MINUTES OF NAVIGATION WORKING GROUP SPRING 2020 WORKSHOP   31-May-2020
David S. Berry / Chair

The CCSDS Spring 2020 Navigation Working Group Meetings were conducted "virtually" via audio/videoconferencing during the week of 11-May-2020 through 15-May-2020. Nominally NASA hosted the meetings, which were to have been held at Huntsville, Alabama, USA, but the responsibilities of "hosting" were more or less undefined in the virtual meeting situation. This is a summary of the activities of the Navigation Working Group (WG) during the week. The Navigation WG is an element of the Mission Operations and Information Management Services (MOIMS) Area in the CCSDS organization.

ON-SITE PARTICIPANTS

Not applicable.

TELECON PARTICIPANTS

David Berry (NASA/JPL), Julien Bernard (Viagenie/SANA), Guillaume Blanchet (Viagenie/SANA), Marc Blanchet (Viagenie/SANA), Frank Dreger (ESA/ESOC), Cheryl Gramling (NASA/GSFC), Julie Halverson (NASA/GSFC), Hideaki Hinagawa (JAXA), Ralph Kahle (DLR/GSOC), Alain Lamy (CNES), Byoung Sun Lee (ETRI), Alexandru Mancas (ESA/ESOC), Jose Miguel Lozano(GMV/ESA/ESOC), Mario Merri (ESA/ESOC), Dan Oltrogge (NASA (AGI, SDC, ISO TC20/SC14)), Vincent Schaeffer (CNES), Brian Swinburne (Airbus/UKSA), Elena Vellutini (ASI), Patrick Zimmerman (NASA/JSC).

AGENDA

The final agenda for the WG meetings is available on the Navigation WG CWE at: https://cwe.ccsds.org/moims/docs/MOIMS-NAV/Meeting%20Materials/2020/Spring/navwg-agenda-spring-202005-final.pdf . In the meeting proceedings below, the detailed agenda for each meeting day (as realized) is included in the minutes to provide context.

CURRENT ACTION ITEMS

The following action items were produced during the meetings. They are also available on the CWE at https://cwe.ccsds.org/moims/docs/MOIMS-NAV/Meeting%20Materials/2020/Spring/navwg-action-items-202005.pdf . The action items and due dates below reflect the status as of the end of the meetings; the list on the web page will be updated periodically between now and the next meeting series and will thus reflect relative completion progress and any new action items added after the face-to-face meetings. The list also includes any items from prior meetings that had not yet been completed. NOTE: Several action items have "TBD" dates that we will attempt to resolve at the next telecon.
 New/Outstanding Action Items

If "Status" = "Open", then "Date" = "Target Date"
If "Status" = "Complete", then "Date" = "Completion Date"
If "Status" = "Cancelled", then "Date" = "Cancellation Date"
Sort by "Status" (Descending), "Date" (Ascending)

