**CCSDS 2013 Spring MEETING**

**SLS-SLP Space Link Protocols Working Group**

**Final Minutes of the Meeting – April 16, 2013**

**1. Action item list**

* 1. Greg Kazz - create a resolution to the SLS area director to publish the next version of the CCSDS Proximity-1 Space Data Link Protocol by June 15, 2013. This date was chosen to ensure publication of this document before the Fall CCSDS 2013 meeting.
  2. Greg Kazz - create a resolution to the SLS area director to publish Version 2 of the CCSDS Proximity-1 Space Link Green Book by June 15, 2013. This date was chosen to ensure publication of this document before the Fall CCSDS 2013 meeting.
  3. Greg Kazz - create a resolution to the SLS area director to publish Version 3 of the CCSDS Overview of Space Link Protocols Green Book by July 15, 2013. This date was chosen to ensure publication of this document before the Fall CCSDS 2013 meeting.
  4. Greg Kazz - propose a new CWE project under SLP to update the Space Data Link Protocol GB, i.e., CCSDS 130.2-G-2 by August 15, 2013 to reflect the updates to the link layer protocols due to the SDLS requirements
  5. Greg Kazz – create a resolution to the SLS area director to send the TC, AOS, and TM pink sheets for agency review by July 1, 2013. This date was chosen to ensure that adequate time was provided for the agency review to take place before the Fall CCSDS 2013 meeting.

**2. Topics Covered**

2.1 PICS Proforma for the Prox-1 Space Data Link Layer Protocol

* Consensus reached on both the format and content. Additional column added to distinguish between “Mandatory vs. Optional” statements. In fact, one conditional statement was also identified. If optional, ISO format used to delineate those options in a standard form. During the meeting, the WG was able to assign either mandatory vs. optional attributes where appropriate.
* With the PICS Proforma completed, the SLP WG has completed all of its work on the document. Once the other two related Prox-1 books and the Prox-1 GB have been completed, this complete set of books will be republished by the Secretariat. Consequently before the Fall 2013 meeting, the WG chairman will create a resolution to the SLS area director to publish this document concurrent with the other Prox-1 blue books and green book.

2.2 Final Inputs and discussion on the Proximity-1 Green book Version 2.0

* Prox-1 GB is being updated to Version 2.0, due to the 5-year review of the Proximity-1 blue books. Main focus of the review was to ensure that the changes made to these blue books gets reflected in the GB. In addition, the UK Space Agency/NASA Lessons Learnt as described at the Fall 2012 Cleveland meeting has been added as an Annex to the GB.
* With the Proximity-1 GB Version 2.0 now completed, the WG chairman will create a separate resolution to the SLS area director to publish this document concurrent with the other Prox-1 blue books.

2.3 Discussion with a subset of the CSTS Area on their RID to add MC-OCF Service to AOS

* Consensus between SLS-SLP and CSTS was reached on the question of a requirement for a defined AOS MC-OCF service
  + AOS does not require the addition of a MC-OCF service.
  + Instead, CSTS will propose to provide the TM or AOS VCID in the annotated information in the Return OCF Service so that the user can determine whether or not OCF is received from delivery of OID AOS frames.
* Key points during the discussion were:
  + TM contains both a VC-OCF and a MC-OCF service
  + AOS only allows for a VC-OCF service
  + CSTS R-OCF Service allows for both a VC-OCF and a MC-OCF regardless of the use of either TM or AOS
  + Is MC-OCF service used in practice? Answer was no. Not on ESA earth observation missions.
  + The RID focused on the potential use of AOS MC-OCF service during LEOP and not in high data rate scenarios, in which the service would be pretty much useless.
  + Concern voiced that if MC-OCF was added to AOS, then two independent prototypes would be required to test.
  + For MC-OCF service, the issue came up about removal of only-idle-data (OID) frames. Should the service remove them or not. Is the OID-frame considered part of the MC ? From NASA’s point of view, NASA mission users are used to receiving the entire data stream from the spacecraft including the OID frames.
  + John Pietras (NASA/GSFC) pointed out a possible modification to the 32-bit OCF field of future versions, so that individual status updates of only the RF available flag and bit lock achieved could be expedited for real time reporting. This could take up 2 bits of the existing field or be part of a new version OCF.
  + Both CSTS and SLP concluded that on a MC in AOS, the R-OCF service would deliver OCFs extracted from all frames including the OID frames and that annotated information would be available to provide the VCID of the frame.
  + Figure 2.7 AOS Space Data Link Protocol Channel Tree in the current AOS Space Data Link Protocol shall be fixed (it contains a data flow from the “MC-OCF service”) so that there is no reference to the MC-OCF service in AOS. This correction has been factored into the AOS pink sheets held by the WG chairman.

