| **Page** | **Section** | **Line** | **Type** | **Comment/ Rationale** | **Source of Comment (Name/Agency)** | **Suggested Disposition** | **Disposition****(Completed by Principal Editor)** |
| --- | --- | --- | --- | --- | --- | --- | --- |
| 5-20 | 6.2.7.1 | 1 |  | shall be used in [the] OCM orbit... | dav/cssi | Insert the change | Agreed |
| 5-29 | 6.2.9.8 | 1 |  | I suspect you've already had a discussion about measurement vs observation. I tend to be sloppy and use them somewhat interchangeably. I think the important thing is to be completely consistent with the terminology. I'm fine with observation being the 'thing' measured. | dav/cssi | Check to be sure it’s consistent terminology throughout | Okay |
| 5-29 | 6.2.9.9 | 1 |  | I'd say you could do it with two observations. In a single optical frame, one can often distinguish 2 observations (start stop of the streak). While not sufficient to completely characterize an orbit, you are "tracking" the streak. Perhaps a fine line. | dav/cssi | Think about changing the definition.  | This verbiage was from Cheryl and TJ. Please coordinate with them to amend as necessary to make concrete amendment as/if necessary. |
| 5-30 | Table 6-9 | 1 |  | I guess I'd argue that all the parameters listed there are really only of use to BWLS systems. Sequential Kalman Filters would have terms like "restart" - whether or not the filter was starting from an epoch (in which case the parameters listed would be ok), or if it was starting from a previous solution (in which case the listed parameters would not be that relevant). For example, I've been running SLR reference orbits for several satellites from an epoch in 2012 - never restarted, never diverged, just accumulates all the SLR obs from that time. The eigenvalue at the end of the observations is not really indicative of the uncertainty throughout the interval of observations processed. There's a 'bathtub' effect where the ends go up slightly - due to the lack of obs past that point of processing. There's also the issue of using a filter 'and' a smoother. The smoother will get you a better estimate throughout the obs processed, but the final state will be identical to the filter final state. I guess the difficulty with assigning individual values to a filter is that the 'entire' interval is important because the filter moves the state, and state parameters around throughout the processing. So you get a dynamic picture of what is going on. If solar panels are seeing daily eclipses or differences in solar illumination, you'll see it. Likewise for drag. Not really sure what to recommend here. Perhaps a branch with some additional parameters for a filter? I'll have to think on it some more. | dav/cssi | Comment, change for KF term | Awaiting concrete recommendations. |
| 5-32 | 6.2.10.10 | 1 |  | A space is needed in "6.2.10.10Each" I think? There are several that look like this - it may just be how the pdf looks though. | dav/cssi | Check and correct spaces as needed | Fixed |
| 5-35 | Table 6-10 | 1 |  | I didn't see an option where the covariance could be in Cartesian elements, orbital elements (of type Keplerian, equinoctial, etc)? | dav/cssi | Add additional conversions | It is there… COV\_REF\_FRAME and COV\_TYPE  |
| 5-36 | 6.2.11 | 1 |  | I understand this section (and like the reference :-)), but I wonder how applicable the STM and Error STM would be to an end user? If you have the time history of the covariance (and state) you really don't need it for much else. I'll have to think on this one some more too. | dav/cssi | Is this section needed? | Yes, this section was requested by ESA and I believe that it makes sense to include. |
| 5-38 | Table 6-11 | 1 |  | The STM\_MAP\_MODE is correct, but perhaps instead of differences, it would be better to say 'uncertainty', or 'state error'? | dav/cssi | Uncertainties is probably a better term | Added “(or uncertainties)”. Note that the differential STM doesn’t only apply to errors, but it also applies to specified deltas (or differences) as well. |
| 5-29 | 6.2.9 | 6.2.9.3 | ed/te | “The order of occurrence of these OCM Orbit Determination Data keywords shall befixed as shown in table 6-9, with the exception that comments may be interspersed throughoutthe this section as required.”I recall discussing this in the San Antonio meeting, but I do not recall the outcome. It would be a good idea to only allow comments at the beginning of the block, otherwise an XML schema won’t work. | A. Mancas/ESA | Think about only allowing comments at the beginning. | Fixed. Comments only permitted at the beginning |
| 5-29 | 6.2.9 | 6.2.9.86.2.9.9 | ed | The two definitions are consistent with the CDM Blue Book, but there they are in an annex at the end. | A. Mancas/ESA | Consider moving to informative annex. | Considered. But it doesn’t make sense to me to have an informative annex just for these two definitions, I think. |
| 5-30 | 6.2.9 | table 6-9, 5 | ed/te | Why is the OD\_START keyword after COMMENT, OD\_ID and OD\_PREV\_ID? I was expecting it to be the first keyword in the section. The current approach is inconsistent with the way covariance data is given as well. | A. Mancas/ESA | Consider moving OD\_START at the beginning. | Agreed – fixed. |
| 5-295-30 | 6.2.9 | 6.2.9.7 andtable 6-9,7 | te | The paragraph states “All orbit determination event times shall be specified in DAYS relative to the epoch time specified via the EPOCH\_TZERO keyword.”, but in the table OD\_EPOCH is given as a CCSDS time string and other epochs are relative to it. | A. Mancas/ESA | Replace EPOCH\_TZERO with OD\_EPOCH (or if absent EPOCH\_TZERO) in 6.2.9.7. | Agreed – fixed. |
| 5-31 | 6.2.9 | 3 | te | The DATA\_TYPES keyword recommends a list of TDM data measurement types. But ANGLE\_1 and ANGLE\_2 are not that descriptive on their own, it would be better to know whether they are RADEC (likely from a telescope), AZEL (likely from a radar), as data quality will be different. Ditto for RANGE (whether from radar or laser ranging). | A. Mancas/ESA | I don’t have any better ideas at the moment, but it is something to look into. | Tried to accommodate, but not sure I’m a fan. If Table 3-5 is not sufficiently clear, then we should fix Table 3-5 (as opposed to the ODM). |
| 5-32 | 6.2.10 | 6.2.10.3 | ed/te | “with the exception that comments may be interspersed throughout the this section as required.”I recall discussing this in the San Antonio meeting, but I do not recall the outcome. It would be a good idea to only allow comments at the beginning of the block, otherwise an XML schema won’t work. | A. Mancas/ESA | Think about only allowing comments at the beginning. | Fixed |
