| **Page** | **Section** | **Line** | **Type** | **Comment/ Rationale** | **Source of Comment (Name/Agency)** | **Suggested Disposition** | **Disposition****(Completed by Principal Editor)** |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Cover | Cover | last | ed | Issue date is in the past with respect to distribution date. | David S. Berry / NASA | For future, update issue date as well as version |  |
| 1-1 | 1.1 | para 3 | ed | Paragraph starts "Four CCSDS-recommended ODMs are described...". It's basically 100% redundant with respect to paragraph 1. | David S. Berry / NASA | Remove paragraph. |  |
| 1-1 | 1.1 | para 4, line 2 | ed/te | Full name of ISO body is not provided. There may be other Technical Committees with a Subcommittee 13 and 14. | David S. Berry / NASA | From: (ISO) Subcommittee 13To: (ISO) Technical Committee 20 Subcommittee 13 |  |
| 1-1 | 1.1 | para 4, line 3 | ed/te | Full name of ISO body is not provided. There may be other Technical Committees with a Subcommittee 13 and 14. | David S. Berry / NASA | From: ISO SC14To: ISO Technical Committee 20 Subcommittee 14 |  |
| 1-1 | 1.1 | para 5 | te | Should mention in this paragraph that both KVN and XML formats will be described in this document. | David S. Berry / NASA | Consider. XML material forthcoming. |  |
| 1-2 | 1.2 | para 3 | te | Referring to reference [4] is OK, but we plan to incorporate XML descriptions in this doc as well and the applicable section should be mentioned. | David S. Berry / NASA | Consider. XML material forthcoming. We have some options as to how to organize that we can discuss at The Hague (or on a telecon). Face-to-face might be better. |  |
| 1-3 | 1.4 | para 2 | ed | Obsolete document section. In the past the Security considerations were in a normative section in the document; now they are in a non-normative annex. | David S. Berry / NASA | Delete the line that states "Section 0 discusses security requirements for the Orbit Data Messages". |  |
| 1-4 | 1.7 |  | te | Add Part 1 of the XML Schema standard. | David S. Berry / NASA |

|  |
| --- |
| Add: Henry S. Thompson, et al., eds. XML Schema Part 1: Structures. 2nd ed. W3C Recommendation. N.p.: W3C, October 2004. |

 |  |
| 3-1 | 3.1.5 | 1-2 | ed/te | Second sentence is a requirement on the WG to guide creation of the OPM standard. So really it should be deleted. (The fact that this is here is my prior error as Lead Editor.) | David S. Berry / NASA | Remove second sentence regarding "easily readable". |  |
| 3-2 | Table 3-1 |  | te | For CCSDS\_OPM\_VERS, the Example value should be "3.0", reflecting the eventual version of the standard. | David S. Berry / NASA | From: 2.0To: 3.0 |  |
| 3-3 | NOTE | 1 | ed/te | Refers to "ORB\_CENTER\_NAME", but "CENTER\_NAME" is the keyword for OPM | David S. Berry / NASA | From: ORB\_CENTER\_NAMETo: CENTER\_NAME |  |
| 3-3 | NOTE | 3 | ed | Section reference of 0 | David S. Berry / NASA | From: "listed in 0"To: "listed in 1.7" |  |
| 3-4 | Table 3-2 |  | ed/te | Example "ICRF" is not listed in Annex B2 | David S. Berry / NASA | Add "ICRF" to B2, or add "yyyy" to "ICRF" in examples. Not having "ICRF" in B2 could be a continuity problem for some users. |  |
| 3-4 | Table 3-2 |  | ed/te | Example "ITRFXXXX" is shown, but B2 has "ITRFyyyy" | David S. Berry / NASA | From: ITRFXXXXTo: ITRFyyyy |  |
| 3-9 | Fig 3-1 |  | ed/te | The OBJECT\_NAME is fictional, the OBJECT\_ID is not (it was assigned to EuroBird 2 / HotBird 5). (The fact that this is here is my prior error as Lead Editor.) | David S. Berry / NASA | Probably should assign a fictional number for the OBJECT\_ID, 1998-099A |  |
| 3-9 | Fig 3-3 |  | ed/te | Same as for Figure 3-1 | David S. Berry / NASA | Same as for Figure 3-1 |  |
| 4-1 | 4.1.5 | 1-2 | ed/te | Second sentence is a requirement on the WG to guide creation of the OMM standard. So really it should be deleted. (The fact that this is here is my prior error as Lead Editor.) | David S. Berry / NASA | Remove second sentence regarding "easily readable". |  |
| 4-2 | Table 4-1 |  | te | For CCSDS\_OMM\_VERS, the Example value should be "3.0", reflecting the eventual version of the standard. | David S. Berry / NASA | From: 2.0To: 3.0 |  |
| 4-3 | NOTE | 3 | ed | Section reference of 0 | David S. Berry / NASA | From: "listed in 0"To: "listed in 1.7" |  |
| 4-3 | NOTE | 5 | ed | Font size is tiny relative to the rest of the note. | David S. Berry / NASA | Even out the font size. |  |
| 4-4 | Table 4-2 |  | ed/te | Object name "TELCOM 2" is reflected on UNOOSA as "TELKOM 2" | David S. Berry / NASA | Change "C" to "K"  |  |
| 4-4 | Table 4-2 |  | ed/te | Per UNOOSA, the first OBJECT\_ID in our example applies to the second OBJECT\_NAME (and vice versa). | David S. Berry / NASA | Swap order of first 2 example values for OBJECT\_ID |  |
| 4-4 | Table 4-2 |  | ed/te | Per UNOOSA, the fourth OBJECT\_ID in our example applies to the third OBJECT\_NAME (and the third OBJECT\_ID no longer applies to any of the example OBJECT\_NAMEs. | David S. Berry / NASA | Delete third example value for OBJECT\_ID |  |
