| **Page** | **Section** | **Line** | **Type** | **Comment/ Rationale** | **Source of Comment (Name/Agency)** | **Suggested Disposition** | **Disposition**  **(Completed by Principal Editor)** |
| --- | --- | --- | --- | --- | --- | --- | --- |
| 1-1 | 1.1 | 4 | ed | Omission of "Oxford Comma" (convention mandated by CCSDS Lead Editor). Note... this omission is pervasive throughout the OCM section of the document. See page 3 towards the bottom in the Boot Camp materials available at https://cwe.ccsds.org/cesg/docs/Author's%20Toolkit/Writing%20Guidance/05\_CCSDS%20Style%20Guide%20Part%201--.pdf . | David S. Berry / NASA | Add missing comma after "(OEM)"  From: "(OEM) and the Orbit Comprehensive Message"  To: "(OEM), and the Orbit Comprehensive Message" |  |
| 1-1 | 1.1 | para3 | ed/te | Refers to "International Standards Organization", but that should be "International Organization for Standardization". From the ISO web page: "Because 'International Organization for Standardization' would have different acronyms in different languages (IOS in English, OIN in French for Organisation internationale de normalisation), our founders decided to give it the short form ISO." | David S. Berry / NASA | From: International Standards Organization  To: International Organization for Standardization |  |
| 1-2 | 1.4 | 1 | ed | Refers to "Section 0" | David S. Berry / NASA | From: Section 0  To: Section 2 |  |
| 1-2 | 1.4 | 9 | ed | Omission of "Oxford Comma" (convention mandated by CCSDS Lead Editor). | David S. Berry / NASA | Add missing comma after "OEM"  From: "OEM and OCM"  To: "OEM, and OCM"  Note: If you do a find on "OEM and OCM" in the document, you will find several of this same phrase that need to be changed. There are many other missing "Oxford Commas" too. Suggest fixing them wherever you encounter an absence thereof. |  |
| 1-3 | 1.5 |  | te | In several places the term "T\_Relative" is used without it having been formally defined. Presumably it means something like "Delta-T with respect to EPOCH\_TZERO". | David S. Berry / NASA | Add a definition for the term "T\_Relative", either here in "Definitions" or alternatively in 6.2.3.6 where the term "EPOCH\_TZERO" is introduced. |  |
| 1-4 | 1.7 | Ref [6] and [8] | ed | References [6] and [8] both deal with XML. They are presently separated by reference [7] because [8] wasn't applicable previously, but now it is since we have XML info in the book. It would be nice if the current order [6], [7], [8] were either [7], [8], [6] or [8], [6], [7] (using current numbers). There are only a small number of citations in the document, so the rearrangement shouldn't cause to much editorial work. | David S. Berry / NASA | From: [6] schema part 2, [7] IEEE, [8] schema part 1  To: [6] IEEE, [7] schema part 1, [8] schema part 2  Or: [6] schema part 1, [7] schema part 2, [8] IEEE  Then fix the few references in text correspondingly. |  |
| 1-4 | 1.7 | Ref [9] | ed | Now that the TDM is in review, we can use a Red Book number. Alternatively, we could use Blue Book 2 with a "to be published" qualifier (that can conceivably be fixed by the CCSDS editor). | David S. Berry / NASA | From: CCSDS 503.0-P-1.0.4, January 2017  To: CCSDS 503.0-P.1.1, May 2018  Or: CCSDS 503.0-B-2, to be published |  |
| 2-1 | 2.2 | para2, para 4 | ed/te | The last sentence of paragraph 2 and the single sentence that comprises paragraph 4 are largely redundant, but there is some material that could be combined. | David S. Berry / NASA | Add the statement regarding uncertainty of the orbit state to the last sentence in paragraph 2, and delete the single sentence that comprises paragraph 4. |  |
| 2-1 | 2.3 | para 2 | ed | The reference to [L4] should now be [P-4] given the addition of several annexes and notation change. NOTE: This is a general change throughout the document. Annex L now provides guidance as to the info that should be in an ICD. | David S. Berry / NASA | From: [L4]  To: [P-4]  Suggestion: Do a find on "[L" and do a mass change to "[P-" to fix all the citations of informative references in the document. |  |
