

# **CCSDS Engineering Steering Group (CESG): SUMMARY OF SPRING 2012 CESG MEETING**

**Adrian Hooke, CESG Chair**

**18 May 2012**

## Area/Working Group Highlights

- Spacecraft Onboard Interfaces (SOIS)
- System Engineering (SEA)
- Mission Operations and Info. Management (MOIMS)
- Cross Support (CSS)
- Space Link (SLS)
- Space Internetworking (SIS)

**CCSDS Management Council (CMC)**

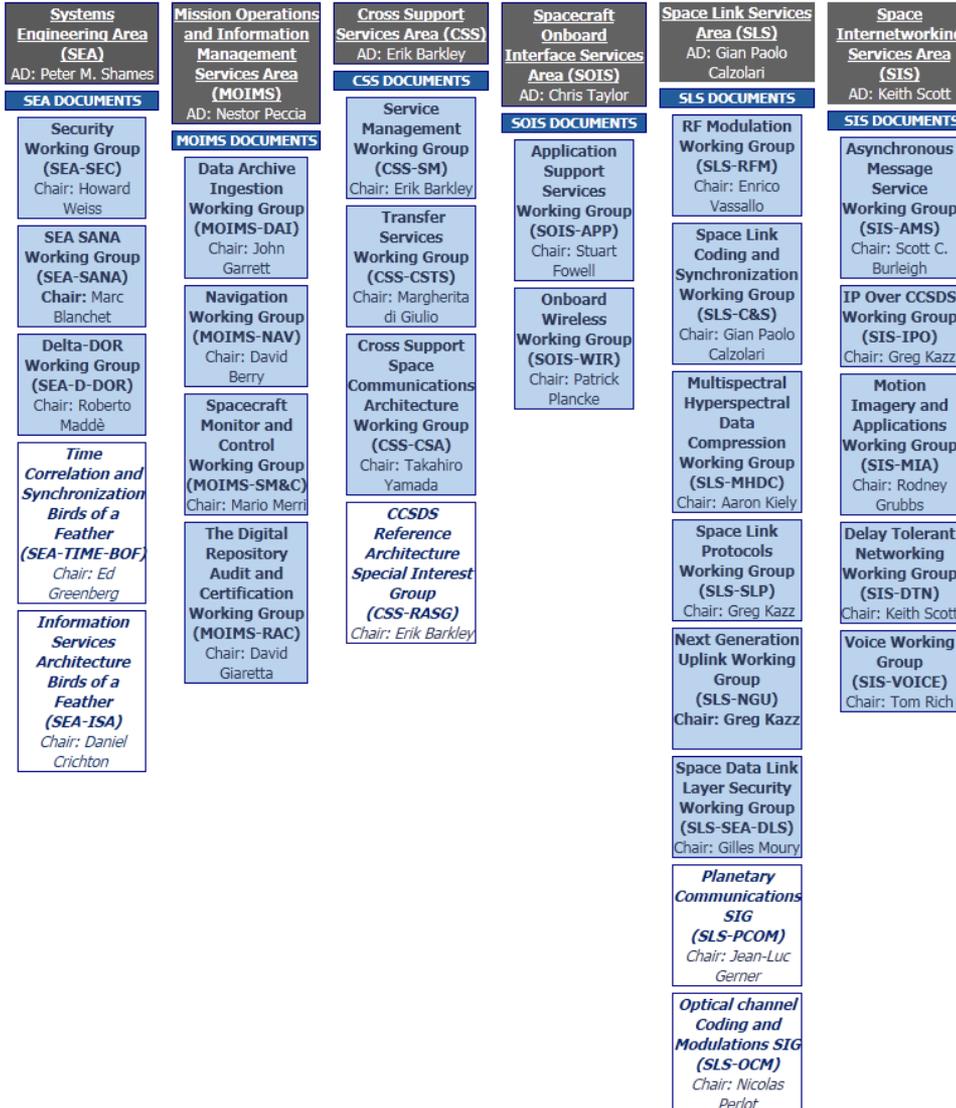
General Secretary: Mike Kearney

CMC DOCUMENTS CMC POLLS

**CCSDS Engineering Steering Group (CESG)**

CESG Chair: Adrian Hooke

CESG DOCUMENTS CESG POLLS



## Application Support Services Working Group

**Goal:** Develop SOIS Application support layer services and if appropriate protocols

### *Working Group Status*

- Green Book Issue 2 ready for sending to Secretariat for CESG Poll to publish
- File & Packet Store Services Magenta Book CESG Poll RIDs dispositions agreed & updated book with Secretariat for publishing
- Device Data Pooling & Message Transfer Services Magenta Books CESG Poll RIDs dispositioned
- Device Access Service Red Book ready for sending to Secretariat for conversion to Magenta Book at CESG Poll to publish
- Device Virtualisation & Device Enumeration Services Red Books ready for sending to Secretariat for 1<sup>st</sup> Agency Review
- Finalised plan for Electronic Data Sheet for Onboard Devices Blue Book & associated XML Schema
- Finalised plan for Common Dictionary of Terms for Onboard Devices Blue Book & associated XML Schema

## Application Support Services WG (cont.)

### Progress

- All SOIS service specifications are either published or in Agency review process
- The specifications are compatible with several existing architectures (ESA, NASA, AFRL)
- After WG analysis the use of electronic data sheets and associated schema to define device interfaces, has been assessed as providing great benefits not just within SOIS but in a much wider context (data driven interfaces, spacecraft data base import, auto testing etc)
- The intention to define standard functional interfaces within the SOIS has been de-scoped as this is better left to external groups

### Planning

- Publish remaining Green and Magenta Books
- Issue new CWE projects for Electronic Data Sheets & Common dictionary or terms
- Continue fortnightly telecons

Activity	Milestone	Planned end date
Electronic Data Sheets for Onboard Devices Blue book	Draft 1 - end 2012	Blue book May 2014
Electronic Data Sheets XML Schema	Draft 1 - end 2012	SANA XML May 2014
