CCSDS SLS-SLP WG MEETING
Noordwijerhoot, the Netherlands 31 March - 3 April 2014

CCSDS 2014 Spring MEETING

SLS-SLP Space Link Protocols Working Group
Final Minutes of the Meeting – April 1, 2014

1. Action item list

1.1 Gilles Moury - will provide the text for both the TM and AOS Space Data Link Protocols for inclusion of the type 2 OCF field for the SDLS protocol extended procedures. Due before the Fall 2014 meeting.

1.2 Greg Kazz – reorganize the NGSLP concept paper into drivers and significant considerations. This will help in the further splitting of the way forward into a separate requirements based green book and protocol based blue book. Due by May 2014.

1.3 Greg Kazz – generate the NGSLP GB and BB projects within the CCSDS framework. Due by May 2014.

2. Topics Covered

2.1 Status of TM, TC, AOS Space Link Protocols Blue Books

- The editorial RIDs input by NASA-JSC were withdrawn by that NASA center's standard representative. Thereafter there were no objections to moving these 3 pink sheets forward as updated blue books. Consensus was obtained within the WG to have the WG provide a resolution to the SLS area director, to publish these pink sheets concurrent with the publication of the Space Link Security Protocol (SDLS) blue book.
- Continued coordination is needed between SLP WG and SDLS WG to ensure that the TM, TC, and AOS Space Data Link Protocols and the emerging SDLS protocol are published concurrently. The action listed in Section 1.1 of this report will be investigated by the CCSDS secretariat to determine how this update is best handled in the editing cycle.

2.2 Status of Overview of Space Communications Protocols Green Book

- Peter Shames addressed several comments from the CESG review of this Green book. The comments applicable to SLP were associated with the description of the SPP protocol as a Network layer protocol. Peter took exception to that categorization and claimed that SPP only provides a tag via the APID and a logical data path connector. The consensus summary of results of the review of Peter's comments within the working group are:

The SLP WG agrees that the Encapsulation Packet cannot be used for routing (not found in Encapsulation Packet part of Encapsulation Service). However SPP can be used for routing (see SPP blue book).

We believe by removing the networking references to the Encapsulation packet but leaving the references to the Space Packet, the issue should be resolved.

A detailed response to each comment was supplied to Peter in-line using the word revision feature.

- Keith Scott also had comments from his CESG review of this Green Book that were addressed by a subgroup of the working group after the meeting due to time constraints. Keith generated several PIDs (Poll Item Dispositions) from the Space Internetworking Services Area point of view. The resolution to these PIDs are in the SLP WG CWE under the URL: http://tiny.cc/sp1gex

2.3 SLP WG Proposed Project: The Next Generation Space Link Protocol (NGSLP)

Major progress was achieved on the review of the NGSLP concept paper. Consensus was achieved on reorganizing it based upon the separation of the key technical drivers vs. the significant considerations. An update by May 2014 will be produced as a result. During the meeting a summary report of this reorganized concept paper was generated and given at the joint SLS area technical meeting on Thursday AM on April 3. See Item 4 for joint meeting reporting.

DLR, NASA and UK Space Agency have agreed to provide resources for a Next Generation Space Link Protocol (NGSLP). Consensus has been achieved at this meeting with affected SLS area working groups and with external working groups concerning the way forward. WG assumes project within SLP will be approved by SLS Area director.

The Framework will be updated to include NGSLP GB and BB components with GB to be published addressing requirements and significant considerations.

During the SLP WG meeting, consensus was achieved that unifying the 4 space link protocols (TM, TC, AOS, Proximity-1) is really a criteria (desirement for the most part) than a driver. It will not be put forward as a driver. Rather, the essential requirements already contained in the concept paper will be put forward and listed by order of priority. The following needs and limitations of existing NGSLP have been discussed:

a) Supporting higher rates:
   a. For robotic downlink: 10 Gbps for TM (optical P/L TM links)
   b. For robotic uplink: 10 Mbps (individual command rate is stable but anticipated increase of uplink data rate due to file transfer (work plan, software upload, FPGA configuration,) and potential DTN usage)
   c. For manned downlink mission: 20 Gbps (audio, video, internet, …),
   d. For manned uplink robotic missions: 1 Gbps (individual command rate is stable but anticipated increase of uplink data rate due to file transfer (work plan, software upload, FPGA configuration, …) and potential DTN usage)

b) Increasing SCID size:
   a. Dealing with shortage of SCID in version 2 (AOS) and version 1 (TM/TC)
   b. Provide a SCID of at least 12 bits (4096 SCID) to solve the lack of adequate IDs in the long run

c) Enabling frame relay:
   a. Deep space scenario: lander-orbiter-earth

d) Decoupling channel coding sub-layer from data link sub-layer:
   a. Channel coding should be tuned for the physical channel error characteristics
   b. Data link should be tuned to the on-board & ground data system architecture and constraints

e) Provide a low rate & real-time signaling channel in band with data channel:
   a. Compatible with the approach taken for VCM/ACM signaling
   b. Could be used for SDLS extended procedures

First stage of the NGSLP work will be the development of a green book on:
- Requirements of future missions
- Limitations of existing SDLPs vs. identified requirements
- Definition of criteria to compare solutions

Concurrent with the first stage where feasible, prototyping and development of a new space link protocol blue book to address the key needs and limitations listed above. The NGSLP protocol may or may not lead to a comprehensive solution for all space links.