| 4-7 | 4.2.4.5 | 5 | ed | Refers the reader to section 6.4, however, the related information is now in 7.5 | David S. Berry / NASA | Change reference from 6.4 to 7.5 |  |
| 5-1 | 5.1.3 | 1-2 | ed/te | Second sentence is a requirement on the WG to guide creation of the OEM standard. So really it should be deleted. (The fact that this is here is my prior error as Lead Editor.) | David S. Berry / NASA | Remove second sentence regarding "easily readable". |  |
| 5-3 | Table 5-1 |  | te | For CCSDS\_OEM\_VERS, the Example value should be "3.0", reflecting the eventual version of the standard. | David S. Berry / NASA | From: 2.0To: 3.0 |  |
| 5-3 | NOTE | 3 | ed | Section reference of 0 | David S. Berry / NASA | From: "listed in 0"To: "listed in 1.7" |  |
| 5-3 | NOTE | 5 | ed | References subsection B1, but that only refers to time systems. | David S. Berry / NASA | From: "subsection B1."To: "subsections B1 and B2." |  |
| 5-6 | Table 5-3 |  | ed | REF\_FRAME description line 3 refers to "subsections B2...". Subject/verb disagreement. | David S. Berry / NASA | From: subsections B2To: subsection B2 |  |
| 5-6 | Table 5-3 |  | ed/te | Example "ICRF" is not listed in Annex B2 | David S. Berry / NASA | Add "ICRF" to B2, or add "yyyy" to "ICRF" in examples. Not having "ICRF" in B2 could be a continuity problem for some users. |  |
| 3-4 | Table 5-3 |  | ed/te | Example "ITRFXXXX" is shown, but B2 has "ITRFyyyy" | David S. Berry / NASA | From: ITRFXXXXTo: ITRFyyyy |  |
| 5-1 (pg # sec off by 1. | 6.1.2 | 2-3 | ed/te | Second sentence is a requirement on the WG to guide creation of the OCM standard. So really it should be deleted. (The fact that this is here is my prior error as Lead Editor.) | David S. Berry / NASA | Remove second sentence regarding "easily readable". |  |
| 5-2 | 6.2.1 | Sub sec 3 | te | The specified section ordering seems odd to me. In the data sections for OPM, OMM, OEM, the orbit data is presented first. An analogous ordering of the OCM data sections that roughly follows the ordering of the data in OPM, OMM, OEM (using your lettering) might be: d, a, f, g, c, b, e, h, i. | David S. Berry / NASA | Consider. Discuss at The Hague. |  |
| 5-3 | Table 6-1 |  | ed | The document sections are generally in the same order as this table, but the ephemeris compression data is in section 6.2.8; it would be in section 6.2.11 if it were in the same order as the sections listed in the table. | David S. Berry / NASA | Either (a) rearrange the document sections to be in the same order as the file layout shown in the table, or (b) rearrange the table to correspond to the document section order. |  |
| 5-3 | Table 6-1 |  | te | The notion of one or more "sections" for some of the data types (e.g., maneuver specifications, orbit data, covariances, etc. should be clarified. | David S. Berry / NASA | To my mind, a "section" would extend from the "\*\_START" keyword to the "\*\_STOP" keyword. The examples in Figure 6-3 and 6-4 show this style. Figure 6-5 seems to show a different style. |  |
| 5-3 | Table 6-1 |  | te | At this point in the evolution of our standards, it is premature to add an Attitude Section in the ODM. | David S. Berry / NASA | Discuss at The Hague. At this point I believe this material belongs in the ADM, in a new message. Later in the "modular message era", an ODM could have an attitude history incorporated. Right now I believe it to be premature. It will also add a completely new dimension of complexity to the prototyping of the OCM, which will already be a considerable challenge, even without an attitude section. |  |
| 5-3 | Table 6-1 |  | te | Does not list the User Defined Parameters section. | David S. Berry / NASA | Add the User Defined Parameters section to the table. |  |
| 5-4 | Table 6-2 |  | te | For CCSDS\_OCM\_VERS, the Example value should be "3.0", reflecting the eventual version of the standard. | David S. Berry / NASA | From: 1.0To: 3.03.0 will be the only appropriate version number for the OCM. The version number for other message examples may be debatable. |  |
| 5-4 | Table 6-2 |  | ed/te | MESSAGE\_ID: The description starts with ID. I think we need to be a little more descriptive. | David S. Berry / NASA | From: "ID that uniquely identifies..."To: "Alphanumeric string that uniquely identifies..." |  |
| 5-4 | Table 6-2 |  | ed/te | MESSAGE\_ID: This is in the OCM but none of the other ODMs. This is a potentially good idea to add to the OPM, OMM, OEM, but would introduce a version change. | David S. Berry / NASA | Discuss at The Hague. |  |
| 5-4 | 6.2.3.4 | 1 | ed | Incomplete sentence... almost looks like it might have been intended to be a header. | David S. Berry / NASA | Probably can be deleted. |  |