Common Dictionary of Terms for Onboard Devices Blue book	Draft 1 - end 2012	Blue book May 2014
Common Dictionary of Terms XML Schema	Draft 1 - end 2012	SANA XML May 2014

## Security WG

### Goals:

- Develop security overview & threat assessment, and security architecture, framework and related standards
- Current focus (security architecture, glossary, algorithms, key management)

### Working Group Status:

- Progress
  - Security Architecture RIDS processed, ready for Red-2 review May 2012
  - Algorithm document, 56 Red-1 RIDs dispositions, one open RID requires further study, expect to be ready for Red-2 review July 2012.
  - Algorithm implementation & testing Yellow Book draft reviewed, nearly completed.
  - Good progress on KM Blue Book (White) for symmetric KM, 10/12 publications date due to resource issues.
  - Joint meeting with SM&C to discuss security use cases, their authentication design, and key management (use of SecWG KM in SM&C).
  - Security Glossary finalized by WG, in Secretariat document queue for CESG.
  - Discussed Threat Document revisions, considering options.
  - Discussed Network layer security profile, plan by 10/12.
  - Key Management Green Book, CCSDS 350.6-G-1, published Nov 2011.
  - Security Guide for Mission Planners, CCSDS 350.7-G-1, published Oct 2011.
- Good joint progress on Space Data Link Layer Security WG, produced by SecWG members, reported in SLS

## Wireless WG

**Goal:** Develop wireless recommendations for onboard space applications

### Working Group Status:

- RFID-Based Inventory Management Systems Magenta Book Published
- Low data-rate wireless communications for spacecraft monitoring and control Magenta book ready to submit to CEGS for Agency review
- The SSIART (joint test-bench) MOU under signature process

### Progress

- Several use cases identified which require high-speed wireless connectivity (ISS comms and multimedia support, ESA standard telcom platform AIT) - in general data transfer requirements increasing for all existing use cases
- Planning for symposium on wireless technologies to be held in North America in September 2012

### Planning

- Update Green book to cover high rate use cases and technology evaluation
- Development of magenta book covering high-rate wireless technology (on completion of green book)
- Continue with the definition and usage of the SSIART

Activity	Milestone	Planned end date
Wireless Green Book issue 2	Draft 1 - end 2012	May 2013
Low rate Wireless Magenta	Issue 1 - end 2012	October 2012
High rate Wireless Magenta	Imitate work May 2013	May 2014

