 20090408T185223.368Z\_OUTGOING\_CSP-I-73-2.management |
| 14 | 20090408T185227.509Z\_INCOMING\_MessageSet.management |
| 15 | 20090408T185228.087Z\_INCOMING\_MessageSet.management |
| 16 | 20090408T185233.368Z\_OUTGOING\_QSP-I-73-2.management |
| 17 | 20090408T185236.743Z\_INCOMING\_MessageSet.management |
| 18 | 20090408T185310.838Z\_OUTGOING\_QSCSP-I-73-A.management |
| 19 | 20090408T185314.807Z\_INCOMING\_MessageSet.management |

## TENTATIVE SERVICE PACKAGE CREATION

### goals

Verify that a service package can be created via CM initiation, and UM confirmation.

### Steps

1. [Preconditions: SpaceCommunicationsServiceProfile, SCSP-74-A, SlsTsProfile STP-74-A with appropriate umber of (SLE) service instances, Trajectory Prediction, TP-74A data to be referenced are agreed upon in advance by UM + CM]
2. CM: Issue CTSP-I, SP-74-1 with agreed-upon values for various configuration profile, antenna references and trajectory prediction
3. UM: CTSP-AR, CTSP-SR, with a service package properly defined as follows:
4. contains one scenario only
5. no deferred data sets,
6. no re-specified configuration parameters,
7. configuration profile references as indicated in the CSTP-I
8. trajectory prediction as indicated in the CSTP-I
9. scheduled service package start and stop times in conformance with the CSTP-I
10. scheduled carrier start and stop times and performance with the CSTP-I
11. no event sequence references
12. same number, instances of transferServiceInstanceNumberRef parameter as the CSTP-I
13. UM: issue QSP-I, SP-74-1, utilizing the service package reference used in the CSTP operation.
14. CM: QSP-SR, with the same service package information as that provided via the CSTP-I message in step 3

### log OF messages exchanged

Initial Test Run:

| **No.** | **Sender** | **Message** | **Timestamp** | **State** | **Comment** |
| --- | --- | --- | --- | --- | --- |
| 1 | CM | CTSP-I | 2009-04-08T18:00:17Z | SUCCEEDED | sp1239213617056 |
| 2 | -- UM | CTSP-AR | 2009-04-08T18:01:44Z | received | sp1239213617056 |
| 3 | -- UM | CTSP-SR | 2009-04-08T18:02:22Z | received | sp1239213617056 |
| 4 | UM | QSP-I | 2009-04-08T18:05:18Z | TIMEDOUT | sp1239213617056 |
| 5 | CM | unrecognized | 2009-04-08T18:05:21Z | UNRECOGNIZED | trajectoryResult: does not conform to syntax of SM message set - with 0 values must have at least 1 values |
| 6 | -- UM | ums-er | 2009-04-08T18:05:22Z | uncorrelated | does not conform to syntax of SM message set |

| **No.** | **File Reference** |
| --- | --- |
| 1 | 20090408T180017.599Z\_INCOMING\_MessageSet.management |
| 2 | 20090408T180144.633Z\_OUTGOING\_CTSP-AR-74-1.management |
| 3 | 20090408T180222.805Z\_OUTGOING\_CTSP-SR-74-1.management |
| 4 | 20090408T180518.114Z\_OUTGOING\_QSP-I-74-1.management |
| 5 | 20090408T180521.942Z\_INCOMING\_MessageSet.management |
| 6 | (not recorded) |

Re-test after Schema correction:

| **No.** | **Sender** | **Message** | **Timestamp** | **State** | **Comment** |
| --- | --- | --- | --- | --- | --- |
| 1 | CM | CTSP-I | 2009-06-19T14:49:09Z | SUCCEEDED | sp1245422950201 |
| 2 | -- UM | CTSP-AR | 2009-06-19T14:51:38Z | received | sp1245422950201 |
| 3 | -- UM | CTSP-SR | 2009-06-19T14:52:42Z | received | sp1245422950201 |
| 4 | UM | QSP-I | 2009-06-19T14:53:40Z | SUCCEEDED | sp1245422950201 |
| 5 | -- CM | QSP-SR | 2009-06-19T14:53:43Z | received | sp1245422950201 |

|  |  |
| --- | --- |
| **No.** | **File Reference** |
| 1 | 20090619T144909.364Z\_INCOMING\_MessageSet.management |
| 2 | 20090619T145138.180Z\_OUTGOING\_CTSP-AR-74-1.management |
| 3 | 20090619T145242.478Z\_OUTGOING\_CTSP-SR-74-1.management |
| 4 | 20090619T145340.151Z\_OUTGOING\_QSP-I-74-1.management |
| 5 | 20090619T145343.698Z\_INCOMING\_MessageSet.management |

## APPLICATION OF NEW TRAJECTORY TO SERVICE PACKAGE

### goals

Verify that the recommendation supports applying new trajectory information to an existing service package.

### steps

1. [Precondition: a service package SP-75-1 with two service scenarios has been previously defined. The scenarios are defined such that they reference a different trajectory predictions; for the sake of this test plan called them "TP-75-A" and "TP-75-B".]
2. [Precondition: “TP-75-C”, has already been established via ATP operation]
3. UM: Issue ANT-I operation, reference service package “SP-75-1”, with existingTrajectoryRef of “TP-75-A” and newTrajectoryRef of “TP-75-C”
4. CM: Issue ANT-AR, ANT-SR, with SR containing two scenarios with references for “TP-75-B” and “TP-75-C”
5. UM: Issue QSP-I for “SP-75-1”
6. CM: QSP-SR with “SP-75-1”, containing two scenarios with references for “TP-75-B” and “TP-75-C”
7. UM issues ATP-I with one or more references incorrect; i.e. reference to service package or trajectory that does not exist and verify that CM produces the proper diagnostic(s).

### log OF messages excHanged

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **No.** | **Sender** | **Message** | **Timestamp** | **State** | **Comment** |
| 1 | UM | CSP-I | 2009-04-08T19:36:20Z | SUCCEEDED | SP-75-1 |
| 2 | -- CM | CSP-AR | 2009-04-08T19:36:28Z | received | SP-75-1 |
| 3 | -- CM | CSP-SR | 2009-04-08T19:36:29Z | received | SP-75-1 |
| 4 | UM | ANT-I | 2009-04-08T19:37:30Z | SUCCEEDED | SP SP-75-1 from TP-75-A to TP-75-C |
| 5 | -- CM | ANT-AR | 2009-04-08T19:37:35Z | received | SP-75-1 |
| 6 | -- CM | ANT-SR | 2009-04-08T19:37:35Z | received | SP-75-1 |
| 7 | UM | QSP-I | 2009-04-08T19:37:48Z | SUCCEEDED | SP-75-1 |
| 8 | -- CM | QSP-SR | 2009-04-08T19:37:51Z | received | SP-75-1 |
| 9 | UM | ANT-I | 2009-04-08T19:38:50Z | FAILEDWITHDENIAL | SP SP-75-1 from TP-75-B to TP-75-D |
| 10 | -- CM | ANT-FR | 2009-04-08T19:38:56Z | received | newTrajectoryRef non-existent; |
| 11 | UM | ANT-I | 2009-04-08T19:38:50Z | FAILEDWITHDENIAL | SP SP-75-1 from TP-75-E to TP-75-A |
| 12 | -- CM | ANT-FR | 2009-04-08T19:38:54Z | received | existingTrajectoryRef does not match any Service Scenario; |

| **No.** | **File Reference** |
| --- | --- |
| 1 | 20090408T193620.410Z\_OUTGOING\_CSP-I-75-1.management |
| 2 | 20090408T193628.691Z\_INCOMING\_MessageSet.management |
| 3 | 20090408T193629.426Z\_INCOMING\_MessageSet.management |
| 4 | 20090408T193730.365Z\_OUTGOING\_ANT-I-75-1.management |
| 5 | 20090408T193735.146Z\_INCOMING\_MessageSet.management |
| 6 | 20090408T193735.990Z\_INCOMING\_MessageSet.management |
| 7 | 20090408T193748.537Z\_OUTGOING\_QSP-I-75-1.management |
| 8 | 20090408T193751.896Z\_INCOMING\_MessageSet.management |
| 9 | 20090408T193850.851Z\_OUTGOING\_ANT-I-75-2.management |
| 10 | 20090408T193856.023Z\_INCOMING\_MessageSet.management |
| 11 | 20090408T193850.851Z\_OUTGOING\_ANT-I-75-2.management |
| 12 | 20090408T193854.882Z\_INCOMING\_MessageSet.management |

## APPLICATION OF NEW EVENT SEQUENCE TO SERVICE PACKAGE

### goals

Verify that the recommendation supports applying new event sequence information to an existing service package.

### steps

1. [Precondition: a service package “SP-76-1” with two service scenarios has been previously defined. The scenarios are defined such that they reference a different trajectory event sequence; for the sake of this test plan called them "SLEP-76-A" and "SLEP-76-B".]
2. [Precondition: “SLEP-76-C”, has already been established via ASLEP operation.]
3. UM: Issue ANSLEP-I operation, reference service package “SP-76-1”, with existingSpaceLinkEventsProfileRef of “SLEP-76-A” and newSpaceLinkEventsProfileRef of “SLEP-76-C”
4. CM: Issue ANSLEP-AR, ANSLEP-SR
5. UM: Issue QSP-I for “SP-76-1”
6. CM: QSP-SR with “SP-76-1”, containing two scenarios with references for “SLEP-76-B” and “SLEP-76-C” and the corresponding [R|F]SpaceLinkAvailableScheduledState and subordinate data sets as defined in the corresponding event profile definitions.

### log OF messages exchanged

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **No.** | **Sender** | **Message** | **Timestamp** | **State** | **Comment** |
| 1 | UM | ANSLEP-I | 2009-04-09T14:14:22Z | SUCCEEDED | SP-76-1 |
| 2 | -- CM | ANSLEP-AR | 2009-04-09T14:14:27Z | received | SP-76-1 |
| 3 | -- CM | ANSLEP-SR | 2009-04-09T14:14:28Z | received | SP-76-1 |
| 4 | UM | QSP-I | 2009-04-09T14:14:58Z | INVOKED | SP-76-1 |
| 5 | CM | unrecognized | 2009-04-09T14:15:02Z | UNRECOGNIZED | stateStartTimeWindowLag: does not conform to syntax of SM message set - contains a bad value stateStartTimeWindowLag: does not conform to syntax of SM message set - contains a bad value |
| 6 | -- UM | ums-er | 2009-04-09T14:15:02Z | uncorrelated | does not conform to syntax of SM message set |

|  |  |
| --- | --- |
| **No.** | **File Reference** |
| 1 | 20090409T141422.548Z\_OUTGOING\_ANSLEP-I-76-1.management |
| 2 | 20090409T141427.642Z\_INCOMING\_MessageSet.management |
| 3 | 20090409T141428.205Z\_INCOMING\_MessageSet.management |
| 4 | 20090409T141458.425Z\_OUTGOING\_QSP-I-76-1.management |
| 5 | 20090409T141502.065Z\_INCOMING\_MessageSet.management |
| 6 | (not recorded) |

Note the same schema problem as noted in section 7.1, leading to the SQP-SR not being recognized. The contents does, however, include references to the correct event profiles SLEP-76-C and SLEP-76-B.