3. SLP Projects in the CCSDS Framework

The current projects defined for SLS-SLP WG are:

1. Update of Overview of Space Communications Protocols Green Book (spending final CESG review)
2. AOS Space Data Link Protocol Issue 3: 5-Year Review plus SDLS Requirements
3. TC Space Data Link Protocol Issue 3: SDLS Requirements
4. TM Space Data Link Protocol Issue 2: 5-Year Review plus SDLS Requirements

Future projects defined for SLS-SLP WG is:

1. The Next Generation Space Link Protocol (NGSLP)

Upon updating the NGSLP concept paper as agreed to during the SLP WG meeting, the SLP Chairman will enter two new tasks into the framework for development: 1) a requirements oriented NGSLP Green Book and 2) the NGSLP Protocol Blue Book.

2. Space Data Link Protocol Green Book – Version 3

Update to the Space Data Link Protocol Green Book – 130.2-G-2 due to SDLS Requirements for discussion for the first time at the Fall 2014 Meeting.

4. Joint C&S/SLP/RFM/OCM (April 3, 2014)

Minutes of the joint C&S/RFM/SLP/OCM meeting are available as part of the minutes of the RFM WG provided by the respective Chairman.

5. Resolutions

Request that the Area Director forward to CESG a resolution to publish the updated TM, TC, AOS Space Link Protocols based upon both approved SDLS changes and the already CMC approved changes accumulated over the years. The SLS Area director put this resolution on hold until the SDLS protocol is released for publication as the first blue book.

6. Planning

The next SLP WG meeting is tentatively planned for most likely Tuesday during the week of November 10 – 14, 2014 in London, UK. Note this meeting is planned for 5 days instead of 4. Please check the meetings tab under www.ccsds.org for updates.

CCSDS SLS-SLP WG MEETING
Noordwijerhoot, the Netherlands 31 March - 3 April 2014

Annex 1 - List of Participants-Space Link Protocols (SLP) – 11 participants

Cosby	Matthew	mcosby@qinetiq.com	UK Space Agency
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Annex 2 – SLP WG Chairman's report to SLS area director – on April 3, 2014

SLS AREA REPORT

SLS Space Link Protocols (SLP) WG

Goals:

1. **Ensure consensus has been achieved within the WG to publish the updated TM, AOS, and TC Space Data Link protocols concurrent with SDLS blue book release.**
2. **Resolve CESG review comments in order to publish Version 2 of the Overview of Space Communications Protocols GB.**
3. **Review the Next Generation Space Link Protocol concept paper within and external to the SLS area towards the goal of creating a new work project in SLP for it's development.**

status:	OK	CAUTION	PROBLEM
comment:	Good progress		

10-Dec-2012-cesg-1

SLS AREA REPORT

SLP WG Summary Progress:

- **Consensus was achieved in publishing the updates to the TM, AOS, and TC Space Data Link Protocol books in sync with the 1st release of the SDLS blue book.**
- **WG generated a consensus summary of its comments back to the CESG concerning its review of the Overview of SpaceCommunication GB.**
- **Major progress was achieved on the review of the NGSLP concept paper. Consensus was achieved on reorganizing it based upon the separation of the key technical drivers vs. the significant considerations. An update by May 12 will be produced as a result. During the meeting a summary report of this reorganized concept paper was generated and given at the joint SLS area technical meeting on Thursday AM on April 3.**

SLS AREA REPORT

SLS-SLP WG (cnt'd)

Problems and Issues:

- None

Planning:

- Expect joint publication of TM/TC/AOS and SDLS protocols by CCSDS Spring 2014 meeting pending a final joint session with SDLS at Spring 2014 meeting in Noordwijkerhout. See resolution below.
- DLR, NASA and UK Space Agency have agreed to provide resources for a Next Generation Space Link Protocol (NGSLP). Consensus has been achieved at this meeting with affected SLS area working groups and with external working groups concerning the way forward. WG assumes project within SLP will be approved by SLS Area director.
- Framework to be updated to include NGSLP GB and BB components with GB to be published first containing requirements
- Update to the Space Data Link Protocol Green Book – 130.2-G-2 due to SDLS Requirements due by the Fall 2014 Meeting

SLS AREA REPORT – SUMMARY (2 of 2)

SLP WG Space Link Protocols

Resolutions:

- **Request that the Area Director forward to CESG a resolution to publish the updated TM, TC, AOS Space Link Protocols based upon both approved SDLS changes and the already CMC approved changes accumulated over the years.**