## Delta-DOR WG

### Goals:

- Develop delta differential one-way ranging (Delta-DOR) service
  - Coordinate work in other WGs (SLS/Ranging, CSS/CSTS, MOIMS/Nav, CSS/SM)
  - Develop integrated service, interoperability points, and standards

### Working Group Status:

- Delta-DOR Raw Data Exchange Format (RDEF) Blue Book draft (Red-2): ready to go out for Red-2 agency review. Expect publication Fall 2012.
- Excellent progress on 3 agency interoperability validation (ESA, JAXA, NASA), YB test report nearly complete, expect revision 10/12.
- DDOR Green Book updates done, ready for publication 06/12.
- SANA Quasar Catalogue candidate created, YB under review to define SANA registry and update policy. Expect YB publication Spring 2013.
- SMWG, expect D-DOR to be covered by next version of SM BB, no discussion at this meeting.
- Delta-Differential One Way Ranging (Delta-DOR) Reference Model, CCSDS 506.0-M-1, published 4/7/2011
- Expect to work with RF&M WG (mods to 2.5.6B, 25.5-27GHz) & SM WGs before Fall working meetings

## SANA Operations & SANA Steering Group (SSG)

### Goals:

- Operate the Space Assigned Numbers Authority (SANA)
- Support CCSDS WG use of the registry functions

### Operations Status:

- SANA operator in place, web site operational, thirty-two (32) approved registries, six (6) candidate registries not yet approved, three in SIS-DTN
- Met this week with SIS-DTN, SLS-SLP, SEA-DDOR WGs
- MACAO+CAO registries are out of sync (e.g., no change for UK Space Agency). CMC to be requested to repair this. Suggest use of SANA to replace CAO registry.
- New candidate registry for SM&C XTCE 'Tailoring Guides', includes agency and other organization elements
- New Leap Second registry for reference, copy of course
- SANA Steering Group met
  - CMC Chair, SEA AD, CNES, DLR, & ESA reps
  - Agreed on using CCSDS Glossary as authoritative source to terms, needs further thought & procedure changes.
- SANA Yellow Book procedure, CCSDS 313.0-Y-1, published, July 2011

## Navigation WG

- **Conjunction Data Message (CDM)**
  - Initiated review of RIDs from the ongoing CDM Agency Review; resolved approximately 40 RIDs (predominantly from WG members)
  - Continued planning for prototype testing by 5 organizations (JSPoc, SDC, JPL, CNES, ESAC), reviewed a straw-man test plan, and made tentative assignments to test cases
- **Navigation Green Book**
  - Continued discussion of Green Book Version 4 update/supplements
- **Pointing Requests Message (PRM)**
  - Continued discussion of PRM, with presentations and examples of the ESOC prototype and several use case templates in progress
- **Tracking Data Message (TDM)**
  - Initiated reconfirmation review with discussion of 3 sets of proposed changes from 2 agencies... more to come at Cleveland
- **Navigation Hardware Message (NHM)**
  - Completed discussion of NHM White Book 3
- **Spacecraft Maneuver Message (SMM)**
  - Completed discussion of SMM White Book 1
- **Events Message (EVM)**
  - Conducted joint meeting with Service Mgmt WG on this new work item
- **Orbit Data Messages (ODM)**
  - No discussion, but submitted corrigenda are still in progress.

## Spacecraft Monitor and Control WG

- **MO Concept (GB, ESA): Published**
- **MO Reference Model (MB, ESA): Published**
- **MO Common Object Model (BB, ESA)**
  - Completed Agency Review 2: some major RIDs required significant reworking
  - Splinter group (CNES lead) formed, which provided an agreed solution
  - Updated document finalised during this workshop and to be submitted for a new Agency Review early May
  - AD is requested to expedite the secretariat work as this is the 3<sup>rd</sup> Review
- **MO Message Abstraction Layer (BB, ESA): Issue 1 published**
  - Issue 2 updated to adapt to new COM and correct a few minor mistakes. Submitted to CESG for initiating pink sheet Agency Review
- **MO MAL Testing (YB, ESA): Published**
  - Update needed following MAL issue 2
- **MO M&C Service (BB, ESA)**
  - Updated to adapt to new COM: internal review (2 weeks kicked off) before Agency Review
- **MO Common Services (BB, ESA)**
  - Needs to be adapted to new COM. This will be the next document tackled after M&C