| 2-2 | 2.5 |  | ed | In description of the optional covariance matrix, the phrase "to obtain the nominal states in the orbit state(s)" appears... seems a little odd or repetitive. | David S. Berry / NASA | Consider if this is what you really meant to state. |  |
| 3-2 | Table 3-1 |  | ed/te | CCSDS\_OPM\_VERS value should be 3.0 | David S. Berry / NASA | From: 2.0  To: 3.0 |  |
| 3-2 | Table 3-1 |  | ed/te | ORIGINATOR: There are a few aconyms in the list of Examples that are not in the SANA Registry (ESOC, GSOC, USAF). NOTE: This also applies to Table 4-1, Table 5-2, and Table 6-3 | David S. Berry / NASA | I have suggested to the SANA Operator that these abbreviations be added to the registry, but it is not guaranteed that they will. The abbreviations could be removed from the ORIGINATOR Examples, or left in the list even if they are not in the Registry, since this is just a "should". |  |
| 3-4 | Table 3-2 |  | ed/te | REF\_FRAME: Example "ICRF" is not listed in Annex B2 | David S. Berry / NASA | Add "ICRF" (with no "y's" to Annex B, B2 (and also to the material destined for SANA) |  |
| 3-7 | Table 3-3 |  |  | USER\_DEFINED\_X: I'm actually not in favor of what I'm about to propose, but our goals of consistency and symmetry force me to inquire... should we add this construct to the OEM? (it is in the OPM (Table 3-3), OMM (see Table 4-3), and OCM (see Table 6-12). Note that these are all "Data" type tables, and there is no "Data Table" for the OEM, so that's why it wasn't added in the ODM V.2. | David S. Berry / NASA | Discuss at Berlin? |  |
| 3-7 | 3.2.4.7 | last | ed | Typo. | David S. Berry / NASA | From: "subsection B2 and B3"  To: "subsections B2 and B3" (plural) |  |
| 3-8 | 3.3 | last | ed | Reference to Annex E should be to Annex F. | David S. Berry / NASA | From: Annex E  To: Annex F |  |
| 4-4 | Table 4-2 |  | ed/te | The OBJECT\_NAME and OBJECT\_ID of the third entry in the examples are a mismatch. (There is probably no fundamental requirement that we make the examples match reality, but since it's easy to do we might as well). | David S. Berry / NASA | From: INMARSAT 4 F2  To: MARS EXPRESS  or  From: 2003-022A  To: 2005-044A |  |
| 4-8 | 4.3 | last | ed | Reference to Annex F should be to Annex G. | David S. Berry / NASA | From: Annex F  To: Annex G |  |
| 5-6 | Table 5-3 |  | ed/te | REF\_FRAME: Example "ICRF" is not listed in Annex B2 | David S. Berry / NASA | Add "ICRF" (with no "y's" to AnnexB, B2 (and also to the material destined for SANA) |  |
| 5-8 | 5.2.5.2 | 2, 3 | ed/te | Uses an "COV\_START" (OCM keyword) in the OEM. | David S. Berry / NASA | From: "COV\_START"  To: "COVARIANCE\_START" |  |
| 5-8 | 5.3 | last | ed | Reference to Annex G should be to Annex H. | David S. Berry / NASA | From: Annex G  To: Annex H |  |
| 6-1 | 6.1.3 | 1 | te | Proposes to change distance units in OCM from kilometers to meters. I don't think there's a solid rationale for this in the context of the ODM. There are also many portions of the OCM that still reflect km, so the assertion that it's universal is not realized. | David S. Berry / NASA | Delete 6.1.3 and ensure that all distance units are in km.  We can discuss at Berlin if you like, but I think the rationale to change would have to be very strong. |  |
| 6-3 | Table 6-1 |  | ed/te | In the Metadata section, it is stated that "Informational comments recommended but not required", but the "COMMENT" keyword has inexplicably been removed from the Metadata section. | David S. Berry / NASA | Restore the "COMMENT" keyword in the Metadata Section. Also, since "\*\_START" keywords have been added to every OCM section followed by "COMMENT", I repeat the request to have "META\_START" and "META\_STOP" keywords added (consistency with OEM as well as with all the other OCM sections). |  |