| 5-32 | 6.2.10 | 6.2.10.7 | te | The way I read this is paragraph is that multiple covariance “types” can appear in the same COV\_START to COV\_STOP block. But would they not have different metadata requirements? Would it not make more sense to put them in separate “segments”? | A. Mancas/ESA | Consider clarifying the statement. | Fixed. All segments must have \_START and \_STOP delimeters. |
| 5-325-35 | 6.2.10 | 6.2.10.9 &Table 6-10, 9 | ed/te | “All covariance matrices in the OCM data shall be time-tagged by a relative time value measured with respect to the epoch time specified via the EPOCH\_TZERO keyword.” From the table: “Time relative to EPOCH\_TZERO. **Where the time is not provided, omission of this non-mandatory field defaults to 0.0.**”The paragraph and the table seem to be contracting. Also, T can be missing if only one cov matrix is given? There seems to be some information missing here on how the covariance time history lines are to be constructed. | A. Mancas/ESA | Add some clarification, maybe an example on how covariance data lines are to be constructed. | Agree that this was not clear. Fixed. Example in Fig. 6-4 already shows how Time is specified. Added further clarification. |
| 5-33 | 6.2.10 | NOTE | ed | The note is written in requirements language, which, IIRC, is not what the technical editor recommends. | A. Mancas/ESA | Turn into a normative paragraph or change ‘shall’ with ‘can’. | Agreed |
| 5-33 | 6.2.10 | 6.2.10.15 | ed | If I understand it correctly, covariance would then be given as:T = 10 [s]2.34567.6543 1.2345Why not use EPOCH (as in OEM) instead of T?  | A. Mancas/ESA | Consider switching to EPOCH from T. Also, I would add a requirement that if T is absent (implied EPOCH\_TZERO) then all covariance matrices in the block must be at EPOCH\_TZERO (ie you cannot have one cov matrix at EPOCH\_TZERO without T and another at a later epoch with T). | All time in the OCM is relative to EPOCH\_TZERO.This was done for three reasons: (1) eliminate leap second issues; (2) greatly reduce message size; and (3) eliminate CPU associated with always converting Yr/Mo/Dy/ … into time. |
| 5-33 | 6.2.10 | 6.2.10.15 | te | “The reference frame of the covariance matrix, if different from that of the states in the ephemeris, must be provided via the ‘COV\_REF\_FRAME’ keyword.”I think is taken from the OEM, but the COV\_REF\_FRAME is stated to go in a different place in table 6-10 and normative paragraph 6.2.10.3 specifically contradicts this. | A. Mancas/ESA | Remove the reference to COV\_REF\_FRAME in 5.2.10.15 and make all COV\_REF\_FRAMEs the same in one COV block. | Fixed. |
| 5-33 | 6.2.10 | 6.2.10.15 – 6.2.10.19 | ed | It seems like these lines are allowed to repeat and maybe there should be separate table for covariance data lines. | A. Mancas/ESA | Consider adding a separate table for covariance data lines. | Not sure what is meant by “separate table” (?) |
| 5-36 | 6.2.11 | 6.2.11.1 | ed | This normative paragraph is not written in requirements language. It should go in a NOTE or an informative annex. | A. Mancas/ESA | Consider moving or deleting. | Moved to a “Note” |
| 5-36 | 6.2.11 | 6.2.11.4 | ed/te | “with the exception that comments may be interspersed throughout the this section as required.”I recall discussing this in the San Antonio meeting, but I do not recall the outcome. It would be a good idea to only allow comments at the beginning of the block, otherwise an XML schema won’t work. | A. Mancas/ESA | Think about only allowing comments at the beginning. | Fixed. |
| 5-36 | 6.2.11 | 6.2.11.8 | ed/te | It seems that this case could be better covered by having two separate STM block rather than allowing multiple different representations in the same block. | A. Mancas/ESA | Just something to consider. | Accepted. |
| 5-37 | 6.2.11 | 6.2.11.10 | ed/te | “All state transition matrices in the OCM data shall be time-tagged by a relative time value measured with respect to the epoch time specified via the EPOCH\_TZERO keyword.”This contradicts the T row in table 6-11 that states it is optional and if it mission it is 0.0 (epoch is EPOCH\_TZERO). | A. Mancas/ESA | Clarify 6.2.11.10, saying that if more than one matrix is given, T must present etc. etc.. If only one epoch is given, T is not mandatory and absence means T =0.0. | Modified to make T= mandatory |
| 5-37 | 6.2.11 | 6.2.11.16 | ed/te | “The time of the event associated with provided state transition matrices must be provided via the “T = ” keyword. The reference frame of the state transition matrices, if different from that of the states in the ephemeris, must be provided via the ‘STM\_FRAME’ keyword.”The epoch part is a duplicate of 6.2.11.10. The STM\_FRAME should be part of the STM “metadata” and not repeated for each matrix. | A. Mancas/ESA | Consider removing. | Split STM segments into separate data blocks |
| 5-38 | 6.2.11 | table 6-11 | ed | The STM\_CENTER\_NAME points to the NASA/JPL SSD Group. Would a SANA-registry not make more sense? | A. Mancas/ESA | To be discussed if SANA registry makes more sense. | Per David: SANA wouldn’t be responsive enough to keep up with a center like JPL/others. |
| 5-55-6 | 6.2.3 | table 6-3 | ed/te | It would make more sense to have the same series of object-ID related keywords in all messages, egOBJECT\_NAMEINTERNATIONAL\_DESIGNATORCATALOG\_NAMECATALOG\_ID | A. Mancas/ESA | To be discussed | Yes, but I think we’ve already bifurcated beyond that with multiple names in our messages. Happy to narrow them down to one set, if we can. |
|  |  |  |  | Why is there an attitude time history inserted into the OCM? Why not attach an AEM? (The ADM book calls out the possible include of an OPM to accompany an APM, for example.) | J. Halverson | Fix | Fixed (removed). |
|  |  |  |  | Recommend that tables with keywords be removed and a pointer inserted to the SANA tables. | J. Halverson | Recommend | Fully agree. The longer we wait, the more work and potential inconsistencies we will incur. |
| 5-40 | 6.2.1.8 |  |  | This should be made consistent with the latest version of the ADM. (Which is always Frame A to Frame B, and those can be specified as appropriate) | J. Halverson | Fix | Agreed. |
| 5-41 | 6.2.1.9 |  |  | This is not consistent with the AEM. The AEM data contains absolute time tags. | J. Halverson | Fix | The OCM has adopted (from three years ago) relative timing throughout, for the reasons mentioned above. |