## Spacecraft Monitor and Control WG (cont)

- **MO Java Language API (MB, CNES)**
  - Completed Agency Review 1: updated document delivered (including changes in MAL 2). Doc to be submitted for publication
- **MO Space Packet Binding/Encoding (BB, CNES)**
  - Under preparation. Schedule anticipated to cope with potential OPS-SAT needs
- **MO C++ Language API (MB, NASA)**
  - Under preparation. First draft expected by Fall 2012.
- **XTCE 1.2 BB (pink sheet)**
  - Upgrade to be done by OMG first by Aug 2012. Review in parallel with OMG
  - Changes are minor and should not require prototyping. This should be confirmed by CESG
- **XTCE Core GB**
  - Name changed to “XTCE Element Description”
  - Currently under CESG review
- **XTCE CCSDS MB**
  - Document no longer exists and substituted by Tailoring Guidelines currently developed according to an agreed template by
    - NASA (GovSat)
    - ESA (PUS/S2k)
  - SANA has already verified the feasibility of including the TG in SANA
  - AD to confirm that Tailoring Guidelines can be included in SANA
  - SM&C Charter will require update to remove the reference to the MB

## Call for Interest in Standardization of Mission Planning Services

- Large attendance (about 50 persons at the meeting plus 8 via WebEx), but limited participation from the US side (holes in the areas of manned missions and rovers)
- General consensus on need for standardization of Mission Planning Services
- Keep the level of standardization simple, at least at the beginning
  - Fast track (suboptimal solution) useful also to focus and consolidate the opinion of the planning experts
- Identified standardization priorities (not necessarily in order of priority)
  - Terminology
  - Planning Request (and reporting)
  - Plan Management/Timeline (and reporting)
  - Flight Dynamics Event Management
  - Rules & Constraints Management (and reporting): this considered more difficult to agree upon
- Main criticism: unclear trade-off between benefits and the effort/time
  - Most of the participants agreed that it would be very difficult to run a detailed business case.
  - Proposed approach (simple standards first) mitigate the risks
- Way forward
  - Consolidate distribution list
  - Hold a similar meeting at the next CCSDS workshop in Cleveland (more US representation)
  - Initial concept paper may be drafted before the next CCSDS workshop to allow a more focused discussion
  - Agencies and Industries are invited to submit to MM a short email confirming:
    - Their interest in standardization of mission planning services
    - Their mission planning services priorities
    - Their willingness to contribute to the initial concept paper
    - Their (agencies only) willingness (non committing) to contribute to the standardization effort

## Data Archive/Ingest WG

- **OAIS Reference Model MB, Issue 2**
  - **Completed CCSDS Agency Review and ISO Review**
    - RIDs/Comments received, responses generated and accepted
  - **Technical Editor produced draft MB with updates from RID/comment responses**
    - Resolution to publish as a Magenta Book approved by AD in December 2011
    - CESG balloting a number of new comments
      - Technical Author negotiating to determine what changes are acceptable
      - WG discussed additional updates during telecons this week and earlier
      - These comments late in the process have delayed its publication
- **PAIS Blue Book, Issue 1**
  - WG delivered new draft RB to CCSDS Editor at start Nov. 2011
  - **Completed CCSDS Agency Review at beginning of April 2012**
  - Several minor RIDs generated
  - WG developed responses to RIDs this week
    - WG will seek concurrence with response from RID Originators
  - **WG plans to update prototypes and complete testing report**
    - Subject to funding availability

## Repository and Audit Certification WG

- **Working Group Summary progress:**
  - Reviewed status of the documents on RAC Wiki in weekly videoconferences of 6-12 people for 90 mins each
  - No physical meeting in Darmstadt but additional special telecon held
  - “Metrics...” document completed and published on CCSDS site and on ISO
  - “Requirements for Bodies...” document completed and published on CCSDS site and is with ISO
  - Schedule
    - Green book on best practice due Spring 2013. Significant material was collected during the test audits and white book draft in progress