| 6-4 | Table 6-2 |  | ed | COMMENT: subject/verb disagreement... in the phrase "... a contiguous set of one or more comment lines are allowed...", the subject is "set" (singular) and the verb is "are" (plural).  NOTE: This same editorial comment applies to Tables 6-4 through 6-12. They all exhibit the same subject/verb disagreement. | David S. Berry / NASA | From: "are allowed"  To: "is allowed"  OR  From: "a contiguous set of one or more"  To: "one or more"  Either of these will resolve the mismatch. |  |
| 6-4  6-6 | Table 6-2, Table 6-3 |  | ed/te | The ORIGINATOR and MESSAGE\_ID have been moved from the OCM Header to the OCM Metadata. One consequence of this inconsistency is that the OCM XML implementation cannot use the standard NDM Header section that is used for all other NDMs. | David S. Berry / NASA | Please move the ORIGINATOR and MESSAGE\_ID back to the OCM Header. |  |
| 6-4 | 6.2.3.3 |  | te | In the NOTE: the "OBJECT\_ID" keyword is referred to, but it seems to have disappeared from the metadata. | David S. Berry / NASA | For consistency with other ODMs, it would be desirable to add the OBJECT\_ID back to the OCM metadata. |  |
| 6-4 | 6.2.3.3 |  | te | NOTE 2: Refers to "CATALOG\_ID, OBJECT\_NAME, and INTERNATIONAL\_DESIGNATOR", but the OBJECT\_NAME seems out of place in this list. The OBJECT\_ID is a more analogous datum than OBJECT\_NAME in this set. | David S. Berry / NASA | Replace OBJECT\_NAME with OBJECT\_ID in NOTE 2. |  |
| 6-5 | 6.2.3.5 |  | te | States that "The TIME\_SYSTEM value must remain fixed within an OCM", but TIME\_SYSTEM has been removed from the metadata. I think I know why you removed it (since TIME\_SYSTEM\_ABS and TIME\_SYSTEM\_REL have been added, but I'm not sure I see the need for these 2 added keywords since "TIME\_SYSTEM" (fixed in the metadata) represents the same concept as TIME\_SYSTEM\_ABS and the times relative to EPOCH\_TZERO seem to me to fulfill the TIME\_SYSTEM\_REL role. | David S. Berry / NASA | Consider restoring TIME\_SYSTEM to the metadata and removing TIME\_SYSTEM\_ABS and TIME\_SYSTEM\_REL. Perhaps discuss at Berlin. |  |
| 6-6 | Table 6-3 |  | ed/te | MESSAGE\_ID: Shows a value for the default MESSAGE\_ID that is probably meant to be an example. | David S. Berry / NASA | Move the value in MESSAGE\_ID's default to the Examples column, or just delete it. |  |
| 6-6 | Table 6-3 |  | ed/te | MESSAGE\_ID: The description starts with "ID that...". 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..." |  |
| 6-6 | Table 6-3 |  | ed/te | EPOCH\_TZERO: for the far right column (OCM sections relying on the field), the values should be the same as the prefix used on the \*\_START/\*\_STOP keywords (e.g., instead of "MNVR", use "MAN". | David S. Berry / NASA | From: "MNVR, STATES, COVAR, STM"  To: "MAN, ORB, COV, STM" |  |
| 6-6 | Table 6-3 |  | te | For the fields identifying the object (OBJECT\_NAME, INTERNATIONAL\_DESIGNATOR, CATALOG\_ID) it seems there should be guidance similar to that which is provided for the OPM, OMM, OEM (i.e., value taken from the UNOOSA catalog, and if it's not there then an ICD). | David S. Berry / NASA | Consider. |  |
| 6-6 | Table 6-3 |  | ed/te | DATA\_TYPES: The values should be the same as the prefix used on the \*\_START/\*\_STOP keywords (e.g., instead of "MNVR", use "MAN". You could put something like: "Values must be chosen from the list of Examples" and list them all. | David S. Berry / NASA | From/To: MNVR/MAN  From/To: PHYSCHAR/PHYS  From/To: PERTS/PERT  From/To: ATT/blank  Other values are OK. |  |
