**Subject:** [Sea-sa] FW: [EXTERNAL] Re: CESG-P-2020-03-001 Approval to publish CCSDS 371.0-G-1, Application and Support Layer Architecture (Green Book, Issue 1)
**Date:** Tuesday, April 21, 2020 at 3:29:35 PM Pacific Daylight Time
**From:** SEA-SA on behalf of Shames, Peter M (US 312B) via SEA-SA
**To:** SEA-SA
**Category:** Work Contacts, Work
**Attachments:** ATT00001.txt

Dear SEA-SAWG,

Please see attached. I have not yet parsed the inputs for Barkley, but we will need to do so. And we do not yet have inputs from Wilmot.

Mario, for some unknown reason, decided not to vote. Maybe he plans to do it on the next go-round.

Cheers, Peter

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**From:** Tom Gannett <thomas.gannett@tgannett.net>
**Date:** Tuesday, April 21, 2020 at 7:52 AM
**To:** Peter Shames <peter.m.shames@jpl.nasa.gov>
**Cc:** Erik Barkley <erik.j.barkley@jpl.nasa.gov>, Gian Paolo Calzolari <Gian.Paolo.Calzolari@esa.int>, "Wilmot, Jonathan J. (GSFC-5820)" <jonathan.j.wilmot@nasa.gov>
**Subject:** [EXTERNAL] Re: CESG-P-2020-03-001 Approval to publish CCSDS 371.0-G-1, Application and Support Layer Architecture (Green Book, Issue 1)

Peter:

The CESG poll to approve publication of CCSDS 371.0-G-1, Application and Support Layer Architecture (Green Book, Issue 1) concluded with conditions. Please negotiate disposition of the conditions directly with the AD(s) who voted to approve with conditions and CC the Secretariat on all related correspondence.

CESG E-Poll Identifier: CESG-P-2020-03-001
Approval to publish CCSDS 371.0-G-1, Application and Support Layer Architecture (Green Book, Issue 1)

Results of CESG poll beginning 31 March 2020 and ending 17 April 2020:

Abstain: 0 (0%)
Approve Unconditionally: 2 (40%) (Shames, Burleigh)
Approve with Conditions: 3 (60%) (Barkley, Calzolari, Wilmot)

Disapprove with Comment:  0 (0%)

CONDITIONS/COMMENTS:

Erik Barkley (Approve with Conditions):  I am this close ("") to voting disapprove.  However I think CCSDS needs an a good architetural overview of the upper layers.  Unfortunately I find that there is still work to be done.  Several observations are listed below.

1) Page 1-3, section 1.4: suggest revising FROM "ASL Reference Architecture: describes the approach of describing the reference architecture in terms of seven modelling viewpoints and introduces the graphical notation used." TO "ASL Reference Architecture: defines the seven modeling viewpoints and the graphical notations used in this document" or something like that. RATIONALE: as currently written we essentially have the the reference architecture as describing the describing for the reference architecture; circular to say the least.

2) Page 2-1 Section 2 and onward -- a general finding throughout the remainder of the document: the question of architecture versus org chart figures prominently here as this seems to want to describe the architecture in terms of two CCSDS areas: SOIS and MOIMS. An immediate practical concern emerges in terms of considering document maintenance down the road. What happens if CCSDS is reorganized (and that has happened in the past) and the notion of areas and/or their names change? It may not be such a simple editing job of changing the names as some bits and pieces of functionality may move to an entirely different new organization in terms of working groups etc. It's a bit distressing that a more genuine approach to actually identifying the functions independent of the areas has not been pursued. Suggest revision to the document to anchor this firmly in functional terms rather than CCSDS area organizations. As a point of comparison, note that the Space Communications Cross Support--Architecture Description Document (CCSDS 901.0-G-1) makes no mention any CCSDS Area.  Furthermore it has only one note with the term "Working Group" to indicate that WGs will produce future standards.
3) Page 2-1, Section 2.2.1 as follow-up from the immediately preceding observation the document

talks about describing "...MOIMS interaction with the onboard environment..." -- Of course MOIMS has no interaction with anything in terms of an onboard spacecraft environment as it is an area in CCSDS with multiple working groups. I suspect the more functional aspect that is being attempted here is MO (mission operations).
4) Page 2-4, 2nd paragraph as yet further follow-up to the immediately two preceding observations I think that the phrase "based on CCSDS SLS SIS CSS and SEA standards" can be deleted. The protocol stack is already indicated as being defined in SCCS-ADD -- the areas producing the various standards involved are not really germane to description of the architecture.