## Telerobotics BOF

- **Activity Since CCSDS Fall 2011 Meeting**
  - Revised the Telerobotics Draft Charter
  - Revised BOF Draft Telerobotics Concept Paper
  - Identified NASA and CSA resources to support a Telerobotics Working Group products
  - Held 2 Telerobotics BOF Meetings
  - Maintained Telerobotics Mailing List
    - 61 members
    - NASA, ESA, CSA, SLR, RU, JAXA, CNES,
    - University of Colorado, Onera, Mitre, Viagenie, INPE, Scisys, Logica
  - Prepared for CCSDS Spring 2012 Meeting
- **Activity at CCSDS Spring 2012**
  - Held 2<sup>nd</sup> Face to face Telerobotics meeting on 19 April, 2012
    - 23 Attendees from ESA, NASA, CSA, DLR, CNES, ESTEC, RESA, ESOC, JAXA
    - 5 via Telecon
  - BOF Presentations
    - Draft Telerobotics Concept Paper - David Mittman, NASA JPL
    - Telerobotics BOF Draft Charter - Lindolfo Martinez, NASA, JSC
  - General BOF discussion

## Telerobotics BOF (cont)

### • Plan for the next Set of Activities

- Release updated Concept Paper Version 2.2 on April 27, 2012
- Generate WG Resource estimates. Inputs from agencies due by 13 May, 2012
- Meeting on May 14, 2012 (Monday)
  - Final Concept Paper Review,
  - Resource inputs from agencies incorporated into the Draft Working Group Charter
- Final Resource Plan, Draft Charter, Concept Paper delivered to the MOIMS Area Director by May 31<sup>st</sup>, 2012
- Start process for CCSDS approval of Telerobotics Working Group
- Meeting on June 11, 2012(Monday)
  - Review White Paper inputs from agencies.
- Meeting July 16, 2012 (Monday)
  - Review White Paper inputs from agencies
  - Start Draft Green Book Outline
- Meeting September 10, 2012 (Monday)
  - Finalize White Book
  - Draft Green Book Outline
  - Telerobotics Working Group Started (Estimated)
- Support CCSDS Fall 2012 Technical Meetings

## Service Management WG/BOF

**Goals: Develop Specifications for cross support management for TT+C services**

### Working Group Status:

- Reviewed IOAG priorities re Service Management
- Reviewed draft concept (GB) and formal model for next generation framework
- Developed plan for meeting high priority needs (based on IOAG inputs)
  - Visibility information
  - Network resource availability information
  - Schedule information

### *Next Generation SM WG (BOF) Planning*

High Priority Updates to Draft Green Book (internal WG check – support IOAG high priorities items)	May 2012
Draft Charter	May 2012

### *If Resources Available and Charter Approved*

Draft Green Book (complete concept)	October 2012
Draft Mutual Visibility (Communication Geometry) Book (BB Track)	Mar 2013
Draft Schedule/Network Resource Availability Book (BB Track)	May 2014

## Cross Support Transfer Services (CSTS) WG

### Working Group Summary Situation:

- **Framework:** Progressing along the lines of the roadmap developed t at Boulder meetings (see next slide); return side -- updates completed; forward side – concepts identified, many of the updates ready to be applied
- **MD-CSTS (Monitor Data) and TD-CSTS (Tracking Data) need to be updated based on framework revisions**
  - **MD-CSTS, to be updated via NASA resources (to be confirmed – ESA may perform the work on a best efforts basis)**
  - **No resources identified for updates to TD-CSTS**
- **RUFT (Return Unframed Telemetry) -- no progress, lack of resources**
- **Prototypes:**
  - **Framework prototypes: plans identified -- return services: ESA/NASA; forward services via NASA resources**
  - **MD-CSTS: plans identified -- ESA, CNES resources;**
  - **TD-CSTS: no resources identified/available**

## Cross Support Services Architecture (CSSA) WG

### Goals:

- Develop, produce best practices recommendation for cross support services architecture (SCSCA-ADD)
- Provide concept, rationale re cross support services architecture (GB) -- Space Cross Support Communications Architecture Reference Model (SCSCA-RM)

### WG Summary Situation:

- Draft MB/ADD produced
- Draft GB/RM produced

Activity	Date
Update MB (SCCS-ADD), release to Secretariat for preparation as Red-1	July 2012
Update the GB (SCCS-RM), release to AD for consideration as Green-1 for CESG	August 2012