| 5-41 | 6.2.1.11 |  |  | Why just the quaternion derivative? What about angular velocity? Are rate terms required? | J. Halverson | Clarify | Attitude time history has been removed. |
| 5-41 | 6.2.1.12 |  |  | Can angular velocity be included with Euler angles? | J. Halverson | Clarify | Yes (6.2.12.13) |
| 5-42 | 6.2.1.15 |  |  | Not sure what this means? How are the attitudes propagated? Or do you mean interpolated?  | J. Halverson | Clarify | I’m not sure what it meant either! Deleted. |
| 5-42 | NOTE |  |  | Suggest this be a recommendation. If the data points are very close together a linear interpolation may be fine as long as the quaternion is re-normalized.  | J. Halverson | Recommend | Agreed. |
| 5-43 | Table 6-12 |  |  | If this remains in the OCM then the terminology and definitions should match the ADM. Frame transformations, nutation terms, angular velocity (definition, frames)  | J. Halverson | Fix | Agree. |
| 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 | Fixed. |
| 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. | Deleted |
| 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 | Fixed. |
| 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 | Fixed |
| 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. | Done. |
| 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. | For us to discuss. |
| 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". | Done. |
| 1-4 | 1.7 |  | te | Add Part 1 of the XML Schema standard. | David S. Berry / NASA |

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

 | Done. |
| 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". | Done. |
| 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 | Done. |
| 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 | Done. |
| 3-3 | NOTE | 3 | ed | Section reference of 0 | David S. Berry / NASA | From: "listed in 0"To: "listed in 1.7" | Done. |
| 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. | Added ICRF, interpreted as latest realization. |
| 3-4 | Table 3-2 |  | ed/te | Example "ITRFXXXX" is shown, but B2 has "ITRFyyyy" | David S. Berry / NASA | From: ITRFXXXXTo: ITRFyyyy | Done. |
| 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 | Done. |
| 3-9 | Fig 3-3 |  | ed/te | Same as for Figure 3-1 | David S. Berry / NASA | Same as for Figure 3-1 | Done. |
| 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". | Done. |
| 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 | Done. |
| 4-3 | NOTE | 3 | ed | Section reference of 0 | David S. Berry / NASA | From: "listed in 0"To: "listed in 1.7" | Done. |
| 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. | Done. |
| 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"  | Done. |
| 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 | Done. |
| 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 | Done. |
| 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 | Done. |
| 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". | Done. |
| 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 | Done. |
| 5-3 | NOTE | 3 | ed | Section reference of 0 | David S. Berry / NASA | From: "listed in 0"To: "listed in 1.7" | Done. |
| 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." | Done. |
| 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 | Done. |
| 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. | Done. |
| 3-4 | Table 5-3 |  | ed/te | Example "ITRFXXXX" is shown, but B2 has "ITRFyyyy" | David S. Berry / NASA | From: ITRFXXXXTo: ITRFyyyy | Done. |
| 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". | Done. |
| 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. | For us to discuss. |
| 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. | Made consistent. |
| 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. | I need to work on this. |
| 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. | Fixed – removed. |
| 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. | Added. |
| 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. | Done. |
| 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..." | Fixed. |
| 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. | Yes – we should.But now I’m confused on versions (?) |
| 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. | Fixed. |
| 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. | Fixed. But please confirm with me that XML can accommodate multiple lines within one <XML></XML> set (?) |
| 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. | Done. |
| 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 | Done. |
| 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. | Done. |
| 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. | Done. |
| 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". | Done. |
| 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". | Done. |
| 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. | Done.Note #1 already requires at least one of the identifying info fields to be provided. |
| 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 | Done. But note that OBJECT\_ID was used in (OPM, OMM, OEM) |
| 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 | Done. |
| 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..." | Done. |
| 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. | Done. |
| 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..." | Done. |
| 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..." | Done. |
| 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. | Agreed. |
| 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. | Agreed. |
| 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. | Done. |
| 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. | Done. |
| 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 | Would like to discuss – still sorting this out in my head. How would state vectors in GPS time be specified under your proposal? |
| 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 | Done. |
| 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. | Done. |
| 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" | Fixed. |
| 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. | Done. |
| 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. | Done. |
| 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 | Done. |
| 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. | Fixed. |
| 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 . | Fixed. |
| 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. | Fixed. |