##	Action Item	Actionee	Status	Due Date (Original)	Date
59	Produce ODM V3 Test Plan/Report Draft	Dan	Open	15-Mar-2019	TBD
60	Produce ODM P2.40	Dan	Open	TBD	TBD
61	Produce ADM P1.10	Alain/Julie	Open	TBD	TBD
62	Produce ADM P1.10 Review Assignments	David	Open	TBD	TBD
63	Review ADM P1.10	All, as assigned	Open	TBD	TBD
66	Produce ODM 2.40 Review Assignments	David	Open	TBD	TBD
67	Review ODM P2.40	All, as assigned	Open	TBD	TBD
17	Update Navigation Terms in CCSDS Glossary (original + RDM terms)	Secretariat	Open	31-Aug-2019	10-Jun-2020
27	Prepare PRM Corrigendum	Frank?	Open	20-Nov-2019	10-Jun-2020
29	Request addition of "GMST", "MET", "MRT" to Time Systems Registry	David	Open	03-Nov-2019	10-Jun-2020
40	Inquire regarding restricting the usage of some registry entries in certain standards (e.g., restricting CDM users to choosing ITRF, EME2000, or GCRF for the reference frame).	David	Open	20-Nov-2019	10-Jun-2020
53	Determine organization for Italian RDM Provider role	Elena	Open	26-Feb-2020	10-Jun-2020
58	Prototype some "orbitLines" to explore the OCM schema effort for lines coming from SANA registries	David	Open	10-Jun-2020	10-Jun-2020
64	Produce CDM P1.0.1	Brian / Dan	Open	30-Sep-2019	10-Jun-2020
68	Produce NDM/XML P1.0.2	David	Open	20-Dec-2018	10-Jun-2020
69	Expand combined instantiation material in ODM/XML section	David	Open	10-Jun-2020	10-Jun-2020
70	Check with Secretariat... can we used "Conditional" (ICS language) in main portion of OCM (and perhaps ACM as well).	David	Open	10-Jun-2020	10-Jun-2020
78	Combine events lists and distribute to WG	Alain	Open	15-Dec-2018	10-Jun-2020
26	XML Section for ODM (update)	David	Open	08-May-2018	08-Jul-2020
33	Request OID move to separate column in "CCSDS Navigation Normative Annexes" registry	David	Open	20-Nov-2019	08-Jul-2020
39	Inquire regarding implementing a way to print a SANA registry out to PDF.	David	Open	20-Nov-2019	08-Jul-2020
42	Inquire of SANA regarding provision of some kind of "What's New?"	David	Open	20-Nov-2019	08-Jul-2020

##	Action Item	Actionee	Status	Due Date (Original)	Date
	indication for users.				
48	Prepare CDM Corrigendum regarding RESIDUALS_ACCEPTED	David	Open	30-Nov-2019	08-Jul-2020
74	Prepare Navigation references for SANA Registry	David	Open	31-Oct-2018	08-Jul-2020
92	Submit Revised Orbit Centers Registry data for SANA Registry	David	Open	17-Dec-2018	08-Jul-2020
93	Submit Corrigenda to SANA Registry Data	David	Open	07-Jan-2019	08-Jul-2020
96	SANA implementation of Nav References	SANA	Open	31-Jan-2019	05-Aug-2020
16	Prepare ADM section 6.8 (ACM XML)	David	Open	15-Sep-2019	31-Oct-2020
98	Produce Navigation Events Message initial draft	Alain	Open	31-Jan-2018	15-Dec-2020
65	Produce OMM/XML combined instantiation for Dan	David	Complete	31-May-2020	16-May-2020

WORKSHOP PROCEEDINGS

CCSDS Opening Plenary

Given the virtual meeting environment necessitated by COVID19, there was no CCSDS-wide Opening Plenary. All CCSDS Areas and Working Groups were empowered to set their own meeting schedules in May. Reports to the Secretariat are due before the end of May 2020 in order to support the CESG Meeting. The CCSDS Navigation WG elected to meet during the week of 11-May-2020 through 15-May-2020, with 12-May-2020 off due to a holiday.

Future Meetings (as Reported at Fall 2019 Meetings CCSDS Opening Plenary)

The CCSDS is planning the following upcoming meetings:

a) Fall 2020 hosted by CNES at Toulouse, France, Mercure Hotel & Novotel Hotel, 26-October-2020 through 30-October-2020. To date there has been no announcement as to the format of these meetings, either the traditional 5-day face-to-face meetings, or the recently necessary virtual meeting formats.
b) Spring 2021 hosted by NASA at TBD, USA, dates TBD
c) Fall 2021 hosted by ESA at TBD, dates TBD
d) Spring 2022 hosted by NASA at TBD, dates TBD
e) Fall 2022 hosted by UKSA at TBD, dates TBD

MOIMS Opening Plenary

Given the virtual meeting environment necessitated by COVID19, there was no MOIMS Opening Plenary.