| 5-4 | 6.2.3.5 | 2-3 | te | Allowing comments anywhere in the metadata section will eliminate the possibility of an XML implementation of the OCM. I recall your saying at San Antonio that you didn't intend to preclude the possibility of an XML section. | David S. Berry / NASA | Allowing comments anywhere in the OCM is a departure from consistency with the other ODMs, and it precludes the ability for an XML implementation that would otherwise be possible. I therefore think this exception should be reconsidered. This comment generally applies for ALL of the sections and tables of the OCM, which mention that comments can be "interspersed throughout". Allowing comments interspersed throughout eliminates the possibility of an XML OCM. |  |
| 5-5 | 6.2.3.8 | All | ed | This section duplicates 6.2.3.3 | David S. Berry / NASA | Remove 6.2.3.8 or 6.2.3.3, and move the NOTEs to which ever section remains. |  |
| 5-5 | 6.2.3.8 | NOTE 1 | ed | References a section 0 that is probably meant to be 1.7. | David S. Berry / NASA | Fix reference |  |
| 5-5 | 6.2.3.8 | NOTE 2 | ed/te | The 3 fields referenced are not contiguous in the Metadata section. | David S. Berry / NASA | Rearrange the 3 items, of which one must be chosen, so they are contiguous in the metadata. |  |
| 5-5 | 6.2.3.8 | NOTE 3 | ed | The note is incomplete. The parenthetical phrase ends with a comma and no closing parenthesis. It is also an incomplete thought. | David S. Berry / NASA | Complete the note. |  |
| 5-5 thru 5-7 | Table 6-3 |  | ed | The last 2 columns contain many instances of words with inconsistent capitalization. | David S. Berry / NASA | From: "No" and "no" To: "No" and "No" orOr: "no" and "no" With preference for "No" and "No". |  |
| 5-5 | Table 6-3 |  | ed/te | DESIGNATOR\_ID\_SOURCE: This is inconsistent with the CDM and RDM. | David S. Berry / NASA | Change keyword to "CATALOG\_NAME". |  |
| 5-5 | Table 6-3 |  | ed/te | The OBJECT\_NAME field appears farther down in metadata than in any other of the ODMs. For consistency this should be one of the first keywords in the metadata. | David S. Berry / NASA | Move the OBJECT\_NAME and other identifying fields earlier in the metadata. There should also be some material indicating the special circumstances under which identifying information does NOT need to be provided in the OCM, since such identifying information is mandatory in all the other ODMs. |  |
| 5-6 | Table 6-3 |  | ed/te | INTL\_DESIGNATOR: While the data content is consistent with the CDM and RDM, the keyword is not.  | David S. Berry / NASA | From: INTL\_DESIGNATORTo: INTERNATIONAL\_DESIGNATOR |  |
| 5-6 | Table 6-3 |  | ed/te | INTL\_DESIGNATOR: Add "UNKNOWN" in the example values. This value is allowed by the text, but might not be obvious. | David S. Berry / NASA | Consider |  |
| 5-6 | Table 6-3 |  | ed/te | INTL\_DESIGNATOR: states that value "shall" have the specified format, but other ODMs merely recommend the format | David S. Berry / NASA | From: "Values shall have..."To: "Values should have..." |  |
| 5-6 | Table 6-3 |  | ed/te | EPOCH\_TZERO: Given that it is the only required metadata item, and has pivotal importance throughout the OCM, it should be one of the very first values in the Metadata section | David S. Berry / NASA | Consider moving this very early in the Metadata section, maybe even right after the COMMENT. |  |
| 5-6 | Table 6-3 |  | ed | EPOCH\_TZERO: Preposition change recommended. | David S. Berry / NASA | From: "Epoch from which all OCM..."To: "Epoch to which all OCM..." |  |
| 5-6 | Table 6-3 |  | ed | EPOCH\_TZERO: Missing preposition. | David S. Berry / NASA | From: "The time scale EPOCH\_TZERO..."To: "The time scale for EPOCH\_TZERO..."Or: "The time scale of EPOCH\_TZERO..." |  |
| 5-6 | Table 6-3 |  | ed/te | EPOCH\_TZERO: All discussion of this keyword implies or illustrates that relative times with respect to EPOCH\_TZERO have a non-negative value. Exception: 6.2.9.7, but it's subtle. It might be good to explicitly state that times relative to EPOCH\_TZERO are double precision and can be negative, zero, or positive. | David S. Berry / NASA | Consider. |  |
| 5-6 | Table 6-3 |  | ed/te | INCL\_DATA\_BLOCKS: To assist the programmer, the location of this keyword could be earlier in the metadata. | David S. Berry / NASA | Consider moving earlier in metadata. |  |
| 5-6 | Table 6-3 |  | ed/te | INCL\_DATA\_BLOCKS: There is a similar keyword being added to the TDM, "DATA\_TYPES". For consistency, could consider changing to this keyword. | David S. Berry / NASA | Consider changing the keyword name. It's not clear how keywords like this may be useful in the "modular message" era, but it's possible they will be important. |  |
| 5-6 | Table 6-3 |  | ed | For "TIME\_SYSTEM\_ABS", the description uses the term "non-mandatory"... better to use "optional", which is consistent with the rest of the document. | David S. Berry / NASA | From: "non-mandatory"To: "optional"NOTE: This is a general recommendation throughout the document; "non-mandatory" appears frequently. |  |
