

CCSDS Mission Planning & Scheduling WG

Spring Meeting 2025

Attendants:

Peter van der Plas (ESA, chair)
Eric Ferguson (NASA, deputy chair)
Cesar Coelho (ESA, SM&C WG)
Christoph Lenzen (DLR, remote)
Geoffrey Lochmaier (NASA, remote)
Guillermo Buenadicha (ESA, remote)
Luke Berry (ESA, remote, remote)
Maria Wörle (DLR)
Marvin Wittschen (DLR, remote)
Olly Page (UKSA)

Agenda

Date	Time	WG	Topics
Mon 9 June	08:45 – 12:30 EDT	CCSDS	CCSDS Plenary
Mon 9 June	13:30 – 17:30 EDT	MP&S	<u>WG day #1 afternoon session</u> <ul style="list-style-type: none">- Welcome and agenda- Projects and books status- Magenta Book: use cases and concepts – brainstorm
Tue 10 June	08:45 – 12:30 EDT	MP&S	<u>WG day #2 morning session</u> <ul style="list-style-type: none">- Services prototyping status- MO tooling, documentation generation- MAL implementation and evolution
Tue 10 June	13:00 – 15:00 EDT	CCSDS	Special session on DTN and Bundle Protocol with Vint Cerf
Tue 10 June	15:30 – 17:30 EDT	MP&S SM&C	<u>WG day #2 afternoon session</u> <ul style="list-style-type: none">- Joint session with SM&C
Wed 11 June	08:45 – 12:30 EDT	MP&S	<u>WG day #3 morning session</u> <ul style="list-style-type: none">- Magenta Book: document structure, diagrams update and maintenance, use cases and concepts
Wed 11 June	13:30 – 17:30 EDT	MP&S	<u>WG day #3 afternoon session</u> <ul style="list-style-type: none">- Magenta Book: use cases and concepts – hands-on- Green Book: new sections – brainstorm
Thu 12 June	08:45 – 12:30 EDT	MP&S SM&C	<u>WG day #4 morning session</u> <ul style="list-style-type: none">- Green Book: document structure and new sections
Thu 12 June	13:30 – 17:30 EDT	MP&S	<u>WG day #4 afternoon session</u>

			<ul style="list-style-type: none"> - CWE and GDrive reorganisation - Green Book: new sections – hands-on
Fri 13 June	08:45 – 12:30 EDT	MP&S	<u>WG day #5 morning session</u> <ul style="list-style-type: none"> - Next steps - Reporting to MOIMS
Fri 13 June	14:00 – 16:00 EDT	MOIMS	MOIMS Area Plenary

MoM

Day #1: Monday 9th June 2025, 13:30 to 17:00

Welcome and agenda

Blue Book status and next steps towards publication

The Blue Book has been finalized, with all Agencies Review RIDs dispositioned and implemented, in agreement with the Agencies' Review Coordinators. All changes since the publication of the Red Book have been recorded in the RID table. As such, the Blue Book ("Red Book update v3") is ready for publication, pending some minor editorials (such as renaming the SANA Registry links to the production registry) and presuming no more issues are found during the prototyping.

The File Formats prototyping has previously been completed by ESA. During the meeting, it was confirmed that the prototyping is also completed by DLR, with the files submitted (merge request) to the ESA GitLab. The comparison of the output files will require some trivial differences to be resolved, preferably by an automated process. In addition, the Yellow Book will have to be finalized. Peter to perform the merge request and investigate if the resolution of the differences can be automated, and to finalize the Yellow Book.

The Services Prototyping has been completed by DLR. Prototyping by ESA (GMV) is ongoing, with some work on the prototype to be completed. In addition, the pipeline runner has to be implemented. It is expected that this work will be completed during the next two weeks. Cesar will release the MO version 12.1 and make it available on Maven Central (action done on Wednesday 11 June).

The Services Yellow book still needs to be completed. Guillermo to update the specification (XL tables) to the final issue, and update the Yellow Book section 6 with the final test specification and test descriptions. After that, Peter to finalize the Yellow Book with the Verification Matrix (PICS table) and inclusion of the test results.

Once the prototyping is completed, the SANA artefacts can be published on the production Registry, and the Publication Resolution can be requested to MOIMS-AD.

Magenta Book brainstorm session

The first ideas on the contents of the Magenta Book were discussed in the WG, see the MoM (Wednesday 11th June) for the details and the conclusion.