| 6-7 | Table 6-3 |  | ed | ORIGINATOR\_ADDRESS: suggest not using "creator".  (Historical note: The "ORIGINATOR" field was added rather late in the development of the ODM... it was one of the last drafts after I joined the group in 2004. I recall discussion regarding the keyword... I think at the Montreal 2004 spring meetings in May, and the book was published in Sept 2004 ... at any rate, someone suggested the keyword "CREATOR" and someone else responded "how about 'ORIGINATOR'... there's only one 'CREATOR'... seemed to me like an odd reason to pick a keyword, but that's what happened...). | David S. Berry / NASA | From: "OCM creator"  To: "OCM originator" |  |
| 6-7 | Table 6-3 |  | te | 5 fields TECH\_\* have been added to the metadata. It's not clear why the ORIGINATOR\_\* contact information is insufficient. | David S. Berry / NASA | Consider removing the TECH\_\* fields. Seems like overkill, especially since one of your stated goals is to reduce the size of files. |  |
| 6-7 | Table 6-3 |  | te | START\_TIME/STOP\_TIME: Refers reader to 7.5.9 for format, but I don't think that's applicable since these are just double precision number of seconds, right? | David S. Berry / NASA | Remove reference to 7.5.9, add that it's just a double precision number. |  |
| 6-7 | Table 6-3 |  | ed | "TIME\_SYSTEM\_ABS", "TIME\_SYSTEM\_REL": the description uses the term "non-mandatory"... better to use "optional", which is consistent with the rest of the document. | David S. Berry / NASA | If these keywords persist (I don't think they should... see comment on 6.2.3.5)...  From: "non-mandatory"  To: "optional" |  |
| 6-7 | Table 6-3 |  | ed/te | "TIME\_SYSTEM\_ABS", "TIME\_SYSTEM\_REL": for the far right column (OCM sections relying on the field), the values should be the same as the prefix used on the \*\_START/\*\_STOP keywords (e.g., instead of "MNVR", use "MAN". | David S. Berry / NASA | If these keywords persist (I don't think they should.. see comment on 6.2.3.5)...  From: "MNVR, STATES, COVAR, STM, EC"  To: "MAN, ORB, COV, STM, EC" |  |
| 6-8 | 6.2.4.7 | 2 | ed | Reference to Annex C should be Annex D | David S. Berry / NASA | From: Annex C  To: Annex D |  |
| 6-8 | 6.2.4.8 thru 6.2.4.11 |  | ed | The intent is not clear here since it's rather sparse. | David S. Berry / NASA | Probably delete these sections since Table 6-4 discusses them. |  |
| 6-8 | Table 6-4 |  | ed | COMMENT: uses "key word" (two words) instead of "keyword" (one word).  NOTE: This change appears in all tables 6-4 through 6-11. There are 301 instances of "keyword" (one word) in the document. | David S. Berry / NASA | From: "key word" (8 instances)  To: "keyword" |  |
| 6-9 | Table 6-4 |  | ed/te | MASS: The example could be construed as specifying that an integer value is intended. | David S. Berry / NASA | From: 500  To: 500.0 |  |
| 6-10 | Table 6-4 |  | ed/te | Keywords for the inertia matrix look erroneous (I missed this in the P2.36 review!). "IXX" and "IYY" look right, but the rest (e.g., "I33IZZ") look like indecision whether to name the axes with numbers or letters. | David S. Berry / NASA | Numbers only? Letters only? Fix... |  |
| 6-11 | Table 6-5 |  | ed | GEOMAG\_AP: Excess dashes. | David S. Berry / NASA | From: "geo--- magnetic"  To: "geomagnetic" |  |
| 6-11 | Table 6-5 |  | ed/te | GEOMAG\_AP: word choice | David S. Berry / NASA | From: "world"  To: "Earth" |  |
| 6-12 | Table 6-6 |  | ed | GEOMAG\_DST: The notation "Dst" is encountered in the first line, then the meaning of the notation in the second line. | David S. Berry / NASA | From: "Dst" in line 1, "Disturbance Storm Time (Dst)" in line 2  To: "Disturbance Storm Time (Dst)" in line 1, "Dst" in line 2 |  |
| 6-12 | Table 6-6 |  | ed | GEOMAG\_DST: The example looks like an integer value is intended... I'm not familiar with the metric, so maybe that's true (?) | David S. Berry / NASA | From: -20  To: -20.0 (?) |  |
| 6-12 | Table 6-6 |  | ed/te | DX, DY: The acronym "CIP" is encountered first here; what it means is encountered later in S\_PRECNUT | David S. Berry / NASA | Put the expansion of the acronym on "DX". |  |