## cm mODIFICATION OF SERVICE PACKAGE

### goals

Verify that the recommendation supports modification of the service package by CM.

### steps

1. [Precondition: a service package, SP-77-1, has been previously defined that contains spaceCommServiceStartTimeLead|Lag parameters and minimum|preferredServiceDuration parameters in at least one of its scenarios such that the time may change by at least several minutes]
2. CM: Issue SPM-N with modifications to all appropriate scheduled start/stop times in accordance with lead|lag parameters and duration of the invocation for creating ‘SP-77-1’
3. UM: Issue SPM-C
4. UM: Issue QSP-I for “SP-77-1”
5. CM: QSP-SR with “SP-77-1”, containing updated schedule start/stop times with the same values as the information produced in step 2.

### log OF messages exchanged

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **No.** | **Sender** | **Message** | **Timestamp** | **State** | **Comment** |
| 1 | CM | SPM-N | 2009-04-08T18:27:32Z | CONFIRMED | SP-77-1 |
| 2 | -- UM | SPM-C | 2009-04-08T18:27:33Z | received | SP-77-1 |
| 3 | UM | QSP-I | 2009-04-08T18:28:41Z | SUCCEEDED | SP-77-1 |
| 4 | -- CM | QSP-SR | 2009-04-08T18:28:45Z | received | SP-77-1 |

|  |  |
| --- | --- |
| **No.** | **File Reference** |
| 1 | 20090408T182732.720Z\_INCOMING\_MessageSet.management |
| 2 | 20090408T182733.111Z\_OUTGOING\_Confirmation.management |
| 3 | 20090408T182841.878Z\_OUTGOING\_QSP-I-77-1.management |
| 4 | 20090408T182845.207Z\_INCOMING\_MessageSet.management |

## off-line data retrieval service paCKAGE

### goals

Verify that the recommendation supports creation of service packages for retrieval of stored telemetry frames and that applicable service agreements limits are properly applied.

### steps

1. [Precondition: a service agreement, SA-78-A, has been previously defined that contains “small” values for maxRtrvlServicePackages and maxRtrvlServicePackagePerTimePeriod; [NOTE: Values of 1 (one) are considered sufficient for this test.] SA-78-A also has maxSlsServicePackages >= 2 and a correspondingly maxSlsServicePackagesPerTimePeriod of >=2 for one day.
2. [Precondition: service agreement SA-78-A, has values for maxSlsServicePackages and maxSlsServicePackagesPerTimePeriod of at least one greater than those use for maxRtrvlServicePackages and maxRtrvlServicePackagePerTimePeriod.]
3. [Precondition: a transfer service profile, TSP-78-A in reference to SA-78-A is already on file.]
4. UM: Issue CSP-I, servicePackageId of “SP-78-R1”, with RetrievalServicePackageRequest data set. [NOTE: Legal/defined antennaRef value for SA-78-A are used in the invocation.]
5. CM: Issues CSP-AR, CSP-SR.
6. UM: Issue CSP-I, servicePackageId of “SP-78-R2”, with RetrievalServicePackageRequest data set. [NOTE: Legal/defined antennaRef value for SA-78-A are used in the invocation.]
7. CM: Issue CSP-FR with diagnostic ‘exceeds maxRtrvlService­Packages’.
8. Repeat steps 4 through 6, but with service packages composed for SpaceLinkSessionServicePackageRequest/Result and names “SP-78-S1”, SP-78-S2”.
9. CM: Issues CSP-AR, CSP-SR for both SP-78-S1 and SP-78-S2; ie, verify that the retrieval package limit is not being applied to the Spacelink session package limit.

### log OF messages exchanged

| **No.** | **Sender** | **Message** | **Timestamp** | **State** | **Comment** |
| --- | --- | --- | --- | --- | --- |
| 1 | UM | CSP-I | 2009-04-08T19:55:13Z | SUCCEEDED | SP-78-R1 |
| 2 | -- CM | CSP-AR | 2009-04-08T19:55:17Z | received | SP-78-R1 |
| 3 | -- CM | CSP-SR | 2009-04-08T19:55:18Z | received | SP-78-R1 |
| 4 | UM | CSP-I | 2009-04-08T19:55:34Z | SUCCEEDED | SP-78-R2 |
| 5 | -- CM | CSP-AR | 2009-04-08T19:55:39Z | received | SP-78-R2 |
| 6 | -- CM | CSP-SR | 2009-04-08T19:55:41Z | received | SP-78-R2 |
| 7 | UM | CSP-I | 2009-04-08T19:55:53Z | FAILEDWITHDENIAL | SP-78-R3 |
| 8 | -- CM | CSP-FR | 2009-04-08T19:55:57Z | received | exceeds maxRtrvlServicePackages; |
| 9 | UM | CSP-I | 2009-04-08T19:57:15Z | SUCCEEDED | SP-78-S1 |
| 10 | -- CM | CSP-AR | 2009-04-08T19:57:19Z | received | SP-78-S1 |
| 11 | -- CM | CSP-SR | 2009-04-08T19:57:20Z | received | SP-78-S1 |
| 12 | UM | CSP-I | 2009-04-08T19:57:25Z | SUCCEEDED | SP-78-S2 |
| 13 | -- CM | CSP-AR | 2009-04-08T19:57:29Z | received | SP-78-S2 |
| 14 | -- CM | CSP-SR | 2009-04-08T19:57:30Z | received | SP-78-S2 |
| 15 | UM | CSP-I | 2009-04-08T19:57:35Z | SUCCEEDED | SP-78-S3 |
| 16 | -- CM | CSP-AR | 2009-04-08T19:57:40Z | received | SP-78-S3 |
| 17 | -- CM | CSP-SR | 2009-04-08T19:57:41Z | received | SP-78-S3 |
| 18 | UM | CSP-I | 2009-04-08T19:57:42Z | FAILEDWITHDENIAL | SP-78-S4 |
| 19 | -- CM | CSP-FR | 2009-04-08T19:57:46Z | received | exceeds maxSlsServicePackages; |

|  |  |
| --- | --- |
| **No.** | **File Reference** |
| 1 | 20090408T195513.407Z\_OUTGOING\_CSP-I-78-R1.management |
| 2 | 20090408T195517.829Z\_INCOMING\_MessageSet.management |
| 3 | 20090408T195518.439Z\_INCOMING\_MessageSet.management |
| 4 | 20090408T195534.424Z\_OUTGOING\_CSP-I-78-R2.management |
| 5 | 20090408T195539.674Z\_INCOMING\_MessageSet.management |
| 6 | 20090408T195541.033Z\_INCOMING\_MessageSet.management |
| 7 | 20090408T195553.846Z\_OUTGOING\_CSP-I-78-R3.management |
| 8 | 20090408T195557.065Z\_INCOMING\_MessageSet.management |
| 9 | 20090408T195715.536Z\_OUTGOING\_CSP-I-78-S1.management |
| 10 | 20090408T195719.504Z\_INCOMING\_MessageSet.management |
| 11 | 20090408T195720.442Z\_INCOMING\_MessageSet.management |
| 12 | 20090408T195725.458Z\_OUTGOING\_CSP-I-78-S2.management |
| 13 | 20090408T195729.598Z\_INCOMING\_MessageSet.management |
| 14 | 20090408T195730.552Z\_INCOMING\_MessageSet.management |
| 15 | 20090408T195735.536Z\_OUTGOING\_CSP-I-78-S3.management |
| 16 | 20090408T195740.396Z\_INCOMING\_MessageSet.management |
| 17 | 20090408T195741.599Z\_INCOMING\_MessageSet.management |
| 18 | 20090408T195742.974Z\_OUTGOING\_CSP-I-78-S4.management |
| 19 | 20090408T195746.083Z\_INCOMING\_MessageSet.management |

Note: Service Agreement was set up with maxRtrvlServicePackages = 2, and maxSlsServicePackages = 3. Test results show both limits being applied independently.

## DELETION OF SERVICE PACKAGE (DURING CREATION PROCESSING)

### goals

Verify that the recommendation supports deletion of a service package that has been requested but not yet created.

### steps

1. [Precondition: a service agreement, SA-79-A, has been previously defined that contains appropriately large values (sufficient time) for cspRoutineTimeout, cspUrgentTimeout, dspRoutineTimeout, and dspUrgentTimeout qspRoutineTimeout, and qspUrgentTimeout]
2. UM: CSP-I to request creation of service package SP-79-1, urgent == false
3. CM: CSP-AR.
4. UM: DSP-I for SP-79-1, urgent == false
5. CM: CSP-FR for SP-79-1.
6. UM: DSP-SR for SP-79-1.
7. UM: issue QSP-I, for SP-79-1, urgent == false
8. CM: QSP-FR, SP-79-1, diagnostic of ‘referenced service Package unknown’

### log OF messages exchanged

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **No.** | **Sender** | **Message** | **Timestamp** | **State** | **Comment** |
| 1 | UM | CSP-I | 2009-04-08T18:55:42Z | FAILEDWITHDENIAL | SP-79-1 |
| 2 | -- CM | CSP-AR | 2009-04-08T18:55:47Z | received | SP-79-1 |
| 3 | -- CM | CSP-FR | 2009-04-08T18:56:26Z | received | creation terminated by DSP operation; |
| 4 | UM | DSP-I | 2009-04-08T18:56:21Z | SUCCEEDED | SP-79-1 |
| 5 | -- CM | DSP-SR | 2009-04-08T18:56:24Z | received | SP-79-1 |
| 6 | UM | QSP-I | 2009-04-08T18:56:48Z | FAILED | SP-79-1 |
| 7 | -- CM | QSP-FR | 2009-04-08T18:56:51Z | received | referenced Service Package unknown; |
| 8 | UM | CSP-I | 2009-04-08T18:57:29Z | FAILEDWITHDENIAL | SP-79-1 |
| 9 | -- CM | CSP-AR | 2009-04-08T18:57:35Z | received | SP-79-1 |
| 10 | -- CM | CSP-FR | 2009-04-08T18:58:40Z | received | creation terminated by DSP operation; |
| 11 | UM | DSP-I | 2009-04-08T18:58:35Z | SUCCEEDED | SP-79-1 |
| 12 | -- CM | DSP-SR | 2009-04-08T18:58:38Z | received | SP-79-1 |
| 13 | UM | QSP-I | 2009-04-08T18:58:48Z | FAILED | SP-79-1 |
| 14 | -- CM | QSP-FR | 2009-04-08T18:58:51Z | received | referenced Service Package unknown; |

|  |  |
| --- | --- |
| **No.** | **File Reference** |
| 1 | 20090408T185542.076Z\_OUTGOING\_CSP-I-79-1.management |
| 2 | 20090408T185547.498Z\_INCOMING\_MessageSet.management |
| 3 | 20090408T185626.780Z\_INCOMING\_MessageSet.management |
| 4 | 20090408T185621.437Z\_OUTGOING\_DSP-I-79-1.management |
| 5 | 20090408T185624.983Z\_INCOMING\_MessageSet.management |
| 6 | 20090408T185648.390Z\_OUTGOING\_QSP-I-79-1.management |
| 7 | 20090408T185651.500Z\_INCOMING\_MessageSet.management |
| 8 | 20090408T185729.860Z\_OUTGOING\_CSP-I-79-1-b.management |
| 9 | 20090408T185735.470Z\_INCOMING\_MessageSet.management |
| 10 | 20090408T185840.518Z\_INCOMING\_MessageSet.management |
| 11 | 20090408T185835.424Z\_OUTGOING\_DSP-I-79-1-b.management |
| 12 | 20090408T185838.768Z\_INCOMING\_MessageSet.management |
| 13 | 20090408T185848.143Z\_OUTGOING\_QSP-I-79-1-b.management |
| 14 | 20090408T185851.034Z\_INCOMING\_MessageSet.management |

## SERVICE PACKAGES WITH HANDOVERS

### goals

Verify that the recommendation supports creation of service packages for simulated handover situation(s) with proper guard conditions.