## Radio Frequency and Modulation WG

### ***Recommendation on high rate telemetry and PN ranging***

**Additional independent work in progress, draft RED recommendation expected at Fall 2012**

### ***Recommendations on 26 GHz modulations for SRS***

**Red 26 GHz ready for Agency Review along with two companion revised (pink) recs and one to be suppressed**

### ***Green book on 2 GHz (CDMA) modulation for missions supported by data relay satellites***

**Green book being drafted, expected to be ready for CESG/CMC Approval before Cleveland meeting**

### ***Recommendation on 32 GHz modulations***

**Revised rec (pink) ready for Agency Review along with companion revised (pink) rec**

### ***Recommendation on 8 GHz modulation for EESS (2.4.18)***

***No input for this meeting – DVB-S2 based Blue Book not yet available***

### ***Recommendation on 4D-8PSK TCM impairments***

**No input for this meeting – resource problem**

### ***Prox-1 PL BB***

**Under Agency Review**

## Coding & Synchronization WG (1 of 3)

### ***DVB-S2 Standardization***

- In Berlin (Spring 2011), WG reached consensus on a WG resolution for starting Agency Review.
- CNES editorial update pending till this meeting where a Streamlined version has been provided and discussed. A few editorial improvements have been identified and will be implemented soon by CNES.
- WG Consensus confirmed WG resolution for starting Agency Review

### ***Proximity-1 Review & Upgrade***

- Agency Review of the 3 Pink Books just started with deadline 1<sup>st</sup> of June 2012.
- This would need discussing RIDs in the Summer 2012 with possible finalization before or at Fall 2012 Meeting.

## Coding & Synchronization WG (2of 3)

### *TC Green Book 230.1-G Green Book Update*

- After the Introduction of TC Repeated Transmission in coordination with the Space Link Protocol WG, a few additional improvements and corrections have been approved in this meeting. (Similar SLP activity ongoing for updating 130.2-G Space Data Link Protocols Summary of Concept and Rationale Green Book)
- **Resolution** for publication issued and book with CCSDS Editor. (Also true for 130.2-G)

### *TM Coding Green Book*

- Very good progress with latest changes agreed in this meeting
- Agreement for issuing Green 2 deferring to Green 3 (or to separate book[s]) the SCCC and DVB-S2 material
- Resolution for publication of Green 2 will be issued after update (forecast before end of May 2012)

## Coding & Synchronization WG (3of 3)

### *Long Erasures Codes*

- DLR presented an updated draft Orange Book On the use of Erasure Coding for CCSDS space missions. Progress not very fast.
- New version will be discussed at Fall 2012 Meeting with increased level of detail.

### *Short (64, 128, 256 bit ) LDPC codes for uplink - Orange Book*

- NASA are producing an Orange Book on “Short-Blocklength LDPC Codes” suitable for emergency and low data rate uplink. They would provide improvement over the existing BCH codes.
- Draft version discussed in this meeting. It will be updated, possibly with better codes.

## Space Link Protocols WG

- **Preliminary RID resolution of Prox-1 Space Data Link Layer Protocol**
  - **Consensus reached on RIDs submitted by Keith Scott SIS AD**
  - **Agency review continues until June 1 – thereafter WG telecon will take place to dispose any remaining RIDs submitted**
  - **UK Space Agency also to provide as RID updated PICS Proforma based upon work already completed by NASA/ESA Mars 2016/Exomars teams**
- **Updates to Proximity-1 Green Book due to 5- year review of Prox-1 Blue books**
  - **CRC-32 and other material available**
  - **UK Space Agency to supply Lessons Learned Annex based upon Prox-1 interoperability testing between ESA and NASA missions**
- **Pending AOS/TM previously approved pink sheets and 5-year Review**
  - **WG Approved AOS & TM 2008 pink sheets exist (OID frame etc)**
  - **New short sections in AOS, TM, TC Space Data Link books needed to identify the required use and reference emerging SDLS protocol (especially interpretation of frame length field in TC)**
- **NASA presented a proposal for a single future all encompassing link layer protocol to be used by all future missions**
  - **Merges the best of all the CCSDS link layer protocols into one**

