Review of CCSDS A02.1-Y-4 Cor. 1 *Yellow Book on Organization and Processes for the Consultative Committee for Space Data Systems*

Wai Fong, 4/10/2025

**Comments:**

1. Page 2-3, first sentence, last paragraph: “Although private industry is an emerging and significant customer, both classes of stakeholders currently tend to be dominated by national or international civil space agencies because of the high costs involved.”

Comment: Here it is not clear what classes are. The prior paragraph defines 3 types of CCSDS stakeholders, Space-Mission Organizations, Space-mission support infrastructure provider organizations, and Space data user organizations. We have to assume that this is one class of stakeholders, and that private industry is the second class of stake holders.

Proposed wording: “The three types of stake holders defined above is but one class of stakeholders, a second and emerging class is formed by private industry. Both classes of stakeholders currently tend to be dominated by national or international civil space agencies because of the high costs involved.”

1. Page 2-6, the two ISO hyperlinks: <http://isotc.iso.org/livelink/livelink/open/tc20sc13> and <http://isotc.iso.org/livelink/livelink?func=ll&objId=8791028&objAction=browse&sort=name> cannot be accessed without an ISO account which cannot be created by the public. And so these links must be changed to public assessable links.
2. Page 2-12, second paragraph: “A candidate for selection as an AD (or deputy AD) must be recognized as leading technical expert in the field covered by that Area and must have extensive prior experience leading a specific standards development task within the CCSDS, such as having served as a WG chair or deputy chair.”

Comment: This statement is simply misleading. Most of the AD (deputy) for SLS has in the past only been chairman for one WG and is not an expert in all the fields of that Area, i.e., Data Compression, C&S, RFM, SLP, and Lasercomm. In fact, I would say that it is nearly impossible to find an individual that has knowledge of such a diverse range of fields.

Proposed wording: “A candidate for selection as an AD (or deputy AD) must be recognized as leading technical expert in a field covered by that Area and must have extensive prior experience leading a specific standards development task within the CCSDS, such as having served as a WG chair or deputy chair.”

1. Page 2-14, second to last paragraph, last sentence: “The WG’s activities are supposed to focus on just what is in the charter, and not to wander off onto other “interesting” topics. In fact, some WG charters will specify what the WG will not do, particularly if there were some attractive but nebulous topics brought up during the drafting of the charter.”

Comment: This is written in a tone that sounds like parental guidance and should be restated in a mature manner.

Proposed wording: “WGs are advised that all activities should stay focused on items within the WG charter.”

1. Page 2-19, first paragraph, last sentence: “BOFs initiated from inside the CCSDS organization have a lifetime of no more than one year.”

Comment: How many BOFs have lasted no more than a year? From my experience in the C&S WG, BOFs have generally lasted 2 or 3 years.

Proposed wording: “BOFs initiated from inside the CCSDS organization have a targeted lifetime of no more than one year.”

1. Page 33, second paragraph, last sentence: “The AD has the prerogative to define, in alignment with the CCSDS Strategic Plan, the set of projects that this Area contains at any point in time.”

Comment: The CCSDS Strategic Plan has not defined in this document nor are references to this plan.

Recommendation: Define this plan and how to get access to this or state that this is an internal document with no public access.

1. Page 60, Section 6.1.4.3, first paragraph, first sentence: “Recommended Practices are normative and have prescriptive content but are typically not directly implementable for interoperability or cross support.”

Comment: Looking the titles of the Magenta books in the CCSDS repository, 99% of the books are geared toward interoperability or cross support. So this statement is not true.

Suggested wording: “Recommended Practices are normative and have prescriptive content but may not be directly implementable for interoperability or cross support.”

1. Page 66, first paragraph, first sentence: “The schedule for the review shall normally allow 60 days from the time of the review commencement for Agencies to conduct review and return comments to the review coordinator:”

Comment: minor grammatical error, missing article between conduct and review.

Suggested wording: “The schedule for the review shall normally allow 60 days from the time of the review commencement for Agencies to conduct a review and return comments to the review coordinator:”

1. Page A-1, CCSDS Architecture Principles

Comment: This section is really a section on Architecture Principles, it’s on Architectural guidelines. Architectural principles should be more about how CCSDS adheres to the ISO layer model. How the CESG determines what blue books conform to its overall vision of the CCSDS architecture.

Suggested title change: CCSDS Architectural Guidelines

1. Page A-2, second to last paragraph, last sentence: “It is preferable that such approaches should be explored before embarking on the development of a new, space-domain-specific standard. Examples of adoption include XML schema & Reed-Solomon coding, of adaptation include space links (derived from HDLC), space internetworking (adapted from TCP/IP), and examples of development include Proximity-1 (unique characteristics of in-situ communications) and SLE (space agency link level cross support).”

Comment: CCSDS Reed-Solomon coding is not adoption. In reading the history of coding, JPL was the first to use define Reed-Solomon codes for the Voyager spacecraft in 1977, however this first implementation was not standardized. The CCSDS standard is the first Reed-Solomon standard published in 1984 and is technically unique from the Voyager specification. It was used in the ESA mission Giottro in 1985. Operationally, Voyager and Giottro began transmitting Reed-Solomon encoded data at the same time.

Suggested wording: “It is preferable that such approaches should be explored before embarking on the development of a new, space-domain-specific standard. Example of adoption include XML schema, of adaptation include space links (derived from HDLC), space internetworking (adapted from TCP/IP), and examples of development include Proximity-1 (unique characteristics of in-situ communications) and SLE (space agency link level cross support).”

1. Page B-4, second paragraph, first sentence: “At some point in the evolution of a Draft Recommended Standard that is intended to result in a change to mission-support infrastructure, at least one hardware or software prototype (or other implementation) must exist that demonstrates and exercises all of the options and features of the specification in an operationally relevant environment, either real or simulated.”

Comment: It is very difficult to achieve this goal for a large system, e.g., Prox-1.

Suggested wording: “At some point in the evolution of a Draft Recommended Standard that is intended to result in a change to mission-support infrastructure, it is the goal to have at least one hardware or software prototype (or other implementation) must exist that demonstrates and exercises all of the options and features of the specification in an operationally relevant environment, either real or simulated.”

**Overall Assessment and Recommendation:**

Outside of these 11 points, the document is well written, but it lacks an overall CCSDS architectural document to reference. This main point falls in line with comment 9. Looking at the CCSDS yellow and magenta books repositories, there is not one single document that specifies how the blue books work on the ISO layers even though we are part of ISO TC 20/ SC 13. Even [CCSDS 311.0-M-2](https://ccsds.org/index.php?gf-download=2025%2F01%2F%2F311x0m2.pdf&form-id=5&field-id=9&hash=3f4c84989aaff0999989e2f989aa0d4140375b7fd1c1be8b876c20671ecda912) CCSDS Reference Architecture for Space Data Systems does not explain how the CCSDS blue books fit within the ISO layers. [CCSDS 901.1-M-1](https://ccsds.org/index.php?gf-download=2025%2F01%2F%2F901x1m1.pdf&form-id=5&field-id=9&hash=308983e251b70552639d7dc774bf90d29f0c54ebc01424bd3278265a034c5804) has sections on the ISO layers but it doesn’t show how the current books relate to the ISO layers. Of course, this information must be an evolving document that changes with every new blue book added but it should be documented on the CCSDS website as updated page.