### steps

1. [Precondition: a service agreement, SA-710-A, has been previously defined that contains handoversPermitted == ‘false’].
2. [Precondition: a service agreement, SA-710-B, has been previously defined that contains handoversPermitted­ == ‘true’, and handoverOverlap == 5 (seconds)].
3. UM: CSP-I, servicePackageId == SP-710-1, in reference to SA-710-A, handoversPermitted == ‘true’
4. CM: CSP-AR, CSP-FR, with diagnostic ‘parameter value not supported by referenced Service Agreement’, indicating the handoversPermitted parameter.
5. UM: CSP-I, servicePackageId == SP-710-2, in reference to SA-710-B, handoversPermitted == ‘true’ with a single ServiceScenario.
6. CM: CSP-AR, CSP-SR, with two SpaceLinkSessionServicePackageResult data sets, such that:
   1. The scheduledServicePackageStartTime == spaceCommServiceStartTime of the CSP-I of SP-710-1
   2. The scheduledServicePackageStopTime == spaceCommServiceStartTime + preferredServiceDuration of the CSP-I of SP-710-1
   3. The first SpaceLinkSessionServicePackageResult contains
      1. scheduledSpaceCommServiceStartTime == spaceCommServiceStartTime of the CSP-I of SP-710-2
      2. scheduledSpaceCommServiceStopTime == spaceCommServiceStartTime of the CSP-I of SP-710-2 – preferredServiceDuration/2 + handoverOverlap [NOTE: only the first ½ of the requested time is scheduled before the handover]
   4. The second SpaceLinkSessionServicePackageResult contains
      1. scheduledSpaceCommServiceStartTime == spaceCommServiceStartTime + preferredServiceDuration/2 – handoverOverlap of the CSP-I of SP-710-2 [NOTE: only the second ½ of the requested time is scheduled for after the handover]
      2. scheduledSpaceCommServiceStopTime == spaceCommServiceStartTime of the CSP-I of SP-710-2 – preferredServiceDuration/2

### log OF messages exchanged

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **No.** | **Sender** | **Message** | **Timestamp** | **State** | **Comment** |
| 1 | UM | CSP-I | 2009-04-08T20:05:05Z | FAILEDWITHDENIAL | SP-710-1 |
| 2 | -- CM | CSP-FR | 2009-04-08T20:05:09Z | received | parameter value not supported by referenced Service Agreement; |
| 3 | UM | CSP-I | 2009-04-08T20:05:44Z | SUCCEEDED | SP-710-2 |
| 4 | -- CM | CSP-AR | 2009-04-08T20:05:48Z | received | SP-710-2 |
| 5 | -- CM | CSP-SR | 2009-04-08T20:05:49Z | received | SP-710-2 |

|  |  |
| --- | --- |
| **No.** | **File Reference** |
| 1 | 20090408T200505.891Z\_OUTGOING\_CSP-I-710-1.management |
| 2 | 20090408T200509.016Z\_INCOMING\_MessageSet.management |
| 3 | 20090408T200544.033Z\_OUTGOING\_CSP-I-710-2.management |
| 4 | 20090408T200548.971Z\_INCOMING\_MessageSet.management |
| 5 | 20090408T200549.892Z\_INCOMING\_MessageSet.management |

## RETAIN ORIGINAL SERVICE PACKAGE

### goals

Verify that a service package that has been successfully created remains intact upon failure of an RSP operation to replace it.

### steps

1. [Precondition: a service agreement, SA-711-A, has been previously defined that contains allowedAntennaIds of “DSS-24”, and “DSS-26”.]
2. UM: CSP-I, servicePackageId == ‘SP-711-1’, in reference to SA-711-A, AntennaConstraints such that “DSS-24” is requested as ‘acceptable’ and “DSS-26” is indicated as ‘unacceptable’.
3. CM: CSP-AR, CSP-SR.
4. UM: Verify that SP-711-1 contains antennaRef == “DSS-24”
5. UM: RSP-I, servicePackageRef == ‘SP-711-1’, in reference to SA-711-A, AntennaConstraints such that “DSS-26” is requested as ‘acceptable’ and “DSS-24” is indicated as ‘unacceptable’.
6. CM: RSP-AR RSP-SR.
7. UM: Verify that SP-711-1 contains antennaRef == “DSS-26”
8. UM: RSP-I, servicePackageRef == ‘SP-711-1’, in reference to SA-711-A, AntennaConstraints such that “DSS-99” is requested as ‘acceptable’ and “DSS-26” is indicated as ‘unacceptable’.
9. CM: RSP-AR, RSP-FR, with diagnostic ‘parameter value not supported by referenced Service Agreement’, indicating the antennaRef parameter.
10. UM: QSP-SR, servicePackageRef == ‘SP-711-1’, in reference to SA-711-A.
11. CM: QSP-SR.
12. Repeat step 7.

### log OF messages exchanged

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **No.** | **Sender** | **Message** | **Timestamp** | **State** | **Comment** |
| 1 | UM | CSP-I | 2009-04-09T13:34:15Z | SUCCEEDED | SP-711-1 |
| 2 | -- CM | CSP-AR | 2009-04-09T13:34:19Z | received | SP-711-1 |
| 3 | -- CM | CSP-SR | 2009-04-09T13:34:20Z | received | SP-711-1 |
| 4 | UM | RSP-I | 2009-04-09T13:37:39Z | SUCCEEDED | SP-711-1 |
| 5 | -- CM | RSP-SR | 2009-04-09T13:37:45Z | received | SP-711-1 |
| 6 | -- CM | RSP-AR | 2009-04-09T13:37:45Z | received | SP-711-1 |
| 7 | UM | RSP-I | 2009-04-09T13:40:15Z | FAILEDWITHDENIAL | SP-711-1 |
| 8 | -- CM | RSP-FR | 2009-04-09T13:40:19Z | received | parameter value not supported by referenced Service Agreement; |
| 9 | UM | QSP-I | 2009-04-09T13:40:43Z | SUCCEEDED | SP-711-1 |
| 10 | -- CM | QSP-SR | 2009-04-09T13:40:46Z | received | SP-711-1 |

|  |  |
| --- | --- |
| **No.** | **File Reference** |
| 1 | 20090409T133415.057Z\_OUTGOING\_CSP-I-711-1.management |
| 2 | 20090409T133419.807Z\_INCOMING\_MessageSet.management |
| 3 | 20090409T133420.464Z\_INCOMING\_MessageSet.management |
| 4 | 20090409T133739.514Z\_OUTGOING\_RSP-I-711-1.management |
| 5 | 20090409T133745.123Z\_INCOMING\_MessageSet.management |
| 6 | 20090409T133745.342Z\_INCOMING\_MessageSet.management |
| 7 | 20090409T134015.604Z\_OUTGOING\_RSP-I-711-1-b.management |
| 8 | 20090409T134019.260Z\_INCOMING\_MessageSet.management |
| 9 | 20090409T134043.868Z\_OUTGOING\_QSP-I-711-1.management |
| 10 | 20090409T134046.962Z\_INCOMING\_MessageSet.management |

## Selection OF Alternate Scenario within SERVICE PACKAGE

### goals

Verify that the recommendation supports selection of an alternate scenario within an existing service package.

### steps

1. UM: Issue CSP-I operation for service package SP-712-1 with three service scenarios, called “S1”, “S2” and “S3”. The prime scenario is “S1”.
2. CM: Issue CSP-SR.
3. UM: Issue SAS-I operation, reference service package “SP-712-1”, with primeScenarioRef of “S3”.
4. CM: Issue SAS-SR.
5. UM: Issue QSP-I for “SP-712-1”
6. CM: QSP-SR with “SP-712-1”, containing primeScenarioRef “S3”.
7. UM: Issue SAS-I operation, reference service package “SP-712-1”, with primeScenarioRef of “S4”.
8. CM: Issue SAS-FR, with diagnostic ‘scenario reference unknown’.

### log OF messages excHanged

| **No.** | **Sender** | **Message** | **Timestamp** | **State** | **Comment** |
| --- | --- | --- | --- | --- | --- |
| 1 | UM | CSP-I | 2009-04-21T05:02:18Z | SUCCEEDED | SP-712-1 |
| 2 | -- CM | CSP-AR | 2009-04-21T05:02:24Z | received | SP-712-1 |
| 3 | -- CM | CSP-SR | 2009-04-21T05:02:26Z | received | SP-712-1 |
| 4 | UM | SAS-I | 2009-04-21T05:03:49Z | SUCCEEDED | SP SP-712-1 scenario S3 |
| 5 | -- CM | SAS-SR | 2009-04-21T05:03:53Z | received | SP-712-1 |
| 6 | UM | QSP-I | 2009-04-21T05:05:00Z | SUCCEEDED | SP-712-1 |
| 7 | -- CM | QSP-SR | 2009-04-21T05:05:04Z | received | SP-712-1 |
| 8 | UM | SAS-I | 2009-04-21T05:05:49Z | FAILEDWITHDENIAL | SP SP-712-1 scenario S4 |
| 9 | -- CM | SAS-FR | 2009-04-21T05:05:54Z | received | scenario reference unknown; |

|  |  |
| --- | --- |
| **No.** | **File Reference** |
| 1 | 20090421T050218.046Z\_OUTGOING\_CSP-I-712-1.management |
| 2 | 20090421T050224.781Z\_INCOMING\_MessageSet.management |
| 3 | 20090421T050226.156Z\_INCOMING\_MessageSet.management |
| 4 | 20090421T050349.031Z\_OUTGOING\_SAS-I-712-1.management |
| 5 | 20090421T050353.515Z\_INCOMING\_MessageSet.management |
| 6 | 20090421T050500.000Z\_OUTGOING\_QSP-I-712-1.management |
| 7 | 20090421T050504.390Z\_INCOMING\_MessageSet.management |
| 8 | 20090421T050549.812Z\_OUTGOING\_SAS-I-712-2.management |
| 9 | 20090421T050554.484Z\_INCOMING\_MessageSet.management |

# Detailed log of messages exchanged

## Logging overview

UMPA (UM) and CSSXP (CM) were each instrumented to capture/log inbound and outbound messages, provided that the messages were syntactically valid with regards to the XML schema utilized. For most of the tests in the FPI round of testing log files recording the issuance from UM and reception at CM followed by responses from CM to UM are captured in the log files of both prototype implementations. In the case of the notified operations (where CM initiates an interaction with UM) the message flow is the inverse from that described above but the same messaging convention is observed to facilitate audit trail verification.