DAY 1, MONDAY 11-May-2020 (All Times UTC)

1300   1500   Attitude Data Messages V.2
1500   1505   Closing Time

Attendance this day included: David Berry, Frank Dreger, Cheryl Gramling, Julie Halverson, Hideaki Hinagawa, Ralph Kahle, Alain Lamy, Byoung Sun Lee, Alexandru Mancas, Jose Miguel Lozano, Dan Oltrogge, Vincent Schaeffer, Brian Swinburne, Elena Vellutini, Patrick Zimmerman.

1300   1500   Attitude Data Messages V.2

The Attitude Data Messages (ADM) document was the topic of the day. Alain indicated that the review of ADM P1.8 yielded 230 comments. An update (ADM P1.9) was distributed about a week prior to the meetings that included dispositions for most of the comments. Alain noted that there were a few that had not been resolved due to their requiring group discussion. This discussion constituted the bulk of the meeting.

- One issue related to the links to SANA registries. There are 3 ways to do it. ADM does it one way, ODM another, and RDM simply lists the individual registries in the References section and then just refers to the reference number through the rest of the document. The RDM method looks the cleanest and most straightforward.

- Escaped characters in the XML... are they necessary? (I don't think Fran would have thought so).

- There was discussion regarding the terms/phenomena "nutation" and "precession" that had been discussed at length at the Caltech meetings in 2015 and led to a Corrigendum being added to the ADM. There was discussion about the Corrigendum... is it placed properly? Is it necessary? Should there be a pointer to the SANA Glossary (which includes definitions for both terms and treats them as distinct phenomena, not the same phenomenon with 2 different names). David suggested that Alain and Julie make the decision as to the best way to handle the situation, and apprise the group.

- Given that several issues had been resolved, and that no comments have yet been received on P1.9, David suggested that the Working Group NOT review P1.9, and that Alain/Julie produce a P1.10 that would be subjected to the internal review. This was agreed.

- SANA Registry references... textbooks instead of conference papers, if possible.

- In going through the CRM, there were a number of items identified by Dan for harmonization between the OCM and ACM. Alain/Julie will evaluate the necessity of some of the items proposed. In some cases, they make sense for the orbit exchange, but not the attitude exchange.

- On the topic of exchange, and ICDs, some proposed language was offered in our goal to reduce explicit dependence on ICDs: "<technical matter> should be agreed between message exchange partners." This is a subtle suggestion that exchange partners might want something that documents a given agreement, but we don't explicitly prescribe an ICD.

1500   1505   Wrap Up

David requested comments from attendees regarding the meeting, problems, issues, etc.

DAY 2, WEDNESDAY 13-May-2020 (All Times UTC)

1300   1500   Orbit Data Messages V.3
1500   1505   Closing Time

Attendance this day included: David Berry, Frank Dreger, Cheryl Gramling, Julie Halverson, Hideaki Hinagawa, Ralph Kahle, Alain Lamy, Byoung Sun Lee, Jose Miguel Lozano, Alexandru Mancas, Mario Merri, Dan Oltrogge, Vincent Schaeffer, Brian Swinburne, Elena Vellutini, Patrick Zimmerman.

1300   1500   Orbit Data Messages V.3

Dan led the discussion of the Orbit Data Messages (ODM) updates. Dan started by indicating that if WG members still had review comments on P2.39, he is still interested in receiving them.

He also briefly introduced the topic of the prototype test plan. It was proposed that the previously existing ODM messages (OPM, OMM, OEM) do not need to be re-tested because they are already in operational use and the changes to them are insignificant (addition of MESSAGE_ID is functionally a comment, and the use of SANA registries will be fully exercised in OCM testing). David agreed with Dan's sensible proposal. He indicated that AGI will be prototyping, as well as the Orekit team led by Luc Maisonbe.

Dan stated that he had received many inputs on the ODM P2.39, but fewer than he received for P2.38. He is actively working on P2.40, and worked to resolve a number of open issues in this session. Among them:

- Standardizing the "ICD replacement language" with a phrase that can be searched and easily modified if necessary (see above suggestion in the ADM discussion).

