

CCSDS Engineering Steering Group (CESG)

Spring 2019 Meeting: Friday 10th May 2019, NASA AMES ARC

Attendees: MdG, WT, MM, BB, PS, SB, TdC, JW, GPC, JM, EB, CH, TG

This Minute of Meeting contains information that was addressed/discussed in addition to the Presentations of the individual Areas.

CESG Discussion on SLS Area Issues from the past week

Slide 8: Concept Paper for introduction of USLP and down-selection of codes out of the TM Blue Book for the uplink. That book will be updated accordingly, to also contain options for uplink codes and USLP. The Concept Paper is ready and has been attached to the issued resolution by the AD.

A proper title for TM Coding Blue Book that will include uplink coding will be agreed once the update is completed. Tentatively by Fall 2019 Meeting.

Slide 12: Space Packets: some reserved APID have been removed. The encapsulation of higher layers' PDUs in Space Packets is still possible but with mission-specific settings instead of reserved APIDs.

Now in SPP the only reserved APID is the one for the Idle Packet.

The ongoing Update of the Encapsulation Service is ongoing and foresees title change to Encapsulation Packet Protocol (EPP).

The future SPP and EPP Green Book: the work will be based on the existing draft SPP Green Book from T.Yamada. EPP material will be added.

Some text may be introduced about transmission of Space Packet over Bundle Protocol.

SLS Glossary: Some terms need to be checked, wrt duplications and discrepancy. Once SLS Glossary will be completed, the other SLS books will be made consistent with that Glossary, and the SANA registries will be updated accordingly.

Statement by CESG : All Areas shall aim at having the Area-specific Glossary, and the SANA registries will be made consistent with those Glossaries. The Glossary of an Area shall be cross-checked against the ones of Areas who share the usage of some terms.

CESG recommends that Areas work their Glossary issues within their WG and then in the Area as a whole. Any identified issues with Glossary overlap terms may possibly be easily resolved by adding an area or WG prefix.

SLP WG requests CESG/CMC to foster/support the introduction of USLP recommendation at the LOP-G. CESG agrees, and the relevant CESG Resolution will be introduced in the CESG report to CMC .

The changes done to SPP and EPP will have an impact on CFPD over Encapsulation (Magenta Book). To be coordinated by the two Areas.

SB: it will probably be done via Corrigendum.

CESG Discussion on SOIS Area Issues from the past week

Deputy AD was not able to attend. Some topics were not addressed.

Proximity Wireless Orange Book: presently it is supported (and done) by NASA, but likely it will also be supported by CSA. Then, the work can start towards becoming a Blue Book.

Management Information Base: different domains may have similar needs to represent the information that they manage. There is , possibly, an intersection between the Management Information Bases Electronic Data Sheets (EDS: SOIS), the Functional Resource model (FR: CSS), and network management concerns (SIS). This topic to be further explored by joint meetings by involved Areas .

Action: JW to produce a short presentation by the mid-term Telecon, to introduce the notion of MIB, data formats (template) , commonality and possible relationship to other Areas.

AI/S19-1
JW

CESG Discussion on SIS Area Issues from the past week

CFDP Interoperability testing:

Files having very large size (which were not foreseen by BB-4) may have an issue with the computational overhead involved in creating a checksum. Revisions to the spec are proposed to permit introduction of checksum options. The checksum type to be registered in SANA, and the relevant ID will become part of the file's metadata signaled in the PDU.

The draft version of the book, intended to become Blue Book-5 needs to be revised. It requires update and additional Agency Review.

The changes have already been addressed by the WG, and agreed upon. The book can be updated with little effort.

BP Sec: a similar/applicable recommendation is in production by IETF. Issues related to the adoption of (portions of) that text- which by the way is still in draft form – shall be assessed.

SIS DTN will work jointly with SEA SEC on the finalization of the Simple Bundle Security Protocol (SBSP), based on the IETF draft.

It is proposed that a new joint SIS-DTN/SEA-SEC project develops a Green Book for SBSP.

Network management: similar situation w.r.t. to IETF recommendations for SBSP: the Asynchronous Management Protocol from IETF can be used as basis of the Network Management Blue Book, but also this one is still in draft status.