Section 3 tests are about document exchange which, by definition, are aimed at producing errors to ensure that the error channel aspects of the recommendation are exercised. Since these messages are not syntactically valid, they are not captured in the prototype test application logs but are included directly in the section.

The following figure provides an overview of the naming conventions used in producing the log files and the audit scheme used in associating messages between the prototype partners. It should be noted that these messages were captured verbatim as seen on the wire and are in fact XML instance documents in conformance with the XML schema. Section 8.2 illustrates an example of the correlated message set exchanges via extraction following the audit scheme of the full log files included in section 8.3.

**Log File Audit Scheme.emf**

Figure ‑

## lOG Audit example

This example utilizes section 7.2. Steps 4 and 5 indicate the exchange of the three messages, in regard excluding the first antenna of the service agreement as being inappropriate for the requested service package, involving an invocation, an acknowledged return and a successful return. In reference to the second test run after corrections to the test plan, the log summary in section 7.2.3 reads:

…

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| 4 | UM | CSP-I | 2009-06-09T16:45:20Z | SUCCEEDED | SP-72-2 |
| 5 | -- CM | CSP-AR | 2009-06-09T16:45:24Z | received | SP-72-2 |
| 6 | -- CM | CSP-SR | 2009-06-09T16:45:26Z | received | SP-72-2 |

…

This indicates that the invocation message (CSP-I), as recorded by UMPA was successfully sent via the message exchange protocol on 06 June 2009, at 16:45:20 UTC (or Zulu, Z), in reference to service package “SP-72-2” as identified in the test plan, and that UMPA saw and recorded the acknowledged return (CSP-AR) four seconds later and the successful return (CSP-SR) two seconds after the acknowledged return.

The file reference of the log summary provides the following UMPA log file names:

|  |  |
| --- | --- |
| 4 | 20090609T164520.135Z\_OUTGOING\_CSP-I-72-2.management |
| 5 | 20090609T164524.229Z\_INCOMING\_MessageSet.management |
| 6 | 20090609T164526.136Z\_INCOMING\_MessageSet.management |

By opening the UMPA-Logs.zip file and extracting the file

“20090609T164520.135Z\_OUTGOING\_CSP-I-72-2.management”, it can be seen that this is

indeed a CSP-I message:

<?xml version="1.0" encoding="UTF-8"?>

<SmMessageSet xmlns="http://www.ccsds.org/SLE/ServiceManagement" xmlns:navwg="http://www.ccsds.org/NAVWG" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">

<sccsSmVersionRef>1.0.0</sccsSmVersionRef>

<smSource>Interop.Red3.ESOC.ESA</smSource>

<smDestination>CSSXP</smDestination>

<serviceAgreementRef>ESOC.ESA:JPL.NASA:Red3:SA-72-A</serviceAgreementRef>

<createServicePackageInvocation>

<messagePrivateAnnotation></messagePrivateAnnotation>

<messageSequenceNumber>3102</messageSequenceNumber>

<messageTimestamp>2009-06-09T16:45:20Z</messageTimestamp>

<urgentFlag>routine</urgentFlag>

<servicePackageId>SP-72-2</servicePackageId>

<createServicePackageRequest>

<spaceLinkSessionServicePackageRequest>

<handoversPermitted>false</handoversPermitted>

<importance>Standard</importance>

<primeScenarioRef>S1</primeScenarioRef>

<serviceScenario>

<scenarioId>S1</scenarioId>

<spaceCommunicationServiceRequest>

<spaceCommunicationServiceProfileRef>SCSP-72-AA</spaceCommunicationServiceProfileRef>

<spaceCommServiceStartTime>2009-06-10T00:00:00Z</spaceCommServiceStartTime>

<spaceCommServiceStartTimeLag>0</spaceCommServiceStartTimeLag>

<spaceCommServiceStartTimeLead>0</spaceCommServiceStartTimeLead>

<minimumServiceDuration>3600</minimumServiceDuration>

<preferredServiceDuration>3600</preferredServiceDuration>

<transferServiceDeferred>true</transferServiceDeferred>

<sequenceOfEventsDeferred>true</sequenceOfEventsDeferred>

<antennaConstraints>

<acceptabilityConstraintsType>unacceptable</acceptabilityConstraintsType>

<antenna>

<antennaRef>DSS-24</antennaRef>

<constraintType>unacceptable</constraintType>

</antenna>

</antennaConstraints>

<spaceLinkEventsTimeReference>absolute</spaceLinkEventsTimeReference>

</spaceCommunicationServiceRequest>

<trajectoryRef>TP-72-AA</trajectoryRef>

</serviceScenario>

</spaceLinkSessionServicePackageRequest>

</createServicePackageRequest>

</createServicePackageInvocation>

</SmMessageSet>

By indexing the cross-index spreadsheet tab “UMPA, CSSXP Mapping” (in section 8.3) via “20090609T164520.135Z\_OUTGOING\_CSP-I-72-2.management” the corresponding CSSXP message log file is “sle1244565925429.req”.

By opening the CSSXP-Logs.zip file and extracting the file

“sle1244565925429.req”, it can be seen that this is

indeed the same CSP-I message as sent by UMPA:

<?xml version="1.0" encoding="UTF-8"?>

<SmMessageSet xmlns="http://www.ccsds.org/SLE/ServiceManagement" xmlns:navwg="http://www.ccsds.org/NAVWG" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">

<sccsSmVersionRef>1.0.0</sccsSmVersionRef>

<smSource>Interop.Red3.ESOC.ESA</smSource>

<smDestination>CSSXP</smDestination>

<serviceAgreementRef>ESOC.ESA:JPL.NASA:Red3:SA-72-A</serviceAgreementRef>

<createServicePackageInvocation>

<messagePrivateAnnotation/>

<messageSequenceNumber>3102</messageSequenceNumber>

<messageTimestamp>2009-06-09T16:45:20Z</messageTimestamp>

<urgentFlag>routine</urgentFlag>

<servicePackageId>SP-72-2</servicePackageId>

<createServicePackageRequest>

<spaceLinkSessionServicePackageRequest>

<handoversPermitted>false</handoversPermitted>

<importance>Standard</importance>

<primeScenarioRef>S1</primeScenarioRef>

<serviceScenario>

<scenarioId>S1</scenarioId>

<spaceCommunicationServiceRequest>

<spaceCommunicationServiceProfileRef>SCSP-72-AA</spaceCommunicationServiceProfileRef>

<spaceCommServiceStartTime>2009-06-10T00:00:00Z</spaceCommServiceStartTime>

<spaceCommServiceStartTimeLag>0</spaceCommServiceStartTimeLag>

<spaceCommServiceStartTimeLead>0</spaceCommServiceStartTimeLead>

<minimumServiceDuration>3600</minimumServiceDuration>

<preferredServiceDuration>3600</preferredServiceDuration>

<transferServiceDeferred>true</transferServiceDeferred>

<sequenceOfEventsDeferred>true</sequenceOfEventsDeferred>

<antennaConstraints>

<acceptabilityConstraintsType>unacceptable</acceptabilityConstraintsType>

<antenna>

<antennaRef>DSS-24</antennaRef>

<constraintType>unacceptable</constraintType>

</antenna>

</antennaConstraints>

<spaceLinkEventsTimeReference>absolute</spaceLinkEventsTimeReference>

</spaceCommunicationServiceRequest>

<trajectoryRef>TP-72-AA</trajectoryRef>

</serviceScenario>

</spaceLinkSessionServicePackageRequest>

</createServicePackageRequest>

</createServicePackageInvocation>

</SmMessageSet>

Via a similar process, the file recording the acknowledged return from CSSXP to UMPA can be opened for examination:

UMPA log file name ‘20090609T164524.229Z\_INCOMING\_MessageSet.management’ correlations with CSSXP log file ‘sle1244565927323.res’, which contains the CSP-AR response from CSSXP to UMPA as shown below.

<SmMessageSet xmlns="http://www.ccsds.org/SLE/ServiceManagement" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">

<sccsSmVersionRef xmlns:navwg="http://www.ccsds.org/NAVWG">1.0.0</sccsSmVersionRef>

<smSource>CSSXP</smSource>

<smDestination>Interop.Red3.ESOC.ESA</smDestination>

<serviceAgreementRef xmlns:navwg="http://www.ccsds.org/NAVWG">ESOC.ESA:JPL.NASA:Red3:SA-72-A</serviceAgreementRef>

<createServicePackageAcknowledgedReturn xmlns:cssxp="http://www.ccsds.org/SLE/ServiceManagement">

<messagePrivateAnnotation>CSSXP</messagePrivateAnnotation>

<messageSequenceNumber>8980</messageSequenceNumber>

<messageTimestamp>2009-06-09T09:45:26Z</messageTimestamp>

<invocationMessageSequenceNumber>3102</invocationMessageSequenceNumber>

<expectedDispositionTime>2009-06-09T10:45:26Z</expectedDispositionTime>

<privateAnnotation>Nominal processing time.</privateAnnotation>

<servicePackageRef>SP-72-2</servicePackageRef>

</createServicePackageAcknowledgedReturn>

</SmMessageSet>

Similarly, the acknowledged return seen and recorded at UMPA can be examining the file 20090609T164524.229Z\_INCOMING\_MessageSet.management, shown below.

<SmMessageSet xmlns="http://www.ccsds.org/SLE/ServiceManagement" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">

<sccsSmVersionRef xmlns:navwg="http://www.ccsds.org/NAVWG">1.0.0</sccsSmVersionRef>

<smSource>CSSXP</smSource>

<smDestination>Interop.Red3.ESOC.ESA</smDestination>

<serviceAgreementRef xmlns:navwg="http://www.ccsds.org/NAVWG">ESOC.ESA:JPL.NASA:Red3:SA-72-A</serviceAgreementRef>

<createServicePackageAcknowledgedReturn xmlns:cssxp="http://www.ccsds.org/SLE/ServiceManagement">

<messagePrivateAnnotation>CSSXP</messagePrivateAnnotation>

<messageSequenceNumber>8980</messageSequenceNumber>

<messageTimestamp>2009-06-09T09:45:26Z</messageTimestamp>

<invocationMessageSequenceNumber>3102</invocationMessageSequenceNumber>

<expectedDispositionTime>2009-06-09T10:45:26Z</expectedDispositionTime>

<privateAnnotation>Nominal processing time.</privateAnnotation>

<servicePackageRef>SP-72-2</servicePackageRef>

</createServicePackageAcknowledgedReturn>

</SmMessageSet>

## log files

The logs files and correlation meta data file are embedded as objects in this document in the following table.

|  |  |  |
| --- | --- | --- |
| File | File Type/Description | Data |
| UMPA-Logs.zip | Zip file containing individual files for each message transmitted and received by the ‘UM’ (UMPA) in FPI. |  |
| CSSXP-Logs.zip | Zip fle containing individual files for each message transmitted and received by the ‘CM’ (CSSXP) in FPI. |  |
| UMPA-CSSXP-Correlation.xlsx | Two spreadsheets containing 1) (UMPA,CSSXP) message log filename mapping pairs; 2) (CSSX,UMPA) message log file mapping pairs. |  |
| UncorrelatedLogs.xlsx | A small number of message log files were not coorelated; this provides a listing and commentary. |  |

# jaxa/jpl-nasa shadow tracking test plan

**QNX-070010**

**TEST PLAN**

**FOR**

**JAXA-JPL SHADOW TRACKING TEST**

**February 2008**

**Issue 1**

PREPARED BYSORUN CORPORATIONFOR

JAPAN AEROSPACE EXPLOATION AGENCY (JAXA)

TECHNICAL REVIEW

|  |  |  |  |
| --- | --- | --- | --- |
| JAXA |  |  |  |
| Approved By: | K. Yamada  Consolidated Space Tracking  and Data Acquisition Department  (CSTD) |  | Date |
| Reviewed By: | N. Yagi  Consolidated Space Tracking  and Data Acquisition Department  (CSTD) |  | Date |
| JPL |  |  |  |
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REVISION CONTROL

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AMENDMENT POLICY

This document shall be amended by releasing a new edition of the document in its entirety. The Amendment Record Sheet below records the history and issue status of this document.