- Dan indicated that he had completed the Implementation Conformance Statement (ICS) in Annex A.

- Harmonizing the language in Annex B, which contains information on standard values for some keywords; the ADM model for this annex was agreed by the group to be more straightforward

- He presented an idea from Alexandru to restructure Figure 6-1 (OCM structure) to better illustrate the sections that could be repeated and those for which only a single section is specified.

- The group agreed to retention of the SCLK related keywords in the message due to the tendency for spacecraft clocks to drift and/or be reset.

- There was some discussion regarding the XML schema coding for OCM constructs such as orbitLine, maneuverLine, stmLine, etc., where the structure is chosen from a set of options in an applicable SANA registry. David had indicated in comments that it should be decided before coding the schema whether or not this should be a single undifferentiated line parsed by the user, or completely elaborated with XML tags. David took an action item to prototype a few examples to gauge the level of effort.

1500   1505   Wrap Up

David reported that the Navigation Data Messages Overview V.2 had been published on Tuesday 12-May 2020. Congratulations to Patrick!

DAY 3, THURSDAY 14-May-2020 (All Times UTC)

1300　1330　Navigation Data Messages XML Specification V.2
1330　1400　Orbit Data Messages V.3
1400　1450　SANA Registries

Attendance this day included: David Berry, Julien Bernard, Guillaume Blanchet, Marc Blanchet, Frank Dreger, Cheryl Gramling, Julie Halverson, Hideaki Hinagawa, Ralph Kahle, Alain Lamy, Byoung Sun Lee, Jose Miguel Lozano, Alexandru Mancas, Mario Merri, Dan Oltrogge, Vincent Schaeffer, Brian Swinburne, Elena Vellutini, Patrick Zimmerman.

1300　1330　Navigation Data Messages XML Specification V.2

David went over the current status of the NDM/XML five-year revision project which started in 07/2016, provided some background on the original motivation for the document, publication history, and the rationale for moving the XML representations into the documents that formerly only contained KVN constructs. He also discussed the original plan for NDM/XML V.2, which has been superseded by events. The current plan for the NDM/XML V.2 involves removing the material on the TDM (because it has already been relocated into TDM V.2) and retaining the material on the ODM, ADM, and the "combined instantiation". The plan also includes publishing additional NDM/XML Blue Book updates as the ODM V.3 and ADM V.2 are published; this could be either one or two Blue Book versions depending on how the ODM and ADM updates are released. As part of this discussion, Dan suggested that the material on the combined instantiation in the ODM/XML section be expanded, because it may make the XML version more attractive for certain users (e.g., for 18SPCS). David took an action item to produce an OMM/XML combined instantiation example for Dan.

For various reasons the first Pink Book P1.0.1 was not prepared until 10/2018, however, the Pink Book P1.0.1 already contains essentially all of the anticipated changes:

- Material related to the TDM has been removed (it's now in TDM V.2)

- Support for ODM V.1 has been removed (reduced schema complexity)

- The two "common" schemas have been consolidated into one (anticipated need for one of them has never materialized, reduced schema complexity)

- Updates for 'elementFormDefault="qualified"' schemas have been added (provides broader utility) **

- The namespace structure has been revised (will conform to the CCSDS XML Special Interest Group revised namespace) **

He concluded with a statement that it is conceivable that the NDM/XML P1.0.2 can be the version submitted for Agency Review.

Next the test plan was discussed. The formal, approved project resolution stated that "the CESG has confirmed that no prototyping is needed in this case since the revised book will contain no new material". That's not quite true given the two items identified with "**" above. David stated that testing of at least the "qualified" schemas and revised namespace should be done. It was planned to perform exchange

testing with Fran, but now Fran has moved to a different company and is no longer participating in CCSDS. We'll need a different plan for the second prototype. In closing, David stated that he thinks the document is "close" to being ready for Agency Review, and the testing apparatus for one prototype is in place (the same apparatus as used for testing the RDM/XML and TDM V.2/XML). The plan for the NDM/XML V.2 on the CCSDS Project Framework targets publication 10/31/2021, but he hopes to beat that (ideally it would be published just after the TDM V.2 is published, but that very likely won't be possible).