| 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. | Fixed. |
| 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 | Done. |
| 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. | There are parameters surrounding them. |
| 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. | Gone. |
| 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. | To discuss with Cheryl. This is the duty cycle reference time, which is the “t0”. I’m not sure myself how best to portray this vs DC\_REF\_DIR. |
| 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 | Agree. |
| 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. | Agree. |
| 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. | Fixed. |
| 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. | Fixed. |
| 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 | Fixed. |
| 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 | Fixed. |
| 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. | Now states The mass change **in kg** (where a NEGATIVE VALUE denotes a mass decrement/loss) associated with a ΔV imparted to the host (i.e., MON = 0) or the mass (defined as a POSITIVE VALUE) of the deployed object (if MON ≠ 0) |
| 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. | Clarified. |
| 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". | Fixed. |
| 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 Fixed., 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" | Clarified. |
| 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. | Fixed. |
| 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 | Done. |
| 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. | let’s discuss.Note that attitude maneuvers affect orbit; it is not cut/dry. |
| 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. | I am open to removing these requirements, but would like to discuss. Perhaps we could make them recommendations (?)This gets further complicated when having multiple maneuver segments that \*could\* be additive (e.g. multiple thrusters firing in tandem) vs not. |
| 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. | Fixed. |
| 5-17 | Table 6-6 |  | ed | MAN\_CHAR: Description is missing. | David S. Berry / NASA | Provide description. | Deleted. |
| 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. | Fixed. |
| 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. | Fixed. |
| 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). | Done. |
| 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" | Fixed. |
| 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" | Fixed. |
| 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. | Fixed, but still half-baked. |
| 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" | Fixed. |
| 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. | Does not have to be non-negative |
| 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" | Fixed. |
| 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..." | Yes – START and STOP. |
| 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. | Fixed. |
| 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. | Fixed. |
| 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. | Clarified. |
| 5-22 | Table 6-7 |  | ed | ORB\_AVERAGING: Typo | David S. Berry / NASA | From: BROWERTo: BROUWER | Fixed |
| 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. | “Other” \*is\* acceptable, since there are additional theories (Smart, etc.) |
| 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) | Fixed. |
| 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" | Removed. |
| 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. | Moved. |
| 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. | Moved. |
| 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. | I need to work on this. |
| 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). | Fixed. |
| 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. | Fixed. |
| 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. | Reordered. |
| 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. | Fixed. |
| 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. | Fixed. |
| 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.  | Fixed. |
| 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. | Done |
| 5-28 | Table 6-8 |  | ed | EC\_REF\_FRAME: Typo | David S. Berry / NASA | From: "... subsections B2..."To: "... subsection B2..." | Fixed. |
| 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. | Fixed. |
| 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. | Added. |
| 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 | Redefined. |
| 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. | Fixed. |
| 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." | Fixed. |
| 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." | Fixed. |
| 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. | Fixed. |
| 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 | Fixed. |
| 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. | Fixed. |
| 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 | Fixed |
| 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 | Fixed |
| 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" | Fixed |
| 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. | Fixed. |
| 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. | Fixed. |
| 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.  | I understand your reasoning, but feel that the ability to directly share eigenvectors and assoc. values eliminates the user’s need to do SVD etc. |
| 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. | Fixed. |
| 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..." | Fixed. |
| 5-35 | Table 6-1o |  | ed/te | T: Example is "10", maybe should be "10.0"? | David S. Berry / NASA | Consider. | T= was removed. |
| 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. | Already fixed. |
| 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" | Fixed. |
| 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). | Fixed. |
| 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. | Fixed. |
| 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) | Fixed. |
| 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..." | Fixed. |
| 5-39 | Table 6-11 |  | ed/te | T: Example is "10", maybe should be "10.0"? | David S. Berry / NASA | Consider. | T= removed |
| 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. | Removed. |