AMENDMENT RECORD SHEET

| ISSUE | DATE | DCI No. | REASON |
| --- | --- | --- | --- |
| Draft1 | 25 June 2007 | N/A | Initial Draft for JAXA review |
| Draft2 | 27 Nov. 2007 | N/A | 2nd Draft for JPL review |
| 1 | 26 Feb. 2008 | N/A | First issue |
|  |  |  |  |
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## INTRODUCTION

### PURPOSE

This document provides information concerning the activities associated with Shadow Track Test of CCSDS SLE transfer services and SLE service management to allow both agencies to understand the test objectives, resources required and time needed for conduct of the tests. Provided herein are:

- Major objectives to be satisfied

- Test scenario and test cases

- Detailed test procedure

- Preliminary schedule, Test Periods and Documentation

### SCOPE

The Shadow Tracking Test Plan will document the testing required to confirm that Japan Aerospace Exploration Agency (JAXA) SLE GW Systems can interface with the Deep Space Network (DSN) of the Jet Propulsion Laboratory (JPL) for the support of a JAXA’s spacecraft on orbit.

This SLE interface includes the following services:

- SLE service management

- SLE transfer services

This document focuses the only tracking SELENE via arrangements utilizing the service management prototype interface, although both JPL and JAXA may receive two telemetry streams simultaneously from two stations which are different respectively in JPL and JAXA.

### PREREQUISITES

Prerequisites for conduct of all shadow track testing are:

a) One data line and one voice line are active between JPL/Pasadena and JAXA/Tsukuba/Sagamihara. And the interface for service management is provided via internet between JPL/Pasadena and JAXA/Tsukuba.

b) The target spacecraft for testing is the JAXA’s spacecraft; the Selenological and Engineering Explorer (SELENE) launched in Sep 2007.

1. JAXA configures the following systems as a user side.
   * SLE Service User system for transfer service
   * SLE Utilization Management system (UMR-1) prototype for service management
   * Mission Data Operation System(MDOS) for SELENE
   * JAXA navigation system (uFDS) for the issues of Trajectory predictions
   * JAXA plans to receive telemetry simultaneously from two stations, one is a DSN station and another is a JAXA ground station. And the JAXA ground station will bring carrier up.
2. JPL configures the following systems as a provider side.
   * the Command Control Processor (CCP) and the Telemetry Data Server (TDS) subsystems for transfer service
   * SLE Complex Management system, the JPL SLE Service Management prototype (CSSXP) included the CM Test Harness (CM-TH) for service management
3. The difference of implemented service management operations between JPL and JAXA is shown the table 1.3-1.

**Table 1.3-1 The difference of Implemented service management operations**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| SM Service | Operations |  | JPL | JAXA | InterOPR Testing | Shadow Track |
| Service Agreement | Query Service Agreement | QSA | X | X | X | X |
| Trajectory Prediction | Add Trajectory Prediction | ATP | X | X | X | X |
|  | Delete Trajectory Prediction | DTP | X | X | X |  |
|  | Query Trajectory Prediction | QTP | X |  | N/A | N/A |
| Configuration Profile | Add Carrier Profile | ACP | X | X | X | X |
|  | Delete Carrier Profile | DCP | X | X | X |  |
|  | Query Carrier Profile | QCP | X | X | X |  |
|  | Add Event Profile | AEP |  |  | N/A | N/A |
|  | Delete Event Profile | DEP |  |  | N/A | N/A |
|  | Query Event Profile | QEP |  |  | N/A | N/A |
| Service Package | Create Service Package | CSP | X | X | X | X |
|  | Delete Service Package | DSP | X | X | X |  |
|  | Select Alternate Scenario | SAS | X |  | N/A | N/A |
|  | Apply New Trajectory | ANT |  | X | N/A | N/A |
|  | Query Service Package | QSP | X | X | X |  |
|  | Replace Service Package | RSP |  | X | N/A | N/A |
|  | Service Package Cancelled | SPC | X | X | X |  |
|  | Service Package Modified | SPM |  |  | N/A | N/A |

### APPLICABLE DOCUMENT

The document listed here was applied to develop the requirements identified in this plan.

* + 1. ICD FOR SLE SERVICE MANAGEMENT PROTOTYPE BETWEEN JAXA AND NASA/JPL

(QNX-070011, Feb 2008)

* + 1. SPACE LINK EXTENTION SERVICE MANAGEMENT SERVICE SPACIFICATION

(CCSDS 910.11-R-1)

* + 1. SPACE LINK EXTENTION RETURN ALL FRAMES SERVICE SPACIFICATION

(CCSDS 911.1-R-2(Nov.2000))

* + 1. SPACE LINK EXTENTION FORWARD CLTU SERVICE SPACIFICATION

(CCSDS 912.1-R-2(Feb.2000))

### REFERENCE DOCUMENT

The document listed here was referenced to develop the requirements identified in this plan.

1. CROSS SUPPORT CONCEPT PART-1 SPACE LINK EXTENTION SERVICE

(CCSDS 910.3-G-3)

1. TEST PLAN FOR JAXA-JPL SLE INTEROPERABILITY TEST

(QNX-070009, Issue2, Nov 2007)

1. INTERFACE CONTROL DOCUMENT BETWEEN JAXA AND NASA/JPL FOR SELENE

(JAXA-RBX-06051A, Rev.A, Sep 2007)

## MAJOR TEST OBJECTIVES

The SLE Shadow Track Test consists of the following two phases:

* SLE Service Management Test;
* SLE Transfer Service Test;

The major test objective of Shadow Track Test is to verify and demonstrate the following interfaces:

* + The JAXA SLE UM Prototype for Red-1 (UMR-1) can interface with the JPL SLE Service Management prototype (CSSXP) for SLE Service Management service.
  + Based on the service packages and the trajectory predictions planned by the above service management interface, the JPL/DSN stations can acquire the SELENE.
  + The JAXA/SOAC SLE Service User System can interface with the JPL Fwd/Rtn Service provider (CCP/TDS) for SLE Transfer Service.

The target spacecraft of these support service is the JAXA’s spacecraft, which is assumed the SELenological and ENgineering Explorer (SELENE) launched in Sep 2007.

The objectives to be verified or demonstrated are following.

### SLE Service Management Testing

Concerning SLE service management, JAXA use the prototype system as Utilization Management developed in Tsukuba.

The objective of the SLE Service Management Test is to verify the interface of the SLE Service Management in the both agencies system intended to support the SELENE mission. This proves that the SLE Service Management implemented as a prototype in the service management systems at JPL and TACC are able to do following tests correctly.

* Conclusion and reference of Service Agreement
* Addition and use of Trajectory data
* Addition and use of Configuration Profile
* Submission and use of Service Package

### SLE Transfer Service Test

Concerning SLE transfer service, JAXA use the operational system as a User Gateway in Sagamihara and the data line is already established for SELENE critical phase support.

The objective of the SLE Transfer Service Test is to demonstrate the space link with actual spacecraft and the SLE transfer service using the resources which are assigned in the SLE Service Management test. But the forward carrier and CLTU service are not operated in this SLE Transfer Service Test.

The verification of tracking in the shadow track are to confirm the following items.

* Transfer service can be started and closed at the planned timing.
* DSN tracking station can acquire and track the SELENE correctly.
* Telemetry data can be transmitted correctly from station through SELENE MDOS(SOAC).

## TEST CONFIGURATION

For the reference of this document, see the figure3-1 for an overview of the voice and communication to be employed. And the figure3-2 shows test configuration.

JPL

JAXA/TACC

SLE SM/UM (Red-1)

(UMR-1)

Router

Router



Internet

SLE Rtn Service Provider(TDS)

SLE Fwd Service Provider

(CCP)

VoIP

(Already established by SELENE)

SLE

ServiceUser



Router

Voice

System

JAXA/SOAC

DSN

Stations

Voice

RAF/F-CLTU data

SM data



Voice on the black phone

SELENE

MDOS

Voice

System



SLE SM/CM

(CSSXP)

CM-TH



Figure ‑ Voice Configuration

**CCP**

**CCP**

SOAC

**UPA2**

**(DSS**

**-**

**24)**

**-**

**UPA2**

**(DSS**

**-**

**24)**

**-**

**CMD**

**SLE**

**CMD**

**SLE**

**UPA1**

**(DSS**

**-**

**27)**

**CMD**

**-**

**SLE**

**UPA1**

**(DSS**

**-**

**27)**

**CMD**

**-**

**SLE**

**UPA2**

**(DSS**

**-**

**27)**

**CMD**

**-**

**SLE**

**UPA2**

**(DSS**

**-**

**27)**

**CMD**

**-**

**SLE**

Goldstone

JPL

**SLE1**

**TLM SLE**

**SLE1**

**TLM SLE**

**SLE2**

**TLM SLE**

**SLE2**

**TLM SLE**

**TDS**

**JPL**

**Isolation**

**Router**

**JPL**

**Isolation**

**Router**

**JAXA**

**Router**

**SLE2**

**SLE-User**

**SLE1**

**SLE-User**

**UPA2**

**(DSS**

**-**

**24)**

**-**

**UPA1**

**(DSS**

**-**

**24)**

**-**

**CMD**

**SLE**

**CMD**

**SLE**

**SELENE**

**MDOS**

**SELENE**

**MDOS**



Internet

**CSSXP**

TACC



**UMR-1**

**uFDS**



**Tsukuba Control**

**JAXA FDS**

**JPL COMM**

**SELENE OPS**

**CSSXP**

**OPS CHIEF**

**DATA CONTROL**

**SELENE NOPE**



**DSS-24**

**DSS-27**

Figure ‑ Test Configuration

## POSITION RESPONSIBILITIES

In the POSITION field of the test procedure, identifiers are used to indicate the post that should be responsible for the execution of the procedure step. The table 4-1 shows the set of positions, call signs and responsibilities. And locations of positions are shown in the figure 3-2.