1330   1400   Orbit Data Messages V.3

We continued discussion of the ODM V.3 changes in the short time available before the SANA team joined our discussion. Dan was able to cover two topics from his list of unresolved items:

- There was discussion about the possibility of leaving a value for a mandatory keyword blank if the value was unknown; Alexandru suggested the value "UNKNOWN" as used in the RDM and CDM. Dan wondered if there were any numeric fields that were mandatory; he found none.

- Dan revived discussion of the interpolation time tags (duplicate time tags or not). It was not resolved in this session due to the brief amount of time allocated to the ODM discussion; David indicated we should start with this topic in Friday's meeting.

1400   1450   SANA Registries

We were joined by Marc Blanchet, Julien Bernard, and Guillaume Blanchet of the SANA team to continue discussion of the migration of material from Navigation WG normative annexes into SANA registries and other SANA Registry related topics. David had prepared a few "starter" topics for the SANA team:

1. Thoughts on the newly documented procedures for management of the Beta, Candidate, and Approved registries?
2. SANA registry programmable API... description, and where documented?
3. Several new registries are in the works for the Navigation WG

On topic #1, Marc indicated that the SANA team would be modifying their procedures according to the newly defined process. David also asked about the process for changing a registry entry from "provisional" to "assigned"; Marc indicated that this was governed by the Policy and Authority settings in the top left of each "leaf node" registry (some nodes are parent nodes, and may not have Policy or Authority). An email to the SANA team should suffice to request the change.

On topic #2, Marc indicated that they used to have a REST API; it was published a few years ago but got almost zero use. However, when they re-designed the SANA site a couple of years ago, it was removed and they have not yet updated the API to support the new SANA structure. Julien indicated how it would be possible to get a CSV or JSON listing of the registry using wget or curl to get the data from a registry. Dan inquired about the possibility of adding a "number of elements" column to a registry (e.g., to eliminate the need for someone parsing one of these structure lines to count the number, for example, of orbital elements). Again, this can be requested of the SANA team.

There was discussion as to the stability of the SANA Operator funding. Marc explained that the contract is funded by NASA through the Secretariat. Also, that a contract renewal is in progress. ASRC will bid on

the contract. David and Dan offered the support of the Navigation WG if necessary to provide testimonial type information regarding the support that the SANA team has provided to the WG. The ASRC contact is Calvin Ramos.

Julien Bernard mentioned that in the case of new registries, if the new registry can be provided in CSV format, it can be more easily implemented given that they have a converter to import a registry from CSV to the format used in the SANA web pages. Units and other notation are in TeX notation; another source of information is www.mathjax.org/#demo.

We indicated to the SANA team that we would have several additional registry requests in the not too distant future.

As a final item, Dan mentioned some collaborative work going on in ISO/TC20/SC14 and ISO/TC20/SC13 in the area of terminology harmonization that will rely heavily on SANA.

DAY 4, FRIDAY 15-May-2020 (All Times UTC)

1300   1445   Orbit Data Messages V.3
1445   1510   Closing Matters

Attendance this day included: David Berry, Cheryl Gramling, Julie Halverson, Hideaki Hinagawa, Alain Lamy, Jose Miguel Lozano, Alexandru Mancas, Dan Oltrogge, Vincent Schaeffer, Brian Swinburne, Elena Vellutini, Patrick Zimmerman.

1300   1445   Orbit Data Messages V.3

We devoted the bulk of the telecon to continued discussion of the ODM V.3 changes. We started with the interpolation discussion. Dan proposed, and the working group agreed, that duplicate time tags will not be allowed. Dan also suggested simplifying and clarifying the interpolation language surrounding the intent and optional nature of the useable start/stop times.