2.4 Pending AOS/TM approved pink sheets and their 5-year review

* SLP has accumulated many updates in these two link layer protocols over the past few years, none of which were critical to force an immediate change to the documents. Now with the inclusion of a consensus on how to move forward with the functional interface between SDLS and SLP, the plan is to release AOS, TM (and TC) Space data link protocols for agency review before the Fall 2013, with the goal of carrying out an agency review in the Fall 2013 time period.

2.5 Changes to AOS/TM/TC due to SDLS requirements to be in sync with SDLS approved changes.

* An SLP position was achieved before the SDLS WG discussion took place on the order of processing between the SDLS send function, COP-1, and the SDLS receive function. The Major conclusions from SLP are:
  + The SDLS function should be performed before the FOP on the sending side and after the FARM on the receiving side. The TC Space Data Link protocol book will contain a diagram and text that explains this.
    - This requires a single Security Association per single Virtual Channel
  + If the SDLS protocol requires a single Security Association over multiple Virtual Channels
    - This requires the SDLS protocol to be performed at the Master Channel level
    - After the FOP on the sending side and before the FARM on the receiving side
    - As a result the SLP WG recommends that the COP not to be used in this case (i.e. BD Frames only would be allowed)

Note: Some related TC Space Data Link Protocol topics were later addressed in the SDLS WG meeting. Those key points related to SLP were:

1. Recommend that the order of processing be: SDLS send, COP-1, SDLS receive. However if the user choses to reverse this order of processing then only BD frames can be used when running the COP-1. This is to ensure that the COP-1 would not halt forward progress on all channels in particular ones running MAPs that have no COP associated with that given VC.
2. The SDLS WG concluded that we do need RT reporting in telemetry for security errors detected by SDLS. However, the modification to the CLCW to add a single bit flag to tell the FOP that a security error has occurred was not agreed to by SDLS WG. The main reason was that without a complete analysis of the SDLS monitoring and control scenario with reporting needs and expected actions, part of the work on SDLS Extended Procedures, it appears premature to take such decision. It was noted as well that this single bit doesn’t convey enough information to be of use. Furthermore, it would also have undesired ramifications on COP-1 implementations.
3. Data failing the SDLS authentication service is discarded by SLP, however an indication is sent on to the local data manager as a result.

2.6 Updates to Overview of Space Communication Protocols GB, CCSDS 130.0-G-2

* Updates to this GB are largely required since the SCPS protocols have changed, as well as the introduction of IP over CCSDS, as well as the addition of several other CCSDS application layer protocols e.g., AMS. Most of the work involves realignment of the diagrams and associated text.
* The SLP WG goal is to provide the next version of this GB to the SLS area director before the Fall 2013 meeting.

2.7 Ed Greenberg/Greg Kazz (NASA/JPL) – NASA proposal for a singular all encompassing CCSDS Link Layer protocol.

Greg Kazz presented the NASA proposal for a unified data link layer protocol for future missions. The new protocol can be used for both emergency communications as well as very high data rate missions. It also accommodates the use of multiple Security Associations per a given Virtual Channel since it introduces the concept of a Virtual Channel Sub\_channel or VCS. This work was well received by the SLP WG. The question of where it might apply was brought up. The consensus was that this protocol or at least parts of it would best apply to the emerging optical comm standardization and to future space security needs.

**3. SLP Projects in the CCSDS Framework**

The current projects defined for SLS-SLP WG are:

1. Update to the Prox-1 Green book Issue 2
2. 5-year Review of the CCSDS Prox-1 Space Data Link Protocol
3. Update of Overview of Space Communications Protocols Green Book
4. 5-year Review of AOS Space Data Link Protocol + SDSL Rqmt – added after the Darmstadt meeting
5. 5-year Review of TM Space Data Link Protocol + SDSL Rqmt - Rqmt – added after the Darmstadt meeting
6. Update to the TC Space Data Link Protocol due to SDLS requirements.

Note: There will be a need to update the Space Data Link Protocols GB to be in sync with the SDLS requirements on SLP. This work is to be added to the SLP list of projects at the Fall 2013 meeting.

**4. Resolutions**

There were no resolutions passed at this meeting by the SLP WG.

**5. Planning**

The next SLP WG meeting is planned for Tuesday during the week of Oct. 28 – Oct. 31, 2013 in San Antonio Texas, USA at the Southwest Research Institute (SWRI). Please check the meetings tab under [www.ccsds.org](http://www.ccsds.org) for updates.

**Annex 1 - List of Participants-Space Link Protocols (SLP) – 18 participants**

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**Annex 2 – SLP WG Chairman’s report to SLS area director – on April 18, 2013**