**Table 4-1 Position Responsibilities**

|  |  |  |
| --- | --- | --- |
| Position | Call-sign | Responsibilities |
| UMR-1  (TACC) | Tsukuba Control | 1. Responsible for service management operation and control at TACC.  2. The point of control for the service management operation.  3. Lead the briefing/debriefing of service management interface test.  4. Provide support in isolating any problems that may arise across the interface. |
| SELENE OPS  (SOAC) | SELENE OPS | 1. Responsible for satellite operation and control.  2. Responsible for transfer service operation.  3. The point of control for the SELENE tracking.  4. Lead the briefing/debriefing of SELENE tracking. |
| JAXA FDS | JAXA FDS | Responsible for OEM processing data. |
| CSSXP | CSSXP | 1. Responsible for resolving any problems which are determined in service management at JPL.  2. Responsible for service management operation and control at JPL. |
| DSN Operations Chief | OPS CHIEF | Responsible for DSN operation and control. |
| DSN Communications Chief | JPL COMM | Responsible for communication between JAXA and JPL. |
| Data Support Operations Team | DATA CONTROL | Responsible for SLE RAF operation at JPL/Pasadena. |
| DSS Link Controller | DSS-24  or  DSS-27 | 1. Responsible for tracking operations at DSS station.  2. Reporting of the BOT/LOS status in satellite acquisition. |
| Network Operations Project Engineer | SELENE NOPE | 1. Responsible for resolving any problems which are determined to be in JPL/DSN for SELENE tracking.  2. Voice coordinator between SOAC and DSS station.  3. The point of contact for termination, extension or rescheduling of test periods. |

## TESTING SCENARIO

This section outlines the test scenario to allow both agencies to understand the test resources required and time needed for conduct of the tests.

The table 5-1 shows the outline and test cases of this testing.

**Table 5-1 Test Scenario and Test Cases**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Test Case | OPR category | Test Operations |  | Direction | Test Purpose |
| 1 | Preparation #1 | Query Service Agreement | QSA | UM->CM | To confirm the Service Agreement |
|  |  | Add Carrier Profile | ACP | UM->CM | To provide Fwd Carrier Profile |
|  |  | Add Carrier Profile | ACP | UM->CM | To provide Rtn-1 Carrier Profile  (40kbps) |
|  |  | Add Carrier Profile | ACP | UM->CM | To provide Rtn-2 Carrier Profile  (2kbps) |
|  |  | Add Trajectory Prediction | ATP | UM->CM | To provide latest Trajectory Prediction |
|  |  | Create Service Package | CSP | UM->CM | To provide Service Package (Pass #1) |
|  | Tracking #1 | Acquisition #1 on Pass #1 | - | - | To confirm the normal tracking |
|  | Tracking #2 | Acquisition #2 on Pass #1 | - | - | To confirm the normal tracking |
| 2 | Preparation #2 | Create Service Package | CSP | UM->CM | To provide Service Package (Pass #2) |
|  | Tracking #3 | Pass #2 | - | - | To confirm the normal tracking |
| 3 | Preparation #3 | Add Trajectory Prediction | ATP | UM->CM | To provide latest Trajectory Prediction,  if it has been updated |
|  |  | Create Service Package | CSP | UM->CM | To provide Service Package (Pass #3) |
|  | Tracking #4 | Pass #3 | - | - | To confirm the normal tracking |

The figure 5-1 to 5-4 shows the timeline and resources of this testing.

In the following sections each group of tests is discussed in the following way:

* **Goals**: describes the aims of the tests.
* **Pre-requisites**: describes what software or data need to be in place for the tests to occur.
* **Test Procedures**: provides a set of procedures, which constitute a test group. Each procedure is described at a high level of abstraction, but provides enough information for it to be mapped to an implementation-specific test-plan.
* **Test Notes**: which record implementation issues that are though to be of interest.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Date  Resource | Feb 28 | Feb 29 | Mar 1 | Mar 2 | Mar 3 | Mar 4 | Mar 5 | Mar 6 |
| DOY 059 | DOY 060 | DOY 061 | DOY 062 | DOY 063 | DOY 064 | DOY 065 | DOY 066 |
| SLE-SM  **Test Case 1** | 2 Oprs  6 Oprs  **Test Case 2** |  |  |  |  | 2 Oprs  **Test Case 3** |  |  |
| Pass Opr |  |  | Pass#1  Acq#2  Acq#1 |  | Pass#2  Acq#3 |  |  | Pass#3  Acq#4 |
| SLE Transfer  (Only RAF) |  |  | Trk#2  Trk#1 |  | Trk#3 |  |  | Trk#4 |

**Figure 5-1 TEST TIMELINE**

ACP

Test Case

Resource

SLE-SM

CSSXP(JPL)

Pass Opr

Test Case 1

QSA

ATP

UMR-1(JAXA)

CSP

SLE Transfer

(Only RAF)

Feb 28(DOY 059)

Pass-1

TDS(JPL)

SOAC(JAXA)

3 ACPs(Fwd x 1,Rtn x 2)

see Table 5-1

March 1(DOY 061)

ACP

ACP

TransferService

TransferService

TransferService

ServiceUse

TransferService

ServiceUse

BOA

BOT

13:00

EOT

14:00

BOT

14:20

EOT

15:00

EOA

SpaceLink

SpaceLink

Acquisition

#1

Acquisition

#2

Pass#1

**Figure 5-2 TEST CASE 1 TIMELINE**

Test Case

Resource

SLE-SM

CSSXP(JPL)

Pass Opr

Test Case 2

SpaceLink

TransferService

UMR-1(JAXA)

CSP

SLE Transfer

(Only RAF)

Pass-3

TDS(JPL)

SOAC(JAXA)

TransferService

ServiceUse

Feb 28(DOY 059)

March 3(DOY 063)

Acquisition

#3

BOA

BOT

13:00

EOT

14:35

EOA

Pass#2

**Figure 5-3 TEST CASE 2 TIMELINE**

urgent

urgent

Test Case

Resource

SLE-SM

CSSXP(JPL)

Pass Opr

Test Case 3

ATP

UMR-1(JAXA)

CSP

SLE Transfer

(Only RAF)

Pass-4

TDS(JPL)

SOAC(JAXA)

The behavior of CSSXP will not change.

Mar 4 (DOY 064)

March 6(DOY 066)

SpaceLink

TransferService

TransferService

ServiceUse

Acquisition

#4

BOA

BOT

20:50

EOT

22:15

EOA

Pass#3

**Figure 5-4 TEST CASE 3 TIMELINE**

## TEST PROCEDURE

This section outlines the test approach to be adopted, and explains why this document is organized in the way that it is.

### Test Case 1

#### Goals

The goals of test case 1 are as follows:

1. Necessary service management information is exchanged between UMR-1 and CSSXP.
2. UMR-1 can generate two acquisition requests in one service package for SELENE operation.
3. Transfer service can be started and closed at the timing planned by above service package.
4. DSN tracking station acquires and tracks the SELENE correctly.
5. Telemetry data can be transmitted correctly from station through SELENE MDOS.

#### Pre-requisites

The following pre-requisites are necessary:

1. Provided the necessary information for the Cross Support by ICD.
2. Completion of the interoperability test of SLE Service Management.
3. Service Agreement for this Shadow Track test is provided into CSSXP in JPL/NASA.
4. Voice interface is established among JAXA/TACC/SOAC and NASA/JPL.

#### Test Procedures

| Step |  | Action |  | Expected result |
| --- | --- | --- | --- | --- |
| **[Service Management Interface #1]**  Test Date: / /2008  Test Period: : - : (UT) | | | | |
|  | UMR-1 | Conduct briefing with CSSXP for starting test case 1. |  |  |
|  | UMR-1 | Send QSA invocation |  |  |
|  | CSSXP | Send QSA return | UMR-1 | Receive QSA-SR |
|  | UMR-1 | Send ACP(1) invocation |  | ACP(1) has F401SpaceLinkCarrier |
|  | CSSXP | Send ACP(1) return | UMR-1 | Receive ACP-AR(1),  Receive ACP-SR(1) |
|  | UMR-1 | Send ACP(2) invocation |  | ACP(2) has R401SpaceLinkCarrier (40kbps) |
|  | CSSXP | Send ACP(2) return | UMR-1 | Receive ACP-AR(2),  Receive ACP-SR(2) |
|  | UMR-1 | Send ACP(3) invocation |  | ACP(3) has R401SpaceLinkCarrier (2kbps) |
|  | CSSXP | Send ACP(3) return | UMR-1 | Receive ACP-AR(3)  Receive ACP-SR(3) |
|  | UMR-1 | Send ATP invocation |  |  |
|  | CSSXP | Send ATP return | UMR-1 | Receive ATP-SR |
|  | UMR-1 | Send CSP(1) invocation |  | CSP(1) has two ReturnCarrierRequests on Pass#1 |
|  | CSSXP | Send CSP(1) return | UMR-1 | Receive CSP-AR(1),  Receive CSP-SR(1) |
|  | UMR-1 | Confirm returned schedule in CSP-SR(1). | UMR-1 | Expect the same schedule as the invocated CSP(1). |
|  | UMR-1 | Inform the connection start/end time of Pass#1 to SOAC | SOAC | Receive the connection start/end time of Pass#1. |
| **[SELENE Tracking#1 on Pass#1]**  Test Date: / /2008  Test Period: : - : (UT) | | | | |
|  | SELENE OPS | Voice check with JPL COMM. |  | BOA of Tracking#1 on Pass#1 |
|  | SELENE OPS | Conduct pre-track briefing with DSS-27 |  | F-CLTU service is not required. (No commanding.) |
|  | DSS-27 | Configure station accordingly |  |  |
|  | SELENE OPS | Establish RAF bind with TLM SLE. |  |  |
|  | DSS-27 | Announce BOT time to SELENE OPS. | SELENE OPS | BOT= : : (UT)  Start receiving RAF data. |
|  | SELENE OPS | Verify telemetry quality received from DSS. |  | BOT+1 min |
|  | SELENE OPS | Monitor telemetry receiving from DSS. |  |  |
|  | DSS-27 | Announce EOT time to SELENE OPS. | SELENE OPS | EOT= : : (UT)  Stop receiving RAF data. |
|  | SELENE OPS | Provide post-track debrief. |  | Next Voice Contact  = : : (UT) |
| **[SELENE Tracking#2 on Pass#1]**  Test Date: / /2008  Test Period: : - : (UT) | | | | |
|  | SELENE OPS | Conduct pre-track briefing with DSS-27 |  | F-CLTU service is not required. (No commanding.) |
|  | SELENE OPS | Establish RAF bind with TLM SLE. |  | (TBD) |
|  | DSS-27 | Announce BOT time to SELENE OPS. | SELENE OPS | BOT= : : (UT)  Start receiving RAF data. |
|  | SELENE OPS | Verify telemetry quality received from DSS. |  | BOT+1 min |
|  | SELENE OPS | Monitor telemetry receiving from DSS. |  |  |
|  | DSS-27 | Announce EOT time to SELENE OPS. | SELENE OPS | EOT= : : (UT)  Stop receiving RAF data. |
|  | SELENE OPS | Provide post-track debrief. |  |  |
|  | DSS-27 | Begin teardown activities. |  |  |
|  | SELENE OPS | Declare of EOA. |  | EOA of Tracking#2 on Pass#1  Next Voice Contact  = : : (UT) |

#### Test Notes

CSP(1) has two sets of ReturnCarrierRequest and does not have ForwardCarrierRequest and CltuServiceInstanceRequest.

