**CCSDS Timing BoF Meeting Notes Feb 5, 2019**

**Attendees**

Gian Paolo Calzolari, Ramon Crosley, Jon Hamkins, Ramon Krosley, Sinda Mejri, AJ Oria, Osvaldo Peinado, Lee Pitts, Erika Sanchez, Victor Sank, Peter Shames, Christian Stangl

**Agenda**

* Summary of COO for Time document
  + Time interval time scales, mission survey of 60+ missions, contains a partial glossary of terms, mission domains
  + Reviewed Christian Stangl’s email with pointers to web resources
* Draft Charter review
  + Charter is to describe what our Time Management working group proposes to work on
  + Green book – descriptive materials
    - Domain, applications, accuracies
    - Are there different “operational domains”, or different aspect of mission operations and data acquisition, that require significantly different clock accuracies or ways of handling time?
    - Are second or milliseconds good enough, or do we need micro- or pico-seconds?
    - What about relativistic effects?
  + Blue Book(s) – implementable protocol, usually at a single “layer”
    - Could be one Blue Book, or more than one
    - Transfer of Time Correlation Data – many ways of documenting this, do we pick one, or a few
    - Aside from the usual telemetry based means of exchanging S/C time / clock data, what about PN ranging as means for measuring the time interval between sending and receiving S/C data? PN ranging Blue Books already exist, including [CCSDS 414.1-B-2](https://public.ccsds.org/Pubs/414x1b2.pdf) (PN Ranging systems) and [CCSDS 415.1-B-1](https://public.ccsds.org/Pubs/415x1b1.pdf) (data transmission and PN ranging from data relay satellites). The [CCSDS 401.0-B-28](https://public.ccsds.org/Pubs/401x0b28.pdf) (RF & Modulation) Blue Book also includes info on PN ranging for high rate telemetry at different bands.
    - Must also consider where we can use GNSS services, what is the “service volume?
    - A space version of a “Network Time Protocol”, suitable for use over deep space links, is another possible standard that could be developed, something that should be of value to the Lunar Gateway project.
    - What else might we want to standardize?
  + Magenta Book – recommended practice, covering not just how it has been done successfully in the past, but also how we recommend that it be done now.
* Discuss creating two smaller “sub-groups” to tackle the set of terms and the draft charter, and to bring the results of their consensus work back to the whole BoF. Agree on focus and membership.

**Action Items**

* Peter – Send out “gentle guide” to mailman and CWE instructions
  + Send to Mailman SEA-Time mailing list and especially to Victor Sank & AJ Oria
* Peter – Reach-out to Asian organizations to assess interest
* Sinda, Erika, Christian, Ramon Krosley – Meet as a sub-group to harmonize and add any new terms from Christian’s email and COO doc to the draft SEA-Time terms doc
* AJ Oria – Send out information on Lunar GNSS reception
* Lee Pitts, Victor Sank, Jon Hamkins, Peter - Review COO document and list topics that could be standardized
* Erika - Schedule next meeting, Feb 19, 2019
* All “Newbies” - read the new Gentle Guide to CWE, see below
* Everyone unfamiliar with CCSDS documents & processes, or interested in writing / editing any CCSDS documents - read the Boot Camp materials, see below, or plan to attend the Boot Camp at the next CCSDS meeting

**Next Meeting – 19 Feb 2019 @ 0700 PST**

**File Locations**

Time Management BoF working Materials

https://cwe.ccsds.org/sea/docs/Forms/AllItems.aspx?RootFolder=%2Fsea%2Fdocs%2FSEA%2DTIME%2FMeeting%20Materials%2F2019&FolderCTID=0x012000F83FD93BEFF45E4FB5D1769B01CA762F&View=%7BA709F322%2D0E67%2D45C7%2D932D%2DCB78C55CE268%7D

CCSDS “guide” Materials, including the new “gentle guide to CWE” and CCSDS Boot Camp slides

<https://cwe.ccsds.org/cesg/docs/Forms/AllItems.aspx?RootFolder=%2Fcesg%2Fdocs%2FBoot%20Camp%20Slides&FolderCTID=0x0120008F128D83E4774A40906DD60662AC3B27&View=%7B448728FC%2D9186%2D4BCF%2D80F0%2D192B39C01942%7D&InitialTabId=Ribbon%2ERead&VisibilityContext=WSSTabPersistence>