A question was raised as to whether or not we should allow more than one Perturbations section. After brief discussion, it was decided that we will only include one Perturbations Section and one Orbit Determination section in the OCM for now (addition of more of these in the same message would require additional keywords to match applicable OD and/or Perturbations sections to the other parts of the message). Multiple messages could be made if more are desired.

Dan showed that he had filled out the Implementation Conformance Statement (ICS) in Annex A, which is a major job. In response to a question from Dan, we found in the ICS Yellow Book that in addition to the "M" and "O" for "mandatory" and "optional" respectively, there is a "C" for "conditional". An additional question was raised... can we use "conditional" in the tables in the Main portion of the document? (Note we already use "mandatory" and "optional" for keywords in those tables). David took an action item to discuss with the Secretariat, though it seems clear that somewhere the applicable condition must be specified.

There was good discussion regarding duty cycles in the Maneuver section of the OCM. It was clarified that the rotation referred to in the PHASE_ANGLE duty cycle is rotation of the spacecraft with respect to a principal axis. Also, Alexandru suggested use of a maneuver "GROUP_ID" to replace the potentially

ambiguous "MAN_IS_ADDITIVE" construct. Dan liked this suggestion.

Another topic of discussions was the concept of "value" in KVN (keyword = value notation), specifically, where a 3-vector is listed as the default in the OCM. David indicated that this had been a topic of major discussion during the development of the TDM since that incorporated the first major departure from a KVN in which the value was a single word or a single number. The TDM discussion rendered the thought that the "value" in the data section was bipartite, i.e., timetag+measurement, since neither was useful without the other. Under this same construction, an OCM value could be tripartite, e.g., x+y+z. Next question... is there a limit to the number of sub-components of a value in KVN? We didn't address this.

In his P2.39 review, Alexandru had suggested that OCM blocks be considered as interleaved metadata/data, similar to the logical structure of the segment in an OEM or TDM; this came up in the context of a revision of Figure 6-1. Dan showed a revision of that figure that reflected this idea and it was generally well-received as being more representative of the detailed substructures in the OCM.

There were a few other topics upon which decisions were reached fairly rapidly.
- There is currently no tabular list of ephemeris and covariance keywords in the OCM: decision was to leave as is.
- Dan pointed out that there is currently no User-Defined Parameters section in the OEM. David provided the rationale for that. Dan had inquired whether or not that would require re-prototyping the OEM and the answer is "yes". The decision was to leave as is.

Although the OCM discussions had not been totally completed, it was necessary to turn to a couple of administrative topics to conclude the meeting series, so ODM discussion was concluded. Dan indicated that most of the critical topics had been addressed. See several additional ODM topics in Dan's presentation at:
https://cwe.ccsds.org/moims/docs/MOIMS-NAV/Draft%20Documents/Orbit%20Data%20Messages%20(ODM)/20200528_ODM_P2.39_for_Spring2020-Mtgs.pdf .

1445   1510   Preview Closing Report, Discuss Next Telecon Strategies

David reviewed the draft Final Report with the WG members. We worked through the draft Final Report, making modifications as applicable. As we were over the scheduled time, David indicated he would send out the Draft Report for comment; comments were due Monday 18-May-2020. After processing comments, David indicated he would submit the report to Area Director Mario Merri and Michael Blackwood at the CCSDS Secretariat.

Given that we were not able to meet for the usual 40-ish hours for a Spring Meeting set, David proposed that we consider either longer telecons, more frequent telecons, or both between the end of these Virtual Spring Meetings and the Fall 2020 Meetings (nominally to be held at Toulouse, France 26-Oct-2020 through 30-Oct-2020). David proposed that each telecon consist of minimal "business", near term action item updates, and a focus on one of the documents under development. This will hopefully allow us to make more-than-usual progress between Spring and Fall to make up for the less-than-usual progress during the Spring Meetings.