| 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.  | Disagree - - as we agree, while user-defined parameters can be beneficial and at times necessary, their greatest negative is the chance of misunderstanding them. I feel that comments are necessary here as an avenue to help mitigate risk of confusion or misinterpretation  |
| 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. | Fixed. Only one such section is permitted, and it must be at the end of the 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. | Fixed. |
| 5-46 thru 5-48 | Figures 6-2 thru 6-4 |  |  | NOTE: I didn't spend too much time reviewing example OCM's, but there are a few inconsistencies between the examples and the evolution of the metadata, e.g., these contain keywords that have apparently been phased out of the OCM: TECH\_POC, OBJECT\_ID, TIME\_SYSTEM.  | David S. Berry / NASA | Ultimately the examples will need to be updated. It's an open question as to whether examples should be updated as changes to the specification is made, or whether the examples should be all updated at the conclusion of the specification development. | Fixed (most things); will need to revisit later for a few inconsistencies. |
| 5-50 | Fig 6-5 |  |  | The example indicates "<intervening data records omitted here>". Since you know how many lines were omitted given EC\_REPR\_N, the number of intervening lines should be given. | David S. Berry / NASA | From: "<intervening data records..."To: "< 8 intervening data records..." in the first case, and ""< 18 intervening data records..." in the second case. | Fixed (to “4 intervening rows” in all 3 cases) |
| 6-1 | 7.3.1 |  | ed/te | "Comment line;" was added to the list of line types, but I think the order should be changed such that comment lines follow data lines in the list. | David S. Berry / NASA | From: "Comment line;" followed by "Data line; or"To: "Data line;" followed by "Comment line; or"i.e., reverse the existing order of the 2 lines. | Fixed. |
| 6-2 | 7.4.1.6 | 4 | ed | Indicates to "See 0". | David S. Berry / NASA | I'm not certain what section the reader is being referred to... 5.2.5.4 is a possibility, but it explicitly lists 6 elements, which could be misleading for an OCM reference. | Fixed. |
| 6-4 | 7.6.1.1 | (c) | ed/te | There is an implied division of units here that is not specified. [Note this is my omission from the prior version of ODM.] | David S. Berry / NASA | It may be desirable to consider something like the Section 1.4.1 "Unit Notation" shown in the RDM. On the other hand, given some of the other ODM concepts, these unit operations are pretty elementary. | Sorry, I don’t understand. Could you please clarify? |
| 6-6 | 7.7.9 |  | te | This specification makes impossible an XML schema definition of the OCM. We could still have an XML representation, but there would be no way to validate it with a schema checker. | David S. Berry / NASA | Consider the true desirability of the specification as written. It is possible to have many comments in an OCM in specific places and write an XML schema to match that, but "comments anywhere" in combination with many adjacent optional keywords will fail validation, as has been illustrated. | Fixed. |
| 6-7 | 7.8.1 | Last | te | The statement currently reads: "The following version numbers are supported:". Technically, any CCSDS version of the ODM other than the current Blue Book is referred to as a "Silver Book", and is "Historical". Thus it is technically not "supported" by the CCSDS; however, individual users may have implementations that conform to earlier versions of the ODM, and may not wish to change. | David S. Berry / NASA | From: "... are supported:"To: "... are supported (Blue Book) or have been supported in the past (Silver Book):"  | Fixed. |
| 6-8 | Table |  | ed | The top part of the table (versions 1.0 and 2.0) is sorted by order of message type appearance in the ODM, then by version number. The bottom part (version 3.0) is sorted by only by order of message type appearance in the ODM. | David S. Berry / NASA | Consistent sort: either all version 1.0 together, 2.0 together, 3.0 together; or all OPM entries together, OMM entries together, etc. | Fixed. |
| 6-9 | 7.8.2.4 |  | ed | Table 6-11 is left out of the list. | David S. Berry / NASA | Add Table 6-11 to the list of applicable tables of keywords for an OCM. | Fixed. |
| A-4 | A2.4 |  | ed | The document number refers to the TDM. | David S. Berry / NASA | From: 503.0To: 502.0 | Fixed. |
| A-5 | A2.5 |  | te | The table is blank. | David S. Berry / NASA | Eventually we need to fill this out. I agree it can be left until the content solidifies, though it should be fairly easy to fill out for the OPM, OMM, OEM. | Will do later. |
| A-9 |  |  | ed/te | Since we have "ITRFyyyy" in the list, should we remove "ITRF-93" and "ITRF-97"? or "grandfather" these two entries? | David S. Berry / NASA | Consider. | Changed to ITRFyyyy. |
| A-9 | B2 |  | te | MOON\_MEIAUE... good idea to add a technical reference here. | David S. Berry / NASA | No action necessary, but could consider for other frames as well... Ref L-1 is unlikely to ever include all these frames in my opinion. | Okay. |
| A-10 | B3 |  | te | Most of the frames in this table require an ICD to be effective (spacecraft body related, actuator related, sensor related, etc.). | David S. Berry / NASA | Perhaps add a general statement at the beginning of B3 indicating that an ICD is likely necessary for most of these. | Fixed. |
| A-10 | B3 |  | te | Several of the frame values are limited to 1 digit (e.g., ACTUATOR\_x), but some "major" spacecraft have more than 10 actuators (e.g., Stardust spacecraft had 8 RCS thrusters and 8 TCM thrusters, Mars Reconnaissance Orbiter has 8 RCS thrusters and 6 TCM thrusters, etc.). | David S. Berry / NASA | Consider whether one digit should be expanded to 2 for any of the relative frames. | Fixed. |
| A-10 | B3 |  | ed | For CSS\_xy, it might be helpful to specify what is different about "x" and "y". (At least, I personally don't know).  | David S. Berry / NASA | Consider adding explanatory sentence. | Fixed to xx from 00 to 99 |
| A-10 | B3 |  | ed/te | For "RTN", we have the parenthetical "(QSW)". For "RSW" we have "Another name for 'Radial, Transverse, Normal". | David S. Berry / NASA | Can the phrase "Also known as 'QSW' or 'RSW'." be added to the RTN definition? or should "QSW" be explicitly added as a table entry? | Fixed. |
| A-12 | B4 | 1 | ed/te | Specify in the first line that these element set keywords are only applicable to the OCM. | David S. Berry / NASA | From: "... time histories may..."To: "... time histories in the OCM may..." | Fixed. |
