## Scott, Keith L.

**From:** Barkley, Erik J (317H) [erik.j.barkley@jpl.nasa.gov]
**Sent:** Wednesday, April 14, 2010 5:31 PM
**To:** Scott, Keith L.
**Subject:** RE: RIDs on CCSDS Green Book

Keith,

Thanks for the very quick response. Comments below.

-Erik

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**From:** Scott, Keith L. [mailto:kscott@mitre.org]
**Sent:** Wednesday, April 14, 2010 11:10 AM
**To:** Barkley, Erik J (317H)
**Subject:** RIDs on CCSDS Green Book

Erik,

Thank you for reviewing the SIS-DTN Green Book. I have a question about your item (a) and a bunch of proposed resolutions for your approval conditions that I'd like to talk with you about. Can you either call me at 703.983.6547 or propose some times when you'd be available to chat?

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My proposed responses to your conditions:

a) The references (section 1.7) should probably include 912.1-B-2 (SLE -- Forward CLTU Service Specification). CLTUs are included in Figure 5-3 -- also, discussion with regard to references [17], [18] on page 2-1 appears to include both forward and return directions but the references are with regard to the return direction only.

Figure 5-3 was taken directly from the SISG Report, and I wonder if maybe there is a cut-and-paste or other slip. Does it make sense to you to invoke the CLTU service across a single space link hop as shown in the figure? That's a single TC data link between the orange entities (I believe).

***[eb] Well, I suppose there are some fine distinctions and ultimately, to the best of my limited knowledge, we could talk about TC Codeblocks encompassing TC Transfer Frames encapsulated in CLTUs, but it is my understanding that the CLTUs are the "top-level" entity carried to the ground station from the mission operations center via SLE (which packs additional information controlling behavior of the radiation of the CLTUS). The figure is perhaps a little "fanciful" in that it makes reference to a nonexistent SLE forward file service but in general the minor concern I have is not any of this but just rather that we note CLTU's in the forward direction and call out the proper reference.***

I think making reference to the CLTU service wherever [17, 18] are referenced, as well as possibly in Appendix F, is certainly warranted.

***[eb] Thanks -- that will be just fine.***

b) more of a question: does very long propagation delay need to be noted as an issue in scenario 3.2 ? Short contact duration is cited...why not the inverse (long contact duration but with long propagation delay)?

Good catch. I added the text:

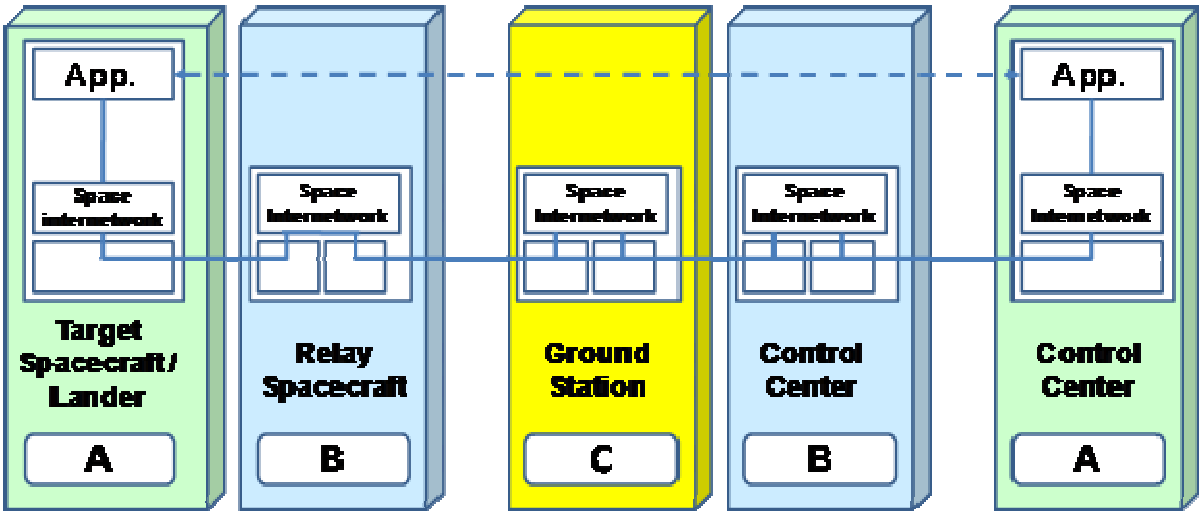
– The one-way light time (and hence the round-trip light time) between the ground station and the spacecraft may be large.