The two Asynchronous Message Service (AMS) books require 5-years update. The WG that has produced those books is disbanded. It would be too resource-intensive to start a new WG just for these updates so the update will be developed by SIS DTN.

This is a general issue - to be tackled at the next CESG Telecon or meeting. It may imply changes to the Org & Proc.

CESG Discussion on CSS Area Issues from the past week

Future “shape” of the CSTS WG : only NASA and ESA contributions are left.

Services are going towards a database-oriented kind of behavior. CCSDS shall consider a different kind of “resource” for the WGs, to carry out e.g. maintenance of databases. This issue shall be addressed at next CESG telecom or meeting (proposal by CESG to be submitted to CMC).

Service Control CSTS: a draft Concept Paper will be produced by the Fall Meeting. At Spring 2020 meeting, the CSS Area will decide re making a formal request for project initiation.

901.0-G-1 Architecture Description Document: it is due for 5-Years review, but the WG that produced that book has been disbanded. Initiating the WG again would be too resources-intensive (same issue as above, in SIS Area report). Alternative ways shall be considered.

Question by CSS AD: where are test reports (Yellow Books) published? The answer by Secretariat is that they are put in the CESA CWE, under the “Interoperability Test Reports” folder.

CESA Discussion on MOIMS Area Issues from the past week

DAI : the three books that were requested by CESA to be updated, in order to include the SANA-related aspects of Control Authority registries, are now proposed by the WG to be reconfirmed as-is, due to the lack of resources

Action: DAI WG to find out and list the Control Authority offices that are active and functioning. DAI WG to consider the fact that these CA registries were used as the source format for the RMP (due date: by Fall Meeting).

AI/S19-2
MM
(DAI)

A set of CESA instant Poll have been proposed throughout the MOIMS Area presentation. These took place later, and are listed below under **CESA Instant Polls**.

SM&C WG. : IOAG-directed effort to develop an inter-agency interoperability demonstrator: the aim of this demonstrator is to validate some of the services requested by IOAG Catalogue 3, including experimentation on the alleged dualism services- vs-data-formats.

MOIMS/SM&C are working on a website to group all the resources and information about the MO Services. It is publicly accessible.

Use of SCIDs: SM&C WG claims that it is problematic for mission operations to have multiple SCID) assignment for the same spacecraft (only distinguished by the frequency band) as today the SCID is used in several systems to identify the data from that particular spacecraft.

Note from SEA AD: The SCID , which explicitly states that the same numerical GSCID may be allocated in different frequency bands was introduced in the updates to the CCSDS Spacecraft Identification Field Code Assignment Procedures, CCSDS 320.0-M-7, dated Nov 2017.

During discussion it was clarified that the SCID is intended for communication aspects: it is embedded in the Frame header, it is not even part of the Packet header. From the earliest versions of this standard it was never intended to be used for mission operations. For this purpose, there is no strict requirement to standardize it. There have always been these requirements to not use the SCID for archiving or management of data in the ground and to relinquish the QSCID when the mission is no longer active.

Option for SCID re-use and multiple assignment in operation services :

- (Agency)-Local convention
- Usage of the Global OID, assigned to each S/C when it is registered, to be looked up in SANA
- Use of some other global S/C identifier such as the COSPAR ids

As a mitigating factor for missions that adopt USLP, a longer (16 bit) SCID field has been adopted. This is still only to be used for communications aspects, not for mission operations. In fact, some missions may use USLP in the downlink but not to in the uplink (i.e they could keep using TC for uplink).

USLP QSCID allocations will still be assigned in the Frequency Bins.