| A-12 | B4 | para3 | ed/te | Replace "implied normative" statements with the "approved" vocabulary. Also, break this one sentence into two. (PART 1 of 2) | David S. Berry / NASA | From: "It is not allowed to specify non-inertial reference frames when employing inertial element sets..."To: "Non-inertial reference frames shall not be specified when employing inertial element sets." | Fixed. |
| A-12 | B4 | para3 | ed/te | Replace "implied normative" statements with the "approved" vocabulary. Also, break this one sentence into two. (PART 2 of 2) | David S. Berry / NASA | From: "or to specify inertial reference frames when employing non-inertial element sets."To: "Similarly, inertial reference frames shall not be specified when employing non-inertial element sets." | Fixed. |
| A-12 | B4 |  | ed | For ADBARV and LDBARV, the "Meaning" text has one element description that contains a comma (specifically, the "inertial azimuth angle"). This requires the use of a semi-colon to separate the individual elements. | David S. Berry / NASA | Either remove the comma between "inertial azimuth angle" and "measured" (it's not strictly necessary), or replace all the other commas in this "Meaning" text with semi-colons. I think removing the offending comma is easier. | Fixed. |
| A-12, A-13 | B4B5 |  | ed | Note that these lists of elements do not use "the Oxford comma" construction. See p.35 in https://cwe.ccsds.org/cesg/docs/Boot%20Camp%20Slides/2017-05%20Technical%20Editor%20Boot%20Camp%20Slides.pptx  | David S. Berry / NASA | You can save the CCSDS Editor some time by adding a comma separating the last 2 elements in each "Meaning" statement. | Fixed. |
| A-13 | B5 |  | ed | For TADBARV and TLDBARV, the "Meaning" text has one element description that contains a comma (specifically, the "inertial azimuth angle"). This requires the use of a semi-colon to separate the individual elements. | David S. Berry / NASA | Either remove the comma between "inertial azimuth angle" and "measured" (it's not strictly necessary), or replace all the other commas in this "Meaning" text with semi-colons. I think removing the offending comma is easier. | Fixed. |
| A-14 | B5 |  | te | For COV\_NNXNN, an ICD should be required. | David S. Berry / NASA | Remove "in adjacent COMMENTS or". | Fixed. |
| A-15 | C1 |  | te | The x, y, z dimension descriptions of the OEB assume that the box has 3 unique dimensions that can be ordered max, med, min. This ripples into the discussion of the roll, pitch, yaw and keywords in the Physical Characteristics section of the OCM. | David S. Berry / NASA | Add some text that describes how to deal with a situation where 2 or 3 of the dimensions are exactly the same. | Fixed. |
| D-1 | D1 | para1, line 3 | te | An esoteric term is used without example, "exoatmospheric Resident Space Object (RSO)". | David S. Berry / NASA | Provide an example of what you mean here. | Fixed. |
| D-1 | D1 | Phase | ed | On definition of phase, "CATS" acronym used without expansion. | David S. Berry / NASA | Either add expansion here or add "CATS" to annex E. | Fixed. |
| D-1 | D1 |  | ed | On ETarget the abbreviation "w/o" is used. | David S. Berry / NASA | From: "w/o"To: "without" | Fixed. |
| D-1 | D1 |  | ed/te | On "VMapparent", the designation "[vmag]" follows the equation, which based on other usage in this section implies that it is a units designation, but it's not. | David S. Berry / NASA | Remove "[vmag]" (cf. "VMabsolute" on p.D-2 | Clarified as, “in the visual magnitude scale” |
| D-2 | D1 |  | ed/te | On "Phase($φ$)", the designation "[ratio]" follows te equation, which based on other usage in this section implies that it is a units designation, but it's not. | David S. Berry / NASA | Remove "[ratio]" | Fixed. |
| D-8 | F2.2 |  | te | I think one of the "Heritage Requirements" is too focused on NASA networks, which may have made sense at the beginning, but may no longer be entirely applicable. Specifically, the second in the table: "Ephemeris data provided for Deep Space Network (DSN), ..." | David S. Berry / NASA | I would remove the list of NASA networks, and the requirement then reads: "Ephemeris data provided for scheduling or operations (metric predicts) is to be certified by the providing Agency...". | Fixed. |
| D-8 | F2.3 |  | te | The fourth "Desirable Characteristic" has an "N" for "OEM?" In my experience OEMs are in fact used for purposes other than exclusively predicts generation. | David S. Berry / NASA | On the fourth "Desirable Characteristic" ("... is consistent with, and ideally a part of..."), change "N" to "Y". | Agree and fixed. But I’d think that would also apply to OPMs, right? |
| D-7 thru D-8 |  |  | ed/te | I had trouble describing which requirement in Annex F I was referring to in the previous 2 comments. This suggests a numbering scheme. | David S. Berry / NASA | Apply a requirement number to each of the ODM requirements. (I should have done this when we worked on version 2... mea culpa.) | Fixed. |
| D-9 | F3 | 4 | te | Question: I'm wondering why the OCM is included here. I'm not understanding the logic of asserting that the OCM is "engineered only for low-to-medium-fidelity orbit propagation". Most of the apparatus defined for the OCM is much more comprehensive that that provided for any of the other messages in the ODM, so it makes me wonder what was left out that, were it included, would make the OCM "high fidelity". | David S. Berry / NASA | Discuss at The Hague. | Fixed. |
| D-10 | F3 | para2, lines 2-3 | ed | States that "A number of potential COMMENT statements are included in Annex G". I believe this is a reference to what was Annex D, section D2, in ODM V.2. The need for this this Annex material is supplanted by the OCM. | David S. Berry / NASA | Suggest removing the referenced statement. | Fixed. |
| D-11 | G1 | 3) | ed | The item regarding KVN for XML format has been moved. | David S. Berry / NASA | From: 2.1To: 1.1 | Fixed. |
| D-11 | G1 | 5) | te | The ICD suggestion for the format on values of "ORIGINATOR" no longer appears in the document. | David S. Berry / NASA | Remove #5) from the list of items. | Fixed. |
| D-11 | G1 | 6) | ed/te | The section trace includes 6.2.3, but "OBJECT\_ID" has been removed the OCM Metadata. | David S. Berry / NASA | Either remove 6.2.3 from the Section trace or add OBJECT\_ID to OCM metadata. The latter is consistent with the other messages in the ODM. | Fixed; removed 6.2.3. |