Day #2: Tuesday 10th June 2025, 08:45 to 17:30

Prototyping Status, MAL Status and MO Tooling

- Prototyping status and ongoing work
 - o File Formats: ESA tests completed, DLR tests completed (GitLab merge request available).
 - o Next steps: Peter to check the differences and possibly resolve, either by applying a filter or update the XML – after this, the Yellow Book (volume 2 on File Formats) can be finalized.
 - o Services: DLR tests completed, ESA/GMV tests will be completed by next week, pipeline for running tests to be completed, cross-tests to take place, test results to be provided for inclusion in Yellow Book.
 - o Guillermo to provide v23 of the specification (Excel) this week, after that to update the Yellow Book section 6.
 - o Peter to finalize the Yellow Book (volume 1 on Services), including the verification matrix.
- Discussion with Cesar on the MAL Implementation and Tools. In particular the MO Viewer will be useful to browse through the Blue Book tables (reflected in the XML Service Specification).
 - o The MO Viewer is already available on-line:
<https://esa.github.io/mo.viewer.web/?u=MPS>
Note: branch "prototypes" includes the most recent MP&S Service XML. Discussion was on the “formalization” of the tool for MP&S use, to have it available from a known location, linked from the Green Book (using a SANA link?) and/or the CCSDS website (on the software page).

Joint session with SM&C

- SANA Registry: there is now an overarching MO “meta-registry” in the beta repository. MP&S should be added here, specifically with the MPSFileFormats. This will not impact the location of the current MPSFileFormats.
- SM&C is finalizing the HTTP/XML book update, in line with latest MAL v3. This could support a mapping for the MP&S Blue Book, but it is noted that this is not the same as the way that the File Formats are defined.
- In terms of software support to the community, the provision of an MP&S “gateway” could be useful. SM&C is considering this approach for the MPDS. This idea could be taken over by MP&S.

Day #3: Wednesday 11th June 2025, 08:45 to 17:30

Magenta Book

- The Magenta Book will augment the Blue Book (as such refer to it)
- No information from the Blue Book should be duplicated
 - Except probably some high-level overview/introduction/diagrams
- Section 1 – Introduction – to be simplified (for example no definitions) and updated
- Section 2 – Overview – Only diagram with top-level data types and maybe the diagram with the MP Object data types (definitions, instances, updates), with a short top-level description of the data types
- Section 3 – Information Model
 - Keep the diagrams (class diagrams and state transition diagrams)
 - Note: diagrams to be updated for latest Blue Book
 - Remove the tables (MO objects, data types, enumerations)
 - Supporting text: keep high-level text, remove descriptions for data types if already in Blue Book (to be checked on a case-by-case basis)
 - Note: description of diagrams may be enhanced/updated where needed
- Section 4/5 – concepts and use cases
- Annex: keep acronyms, references, SANA/security (probably not)

Diagrams are currently in Enterprise Architect, which is a complex tool. The idea is to update and maintain the diagrams in an Open-Source UML tool, for example draw.io.

To summarize:

- The EA model will not be maintained (but kept for possible future use)
- The diagrams will be exported (for example using XMI) to draw.io
- The diagrams should be updated according to the latest Blue Book revision
- The diagrams will be maintained in draw.io from here

Eric to investigate, with support of Christoph for the EA export. For the diagram editing, additional WG members may help out. Note: the first investigation showed that using Open-Source tools may not provide the desired results. The use of an EA export to scalable vector graphics may be a better option, to be investigated.

Section 4: provide a number of “concepts” (explanations and additional information on the Information Model content – how elements are related to each other, how elements are distinguished and have different use cases), giving by example the different planning concepts in which they might be used

- Mission Planning “Concepts”
 - Hierarchical Planning (Planning Cycles)
 - Distributed/Federated Planning (versus Centralized Planning)
 - Onboard Planning
 - Goal-Based Planning
 - Manual versus Automated Planning, Mixed-Initiative Planning
 - Iterative Planning and Replanning
- Brainstorming for content of this section
 - Activities (Definition, Instance, Details, Updates) – section 3 possibly
 - Arguments – used on multiple data types, section 3 or section 4?

- Constraints – convey the bigger picture, different types, planning request versus configuration data, use cases for hierarchical planning
- Custom Functions (more general: extending the standard with customisations)
- Domain (describe relation to distributed planning)
- Events (Definition, Instance, Updates, Predicted/"the other ones")
- Expressions (? Could say where it is used – only an input, planning system should resolve it)
- Plans (*Updates*, Full, Patch, Partial, Target, Sub-Plans, Successor/Predecessor, Parent) – different "types of plans" should be explained with the rationale (use cases with examples), and mapping to the Blue Book relevant fields
- MO Object Identity and Reference – already in the Blue Book – take it out? Maybe linked to domain?!
- Plan Revisions (linked to Plans, should be explained with use case / example)
- Planning User (linked to domain, maybe linked to Security / Access / Visibility)
- Planning Requests (Definition, Instance, Details) – section 3 possibly
- Resources (Updates), Effects, Resource Constraints – explain why/who should be using this and where/how the constraints can be computed
- Triggers (linked to Events) – Plan Execution (example on on-board planning versus on-ground planning), Earth Observation use case with GPS position-based planning
- Versions (useful in hierarchical planning, but also in general – the Blue Book does not describe where versions could be useful – provide an example use case here)
- From the Green Book Mission Survey
 - Execution Feedback (Green Book section 5.3.x.3)