### Test Case 2

#### Goals

The goals of test case 2 are as follows:

1. UMR-1 can generate the second service package for SELENE operation before the first one is carried out.
2. CSSXP accepts the second service package before the first one is carried out.
3. Transfer service can be started and closed at the timing planned by one of service packages.
4. DSN tracking station acquires and tracks the SELENE correctly.
5. Telemetry data can be transmitted correctly from station through SELENE MDOS.

#### Pre-requisites

The following pre-requisites are necessary:

1. Completion of the Service Management Interface #1(the step 1-1 to 1-15) in test case 1.
2. Same as the section 6.1.2.

#### Test Procedures

| Step |  | Action |  | Expected result |
| --- | --- | --- | --- | --- |
| **[Service Management Interface #2]**  Test Date: / /2008  Test Period: : - : (UT) | | | | |
|  | UMR-1 | Conduct briefing with CSSXP for starting test case 2. |  |  |
|  | UMR-1 | Send CSP(2) invocation |  | CSP(2) has Pass#2 operation parameters |
|  | CSSXP | Send CSP(2) return | UMR-1 | Receive CSP-AR(2),  Receive CSP-SR(2) |
|  | UMR-1 | Confirm returned schedule in CSP-SR(2) | UMR-1 | Expect the same schedule as the invocated CSP(2). |
|  | UMR-1 | Inform the connection start/end time of Pass#2 to SOAC | SOAC | Receive the connection start/end time of Pass#2 |
| **[SELENE Tracking #3]**  Test Date: / /2008  Test Period: : - : (UT) | | | | |
|  | SELENE OPS | Voice check with JPL COMM. |  | BOA of Pass#2 |
|  | SELENE OPS | Conduct pre-track briefing with DSS-27 |  | F-CLTU service is not required. (No commanding.) |
|  | DSS-27 | Configure station accordingly |  |  |
|  | SELENE OPS | Establish RAF bind with TLM SLE. |  |  |
|  | DSS-27 | Announce BOT time to SELENE OPS. | SELENE OPS | BOT= : : (UT)  Start receiving RAF data. |
|  | SELENE OPS | Verify telemetry quality received from DSS. |  | BOT+1 min |
|  | SELENE OPS | Monitor telemetry receiving from DSS. |  |  |
|  | DSS-27 | Announce EOT time to SELENE OPS. | SELENE OPS | EOT= : : (UT)  Stop receiving RAF data. |
|  | SELENE OPS | Provide post-track debrief. |  |  |
|  | DSS-27 | Begin teardown activities. |  |  |
|  | SELENE OPS | Declare of EOA. |  | EOA of Pass#2  Next Voice Contact  = : : (UT) |

#### Test Notes

CSP(2) does not have ForwardCarrierRequest and CltuServiceInstanceRequest.

### Test Case 3

#### Goals

The goals of test case 3 are as follows:

1. UMR-1 can generate a service management messages which has the urgentFlag parameter 'urgent'.

#### Pre-requisites

The following pre-requisites are necessary:

1. Same as the section 6.1.2.

#### Test Procedures

| Step |  | Action |  | Expected result |
| --- | --- | --- | --- | --- |
| **[Service Management Interface #3]**  Test Date: / /2008  Test Period: : - : (UT) | | | | |
|  | UMR-1 | Conduct briefing with CSSXP for starting test case 3. |  |  |
|  | UMR-1 | Send ATP invocation |  | The urgentFlag parameter is 'urgent'. |
|  | CSSXP | Send ATP return | UMR-1 | Receive ATP-SR |
|  | UMR-1 | Send CSP(3) invocation |  | CSP(3) has Pass#3 operation parameters.  The urgentFlag parameter is 'urgent'. |
|  | CSSXP | Send CSP(3) return | UMR-1 | Receive CSP-AR(3),  Receive CSP-SR(3) |
|  | UMR-1 | Confirm returned schedule in CSP-SR(3) | UMR-1 | Expect the same schedule as the invocated CSP(3). |
|  | UMR-1 | Inform the connection start/end time of Pass#3 to SOAC | SOAC | Receive the connection start/end time of Pass#3 |
| **[SELENE Tracking #4]**  Test Date: / /2008  Test Period: : - : (UT) | | | | |
|  | SELENE OPS | Voice check with JPL COMM. |  | BOA of Pass#3 |
|  | SELENE OPS | Conduct pre-track briefing with DSS-24 |  | F-CLTU service is not required. (No commanding.) |
|  | DSS-24 | Configure station accordingly |  |  |
|  | SELENE OPS | Establish RAF bind with TLM SLE. |  |  |
|  | DSS-24 | Announce BOT time to SELENE OPS. | SELENE OPS | BOT= : : (UT)  Start receiving RAF data. |
|  | SELENE OPS | Verify telemetry quality received from DSS. |  | BOT+1 min |
|  | SELENE OPS | Monitor telemetry receiving from DSS. |  |  |
|  | DSS-24 | Announce EOT time to SELENE OPS. | SELENE OPS | EOT= : : (UT)  Stop receiving RAF data. |
|  | SELENE OPS | Provide post-track debrief. |  |  |
|  | DSS-24 | Begin teardown activities. |  |  |
|  | SELENE OPS | Declare of EOA. |  | EOA of Pass#3 |

#### Test Notes

CSP(3) does not have ForwardCarrierRequest and CltuServiceInstanceRequest.

CSSXP accepts the service management messages which have 'urgent', and the behavior is same as a normal operation.

## PRELIMINARY SCHEDULE, TEST PERIODS & DOCUMENTATION

### SCHEDULE

Shadow Track Test is scheduled from End of February in 2008.

This testing is performed with DSN network and Test facilities.

The desired time for testing is shown in the table 7-1.

**Table 7-1 Test Schedule**

|  |  |  |  |
| --- | --- | --- | --- |
| Test Case | OPR | Time | Date |
| Test Case 1 | Service Management | 1000-1100 | Feb 28, 2008 (DOY059) |
|  | Transfer Service | 1200-1500 \*1 | Mar 1, 2008 (DOY061) |
| Test Case 2 | Service Management | 1100-1200 | Feb 28, 2008 (DOY059) |
|  | Transfer Service | 1200-1435 \*1 | Mar 3, 2008 (DOY063) |
| Test Case 3 | Service Management | 1500-1600 | Mar 3, 2008 (DOY063) |
|  | Transfer Service | 1950-2215 \*1 | Mar 6, 2008 (DOY066) |

NOTE: \*1) The start time is scheduled by the BOT-1 hour.

\*2) The working day time is around as follows;

JAXA 0030-0845 UT

JPL 1700-0100 UT

### TEST REPORT

A Test Report will be issued by JAXA one month after the completion of the JAXA-JPL Shadow track test.

JAXA is going to submit a draft report of the shadow track and it is attached all messages exchanged in shadow track. And after reviewing by JPL, both JPL and JAXA will deploy it to CCSDS SMWG. But there may be some limitation of deployment by the report such as the specific spacecraft information or IP address.

Concerning the transmitted telemetry data, the outline of data or processing results are reported in the same document.

## GLOSSARY

The following acronyms and abbreviations have been used in this document.

|  |  |
| --- | --- |
| AD | Applicable Document |
|  |  |
| CCP | Command Control Processor (JPL) |
| CCSDS | Consultative Committee for Space Data Systems |
| CLTU | Communications Link Transmission Unit |
| CM | Complex Management |
| CM-TH | CM Test Harness (JPL) |
| CSSXP | SLE Service Management prototype (JPL) |
|  |  |
| DSN | Deep Space Network (JPL) |
| DSS | Deep Space Station (JPL) |
|  |  |
| F-CLTU | Forward-CLTU |
| FDS | Flight Dynamic System |
|  |  |
| HB | Heart Beat |
|  |  |
| ICD | Interface Control Document |
|  |  |
| JAXA | Japan Aerospace Exploration Agency |
| JPL | Jet Propulsion Laboratory |
|  |  |
| MDOS | Mission Data Operations System |
|  |  |
| N/A | Not Assigned |
| NOPE | Network Operations Project Engineer (JPL) |
|  |  |
| OEM | Orbit Ephemeris Message |
|  |  |
| RAF | Return All Frames |
| RD | Reference Document |
|  |  |
| SELENE | SELenological and ENgineering Explorer (JAXA) |
| SLE | Space Link Extension |
| SM | Service Management |
| SMWG | Service Management Working Group |
| SOAC | SELENE Operation and Analysis Center (JAXA) |
|  |  |
| TACC | Tracking and Control Center (JAXA) |
| TBD | To Be Determined |
| TBS | To Be Supplied |
| TDS | Telemetry Data Server (JPL) |
|  |  |
| UM | Utilisation Management |
| UMR-1 | SLE UM Prototype for Red-1 (JAXA) |
|  |  |

# jaxa shadow tracking test RESULTS

TR07-717-21

**TEST REPORT**

**OF**

**JAXA-JPL SHADOW TRACKING TEST**

**March 2008**

**Draft 2**

PREPARED BYSORUN CORPORATIONFOR

JAPAN AEROSPACE EXPLORATION AGENCY (JAXA)

TECHNICAL REVIEW

|  |  |  |  |
| --- | --- | --- | --- |
| JAXA |  |  |  |
| Approved By: | H. Ishii  Manager  Network Operations Division  Consolidated Space Tracking and  Data Acquisition Department  (CSTD) |  | Date |
| JPL |  |  |  |
| Approved By: | E. Barkley  DSN Service Management System Engineer |  | Date |

AMENDMENT RECORD SHEET

| ISSUE | DATE | DCI No. | REASON |
| --- | --- | --- | --- |
| Draft1 | March 17, 2008 | N/A | Initial Draft for JAXA review |
| Draft2 | April 7, 2008 | N/A | Initial Draft for JPL review |
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## EXECUTIVE SUMMARY

The Shadow Tracking Test was conducted to confirm that Japan Aerospace Exploration Agency (JAXA) SLE GW Systems could interface with the Deep Space Network (DSN) of the Jet Propulsion Laboratory (JPL) for the support of a JAXA spacecraft on orbit using CCSDS SLE transfer services and SLE service management.

The tests were performed during the period of 28 Feb. 2008 (DOY 059) through 6 Mar. 2008 (DOY066). The tests were performed using the SELENE spacecraft. All test steps were performed with the responses conforming to the expected confirming that the CCSDS SLE interfaces can support a JAXA CCSDS compatible Spacecraft.

## Objectives

The major test objective of Shadow Track Test was to verify and demonstrate the following interfaces:

The JAXA SLE UM Prototype for Red-1 (UMR-1) can interface with the JPL SLE Service Management prototype (CSSXP) for SLE Service Management service.

Based on the service packages and the trajectory predictions planned by the above service management interface, the JPL/DSN stations can acquire SELENE.

The JAXA/SOAC SLE Service User System can interface with the JPL Fwd/Rtn Service provider (CCP/TDS) for SLE Transfer Service.

## Outstanding Problem

Testing was performed with no problem noted.

## TEST DATE/TIMES

Three Test Cases (TC) were prepared with each TC having two parts, a preparation phase and corresponding tracking phase(s).