| D-11 | G1 | 7) | ed | The section trace number (6.2.10) is not correct for the user defined parameters. | David S. Berry / NASA | First correct the section number for the User Defined Keywords, then update the trace table. | Fixed. |
| D-11 | G1 | 8) | ed | The trace to section 4.2.3 is no longer correct; change it to Annex B2 | David S. Berry / NASA | From: 4.2.3To: Annex B2 | Fixed. |
| D-11 | G1 | 10) | ed/te | The item regarding "Information which must appear in comments..." appears to have been removed from the document. | David S. Berry / NASA | Remove Item (10) from the table. | Fixed. |
| D-12 | G1 | 12) | ed | "Specific information security interoperability provisions ..." traces to section 0. | David S. Berry / NASA | Replace "0" with "Annex J1". | Fixed. |
| D-12 | G1 | 13) | ed | Regarding exceptions REF\_FRAME and TIME\_SYSTEM | David S. Berry / NASA | From: annex A2.5To: annex B2 and B1 | Fixed. |
| D-12 | G1 | 14) | ed  | Time systems MET, MRT, SCLK | David S. Berry / NASA | From: A2.5To: B1 | Fixed. |
| D-12 | G1 | N/A | te | In the OCM material there are a number of references to using an ICD that should be added to this annex, e.g., regarding: * OEB\_FRAME in 6.2.4
* MAN\_REF\_FRAME in 6.2.6
* ORB\_REF\_FRAME in 6.2.7
* number of elements in set in 6.2.7 and B4
* orbit averaging method in 6.2.7
* EC\_REF\_FRAME in 6.2.8
* ephemeris compression specifics in 6.2.8
* orbit state elements in 6.2.8
* ephemeris compression functions and algorithms in 6.2.8
* OD confidence metric in 6.2.9
* covariance time history in 6.2.10
* COV\_REF\_FRAME in 6.2.10
* covariance matrix dimension in 6.2.10
* state transition matrix in 6.2.11
* STM\_REF\_FRAME in 6.2.11
* special max line length in 7.3.3
* spacecraft body reference frames in B3
 | David S. Berry / NASA | Add to Annex as appropriate. Recall our relatively recent history with the PRM with pushback from the CESG on the extent of requirement for an ICD. I foresee that we could be heading for additional such pushback on the ODM. Consider whether all of these requirements or suggestions for use of an ICD are justified, and accordingly, if there is a way to reduce the extent of reliance on ICD. |  |
| D-13 | Annex H | Title | ed/te | Title refers to "Version 2" of ODM | David S. Berry / NASA | change to "Version 3" | Fixed. |
| D-13 | Annex H | All |  | We should discuss whether the content of this Annex should address:Changes from V.2=>V.3 onlyChanges from V.1=>V.2 followed by V.2=>V.3 | David S. Berry / NASA | Discuss at the Hague. Ultimately this section will need to be revised. | For us to discuss in our upcoming meeting. |
| D-15 | Annex I | All | te | It made sense to include this material in version 2, but I don't know if it makes continued sense in version 3. | David S. Berry / NASA | Discuss at the Hague. Remove section? Revise to how to produce V.1 compatible from V.3? Add how to produce V.2 compatible from V.3? | I just removed this section, since the Silver Book content is no longer supported per above. |
| D-17 | J1.2 | 3-4 | ed/te | Refers to "... pointing request and potential satellite and instrument pointing maneuvers..." | David S. Berry / NASA | From: "... pointing request and potential satellite and instrument pointing maneuvers..."To: "... preparing pointing and frequency predicts used during spacecraft commanding, and may also be used in collision avoidance studies..." | Fixed. |
| D-18 | J2 | 2 | ed/te | Refers to "ODM XML templates", but we are planning a schema | David S. Berry / NASA | From: "ODM XML templates"To: "ODM XML schemas" | Fixed. |
| D-18 | J2 | 4-5 | te | States that spacecraft names will be drawn from SANA, but elsewhere we have referred to UNOOSA as the source. | David S. Berry / NASA | Remove the line: "- the spacecraft names that appear as origin and target in the ODM", plus the following error. | Work in progress… plan is to switch over to SANA prior to publication of this version. |
| D-18 | J2 | 6 | ed | Reference source not found... | David S. Berry / NASA | Point to SANA Registry of Organizations: https://sanaregistry.org/r/organizations  | Fixed. |
| D-19 | J2 | 1 | ed | This line duplicates the last line of page D-18 | David S. Berry / NASA | Remove. | Fixed. |
| D-19 | J2 | 2-4 | ed/te | These lines regarding identification of celestial bodies applied to the PRM, but do not apply to the ODM. | David S. Berry / NASA | Remove. | I think they still do, since we continue to support the CENTER\_NAME keyword |
| D-20 | Annex K | para 1, line 11-15 | ed | Option (3) in the discussion of EC performance is in my opinion a bit awkward with the many "or" and "and" options. It might be best to try to streamline this sentence a bit.  | David S. Berry / NASA | Consider. | Streamlined and bulletized. |
| D-22 | Annex L | L-2, line 2 | ed | The Organization Processes for CCSDS was updated since this entry was written. | David S. Berry / NASA | From: A02.1-Y-3To: A02.1-Y-4From: Issue 3To: Issue 4From: July 2011To: April 2014  | Fixed. |
| D-22 | [L-1] | 1-3 | Ed | V.4 should be out | D. Force/NASA | Wait and see | Fixed. |
| D-22 | [L-11] | 1-2 | Ed | https://www.hq.nasa.gov/alsj/lunar\_cmd\_2005\_jpl\_d32296.pdf | D. Force/NASA | Include link to document | Fixed. |
| D-22 | [L-10] | 1-3 | Ed | https://naif.jpl.nasa.gov/pub/naif/generic\_kernels/spk/planets/de430\_moon\_coord.pdf | D. Force/NASA | Include link to document | Fixed. |
| D-22 | [L-7] | 1-2 | Ed | http://imbrium.mit.edu/LRORS/DOCUMENT/453\_HDBK\_GN.PDF | D. Force/NASA | Include link to document | Fixed. |
| D-23 | [L-16] | 1-2 | Ed | https://arc.aiaa.org/doi/book/10.2514/MASTR02 | D. Force/NASA | Include link to document | Fixed. |
| D-23 | [L-15] | 1-2 | Ed | https://iafastro.directory/iac/browse/IAC-15/ | D. Force/NASA | Include link to document | Fixed. |
| D-23 | [L-14] | 1-2 | Ed | Improve reference/I could locate abstract but not article | D. Force/NASA | Include link to document | Fixed. |
| 6-9 | 6.2.5.3 | 3 | ed | the this should be this | D. Force/NASA | Remove word the | Fixed. |
| 6-10 | Table 6.5 | 5,11,14,15,16,18 | Ed | Inconsistency in fields, some are labled Free-Test, others not. One has only one choice. | D. Force/NASA | resolve | This is intentional, to help “future-proof” the ODM standard |
| 6-12 | 6.2.6.5 | 1 | Ed | One or more … | D. Force/NASA | Zero or more … | Left it as one or more, since the keyword is not mandatory anyway (i.e., can be zero) |