| 5-6 | Table 6-3 |  | te | The "TIME\_SYSTEM\_ABS" and "TIME\_SYSTEM\_REL" seem unnecessary. Their provision seems to contradict the requirement stated in 6.2.3.6. If 6.2.3.6 is correct, then TIME\_SYSTEM\_REL must be the same as TIME\_SYSTEM\_ABS. Thus the distinction is unnecessary. It also introduces an unnecessary complication for time conversions. If times relative to EPOCH\_TZERO need to be converted to something else, then why not just choose "TIME\_SYSTEM(\_ABS)" to be that time system. Additionally, for times that are not relative to EPOCH\_TZERO (e.g., OEB\_FRAME\_EPOCH, MAN\_WIN\_START, MAN\_WIN\_STOP, etc.), what is the applicable TIME\_SYSTEM? I think this is a totally unnecessary and complicating feature. | David S. Berry / NASA | From: TIME\_SYSTEM\_ABSTo: TIME\_SYSTEMFrom: TIME\_SYSTEM\_RELTo: Delete the keyword |  |
| 5-7 | Table 6-4 |  | ed/te | COMMENT and PHYS\_START: The order of these 2 keywords should be switched. The first keyword in the Physical Characteristics Section should be the PHYS\_START. This would allow the comments associated with the section to be indisputably associated with that section. | David S. Berry / NASA | From: Current keyword order of COMMENT, PHYS\_STARTTo: Keyword order of PHYS\_START, COMMENT |  |
| 5-8 | Table 6-4 |  | ed | It seems odd to me to introduce AREA\_ALONG\_OEB\_\* before introducing OEB\_\* keywords (\*=MAX,MED,MIN). | David S. Berry / NASA | Reverse order of AREA\_ALONG\_OEB\_\* and OEB\_\* (MAX, MED, MIN) keywords. |  |
| 5-9 | 6.2.5.2 | 1 | ed | Word choice. NOTE: This is a general comment to the document, given that references to "column three" appear in several places. | David S. Berry / NASA | From: column threeTo: "the ‘Units’ column" |  |
| 5-10 | 6.2.5.7 |  | ed/te | Since the SOLAR\_RAD\_COEFF is not in the Perturbations section, it seems odd to find instructions for how to treat it in the Perturbations section. | David S. Berry / NASA | Move 6.2.5.7 statement into 6.2.4. Alternatively, you could even put this text into the "Description" cell in Table 6-4. |  |
| 5-10 | 6.2.5.8 |  | ed/te | Since the DRAG\_COEFF is not in the Perturbations section, it seems odd to find instructions for how to treat it in the Perturbations section. | David S. Berry / NASA | Move 6.2.5.7 statement into 6.2.4. Alternatively, you could even put this text into the "Description" cell in Table 6-4. |  |
| 5-10 | Table 6-5 |  | ed/te | COMMENT and PERT\_START: The order of these 2 keywords should be switched. The first keyword in the Perturbations Section should be the PERT\_START. This would allow the comments associated with the section to be indisputably associated with that section. | David S. Berry / NASA | From: Current keyword order of COMMENT, PERT\_STARTTo: Keyword order of PERT\_START, COMMENT |  |
| 5-10 | Table 6-5 |  | ed/te | CENTRAL\_BODY\_ROTA: The keyword name implies bodies other than Earth, which is appropriate, but the description is Earth centric. | David S. Berry / NASA | Modify description so it's not Earth-centric. |  |
| 5-11 | Table 6-5 |  | ed | It seems odd to have the NUTATION\_DEPS and NUTATION\_DPSI so far away (and after) the D\_NUTATION\_DEPS and D\_NUTATION\_DPSI. | David S. Berry / NASA | Make the 4 keywords contiguous in the table, and have the nutation keywords precede the correction keywords . |  |
| 5-11 | Table 6-5 |  | ed/te | OBLATE\_FLATTENING: There should be a description of how to present the value. It is shown as a ratio, but some might do the implied division. | David S. Berry / NASA | Specify how the value should be provided. |  |
| 5-11 | Table 6-5 |  | ed/te | It seems odd to have the S\_PRECNUT, X\_PRECNUT, Y\_PRECNUT so widely separated in the table. | David S. Berry / NASA | Suggest making these contiguous in the table. |  |
| 5-11 | Table 6-5 |  | te | For the SHADOW\_MODEL, are the "Examples" really a normative set? If so, then it would be good to specify that the value should be chosen from the provided set. | David S. Berry / NASA | Consider |  |
| 5-10 to 5-11 | Table 6-5 |  | ed | The various \*\_MODEL keywords are spread throughout the table. It might be nice to have all the models (ATMOSPHERIC, GRAVITY, OCEAN\_TIDES, SHADOW, SOLID\_TIDES, SRP) contiguous (unless there are parameters of those models around them) | David S. Berry / NASA | Consider. |  |
| 5-12 | 6.2.6.7 | 1-2 | ed | Given the requirement stated in 6.2.6.3, section 6.2.6.7 seems redundant. | David S. Berry / NASA | Consider eliminating 6.2.6.7. |  |
| 5-12 | 6.2.6.8 |  | te | I'm not sure I completely understand what is meant by the "DC\_REF\_TIME" keyword... it seems to imply the maneuver ignition time. At any rate, there seems to be some interaction between the EPOCH\_TZERO and DC\_REF\_TIME keyword, e.g., if DC\_REF\_TIME is present, then all the timetags in the maneuver data need to be greater than DC\_REF\_TIME (if I understand that keyword properly). | David S. Berry / NASA | If I have interpreted the keyword properly, consider adding something about the relationship of the 2 keywords here. |  |