Four options for telecon schedules were proposed. WG members were asked to rank the options according to their preferences, 1 = best, 4 = worst:

Option A. Continue a 1-hour monthly telecon until Fall 2020 Meetings, i.e., no change in regular telecon schedule (1 hour/month)
Option B. Schedule a 1-hour telecon every 2 weeks (approximately 2 hours/month)
Option C. Schedule a 2-hour telecon monthly (approximately 2 hours/month)
Option D. Schedule a 2-hour telecon every 2 weeks (approximately 4 hours/month)

The results of this survey are shown in the section "Next Telecons" at the end of these minutes.

All materials from these meetings (agenda, introductory presentation, action items, report, and these minutes) are available on the CWE at the following link:

https://cwe.ccsds.org/moims/docs/Forms/AllItems.aspx?RootFolder=%2Fmoims%2Fdocs%2FMOIMS-NAV%2FMeeting%20Materials%2F2020%2FSpring&FolderCTID=0x012000C8EEDFBFAD59894AB84FF1AF9485D0AB&View={72CC1C3E-EFA9-498B-BEA5-C88E7DEE0C54}

Draft documents reviewed during the meetings are in their respective directories on the CCSDS CWE:

HTTPS://CWE.CCSDS.ORG/MOIMS/DOCS/FORMS/ALLITEMS.ASPX?ROOTFOLDER=%2FMOIMS%2FDOCS%2FMOIMS-NAV%2FDRAFT%20DOCUMENTS&FOLDERCTID=0X012000C8EEDFBFAD59894AB84FF1AF9485D0AB&VIEW={72CC1C3E-EFA9-498B-BEA5-C88E7DEE0C54}#INPLVIEWHASH72CC1C3E-EFA9-498B-BEA5-C88E7DEE0C54=FOLDERCTID%3D0X012000C8EEDFBFAD59894AB84FF1AF9485D0AB-ROOTFOLDER%3D%252FMOIMS%252FDOCS%252FMOIMS%252DNAV%252FDRAFT%2520DOCUMENTS-SORTFIELD%3DLINKFILENAME-SORTDIR%3DASC

NAVIGATION WORKING GROUP CLOSING REPORT

Available at https://cwe.ccsds.org/moims/docs/MOIMS-NAV/Meeting%20Materials/2020/Spring/navwg-report-202005.pdf .

Achievements for this Meeting Cycle
- Completed internal WG review of revisions to drafts of the Orbit Data Messages, Attitude Data Messages, Navigation Data Messages XML Specification
- Initiated discussion of Prototyping Plans/Results for the Orbit Data Messages V.3
- Continued discussion of structure and content of Navigation data on the SANA Registry

Documents Not Discussed in this Meeting Cycle
- Navigation Events Message: first draft not ready, priority lower than ADM which has same Lead Editor
- Conjunction Data Message V.2 update: first draft not ready
- Tracking Data Message V.2 in CESG Poll at present, Tracking Data Message V.3 not ready to discuss

Working Group Status
- Active, "High Momentum"

Interaction with Other WGs
- Completed joint meeting w/SANA Operator regarding continued migration of material from Nav WG document annexes to SANA (registry hierarchy (Approved, Candidate, Beta),

programmable API, etc.)

Environmental Report

- Plus: Virtual meeting format worked OK, but meetings were shorter due to time zone constraints.
- Plus: Occasional internet audio problems, but nothing "terrible". Some other WGs had horror tales. One participant said that online audio was actually better than being together in a single room.
- Minus: There were many people in the virtual meeting, but because the meetings were short and most people remained muted w/video off (by WG convention), there was no sense of group camaraderie except during the "Gathering Time" 20 minutes before the meetings, and many people could not attend those due to other time conflicts. Use of video was suggested to combat this; this would also allow presenters to better gauge reaction of the participants, see if they are understanding, etc. We will try more video in future audio/video conferences.