## Next Generation Uplink WG

- **Version 2 of NGU Green Book on the CWE**
  - **Book was updated to include scope, rational, application profiles, and trade-offs performed to date, and performance data. DLR material to be integrated before Fall 2012.**
- **NASA presented White Paper on proposed NGU upgrades to TC Sync & Channel Coding**
  - **Current TC standard is out-of-date compared to current state of the art. Some current missions (NASA MSL, Solar Probe and potentially ESA Euclid) have identified benefits of having a better performance uplink.**
  - **Minimum changes to the standard would be to add additional uplink codes such as LDPC to profit from the performance gains. Other potential changes include use of a larger message start sequence to aide in synchronization, and use of a signaling byte to signal the end of the CLTU instead of the use of a failed code word.**
  - **In order to facilitate comparisons, SLS AD made the “let’s preserve terminology” presentation so that performance and functionality of the current TC vs the proposed TC changes could more easily be compared. WG concurred.**
- **NASA presented status and results on short LDPC codes for uplink**
  - **New non-binary NASA LDPC code performance is approx. 1 dB better than the binary ones – very comparable to the performance of the DLR Turbo codes for uplink presented in Fall 2011 meeting.**
  - **However the non-binary codes are approx. 64x more complex than the binary ones making them less attractive at this time for implementation. This work is on-going.**

## Multispectral & Hyperspectral Data Compression (MHDC) WG

1. **Lossy Compression**
  - Reviewed compression performance results for candidate lossy compression algorithms
  - Selected a lossy approach for standardization: pre-processing spectral transform extension to existing CCSDS-122B Image Data Compression (current work)
  - Lossy extension to CCSDS-123B (lower complexity) is being pursued under ESA leadership (possible future work)
2. Reviewed draft text submitted for lossless Green Book (supporting CCSDS-123B)
3. CMC Polls for 123.0-B *Lossless Multispectral & Hyperspectral Image Compression* and updated 121.0-B-2 *Lossless Data Compression*

### *Planning :*

- A. Lossless Green Book:
- B. Additional text and revisions to be delivered (Fall meeting)
- C. Lossy Compressor
- D. Extensions to 122B to support pre-processing transform to be identified (July) and reviewed by WG (Aug)
- E. White Book to be produced defining spectral preprocessing transforms (Fall meeting)

## Space Data Link Security (SDLS) WG

1. **SDLS core protocol**
  - Dispositioned all RIDs from agency review #2 of red-2 : no significant technical changes
  - WG proposes to finalize draft SDLS Blue Book and submit to CESG/CMC approval for publication (once interoperability testing is performed)
  - Interoperability testing:
    - CNES simulator development started – protocol validation results expected end 2012. Test plan to be finalized by mid 2012.
    - Second independent implementation still to be started : ESA ? NASA ? DLR ?
  - SDLS core protocol green book : 75% complete – target is to publish with BB
2. **SDLS extended procedures** : User Requirements and outline of future recommendation agreed. Discussion of proposals for directives.

### *Problems and Issues:*

- No firm commitment for development of second independent implementation of core protocol : could delay even further SDLS blue book publication
- Update of TC/TM/AOS SDLP blue book so that they refer to SDLS for secure mode and incorporate any necessary requirements for operation in secure mode.

### *Planning:*

- **SDLS core protocol:**
  - Final draft blue book for CESG/CMC approval, ready by June 2012
  - Final draft green book for CESG/CMC approval, ready by end 2012
  - Interoperability testing: nov 2012 – fev 2013
  - Blue book publication : march 2013
- **SDLS extended procedures:**
  - Red-1 expected mid 2013
  - Blue book mid 2014

## SLS-OCM: Optical Coding & Modulations (SIG)

### *Goals:*

- Provide a discussion forum for cooperation and cross-support
- Prepare creation of a WG

### *Summary Progress:*

- IOAG/OLSG interim report was reviewed (final report is expected for Fall 2012)
- Concept paper is left open for future possible updates
- OCM workshop: update of agencies' activities on optical communications.
- Still no consensus on whether standardization should start now and what should be standardized (wavelength?, Coding and modulation?)

### *Planning:*

- OCM SIG will move towards BoF and WG if IOAG recommends to start standardization.
- OCM SIG activities will stop (or be significantly reduced) if IOAG does not recommend standardization.