| 5-12 | 6.2.6.10 | 1-2 | ed | Given the requirement stated in 6.2.6.3, section 6.2.6.10 seems redundant. | David S. Berry / NASA | Consider eliminating 6.2.6.10 |  |
| 5-12 | 6.2.6.10 | 1-2 | ed | Note that this requirement states that "MAN\_TYPE" must appear immediately before maneuver time history lines, however, Table 6-6 has 3 keywords between "MAN\_TYPE" and maneuver time history lines. | David S. Berry / NASA | Consider eliminating 6.2.6.10. If it remains, move it in Table 6-6 to immediately prior to the maneuver time history lines. |  |
| 5-12 | 6.2.6.11 | 2 | ed/te | Indicates that there are "nine parameters", however, the list of parameters only contains eight items. | David S. Berry / NASA | Make the text and the list of parameters consistent. |  |
| 5-12 | 6.2.6.11 | 4-6 | te | The velocity increments do not indicate units. They ARE listed in 6.2.6.12, but would be better here. | David S. Berry / NASA | Indicate the units of the velocity increments in 6.2.6.11 list items 2, 3, 4. This is consistent with what you have done in 6.2.6.13, 6.2.6.14, 6.2.6.15. |  |
| 5-13 | 6.2.6.11 (7) |  | te | I feel like the Maneuver Objection Number should be early in the data structure, maybe right after T\_Relative, so it's easily apparent to which vehicle the data applies. | David S. Berry / NASA | Consider |  |
| 5-13 | 6.2.6.11 (8) |  | te | The units should be specified for the mass change. | David S. Berry / NASA | Specify units in the item description |  |
| 5-13 | 6.2.6.11 (8) |  | te | Lists mass loss associated with a deltaV, but not a deployment. | David S. Berry / NASA | There should be a negative value associated to MON=0 for the deployment. |  |
| 5-13 | 6.2.6.13 |  | te | In the discussion of thrusting burns, it should be explicitly stated that they apply to the parent spacecraft (MON=0) only. Once the children are separated, they should have their own OCMs. | David S. Berry / NASA | Indicate that the THRUST maneuvers apply to MON=0 only. |  |
| 5-13 | 6.2.6.13 (14) (15) |  | te | The use of the word "repeats" raises an ambiguity. Specifically, if the total number of "ON" cycles is N, then there are N-1 repeats. "Repeat" implies that the first "ON" cycle is not counted. | David S. Berry / NASA | It might be better to list minimum/maximum number of ON cycles to avoid the question of whether or not the initial "ON" cycle is "repeat 0". |  |
| 5-14 | 6.2.6.14 | 4-5 | ed | Incomplete thought... "allows the OCM originator to moddel and share such maneuver and perturbations information without the OCM recipient needing to." When I read this I asked "needing to what?". I think you mean without the recipient needing to model the maneuver and perturbations, but the use of "share" threw me off. | David S. Berry / NASA | From: "... model and share such..."To: "... model such..."i.e., remove "and share" |  |
| 5-14 | 6.2.6.14 |  | te | In the discussion of acceleration profiles, it should be explicitly stated that they apply to the parent spacecraft (MON=0) only. Once the children are separated, they should have their own OCMs. | David S. Berry / NASA | Indicate that the ACCEL maneuvers apply to MON=0 only. |  |
| 5-14 | 6.2.6.14 (7) |  | te | The units should be specified for the mass change. | David S. Berry / NASA | Specify units in the item description |  |
| 5-14 | 6.2.6.15 | All | te | I think this material should be in the ADM, not the ODM. | David S. Berry / NASA | See previous comments about detailed attitude information in this version of the ODM. Remove the section. |  |
| 5-15 | 6.2.6.16 | 2 | te | Regarding the "multiple representations" uniqueness conditions that appear here and in several other sections of the OCM. After much reflection, I think these are an unnecessary complicating factor. This is a general comment regarding ALL instances of the "multiple representations" conditions. In order to implement this feature, a programmer producing an instantiation of the standard would have to keep a history of all the representations, and check the factors of each new representation against all of the prior representations. Then the recipient would need to do the same to ensure that the message is compliant with the standard. I believe this feature, which occurs in multiple of the OCM sections, will make prototyping more difficult (and require more time) than we would like, and is also very likely prone to error. I think it makes it hard for someone to confirm that they have a message that complies with the standard. | David S. Berry / NASA | Eliminate the uniqueness conditions specified for multiple recommendations, throughout the document. Allow the OCM originator to produce multiple representations without the complications associated with these uniqueness factors. If you want to discuss this at the Hague, that would be fine. But I am increasingly opposed to the "uniqueness" requirement. |  |