Resolutions Agreed Upon this Meeting:

- None

Further Resolutions Anticipated in the Next 6 Months:

- None anticipated as a result of this meeting series.

Completed Projects Since Fall 2019

Area and WG name	CCSDS Ref Nr	Document Title	Status / Comments	Start and / or Target Publication Date	
MOIMS NAV	500.0	Navigation Data—Definitions and Conventions (Update) V.4	Completed and published 04-Dec-2019	Start date	09-Nov-2015
				End date	04-Dec-2019
MOIMS NAV	508.1	Re-Entry Data Message	Completed and published 04-Dec-2019	Start date	03-Jul-2016
				End date	04-Dec-2019
MOIMS NAV	500.2	Navigation Data Message Overview (Update) V.2	Completed and published 12-May-2020	Start date	25-Apr-2018
				End date	12-May-2020

Planning (Only Approved Projects)

Area and WG name	CCSDS Ref Nr	Document Title	Status / Comments	Start and / or Target Publication Date	
MOIMS NAV	503.0	Tracking Data Message (TDM) 5 Year Review Revision	Not discussed in these virtual meetings because the document is in CESG "approval to publish" Poll ending 14-May-2020.	Start date	09-Oct-2013
				End date	01-Jul-2020
MOIMS NAV	505.0	Navigation Data Messages XML Specification 5 Year Review Revision	Acceptable progress. We hope to complete the project prior to the projected end date.	Start date	13-Jul-2016
				End date	31-Oct-2021
MOIMS NAV	508.0	Conjunction Data Message 5 Year Revision	Not discussed in these virtual meetings due to reduced meeting time.	Start date	14-Jan-2019
				End date	31-Dec-2021
MOIMS NAV	504.0	Attitude Data Message (ADM) 5 Year Review Revision	Good progress. Completed discussion of comments received during Pink Book P1.8 internal draft review	Start date	16-Apr-2015
				End date	30-Apr-2022

Area and WG name	CCSDS Ref Nr	Document Title	Status / Comments	Start and / or Target Publication Date	
MOIMS NAV	502.0	Orbit Data Message (ODM) 5 Year Review Revision	Good progress. Discussed and resolved a number of lingering issues existing in the ODM V.3 drafts.	Start date End date	16-Apr-2015 28-Feb-2022
MOIMS NAV	TBD	Navigation Events Message	Not discussed in these virtual meetings due to reduced meeting time. Document has lower priority than another document with same Lead Editor.	Start date End date	07-Nov-2017 30-Nov-2022
MOIMS NAV	503.0	Tracking Data Message (TDM) Version 3 Revision	Not discussed in these virtual meetings due to reduced meeting time.	Start date End date	07-Jan-2019 30-Nov-2024

NAV WG Upcoming New Work Items

- None at this time.

NAV WG Issues for CESG / CMC

- None this meeting series.

NEXT TELECONS:

As noted above, a survey of preferences for a telecon schedule going forward was distributed.

Working Group Average Ranking (Lowest Score is Best):

Option A = 3.70. Continue a 1-hour monthly telecon until Fall 2020 Meetings (1 hour/month)
Option B = 2.10. Schedule a 1-hour telecon every 2 weeks (approximately 2 hours/month)
Option C = 1.58. Schedule a 2-hour telecon monthly (approximately 2 hours/month)
Option D = 2.50. Schedule a 2-hour telecon every 2 weeks (approximately 4 hours/month)

Option C, highlighted, had the best (i.e., lowest) ranking of the options under consideration. Accordingly, a full schedule of monthly meetings until the Fall 2020 Meetings is set, as follows (all agendas TBD):

- 10-Jun-2020 13:00-15:00 UTC
- 08-Jul-2020 13:00-15:00 UTC
- 05-Aug-2020 13:00-15:00 UTC
- 02-Sep-2020 13:00-15:00 UTC
- 07-Oct-2020 13:00-15:00 UTC
- Fall 2020 Meetings 26-Oct-2020 to 30-Oct-2020 (nominal dates)