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| <p>Action: MM to raise the matter with the IOAG Chairman (Michael Schmidt) to increase the awareness of this issue and limitation within IOAG Member Agencies. Action : PS to provide materials he has developed for the DSN that address this issue.</p> <p>Coordination with and participation to the LOP-G decision process about adoption of CCSDS standards.</p> <p>Action: MM to draft a letter for the CMC that, if approved, will be sent by the CMC to the "Gateway Management" to make them aware of the interest of CCSDS in being available to support such a large international endeavour with effective interoperability standards. Practically, the letter shall propose opening a special channel between CCSDS and Gateway (modalities to be agreed) to discuss priorities on standards production in order to foster their adoption by the Gateway.</p> <p><u>CESG Discussion on SEA Area Issues from the past week</u></p> <p>Time Management BOF: finalization of Charter, production of Concept Paper. All involved agencies participated at the WG meeting that discussed the finalization of Charter. All comments have been discussed and agreed upon . Charter is ready to be submitted to CESG and CMC.</p> <p>Time Coordination on-board is a service defined by SOIS area, and there shall be coordination with this WG. Time distribution is a service described by MOIMS, and there shall be coordination with this WG</p> <p>SANA: the website database is synchronized with the SANA database, which is now to be the only repository of mission and contact data. When accessing any member agency, point of contact, or related data on the CCSDS website, a query gets issued to fetch it from the SANA database.</p> <p>SANA: Any change to the set of data of an Agency, <u>shall be communicated to the CCSDS Secretariat, as in the current practices.</u> They will, in turn, directly update the information in the SANA database via a secure interface. Note from SEA AD: The CCSDS website list of CWE access holders will similarly be made accessible to the SANA for access control purposes to certain websites, such as the Service Site and Aperture (SS&A) registry.</p> <p>SANA, QSCID frequency bins: Once the corrigendum to the CCSDS 320.0-M-7 is published, aligning the SANA QSCID frequency bins with the normative ITU frequency assignment ranges will be completed. SANA will then use the precise frequency range values (as well as providing the commonly used "band" names).</p> <p>Issue to the attention of CMC: an official Agency representative of the Chinese Space Agency shall be appointed to be the identified SANA Agency Representative (AR) for the member agency. That AR may appoint a Point of Contact (PoC) and other ARs, as needed, for any observer agencies, as specified in the RMP. The SANA must have an official AR identified as the requestor for changes to agency information.</p> <p><u>RID Template – presentation by M. Blackwood</u></p> <p>MB showed the set of requirements established for the RID tool. No prototype is available yet. Some CESG members objected that the Bugzilla approach (as proposed at the Gaithersburg meeting) is far too complex, therefore it shall not be pursued.</p> | <p>AI/S19-3 MM AI/S19-4 PS</p> <p>AI/S19-5 MM</p> |
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It was agreed to re-assess adoption of a simple RID tool, based on an Excel spreadsheet, that was produced by David Ross, and discuss its suitability at the mid-term Telecon.

CESG Instant Polls:

The following resolutions were approved by raise of hands (instant poll):

SLS Reconfirmation:

211.1-B-4 Proximity-1 Physical Layer” Blue Book, “CCSDS 414.0-G-2 PN Ranging” Green Book, and “CCSDS 414.1-B-2 PN Ranging” Blue Book
230.2-G-1 Next Generation Uplink” Green Book

MOIMS Reconfirmation:

DAI WG :

651.2-G-1 Producer-Archive Interface Specification (PAIS) - A Tutorial
610.0-G-5 Space Data Systems Operations with Standard Formatted Data Units: System and Implementation Aspects
620.0-B-2 Standard Formatted Data Units — Structure and Construction Rules
621.0-G-1 Standard Formatted Data Units — A Tutorial
622.0-B-1 Standard Formatted Data Units — Referencing Environment
641.0-B-2 Parameter Value Language Specification (CCSD0006 and CCSD0008)
641.0-G-2 Parameter Value Language — A Tutorial
643.0-B-1 ASCII Encoded English (CCSD0002)
647.1-B-1 Data Entity Dictionary Specification Language (DEDSL) — Abstract Syntax (CCSD0011)
647.2-B-1 Data Entity Dictionary Specification Language (DEDSL) — PVL Syntax (CCSD0012)
647.3-B-1 Data Entity Dictionary Specification Language (DEDSL) — XML/DTD Syntax (CCSD0013)

SM&C WG :

521.0-B-2 MAL Blue Book 521.0
521.1-B-1 COM Object Model Blue Book 521.1
523.1-M-1 JAVA API Magenta Book 523.1

Also the following resolution has been approved:

660.0-P-1.1 Initiate Agency Review of OMG’s XTCE 1.2 as an adopted CCSDS standard

TIME Management BOF - Definition of Charter –Status

During this meeting the finalization of Charter, and production of the Concept Paper was concurred by all participating agencies (as per SEA Report)
Charter to be submitted to CESG and CMC Polls.