| 5-17 | Table 6-6 |  | te | The "MAN\_START" keyword follows the "COMMENT" keyword. | David S. Berry / NASA | Swap the order of these 2 keywords for consistency with the other NDMs. |  |
| 5-17 | Table 6-6 |  | ed | MAN\_CHAR: Description is missing. | David S. Berry / NASA | Provide description. |  |
| 5-17 | Table 6-6 |  | ed/te | MAN\_BASIS: The values appear to be a normative set. All acceptable values should be listed in the Examples column, and the text should explain that one of the values in Examples column must be selected. | David S. Berry / NASA | List all acceptable values in the Examples column, and add text stating that one of the values in Examples column must be selected. |  |
| 5-18 | Table 6-6 |  | ed | Header rows are not present | David S. Berry / NASA | Use MS Word "Repeat Header Rows" feature for this table. |  |
| 5-18 | Table 6-6 |  | ed | MAN\_PRED\_SOURCE: The description refers to ORB\_ID, OD\_ID, ATT\_ID, none of which have yet been encountered in the text. | David S. Berry / NASA | Indicate that the value for this keyword is recommended to be a value for keywords described in Table 6-7, 6-9, 6-12. (NOTE: I don't think 6-12 should be included in the ODM). |  |
| 5-19 | Table 6-6 |  | te | MAN\_TYPE: The section references in the Description are off... should be 6.2.6.11, 6.2.6.13, 6.2.6.14 | David S. Berry / NASA | From: "6.2.6.7, 6.2.6.9 and 6.2.6.10"To: "6.2.6.11, 6.2.6.13, 6.2.6.14" |  |
| 5-19 | Table 6-6 |  | ed/te | DC\_REF\_TIME, DC\_REF\_DIR: The 2 keywords in "MAN\_\*" section that don't start with "MAN". | David S. Berry / NASA | From: "DC\_REF\_TIME", "DC\_REF\_DIR"To: "MAN\_DC\_REF\_TIME", MAN\_DC\_REF\_DIR" |  |
| 5-19 | Table 6-6 |  | question | DC\_REF\_TIME: Is this the maneuver "ignition" time? Not clear to me. | David S. Berry / NASA | If the answer is yes, maybe make it clear that this is what is intended. |  |
| 5-19 | Table 6-6 |  | ed/te | DC\_REF\_TIME: Units in seconds is implied by the definition. | David S. Berry / NASA | From: Units "n/a"To: Units "s" |  |
| 5-19 | Table 6-6 |  | ed/te | DC\_REF\_TIME: Should state that this value is non-negative. | David S. Berry / NASA | Add "non-negative" to the description. |  |
| 5-20 | 6.2.7.9 |  | ed/te | First sentence duplicates section 6.2.7.5, and the remainder is one of the problematic uniqueness conditions. | David S. Berry / NASA | Remove 6.2.7.9 (see previous comments regarding "uniqueness criteria" |  |
| 5-20 | 6.2.7.10 | 2 | ed | Second sentence implies that the requirement applies to multiple keywords. | David S. Berry / NASA | From: "Each of these keywords..."To: "This keyword..." |  |
| 5-21 | 6.2.7.13 |  | te | As noted elsewhere, allowing comments everywhere precludes an XML implementation of the OCM. | David S. Berry / NASA | The desire for comments can be accommodated by using multiple Orbit State Time History sections, with comments at the beginning of each. |  |
| 5-22 | Table 6-7 |  | ed/te | ORB\_START is not the first keyword in the Orbit State Time History, but it should be. | David S. Berry / NASA | Move ORB\_START before the COMMENT and ORB\_ID keywords. |  |
| 5-22 | Table 6-7 |  | ed/te | ORB\_BASIS: The values appear to be a normative set. All acceptable values should be listed in the Examples column, and the text should explain that one of the values in Examples column must be selected. | David S. Berry / NASA | List all acceptable values in the Examples column, and add text stating that one of the values in Examples column must be selected. |  |
| 5-22 | Table 6-7 |  | ed | ORB\_AVERAGING: Typo | David S. Berry / NASA | From: BROWERTo: BROUWER |  |
| 5-22 | Table 6-7 |  | ed | ORB\_AVERAGING: examples imply that "(other...)" is an acceptable value. | David S. Berry / NASA | Remove "(other...)" from the Examples column, and add text to the description indicating that other values are possible. |  |
| 5-22 | Table 6-7 |  | ed | ORB\_CENTER\_NAME: Typo (mismatched quotes) | David S. Berry / NASA | From: "EARTH'To: 'EARTH' or simply EARTH (no quotes are on other defaults) |  |
| 5-24 | 6.2.8.8 |  | ed/te | First sentence duplicates section 6.2.8.6, and the remainder is one of the problematic uniqueness conditions. | David S. Berry / NASA | Remove 6.2.8.8 (see previous comments regarding "uniqueness criteria" |  |
| 5-25 | 6.2.8.10 |  | ed | Material starting with "This means...", through the end of the paragraph, is probably more suitable for Annex K than in a normative section. | David S. Berry / NASA | Consider moving material to Annex K. |  |
| 5-25 | 6.2.8.11 |  | ed | Material starting with "As such...", through the end of the paragraph, is probably more suitable for Annex K than in a normative section. | David S. Berry / NASA | Consider moving material to Annex K. |  |
| 5-25 | 6.2.8.12 |  | te | The text seems to imply that ∆t = 0 ("EC\_START and EC\_TSTOP set to the same value"). Is this a correct interpretation? This scenario also seems to imply a divide by zero situation if I understand the equation in 7.8.2.5 page D-20 in Annex K.  | David S. Berry / NASA | Perhaps some explanation of this key mission event technique should be added to Annex K. |  |