5) Page 2-6, 1st paragraph: FROM "..Some platforms use Application Programming Interface (API) calls for communication with services. Some platforms use a software message bus for the same purpose. Some platforms are Time and Space Partitioned (TSP), with messages passed between partitions" TO -- something more technically correct. RATIONALE: these two sentences are confusing and not technically correct. Any kind of software messaging bus comes with an API for sending the messages and/or receiving them from the message bus. How this differs from an "API for communication with services" is not at all made clear.

6) Page 2-9 A further follow up related to item 2) above about focus on areas rather than functions. In particular suggest revision to "But it is necessary to describe how the MOIMS services interface with the spacecraft environment..." -- again MOIMS as an area; if you read expanding the acronym you get Mission Operation and Information Services services interface with the spacecraft environment..." I suspect the real object is more just MO and not the entire area within CCSDS.

7) Page 3-1, 5th para: FROM "MOIMS aspects" to "Mission Operations aspects" and FROM "SOIS aspects" to on board the spacecraft aspects" -- again confusion of areas vs functionalities

8) Page 3-2, 2nd para: delete this paragraph. Rationale: This has all been well established prior in the document.
9) Page 3-3, last para: FROM "Two formulations of the Functional Viewpoint diagrams are

provided. The standard diagram is function-oriented and shows functions connected by logical interfaces. These are contained in the body of the document. A set of alternative diagrams are contained in annex B and are service-oriented." TO something that is less confusion prone. RATIONALE: if the alternative diagrams contained in annex B are service oriented then why are they indicated as a formulation of the functional viewpoint diagram when in fact we have a service viewpoint as well?

10) Page 3-4, last para: Please better clarify offline in "Such interactions may be supported as simple offline transfer of data, typically as a file transfer, or more complex online interactions between service consumer and provider functions." RATIONALE: CFDP is a file transfer which I believe many people consider to be something that is "online".

11) Page 3-5, second to last bullet: Please clarify for "… service interaction using message transfer;" -- does this include streaming applications?

12) Page 3-7 section 3.2, last paragraph in particular: this seems to argue that the implementation viewpoint is not really part of the architecture as it is essentially just examples. Please clarify.

13) Page 3-9, figure 3-2 (Graphical Notation for Functional Viewpoint Diagrams), Page 3-13, Figure 3-5 (Graphical Graphical Notation for Communication Viewpoint Diagrams) , Page 3-15, Figure 3-7 (Graphical Notaion for Deployment Viewpoint Diagrams), Page 3-17, Figure 3-9 (Graphical Notation for Implementation Viewpoint Process View -- by the way should not.B viewpoint diagrams and not viewpoint view?) all use the same color (a light value of yellow) to denote different things. The Color Keys legend in Figure 3-1 does not address this. In Figure 3-5, the communications view, functions are shown in a pinkish color. In Figure 3-7, functions are shown with no distinct colors and are shown with the same light yellow color as the nodes. Figure 3-6 (Graphical Notation for Physical Vuiewpoint Digrams), does by contrast, have a viewpoint specific color coding key. Please provide and use consistently, viewpoint specific color coding keys. Given that many of the same shapes show up in different viewpoint diagrams it be difficult

if not confusing to quickly glean what is being addressd.
14) Page 4-3, Section 4.2.2.: FROM "MOIMS AREA CONTEXT" TO "MO CONTEXT". RATIONALE: MOIMS is part of the CCSDS organization and it's hard to see how Working Groups and Area Director/Deputy Area Director in fact participate in the operational concerns indicated in the diagram.