| 6-12 | Table 6-6 |  | te | S\_PRECNUT: The "Description" refers to "the reference epoch and the epoch". Potential ambiguity here... is either of these epochs EPOCH\_TZERO? | David S. Berry / NASA | Clarify. |  |
| 6-13 | Table 6-6 |  | te | SOLAR\_F10P7, SOLAR\_F10P7\_MEAN: These list 3 different possible units, 2 of which are not SI units. | David S. Berry / NASA | Remove references to "Solar Flux Units" and "104 Jansky", leaving just the SI unit representation; this is consistent with all the new "SOLAR\_\*10P7" keywords added in this version. |  |
| 6-13 | Table 6-6 |  | ed | SOLAR\_M10P7, SOLAR\_M10P7\_MEAN: Excessive dashes. | David S. Berry / NASA | Remove excess dashes from: "core--- o---wing", "NOAA---16, ---17,---18 |  |
| 6-15 | 6.2.6.1 | 2 | ed | Missing word "the" | David S. Berry / NASA | From: "used in OCM"  To: "used in the OCM" |  |
| 6-15 | 6.2.6.7 | 3 | ed | States that "Event times may be negative, zero or positive". | David S. Berry / NASA | Oxford comma:  From: "negative, zero or positive"  To: "negative, zero, or positive" (but this may be superfluous based on next comment). |  |
| 6-15 | 6.2.6.7 | 3 | te | States that "Event times may be negative, zero or positive", but I'm having a hard time understanding how the event times can be anything but positive. DAYS\_SINCE\_FIRST\_OBS, DAYS\_SINCE\_LAST\_OBS are both in the past with respect to the OD\_EPOCH, and are thus positive (by virtue of the word "SINCE"). It doesn't make sense to have a RECOMMENDED\_OD\_SPAN or ACTUAL\_OD\_SPAN be negative or zero. I suppose an OBS\_GAP could be measured from either of the bounding observations, so it could be positive or negative, but a maximum negative number would be misleading I think (because it would actually represent the smallest temporal interval between observations). And if the MAXIMUM is zero, then all the observations are at exactly the same time, which wouldn't seem to be too useful for orbit determination. | David S. Berry / NASA | From: "may be negative, zero or positive"  To: "must be positive" |  |
| 6-17 | Table 6-6 |  | te | OD\_ID: Provides no format information, just an example. | David S. Berry / NASA | Add that the value is user determined, at the discretion of the originator. We should probably restrict to alphanumeric with special characters like dash, underscore, etc. |  |
| 6-17 | Table 6-6 |  | ed | OD\_EPOCH: The "Default" is unnecessarily wordy. | David S. Berry / NASA | From: "If not specified, then EPOCH\_TZERO is assumed"  To: "EPOCH\_TZERO" (similar to how you did it for OEB\_PARENT\_FRAME\_EPOCH)  NOTE: This same wordy default occurs in several other places in the document. |  |
| 6-18 | Table 6-6 |  | ed | WEIGHTED\_RMS: Uses both "yi" and "yi" in the description (i.e., with/without subscript notation). | David S. Berry / NASA | From: "the current estimate of yi" (1 occurrence)  To: "the current estimate of yi" |  |
| 6-18 | Table 6-6 |  | ed | DATA\_TYPES: superfluous phrase: "Orbit determine event times are in double precision days." It's not really germane to the data types. | David S. Berry / NASA | Remove sentence: "Orbit determine event times are in double precision days." |  |
| 6-19 | 6.2.7.6 |  | ed/te | Lists attitude maneuver data, now removed. | David S. Berry / NASA | From: "...thrusting, acceleration and attitude maneuver data in the OCM..."  To: "... thrusting, and acceleration maneuver data in the OCM..." |  |
| 6-19 | 6.2.7.7 |  | ed/te | Lists attitude maneuver data, now removed. | David S. Berry / NASA | From: "The thrusting and attitude maneuver specifications..."  To: "The thrusting maneuver specification..." |  |
| 6-19 | 6.2.7.7 |  | ed/te | Lists "Minimum number of repeats" and "Maximum number of repeats", now changed to number of "ON" cycles. | David S. Berry / NASA | From: "repeats"  To: "'ON' cycles" |  |