As an issue there.

*[eb] Thanks -- that works for me.*

c) Figure 4-1 may need a little adjusting ? should the "B" Control Center be labeled "D" ? Otherwise unclear to me why the only Agency "B" entity is a Control Center...? If this is a "D" control center, then presumably in a DTN-aware network, Control Center 'A' can talk directly with ground Station 'C' ?

Hmmm. Yes, that would help. Or maybe 'D' should instead be 'B' to maintain label space compactness? Thanks! Proposed revised figure is:




*[eb] Revised diagram is much better and what I would expect to see – works fine for me.*

d) Page 4-2: the text "...but that this reverse path may not be disjoint in time..." may need to be re-phrased? It reads like a "shall not"...perhaps what is meant is something like "...but it is possible that the reverse path is coincident (in time)..."

Thanks again; that sentence was rather mangled. The intent is that if you can send information A->B that you will at some point in the future be able to send information B->A, but that the B->A path may not be contemporaneous with the A->B path. How about:

- it is expected that if A can send information to B then there will be some time in the future when B can send information to A, but that it is possible that any such reverse path may not be available at the same time as the forward path;

*[eb] Much better. I'm happy with the revised phrasing.*

e) Requirements 4.2.2.2.2 and 4.2.2.2.3: Request for clarification -- may not need any change to document. I note that AMS is cited in the requirement. Does MAL need to be cited as well? To the best of my understanding, MAL does include some generic (to MAL) PDU definitions. Should it be cited in the list of protocols or is it assumed that this is running over AMS and therefore, by extension, included ? I suspect the later is the case, but any clarification would be appreciated.

I don't think it's rational to require DTN (BP) to support MAL PDUs because there aren't any (concrete) MAL PDUs (from 521.0-R-2). MAL is just a service spec and a bunch of requirements for API capabilities from the Transport service used by MAL. Any implementation of MAL would have to be married to an implementation of DTN via some sort of MAL-DTN binding, at which point those interfaces could be developed (I'm thinking specifically of things like MAL's ability to query the transport service for SUPPORTEDQOS). If MAL were implemented over AMS then we'd be done. That said, I think any rational implementation of MAL would be supportable over BP (that is BP's job, after all).

The SOIS message transfer service is in sort of the same boat. From the SOIS MTS spec (875.0-R-2):

> 4. PROTOCOL SPECIFICATION
>
> No protocol is mandated for the Message Transfer Service (MTS). This section defines the following protocols that may be used for MTS1:
>
> – subset of AMS and Meta-AMS protocols.
>
> It is recommended that the subset of AMS and Meta-AMS protocols be used. Together with use of the SOIS Packet Service as mapped onto a common subnetwork type as an underlying transport mechanism, this will enable interoperability between different MTS implementations.

***[eb] with regard to MAL -- I do not have any good answers. And so I am not sure that the book needs to be changed. To me the fundamental issue is whether or not MAL represents a protocol. There are some aspects that lead in this direction by definition of some rather generic (to MAL) message header definitions but perhaps these are really not to be considered as a protocol in the same sense that AMS would be? In general, if MAL is a message abstraction layer that claims to run on top of any protocol then perhaps upon further review we can safely consider that there will ultimately be a MAL to DTN binding specification and we really do not need to say anything further with regard to these two requirements.***

Nestor had a similar comment w.r.t. MAL, so I'm VERY interested in running this STRONGLY to ground before getting back to him.

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Thanks again!

--keith