15) Page 4-3 Context diagram -- this type of diagram is not introduced in the reference architecture section. Please provide at least a note that this will be included in architectural viewpoints. Perhaps the inetnation is that for each viewpoint there is an OV-1 type diagram? (https://en.wikipedia.org/wiki/Operational_View) ?

16) Page 4-45: this seems to be a general discussion about two areas in CCSDS and security rather than any real architectural considerations with regard to security. Please revise to state the functions needed for the ASL security architecture.

17) Page 4-46: re observation 16, immediately above, what is stated as terms seem to be in fact the security functions needed. Please consider revising accordingly.

18) Page 5-2: bottom third of page, page 5-3 top ~quarter of page: Suggest either consistently ensuring all abbreviations are in the appropriate annex or consistently expanding them; as presented here it seems a bit haphazard as to why some abbreviations are spelled out in full while as others are not. There appears to be some sort of assumption that many of the abbreviations are widely understood while there are some new ones introduced here when in fact for reader coming across is the first time they're all essentially foreign.

19) General: the document gives an overall impression of providing viewpoints to describe an architecture into standards being developed within the MOIMS and SOIS areas. That in and of itself is okay and of value. However the document purports to be an architecture description document. By the end of the document I had not seen anything that shows how the MO and On-Board functions were being arranged in architectural sense. For example,where is a diagram that shows the functional realtionship between device enumeration, not to mention Electronic Data Sheet and MO Monitor and Control? Presumably there

would also be some sort of information kind of consideration in that the device enumeration/EDS would have some bearing on the parameters being configured for reporting monitor data. And presumably the on-board Time Access Service would have a bearing in this example as well.

20) Page 10-3, Section 10.2.3 -- this introduces an implementation view sub-view, "COMPONENT VIEW" this is not defined, identified in the reference arcthiectrue section. Consequently its not clear what the concerns are of this view point. Please address in the reference arcthiecture section.
21 Page 10-4 Section 10.2.4 -- Process view another view being introduced that is not defined in the reference arcitecture. Same type of comment as 20 immediately above.

22) Section 3 -- general -- highly recommend that each of the viewpoint description sections begin by indicating the types of concerns/types of questions that the viewpoint is intended to address. I believe that checking the resulting descriptions/diagrams for each of the views will help to validate that the correct views have been developed. For example, the functional viewpoint begins the description that "… The model is broken down hierarchically into a set of functions corresponding to recognizable areas of functionality within space systems which are often associated with particular type of information". But what are we trying to achieve with the functional view? Identification of the functions that a mission needs for operating? Prioritization of the functions in terms of the need for standardization? And to get to these types of questions I think the stakeholders need to be identified. And presumably at the end of the day, the stakeholders would get into mission classes -- perhaps a set something like a list along the lines of Earth Observation, Navigation, Telecommunication / Relay. Astronomical / Astrophysical Observation, Space Platform Servicing. Solar System Body Observation / Orbiter / Flyby, Solar System Body Lander/Penetrator / In-situ Exploration, Sample return, Technology Demonstration. It seems to me that one of the key stakeholders ultimately are the missions that would implement the standards and not having their concerns mapped out with respect to the architecture seems to me to be a disservice having invested the time to understand

the architecture such as it's laid out.

Gian Paolo Calzolari (Approve with Conditions): SPP (Ref.[3]) is mentioned 3 times in the document. At least the first occurence should also mention EPP 133.1-B. For the second one, MOIMS should check/consider if SM&C allows using Encapsulation Packets.

Jonathan Wilmot (Approve with Conditions): SOIS area is in process of consolodating comments from NASA, CAST and ESA reveiwers and will provide those to SEA/Systems Architecture Working Group by 4/24/2020

Total Respondents: 5

No response was received from the following Area(s):

MOIMS

SECRETARIAT INTERPRETATION OF RESULTS: Approved with Conditions
PROPOSED SECRETARIAT ACTION: Generate CMC poll after conditions have been addressed

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