| 6-19  6-20 | 6.2.7.8  6.2.7.9 |  | ed/te | T\_Relative is the second component of the maneuver data line for DELTAV and THRUST maneuvers, but first component of the manever data line for ACCEL maneuvers, and orbit states. Similarly, for covariance matrices and state transition matrices, the T\_Relative is the first datum listed. Putting the time tag first is also the convention for the OEM ephemeris lines, TDM tracking data, and AEM ephemeris lines. Time tag of maneuver information being the first datum is also supported by the "Description" for the maneuver data lines in Table 6-7. | David S. Berry / NASA | I suggest moving the T\_Relative for DELTAV and THRUST maneuvers to be the first component of the maneuver data line for all maneuver types. |  |
| 6-19  6-20 | 6.2.7.8  6.2.7.9 |  | te | For DELTAV maneuvers, the duration and one-sigma error are items (6) and (7) respectively. For THRUST maneuvers, the duration and one-sigma error are items (7) and (6) respectively (i.e., order swapped). | David S. Berry / NASA | Recommend keeping the line layouts as similar as possible, while recognizing that there are differences between them. But analogous quantities should be in the same relative position order in each data line. |  |
| 6-19 | 6.2.7.8 |  | te | Velocity increments (list items 3, 4, 5, 7) are now listed in units "m/s", but in the OPM they are in "km/s". | David S. Berry / NASA | Suggest reverting the units to "km/s", consistent with OPM in the same document. |  |
| 6-19 | 6.2.7.8 |  | te | List item (6) relates to the "specified maneuver time"... I assume this is "T\_Relative"? | David S. Berry / NASA | From: "specified maneuver time"  To: "T\_Relative" |  |
| 6-20 | 6.2.7.8.1 |  | ed | The CCSDS editor doesn't assign hierarchy numbers to "NOTEs". | David S. Berry / NASA | Remove 6.2.7.8.1 section number. |  |
| 6-20 | 6.2.7.9 |  | te | I've not been a fan of the interpolation demarcation being two lines with the same time stamp... might it not be better to make that boundary more explicit (i.e., with a MAN\_STOP for the Nth line and MAN\_START for the (N+1)th?) | David S. Berry / NASA | Consider. |  |
| 6-20  6-21 | 6.2.7.9  6.2.7.10 |  | te | Here, and in other sections, the interpolation method is left to the recipient to decide... little guidance is provided except for EOP data, Space Weather data, and covariance matrices. | David S. Berry / NASA | Consider if additional keywords are necessary, as are provided in the OEM. |  |
| 6-21 | 6.2.7.10 |  | te | It appears that the ACCEL option only applies to a single (parent) object also, but it's not explicitly stated as it was in 6.2.7.9 | David S. Berry / NASA | Indicate (as in 6.2.7.9) that "The ACCEL option only applies to a single (parent) object." |  |
| 6-21 | 6.2.7.12 |  | ed/te | States "Each of these keywords shall appear on a line by itself". The intent is to refer back to 6.2.7.11, but it would be better to make this a second sentence of 6.2.7.11 | David S. Berry / NASA | Move 6.2.7.12 to be the second sentence of 6.2.7.11 |  |
| 6-21 | 6.2.7.13.2 |  | te | ICD agreement: This doesn't feel like an area where an ICD would be necessary. I would remove this option for an ICD. We have already seen pushback from the CESG where there were too many options for using an ICD. Best to eliminate them wherever possible. | David S. Berry / NASA | Remove option for ICD. |  |
| 6-21 | 6.2.7.13.3(2) |  | ed | Lists "attitude determination" as a differentiator. | David S. Berry / NASA | Remove "attitude determination" from the list of differentiators. |  |
| 6-21 | 6.2.7.13.3(2) |  | te | Specifies that one uniqueness criterion is defined by orbit determination, navigation solution, or Monte Carlo simulation. | David S. Berry / NASA | Indicate how the ORIGINATOR conveys this information to the recipient. It's not clear, since there is only a single orbit determination section, navigation solution may be synonymous with orbit determination, and there is no keyword that corresponds to identifying a Monte Carlo solution. |  |