| 5-25 | 6.2.8.14 |  | ed | The section refers to "best practice", but does not refer the OCM user to a guiding reference. | David S. Berry / NASA | Add a reference here (and to annex L if not already there). |  |
| 5-27 | Table 6-8 |  | ed/te | EC\_TSTART: Is there (or should there be) a default of 0.0? | David S. Berry / NASA | Consider. |  |
| 5-27 | Table 6-8 |  | ed | EC\_BASIS\_PROP: there is a long parenthetical phrase in the middle of a long sentence that makes the meaning hard to discern. | David S. Berry / NASA | Rewrite the description. Perhaps separating the parenthetical into a sentence of its own rather than including it in its present position. |  |
| 5-27 | Table 6-8 |  | ed | EC\_BASIS\_PROP: Refers to '"EC\_STATE\_TYPE=YYY" above', but EC\_STATE\_TYPE appears below in the table. | David S. Berry / NASA | Consider removing "above", which gives flexibility to move the keyword in the table without worrying about a point of reference. |  |
| 5-27 | Table 6-8 |  | ed | EC\_ORB\_STATE: Refers to '"EC\_STATE\_TYPE=YYY" above', but EC\_STATE\_TYPE appears below in the table. | David S. Berry / NASA | Consider removing "above", which gives flexibility to move the keyword in the table without worrying about a point of reference. |  |
| 5-27 | Table 6-8 |  | ed/te | EC\_REPRESENT: The values CHEBYSHEV and FOURIER appear to be a normative set. All acceptable values should be listed in the Examples column, and the text should explain that one of the values in Examples column must be selected. I think allowing a different representation, with basis functions and algorithms clarified in an ICD, goes beyond the nature of the standard. | David S. Berry / NASA | List all acceptable values in the Examples column, and add text stating that one of the values in Examples column must be selected. Don't offer use of another representation.  |  |
| 5-27 | Table 6-8 |  | ed | EC\_STATE\_TYPE: Uses the phrase "EC representation" ambiguously (there is already a keyword "EC\_REPRESENT"). | David S. Berry / NASA | From: "Indicates EC representation via 'EC\_STATE\_TYPE=YYY' where YYY is selected from..."To: "A value selected from..."Much simpler, and not ambiguous. |  |
| 5-28 | Table 6-8 |  | ed | EC\_REF\_FRAME: Typo | David S. Berry / NASA | From: "... subsections B2..."To: "... subsection B2..." |  |
| 5-28 | Table 6-8 |  | te | EC\_REPR\_N: It's not clear to me why EC\_REPRESENT is referred to here. Why not keep it simple and refer simply to "EC\_TSTOP"? | David S. Berry / NASA | Since multiple EC sections can appear, why complicate the standard by allowing EC\_REPRESENT as a demark. Just create another EC section with the new EC\_REPRESENT. |  |
| 5-29 | 6.2.9.7 |  | te | The data type for the "all orbit determination event times" should be specified ("DAYS" is specified, should be double precision number) | David S. Berry / NASA | Add data type. |  |
| 5-29 | 6.2.9.7 |  | te | Refers to "all orbit determination event times", which could be interpreted to include the "OD\_EPOCH", which is a specific epoch and is not measured in days. | David S. Berry / NASA | Exclude "OD\_EPOCH" in 6.2.9.7 |  |
| 5-30 | Table 6-9 |  | ed/te | OD\_START is not the first keyword in the Orbit Determination Data, but it should be. | David S. Berry / NASA | Move OD\_START to be the first keyword in the section, before the COMMENT, OD\_ID, and OD\_PREV\_ID keywords. |  |
| 5-30 | Table 6-9 |  | te | OD\_EPOCH: allowing a default of "ZERO" means you have a mixed data type here. If the default is EPOCH\_TZERO, then the data types are the same. | David S. Berry / NASA | From: "... defaults to ZERO (i.e., occurs at EPOCH\_TZERO)."To: "... defaults to EPOCH\_TZERO." |  |
| 5-30 | Table 6-9 |  | te | OD\_CONFIDENCE: Change "shall" to "should" in the Description.  | David S. Berry / NASA | From: "... shall be defined by ICD."To: "... should be defined by ICD." |  |
| 5-31 | Table 6-9 |  | ed | Header rows are not present | David S. Berry / NASA | Use MS Word "Repeat Header Rows" feature for this table. |  |
| 5-31 | Table 6-9 |  | ed | WEIGHTED\_RMS: Uses both "yi" and "yi" in the description (i.e., with/without subscript notation). | David S. Berry / NASA | From: yi (2 occurrences)To: yi |  |
| 5-31 | Table 6-9 |  | ed | TRK\_MESSAGE\_IDS: Should this be a comma-separated list (similar to DATA\_TYPES)? | David S. Berry / NASA | Consider. |  |
| 5-31 | Table 6-9 |  | ed | Refers to the TDM, but it is not listed in the references. | David S. Berry / NASA | Add the TDM to Section 1.7 |  |
| 5-32 | 6.2.10.1 |  | ed | Refers to "table 6-9", but that was the table in the previous section. | David S. Berry / NASA | From: table 6-9To: Table 6-10 |  |
| 5-32 | 6.2.10.7 |  | ed/te | First sentence duplicates section 6.2.10.5, and the remainder is one of the problematic uniqueness conditions. | David S. Berry / NASA | Remove 6.2.10.7 (see previous comments regarding "uniqueness criteria" |  |