AOS Uplink: status of Action on C&S WG about coding and modulation options. Progress from the Berlin Meeting

As per SLS Area Report (see above) the TM Code & Synch Book will be updated to include new reference to USLP, AOS and also to contain options for uplink codes.

CCSDS 870.10-Y-1, MO Services and SOIS Electronic Data Sheets – Deployment scenarios.

This topic has been extensively debated, and the discussion showed that there are still different understandings of e.g the nature of the MO services , the deployment scenarios of

the MO services, the interactions/boundary/intersection with the SOIS-defined on board services.

Since there was a lengthy presentation on this, I think this also needs to be stated: PS demonstrated that all of the prior discussions of MOIMS and SOIS had overlooked, or left out of the discussion, the real nature of the spacecraft on-board environment, with hard real-time control systems, robust fault-tolerant architectures, and stringent requirements on software development and testing processes (Class A/B). There was general agreement that this is the case.

MM stated that (MAL-based) MO services were not conceived for on-board systems or payloads requiring tight real-time control .

and that MO had no intention of developing such systems. MM stated that any MAL services that might be placed on-board are there for "remote management" purposes and that they are only for remote monitor and control and not real-time process control.

With respect to the deployment of MOIMS, 3 Cases were discussed:

1. MOIMS deployed only on ground with the interface to the spacecraft being handled by standard TM/TC
2. MOIMS deployed on the spacecraft by the use of a façade or proxy. In this case a MOIMS compliant application would be present on the spacecraft that would interface to the hard real time applications controlling the spacecraft functionality. In this scenario the S/C would appear to the ground to be MOIMS compliant with the actual details of the spacecraft functionality being hidden behind the façade.
3. MOIMS compliant applications being embedded into the hard real-time systems on the S/C.

It was noted that Case 2 & 3 would require development of one or more Class A/B quality on-board implementations, a cost driver.

It was generally accepted that Case 1 and 2 above were feasible. For Case 3 a number of parties expressed severe concerns about both the feasibility and desirability of embedding MOIMS compliant applications directly into the hard real-time systems on the S/C. Of particular concern was that the interaction patterns specified in the MAL may not be suitable for the needs of hard real time systems.

Case 3 may be viable if it is possible to design a clear separation of the services, with no interference between MO and real-time service - such as by physical separation, where a dedicated processor is deployed to host the MO service(s).

There was a long discussion of what it would mean to be "MO compliant in the on-board environment". MM asserted that it was sufficient to just comply with the abstract message structures and services described in the MO SM&C Blue Book, CCSDS 521.0-B-2 and to use those, through some unspecified process, to create an efficient on-board "MAL-compliant" binding. The SM&C WG and that Blue Book have always stated that in order to turn their very abstract, and not directly implementable, "Blue Book" into a fully implementable, normative, and interoperable spec that two other "technology binding" specs, and an API, must also be specified. How this would work was not made clear.

The following way forward was agreed:

- The stated purpose of the Yellow Book will now be to document this interaction between SOIS and MOIMS on-board, and not only to document the comparative features of the MAL and EDS. PS to assess the comments to the Yellow Book provided by the MOIMS Area, and to update the Yellow Book, in the light of the 3 Cases and the current understanding about SOIS and S/C real-time environments.
- The book shall then be re-assessed by CESG.
- Organize/schedule a telecom focused on sorting out outstanding issues (if any) and come up with an agreed upon concept that will be documented in the final Yellow Book.
- Develop one example of mapping/interfaces of one MO service to one board service. JW to propose one on board SOIS service (e.g one instrument on a subnet, described by EDS's) , MOIMS and SOIS to develop the relevant mapping example.

AI/S19-6
PS

AI/S19-7
PS/MM/J
W

AI/S19-8
MM/JW

The following topics were not addressed due to the lack of time:

Proposed changes to Org&Proc in view of a Corrigendum.

Adoption of external specifications

Documents with due date for R/U/S

CTE Document Queue

General:

CESG presentation for CMC: it will include the Executive Summary for each Area, but for info only. It will be skipped during the oral presentation.