## Planetary Surface Communications (PLACOM) SIG

### *Goals:*

- Survey and report on agencies needs and planning for lunar and Martian local communications/navigation infrastructure (surface coms/nav and surface-orbit coms/nav)
- Establish a preliminary coarse inventory of communications/navigation requirements (URD)
- Identify the way forward, e.g. proposal for the creation of a WG, type of book needed (recommended standard, recommended practice, ...)

### *Progress:*

- Member agencies Lunar/Martian exploration plans on hold or under redefinition; no new input provided at this meeting but expected before Fall'12 meeting
- Report provided on exploration relays requirements and on frequency bands for proximity links
- Action taken by several agencies to put together user requirements on comms and nav by the Fall'12
- Decision on way forward (e.g. Creation of a WG) at the Fall meeting

## Asynchronous Messaging WG

### *Goals:*

- Complete the work; disband WG

### *Working Group Status:*

- No WG comments received on the Green Book; resolve to disband the WG contingent on publication

### *Summary:*

- WG met briefly and resolved to dissolve the WG contingent on publication of the Green Book
- Submitted resolution to that effect to AD

### *Plans:*

- Await CESG approval of Green Book and then close WG

## CFDP over Encapsulation WG

### *Goals:*

- Define a single thin specification for how to run CFDP over Encapsulation in Long-Haul and Prox-1 point-to-point link configurations

### *Working Group Status:*

- Initial draft submitted to secretariat for formatting, CESG, and Agency review

### *Plans:*

- Receive and disposition RIDs; move forward with publication

## IP Over CCSDS WG

### *Goals:*

- Develop a CCSDS Blue Book for how to transfer IP datagrams over the 4 CCSDS link layer protocols.

### *Working Group Status:*

- Final IPoC Blue book submitted to secretariat
  - Set of atomic events required for publication:
    - Revise/retire Space Link Identifiers Book
    - All registries in Space Link Identifiers Book transitioned to SANA
  - Need to add PICS
  - Need to complete test report (material already available)

### *Plans:*

- Produce PICS and test report and publish document
- Close WG

## Motion Imagery Applications (MIA) WG

### *Goals:*

- Leverage command, control and collaboration and interoperability specifications developed by NASA for the Constellation Program for use with standard definition, high definition, and digital cinema quality motion imagery for live and recorded motion imagery transmissions to and from human spacecraft.

### *Working Group Status:*

- Complete WG review of Magenta Book (including PICS)
- First review of test procedures (Yellow Book)

### *Remarks:*

- No face-to-face meeting in Darmstadt – WG activities conducted via email and telecon/webex

### *Plans:*

- Continue discussing test procedures / refine Yellow Book
- Set a date/ participants for testing (possibilities include NASA/MSFC NASA/JSC / JAXA / DLR)
- Publish Blue Book

## Delay/Disruption Tolerant Networking (DTN) WG

### *Goals:*

- Review Solar System Internetworking Architecture Green Book Draft
- Disposition LTP Red-2 RIDS
- Disposition BP Red-1 RIDS
- Review progress on DTN interoperability

### *Working Group Status:*

- LTP Red-2 and BP Red-1 RIDS successfully dispositioned
  - BP will need Red-2 review (adding 'transport-layer' services)
- Coordination of registries between IANA / SANA worked out

### *Joint / Cross-Area Meetings:*

- SIS-DTN / CSS-CSA meetings to coordinate SSI Architecture Green Book and CSS-CSA Architecture [Green Book, Magenta Book]

### *Plans:*

- Address RIDs to LTP and BP; move documents forward
- Shift focus to network management (in charter); extended QoS, routing (new work items)

## Voice WG

### *Goals:*

- Review and final approval of the Charter
- Complete update of chapter 3 of the Magenta Book
- Proposal to update the Green book
  - Add Proximity Operations and Docking Voice
  - Add Search and Rescue Voice
  - Add Audio File Formats
- Establish plan and schedule for MB completion
  - EVA and Vehicle to Vehicle voice will be deferred in order to expedite MB completion

### *Working Group Status:*

- Tasks assigned for Magenta Book for review by Fall meeting
- Tasks assigned for significant update of Green Book for review by Fall meeting

### *Plans:*

- Propose to have a joint meeting with DTN in the Fall to discuss streaming service over BP