| 5-15 | 6.2.1.d, f, .g and Table 6-1 | d, f, g | Te | If there is a single object, a single perturbation set, a single OD, why is it necessary to have options for multiple orbit state time histories, multiple covariance time histories, multiple STM time histories? Is this just syntactical use of the word “histories” to represent the collected history of each of those items? | Cheryl Gramling/NASA-GSFC | If the intent of the text is to provide multiple versions of history, then the rationale for such a provision should be stated. If the intent is that the word “histories” actually refers to a time-ordered series of each of the parameter sets, they change the word to “history” (and the comment becomes editorial). | Multiple time histories are provided when that (same) data is represented in a different manner; i.e., for covariance, one or more of the following must be different: the selected covariance element set (COV\_TYPE) is unique; the orbit state covariance time history is based upon a unique orbit determination, attitude determination, navigation solution or Monte Carlo simulation; the reference frame is unique; the orbit center is unique; or the data interval timespan is unique (i.e., has no overlap with any other data interval(s)) |
| 5-15 | 6.2.1.3) | Missing | Ed | Add the optional attitude time history to the list, per Table 6-1 and the descriptive section 6.2.1 (which is really section 6.2.12 – see next comment) | Cheryl Gramling/NASA-GSFC | Make the section complete. | Attitude time history was removed per NAV WG direction |
| 5-40 | 6.2.1 | All | Ed | Formatting issue: Section number should be 6.2.12 | Cheryl Gramling/NASA-GSFC | Update the section numbering. | Fixed. |
| 5-29 | 6.2.9.7 |  | Te | Event times specified in DAYS may assume an Earth-day, however, per section 6.2.7 Orbit State Time History, the OD\_REF\_FRAME may not be Earth, which changes the definition of a DAY. | Cheryl Gramling/NASA-GSFC | The definition of DAY should be prescribed to be that of the ORB\_REF\_FRAME or otherwise defined. | Want to discuss with you. Would you recommend adopting an SI Earth Day (as I’d intended) or having some sort of variable definition? |
| 5-9 –  | 6-5  |  | Te | The Maneuver and Ephemeris Compression sections (pp 5-11 5-12-5-15 & 5-24; tables 6.2.6 & 6.2.8), among others, seem agnostic to central body, while the Perturbation section seems intrinsically Earth-focused. We seek consistency within the message and the need to use bodies besides Earth as Central body. Special Perturbations may be needed for asteroids, so special modeling (e.g. geometry, rotation, gravity field) may be needed. | Cheryl Gramling/NASA-GSFC | Suggest updating the Perturbations sections to incorporate a keyword similar to the MAN\_CENTER\_NAME that’s in the Maneuver Section, with a provision for special modeling of the central body. | Fixed. |
| 5-29-5-31 | 6.2.9 |  | te | Missing information cogent to an OD: STATION\_GEOMETRY or some other term that allows the OD message recipient to understand the tracking asset diversity in terms of geometry and measurement data. This is necessary because WRMS alone is insufficient since it may present a skewed value if the solution is based on poor geometry and won’t allow insight into RIC terms with reduced observability.  | Cheryl Gramling/NASA-GSFC | Provide a means of optionally identifying the geometry of assets that provided data to the OD solution. This could be summarized in a GDOP-type of parameter. | Let’s discuss further - - I welcome any specific recommendations here. |
| 5-29-5-31 | 6.2.9 |  | te | Missing information cogent to an OD: Qualifiers on the residuals on each DATA\_TYPE used in the OD are needed to provide insight into the efficacy and fidelity of the OD, especially when coupled with insight into all DATA\_TYPES and STATION\_GEOMETRY. | Cheryl Gramling/NASA-GSFC | Suggest adding MAX, MIN, and SIGMA (1) for the set of residuals for each DATA\_TYPE used in the OD solution as an option in the message. | Let’s discuss further - - I welcome any specific recommendations here. |
| 5-20 & 5-22 | 6.2.7.9.2) and Table 6-7 entry 5 |  | te | If the OD comes from an onboard solution that has been telemetered to the ground, the data basis should be clarified. Suggest that an onboard solution that is definitive be considered “DETERMINED\_OD” (and not “DETERMINED\_TLM”). | Cheryl Gramling/NASA-GSFC | Include clarifying statement about the data basis for onboard OD. Suggested wording: “For definitive OD performed onboard, whose solutions have been telemetered to the ground for inclusion in an OCM, the “data basis” is considered “DETERMINED\_OD”.   | Fixed. Removed “TLM” and “OD” distinctions. |
| 6-13 | Table 6-3 |  |  | EPOCH\_TZERO: time scale is said to be specified by TIME\_SYSTEM. But it does not exist any more : only TIME\_SYSTEM\_ABS or TIME\_SYSTEM\_REL exist.  | Alain Lamy / CNES | TIME\_SYSTEM should be "TIME\_SYSTEM\_ABS"(see also below)  | EPOCH\_TZERO still exists. I confined this to be only UTC or UT1. |
| 6-13 | Table 6-3 |  |  | Do you think TIME\_SYSTEM\_ABS or TIME\_SYSTEM\_REL are necessary ? Couldn't only one time system (as usual) be enough ?  | Alain Lamy / CNES | Simplify if 2 time scales are not absolutely necessary | We have had time provided as UT1 from Artemis and other ESA programs. Happy to discuss further with you. |
| 6-13 | Table 6-3 |  |  | TIME\_SYSTEM\_REL is not really clear to me. Could you give an concrete example for an absolute date in TAI (for instance) and a relative date in UTC from TZERO.   | Alain Lamy / CNES | Example would be welcome | I provided an example (OCM ex. #1). |
| 6-20 | Table 6-4 |  |  | Roll / pitch / yaw may not be clear enough : 3 successive rotations around Z, Y, X that transform OEB\_Frame into the optimally encompassing box ? Is it what it means ?  | Alain Lamy / CNES | Clarify if necessary | Fully agree (I discovered this as well). I switched to using quaternions consistent with the ADM. |
| 6-20 | 6.2.7.10 | 1 | te | The MAN\_TYPE=ACCEL is an optional field. How is this considered when an operator has included the optional field specified in 6.2.7.9 MAN\_TYPE=THRUST? | INMARSAT | Clarify is 6.2.7.9 and 6.2.7.10 are mutually exclusive. The risk here is to double account for the same maneuvre | This still needs work; would like to discuss with you. |
| 6-11 | 6.2.5 | 1 | te | The solar indices included here are not relevant to the Jacchia-Bowman atmosphere model. | Dan Oltrogge / JPL | Add SOLAR\_S10, SOLAR\_M10, SOLAR\_Y10, GEOMAG\_AP, GEOMAG\_DST | Fixed. |
| B-21 | App. B3 | 1 | te | Relative reference frames do not clearly state whether they are rotating or pseudo-inertial | Patrick Zimmerman / NASA | Clarify | Fixed. Added “\_ROTATING” or “\_INERTIAL” to each keyword that was not clearly defined. |