Section 5: one example scenario covering some of the concepts of section 4

Way forward for the Magenta Book

- Peter to create a working document for new sections 4 and 5 and share it on the GDrive
- For section 5, first step is to define the scenario, before writing the details – Eric to take the lead here
- For section 4, an outline with the topics will be provided, and some example/guideline what is expected here – Peter to take the lead
 - After this, WG members can start to contribute on a specific topic
- For sections 1-3, Peter will prepare the document based on the existing inputs, after which the WG can review and provide feedback
- For the diagrams, Eric will take the lead (as already mentioned above)

It is currently expected that the first draft of the Magenta Book can be available for the CCSDS Fall Meeting in Hamburg. The second draft for Agencies Review could then be ready by the end of 2025 or early 2026.

Green Book brainstorm session

A first walk-through of the Green Book was performed. Some sections of the current book should probably be taken out, such as the analysis of typical mission types (section 5.3). Note that the “Execution Feedback” topic could be described in the Magenta Book section 4.

Day #4: Thursday 12th June 2025, 08:45 to 17:30

Green Book

Review of the current book, in an annotated Green Book Word file (will be stored on the Google Drive).

SANA Terms and Abbreviations: it is not clear how the MP&S defined Terms and Acronyms are translated into the SANA Registry, automatic (by the Secretariat) or manually (by the MP&S WG). To be discussed with the CCSDS Secretariat.

Additional note: the links in the SANA Registry of the Terms are broken.

CWE and Google Drive Organization

The CWE environment was reviewed. With the new authentication, the public part of the CWE has apparently disappeared. Now all the material under MOIMS-MP is “CWE private”, i.e. visible by anyone with a CWE account (including the sub-directory “CWE Private”).

The WG intends to store persistent/archived material in the MOIMS-MP CWE documentation folder, i.e. MoM, Agendas, Books, Reference Material, Tools, etc. Some of the current GDrive material could be moved to the CWE.

The outline for the GDrive structure was created, mainly following the projects/books approach:

- Blue Books
 - 529.1-B-1_MPS-Services...
 - Final
 - .docx
 - .pdf
 - .pptx (diagrams)
 - Publication
 - White Book
 - .docx
 - Yellow Books
 - Vol 1.docx
 - Vol 2.docx
 - SANA Artifacts

- XML Schemas
 - Service XML
- Agencies Review (1, ...)
- RID Table
 - White Book
 - .docx
 - Red Book
 - .pdf
 - .docx
- Working Area (only on Google Drive)
- Latest.docx
 - EA Model
 - Schemas
 - SANA Artifacts
 - Yellow Book – volume 1
 - Yellow Book – volume 2
 - Tools
 - etc.
- Archive (place to keep Working Area after end of project)
- 529.1-B-2_MPS-Services...
- 529.X
- Tools
 - Macros
- Green Books
 - 529.0-G-1_MPS-Services...
 - Final
 - .docx
 - .pdf
 - .pptx (diagrams)
 - Publication
 - White Book
 - .docx
 - Working Area
 - Archive
- Magenta Books
 - 529.2-M-1_MPS-Services...
 - Final
 - .docx
 - .pdf
 - .pptx (diagrams)
 - Publication
 - White Book
 - .docx
 - Agencies Review (1, ...)
 - RID Table
 - White Book
 - .docx
 - Red Book
 - .pdf
 - .docx
 - Working Area
 - Archive

The information shall also be stored on the CWE (Internal to WG and/or CCSDS Members), except for the Working Area which shall only be on the Google Drive.

Green Book Additional Sections

New section 7:

- Overview of the Mission Planning books
- Possible future books / services
 - Configuration Data Management Service
 - Mission Planning Control Service
- Available supporting material
 - Available tools, examples, outreach material
 - Links to MAL / reference implementations / gateway
 - Possible not hard-coded links but using the SANA Registry

Day #5: Friday 13th June 2025, 08:45 to 12:30

Reporting

The report to the MOIMS was created jointly with the WG.

A meeting with new Technical Editor (Natalya) was held and several topics were discussed, including a suggested improvement of the templates with more modern technologies.

Next meeting:

Next WG meeting will be on Tuesday **1 July 2025**, 16:00 – 18:00. Peter to send the WebEx invite.

Attachments:

None.