Table ‑ Test Dates and Times

|  |  |  |
| --- | --- | --- |
| Test Dates/Times | | |
| Test Case | Preparation Start Time | Tracking Test Period\* |
| 1 | 059/01:20 | 061/13:00-15:00 |
| 2 | 059/01:50 | 063/13:00-14:35 |
| 3 | 064/14:40  066/22:30\*\* | 066/20:50-21:04  066/21:47-22:15 |

\* BOT to EOT

\*\* 2nd Transmission test

## TEST OBJECTIVES/RESULTS

### Test Case 1

#### Goals

The goals of test case 1 were:

* Necessary service management information is exchanged between UMR-1 and CSSXP.
* UMR-1 can generate one acquisition request in one service package for SELENE operation.
* Transfer service can be started and closed at the time planned by above service package.
* DSN tracking station can acquire and track SELENE correctly.
* Telemetry data can be transmitted correctly from DSN station through SELENE MDOS

#### Test Results

All test steps were performed and expected responses provided. No anomalies noted. Test case completed successfully.

### Test Case 2

#### Goals

The goals of test case 2 were:

* UMR-1 can generate a second service package for SELENE operation before the first one is carried out.
* CSSXP accepts the second service package before the first one is carried out.
* Transfer service can be started and closed at the time planned by one of the service packages.
* DSN tracking station can acquire and track SELENE correctly.
* Telemetry data can be transmitted correctly from station through SELENE MDOS.

#### Test Results

All test steps were performed and expected responses provided. No anomalies noted. Test case completed successfully.

### Test Case 3

#### Goals

The goals of test case 3 were:

* UMR-1 can generate two acquisition requests in one service package for SELENE operation.
* UMR-1 can generate a service management messages which has the urgentFlag parameter 'urgent'.
* Transfer service can be started and closed at the time planned by the above service package.
* DSN tracking station can acquire and track SELENE correctly.
* Telemetry data can be transmitted correctly from station through SELENE MDOS.

#### Test Results

All test steps were performed and expected responses provided. No anomalies noted. Test case completed successfully.

## SUMMARY OF TEST RESULTS

Table 4-1 shows the confirmation status of the test operations performed for the JAXA-JPL SLE SM Interoperability Test.

Table ‑ JAXA-JPL Shadow Track Test Summary

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Test Case | OPR category | Test Operations | Test Purpose | Confirmed |
| 1 | Preparation #1 | Query Service Agreement | Confirm Service Agreement | Yes |
|  |  | Add Carrier Profile | Provide Fwd Carrier Profile | Yes |
|  |  | Add Carrier Profile | Provide Rtn-1 Carrier Profile(40kbps) | Yes |
|  |  | Add Carrier Profile | Provide Rtn-2 Carrier Profile(2kbps) | Yes |
|  |  | Add Trajectory Prediction | Provide latest Trajectory Prediction | Yes |
|  |  | Create Service Package | Provide Service Package (Pass #1) | Yes |
|  | Tracking #1 | Pass #1 | Confirm normal tracking | Yes |
| 2 | Preparation #2 | Create Service Package | Provide Service Package (Pass #2) | Yes |
|  | Tracking #2 | Pass #2 | Confirm normal tracking | Yes |
| 3 | Preparation #3 | Add Trajectory Prediction | Provide latest Trajectory Prediction, if it had been updated | Yes |
|  |  | Create Service Package | Provide Service Package (Pass #3) | Yes |
|  | Tracking #3 | Acquisition #3 on Pass #3 | Confirm normal tracking | Yes |
|  | Tracking #4 | Acquisition #4 on Pass #3 | Confirm normal tracking | Yes |

## INPUT to CCSDS SMWG

This section shows the items which are to be put into CCSDS SMWG.

### Scope of XML Encryption

In the XML encryption, the scope of encryption was all items excluding SleSmDocument and SleSmMessageSet. Both the items SleSmDocument and SleSmMessageSet were not encrypted in order to make the access control efficient.

This section shows the samples of encryption, in which the name space and the contents of data are omitted.

NOTE:

* + Apache XML security was used in the prototype as a middleware for encryption.
  + We encrypted in the prototype by the form that didn't omit “xenc”, because it was necessary for the name space of the encryption tag in apache XML security.
  + The version of Apache XML security which was used in JAXA/TACC and NASA/JPL was 1.4.1.

1. **For Invocation, Acknowledgement, Successful return and Failed return**

<sleSmDocument>

<sleSmVersionRef>0.3.0</sleSmVersionRef>

<sleSmMessageSet>

<sleSmCreatorName>UMR-1</sleSmCreatorName>

<serviceAgreementRef>SA1</serviceAgreementRef>

**<createServicePackageInvocation>**

**:**

**:**

**</createServicePackageInvocation>**

</sleSmMessageSet>

</sleSmDocument>

<sleSmDocument>

<sleSmVersionRef>0.3.0</sleSmVersionRef>

<sleSmMessageSet>

<sleSmCreatorName>UMR-1</sleSmCreatorName>

<serviceAgreementRef>SA1</serviceAgreementRef>

**<xenc:EncryptedData>**

**:**

**:**

**</xenc:EncryptedData>**

</sleSmMessageSet>

</sleSmDocument>

1. **For sleSmExceptionResponse**

<sleSmDocument>

<sleSmVersionRef>0.3.0</sleSmVersionRef>

**<sleSmExceptionResponse>**

**:**

**:**

**</sleSmExceptionResponse>**

**<**/sleSmMessageSet>

</sleSmDocument>

<sleSmDocument>

<sleSmVersionRef>0.3.0</sleSmVersionRef>

**<xenc:EncryptedData>**

**:**

**:**

**</xenc:EncryptedData>**

</sleSmMessageSet>

</sleSmDocument>

NOTE:

* + - The sleSmExceptionResponse.unrecoginzedMessageSetResponse was not encrypted, considering the case that the receiver did not recognize the sender or the service agreement was not recognized.
    - The sleSmExceptionResponse.invalidMessageResponse was encrypted.

### Data Compression

ATP operation went out of control by limiting data communication at JAXA since volume of the OEM, which was exchanged at ATP operation, was a large amount of data (this time it was greater than 5 Mbytes). Therefore, we conducted data compression of the OEM to reduce the data volume.

This section shows the method of data compression which was used for transmission of the much volume data between JAXA/Tsukuba and JPL.

**a. DATA TYPE**

The following data was always compressed between JAXA/Tsukuba and JPL.

Data Type: Trajectory Prediction

Message Type: Orbit Data Message

ODM Type: Orbit Ephemeris Message (OEM)

File Type: Text

SM operation: Add Trajectory Prediction (ATP)

**b. IMPLEMENTATION FOR DATA COMPRESSION**

JAXA/UMR-1(UM) stored the OEM text into bilateralTrajectoryData of ATP invocation.

bilateralTrajectoryFormatId: ZipOEMTxt

Compress: Zip

Encodeing: Base64

## Additional Uplink Information

JAXA conducted the shadow track test performing the actual spacecraft operation via JAXA ground station simultaneously. The figure 5-1 shows the test configuration for the shadow tracking tests.



Figure ‑ JAXA-JPL Shadow Track Test Configuration

JAXA brought carrier up from the JAXA ground station. When the DSN station acquires the spacecraft, the station operator inquires to JAXA in all test cases which station will bring carrier up. This means the station needs the uplink information for acquisition spacecraft in 3-way tracking.

Therefore we report that the information of uplink station was necessary for downlink station in order to acquire the spacecraft, in case that the multiple stations would acquire simultaneously. Of course it should be added as information in to be exchanged in service management interface.

# jPL shadow tracking test RESULTS

## sHADOW TRACKING STATEMENT FROM DSN OPERATIONS, DOY 061, 2008

**From:** Hewitt, Greg  
**Sent:** Saturday, March 01, 2008 7:48 AM  
**To:** DSN-OPS-CHIEFS  
**Cc:** DSN-MPSETD; Waldherr, Stefan; Landon, Arthur J; Orozco, Sam; Stoloff, Michael J; Diep, Joe; Williams, Raymond C  
**Subject:** SIG EVENT FOR SELE DSN ENG DEMO on DOY 061 DSS-27

SELE DSN Engineering Demo, DOY 061/1300 - 1500 UTC, DSS-27

SELE DSN engineering Demo was successful. DSS-27 acquired the downlink and provided telemetry using the support products delivered through the CSSXP.

Before the support, the project provided OEM and support package inputs to the CSSXP and the engineers were able to generate products for the SPS.  The SPS generated the SDP using the inputs from the CSSXP and transmitted to the station.

Regards,

**Gregory W. Hewitt**

(626) 305-6292 (Office)

(626) 305-6389 (Fax)

[ghewitt@jftl.jpl.nasa.gov](mailto:ghewitt@jftl.jpl.nasa.gov)

## sHADOW TRACKING STATEMENT FROM DSN OPERATIONS, DOY 063, 2008

SELENE DSN DEMO, DOY 063/ 1300 - 1435 UTC, DSS-27

The SELENE DSN DEMO was successful. DSS-27 acquired 3-way with DSS-74 (Santiago) and outputted 80 kbps to SELENE OPS. The CSSXP (CCSDS SLE Management XML Prototype) provided the SPS a DKF and OEM file. The SPS was able to generated a support data package (FZC=PF) and transmit them out to the station. DSS-27 downloaded FZC=PF and acquired the downlink. Project reported no problems for this downlink only support.

***Jesse Velasco***

NOPE

MEX/SELE/VEX/ROSE/CLUS

(626) 305-6315

## sHADOW TRACKING STATEMENT FROM DSN OPERATIONS, DOY 063, 2008

**Engineering DEMO Report**

**Name of Training:** SELENE DSN DEMO

**Date:** March 6, 2008

**Support Period Times:**

DOY     START   BOT     EOT     END     FACILITY         
066     2005    2050    2215    2230    DSS-24

**Supporting Facilities:** DSS-24, NOCC, SELE OPS, DSOT, ROC

**1.      Objectives:**

SPS generate a Support Data Package from the inputs provided by CSSXP (CCSDS SLE Service Management XML Prototype) and DSS-24 lockup to the downlink using the SDP.

**2.      Training Results:** All objectives met.

**3.      Training Activity Summary:**

SELE MSTA objectives were met. DSS-24 acquired 3-way with DSS-74 (Santiago) and outputted 80 kbps to SELENE OPS. The CSSXP (CCSDS SLE Management XML Prototype) provided the SPS a DKF and OEM file. The SPS was able to generated a support data package (FZC=WL) and transmit them out to the station. DSS-24 downloaded FZC=WL and acquired the downlink. Project reported no problems for this downlink only support.

**4.      Training Activity Details:** Objectives met.

**5.      Software Versions:**

**a.      Tracking:** Tracking data was not required. DSS-24 acquired the downlink 3-way with DSS-74 (Santiago) with no problems.

**b.      Telemetry**:  SELE OPS confirmed 80 kbps data.

**c.      Commands:** No commanding required.

**d.      Monitor:** Not required**.**

**6.      Discrepancies/Anomalies:** None

**7.      NOPE Comments:**  DSS-24 provided excellent support

***Jesse Velasco***

NOPE

MEX/SELE/VEX/ROSE/CLUS

(626) 305-6315

# 

# 

# 

# [Other Sections]

[All sections and annexes should be separated by Word continuous section breaks.]

1. [ANNEX TITLE]

[Annexes contain ancillary information. See CCSDS A20.0-Y-2, *CCSDS Publications Manual* (Yellow Book, Issue 2, June 2005) for discussion of the kinds of material contained in annexes.]