| 6-21 | 6.2.7.13.3(6) |  | te | This condition is difficult to check because the DELTAV maneuver time is assumed to be centered about "the specified maneuver time" (T\_Relative?), while THRUST and ACCEL have T\_Relative at the start of the interval. | David S. Berry / NASA | Consider how to resolve. |  |
| 6-23 | Table 6-7 |  | ed/te | MAN\_PREV\_ID (line 4 of Description): ambiguous | David S. Berry / NASA | From: "... if this maneuver is the first..."  To: "... if the value for the MAN\_ID keyword represents the first..." |  |
| 6-23 | Table 6-7 |  | ed/te | MAN\_NEXT\_ID (line 4 of Description): ambiguous | David S. Berry / NASA | From: "... if this maneuver is the last..."  To: "... if the value for the MAN\_ID keyword represents the last..." |  |
| 6-24 | Table 6-7 |  | ed/te | MAN\_PRED\_SOURCE: Contains residual references to attitude states. | David S. Berry / NASA | Remove "and/or attitude", ATT\_ID from the Description. |  |
| 6-24 | Table 6-7 |  | ed | MAN\_PRED\_SOURCE: last 4 lines of the Description seem to be two mixed thoughts. | David S. Berry / NASA | Revise the last part of the Description (part starting with "... from Indicate..."). |  |
| 6-25 | Table 6-7 |  | ed | MAN\_FRAME\_EPOCH: The Description text indicates a default of "EPOCH\_TZERO", but the "Default (if any)" column is blank. | David S. Berry / NASA | Add "EPOCH\_TZERO" in the "Default (if any)" column. |  |
| 6-25 | Table 6-7 |  | ed | MAN\_TYPE: The Description and Examples contain residual references to attitude. | David S. Berry / NASA | Remove text relating to "MAN\_TYPE=ATTITUDE" from the Description. Remove "ATTITUDE" as an example value. |  |
| 6-25 | Table 6-7 |  | ed | MAN\_TYPE: The Description states that "The maneuver data follows this MAN\_TYPE specifier line.", but several keywords have been added to the table between MAN\_TYPE and the maneuver data lines. | David S. Berry / NASA | Move MAN\_TYPE in the table to just before the manuever data lines, or remove the statement that maneuver lines follow this specifier from the Description. |  |
| 6-25 | Table 6-7 |  | ed | MAN\_DUTY\_CYCLE\_TYPE: The Description text indicates a default of "NONE", but the "Default (if any)" column is blank. | David S. Berry / NASA | Add "NONE" in the "Default (if any)" column. |  |
| 6-25 | Table 6-7 |  | ed | MAN\_DC\_REF\_DIR, MAN\_DC\_BODY\_TRIGGER\_DIR: These 2 keywords have the same Description. | David S. Berry / NASA | Differentiate the Descriptions. |  |
| 6-25 | Table 6-7 |  | ed | In "Description" of maneuver data lines: Missing word. | David S. Berry / NASA | From: "..., followed the corresponding..."  To: "..., followed by the corresponding" |  |
| 6-26 | 6.2.8.6 |  | ed/te | States "Each of these keywords shall appear on a line by itself". The intent is to refer back to 6.2.8.5, but it would be better to make this a second sentence of 6.2.8.5 | David S. Berry / NASA | Move 6.2.8.6 to be the second sentence of 6.2.8.5 |  |
| 6-26 | 6.2.8.7.2 |  | ed | Word choice: "precluding". The word "preclude" means "to prevent from happening; make impossible". I think what you mean is "preceding". NOTE: There are 3 other instances of "precluding" in the document in similar phrases. | David S. Berry / NASA | Replace "precluding" with "preceding" everywhere it occurs. |  |
| 6-26 | 6.2.8.7.2 |  | te | ICD agreement: This doesn't feel like an area where an ICD would be necessary. I would remove this option for an ICD. We have already seen pushback from the CESG where there were too many options for using an ICD. Best to eliminate them wherever possible. | David S. Berry / NASA | Remove option for ICD. |  |
| 6-26 | 6.2.8.7.3(2) |  | ed | Specifies that one uniqueness criterion is defined by attitude determination | David S. Berry / NASA | Remove reference to attitude determination |  |