| 5-33 | 6.2.10.12 |  | ed/te | Not sure what is intended here: "one or more covariance matrices may appear at any desired frequency (for example, multiple covariances when based upon Monte Carlo simulations...".  | David S. Berry / NASA | Clarify. It's not clear what it actually means. One interpretation might be that "T" values for multiple matrices are the same, but that violates the monotonically increasing restriction. |  |
| 5-33 | 6.2.10.15 |  | te | This feels like 2 distinctly different requirements. | David S. Berry / NASA | Split into 2 requirements at the first period... ORMove the second sentence in 6.2.10.15 to be the second sentence in 6.2.10.16, where it feels more appropriate. |  |
| 5-33 | 6.2.10.176.2.10.18 |  | te | The inclusion of TEIGVAL3EIGVEC3 as an exception to the covariance matrix feels like an unnecessary complication. | David S. Berry / NASA | Consider removing this as a candidate covariance "matrix" type.  |  |
| 5-35 | Table 6-10 |  | ed/te | COV\_BASIS: The values in the Description appear to be a normative set. All acceptable values should be listed in the Examples column, and the text should explain that one of the values in Examples column must be selected. | David S. Berry / NASA | List all acceptable values in the Examples column, and add text stating that one of the values in Examples column must be selected. |  |
| 5-35 | Table 6-10 |  | ed | COV\_TYPE: Description simplification. | David S. Berry / NASA | From: "Indicates covariance composition via 'COV\_TYPE=YYY' where YYY is selected from..."To: "Indicates covariance composition; selected from..." |  |
| 5-35 | Table 6-1o |  | ed/te | T: Example is "10", maybe should be "10.0"? | David S. Berry / NASA | Consider. |  |
| 5-36 | 6.2.11.1 |  | ed/te | The material here is more suitable for an Informative Annex or a NOTE than for a normative specification. | David S. Berry / NASA | You could either add to an existing informative annex, or create another informative annex, or move 6.2.11.2 to 6.2.11.1 and make the current 6.2.11.1 a NOTE that follows the current 6.2.11.2. Probably the last option is best. |  |
| 5-36 | 6.2.11.8 |  | ed/te | First sentence duplicates section 6.2.11.6, and the remainder is one of the problematic uniqueness conditions. | David S. Berry / NASA | Remove 6.2.11.8 (see previous comments regarding "uniqueness criteria" |  |
| 5-36 | 6.2.11.20 |  | ed | The section refers to "best practice", but does not refer the OCM user to a guiding reference. | David S. Berry / NASA | Add a reference here (and to annex L if not already there). |  |
| 5-38 | Table 6-11 |  | te/ed | STM\_REF\_TIME: is there a default to 0.0? | David S. Berry / NASA | If there's a default, state it. |  |
| 5-38 | Table 6-11 |  | ed | STM\_CENTER\_NAME: Typo (mismatched quotes) | David S. Berry / NASA | From: "EARTH'To: 'EARTH' or simply EARTH (no quotes are on other defaults) |  |
| 5-39 | Table 6-11 |  | ed | STM\_TYPE: Description simplification. | David S. Berry / NASA | From: "Indicates state transition matrix composition via 'STM\_TYPE=YYY' where YYY is selected from..."To: "Indicates state transition matrix composition; selected from..." |  |
| 5-39 | Table 6-11 |  | ed/te | T: Example is "10", maybe should be "10.0"? | David S. Berry / NASA | Consider. |  |
| 5-40 thru 5-43 | 6.2.1.1 thru 6.2.1.17, Table 6-12 |  | te | At this point in the evolution of our standards, it is premature to add an Attitude Section in the ODM. | David S. Berry / NASA | Discuss at The Hague. At this point I believe this material belongs in the ADM, in a new message, as we have previously implied. Later in the "modular message era", an ODM could have an attitude history incorporated. Right now I believe it to be premature. It will also add a completely new dimension of complexity to the prototyping of the OCM, which will already be a considerable challenge, even without an attitude section. Remove entire section and offer it to Alain Lamy for inclusion in the ADM. |  |
| 5-44 | Table 6-12 |  | te | COMMENT: There really are not special provisions for comments related to user defined parameters. There are numerous other opportunities for comments that can be used. | David S. Berry / NASA | Remove the COMMENT from Table 6-12.  |  |
| 5-44 | Table 6-12 |  | te | Note that there was no provision for user defined parameters in an OEM. In an OCM, user defined parameters could conceivably be added to ANY section. There needs to be more information provided regarding the allowable placement options for user defined parameters, e.g., "immediately before the \*\_STOP keyword that ends an OCM section" or something like that. | David S. Berry / NASA | Clarify placement considerations for user defined parameters in an OCM. |  |
| 5-45 | 6.3 |  | ed | Refers to 4 OCM examples, but there are 5. | David S. Berry / NASA | Correct text to describe all 5 examples. |  |