| 6-26 | 6.2.8.7.3(2) |  | te | Specifies that one uniqueness criterion is defined by orbit determination, navigation solution, or Monte Carlo simulation. | David S. Berry / NASA | Indicate how the ORIGINATOR conveys this information to the recipient. It's not clear, since there is only a single orbit determination section, and navigation solution may be synonymous with orbit determination. |  |
| 6-26 | 6.2.8.9 |  | te | I've not been a fan of the interpolation demarcation being two lines with the same time stamp... might it not be better to make that boundary more explicit (i.e., with an ORB\_STOP for the Nth line and ORB\_START for the (N+1)th?) | David S. Berry / NASA | Consider. |  |
| 6-28 | Table 6-8 |  | ed | ORB\_AVERAGING: Missing word. | David S. Berry / NASA | From: "... formulation is used than..."  To: "... formulation is used other than..." |  |
| 6-28 | Table 6-8 |  | ed | ORB\_AVERAGING: Example issue | David S. Berry / NASA | From: "(other...)"  To: "OTHER" (this is implied by the Description) |  |
| 6-28 | Table 6-8 |  | ed/te | CENTER\_NAME: This is the only keyword in the Orbit State Time History that doesn't start with "ORB\_". Lack of that prefix is consistent with the other messages in the ODM, but is inconsistent with the other Orbit State Time History keywords in Table 6-8. | David S. Berry / NASA | I understand why you may have changed this from "ORB\_CENTER\_NAME", but it's possible to imagine in the modular message future that the OPM, ODM, OMM recede and the OCM becomes the basis for orbit related keywords in the modular message. In this case, ORB\_CENTER\_NAME would make sense. I suppose we can always make it ORB\_CENTER\_NAME in the future. For discussion. |  |
| 6-28 | Table 6-8 |  | ed/te | CENTER\_NAME: The examples should be in all caps, per 7.5.6 | David S. Berry / NASA | From: Earth  To: EARTH  etc.... |  |
| 6-30 | 6.2.9.6 |  | ed/te | States "Each of these keywords shall appear on a line by itself". The intent is to refer back to 6.2.9.5, but it would be better to make this a second sentence of 6.2.9.5 | David S. Berry / NASA | Move 6.2.9.6 to be the second sentence of 6.2.9.5 |  |
| 6-30 | 6.2.9.7.2 |  | te | ICD agreement: This doesn't feel like an area where an ICD would be necessary. I would remove this option for an ICD. We have already seen pushback from the CESG where there were too many options for using an ICD. Best to eliminate them wherever possible. | David S. Berry / NASA | Remove option for ICD. |  |
| 6-30 | 6.2.9.7.3(2) |  | ed | Contains residual reference to attitude determination. | David S. Berry / NASA | Remove reference to attitude determination |  |
| 6-30 | 6.2.9.7.3(2) |  | te | Specifies that one uniqueness criterion is defined by orbit determination, navigation solution, or Monte Carlo simulation. | David S. Berry / NASA | Indicate how the ORIGINATOR conveys this information to the recipient. It's not clear, since there is only a single orbit determination section, navigation solution may be synonymous with orbit determination, and there is no keyword that corresponds to identifying a Monte Carlo solution. |  |
| 6-30 | 6.2.9.10 |  | te | I've not been a fan of the interpolation demarcation being two covariance matrices with the same time stamp... might it not be better to make that boundary more explicit (i.e., with a COV\_STOP for the Nth matrix and COV\_START for the (N+1)th+ ?) | David S. Berry / NASA | Consider. |  |
| 6-31 | 6.2.9.13 |  | ed/te | The NOTE immediately after this section contains a "shall" statement, which the CCSDS editor will not allow in a NOTE. | David S. Berry / NASA | Convert the NOTE to be section 6.2.9.14 |  |
| 6-33 | 6.2.10.6 |  | ed/te | States "Each of these keywords shall appear on a line by itself". The intent is to refer back to 6.2.10.5, but it would be better to make this a second sentence of 6.2.10.5 | David S. Berry / NASA | Move 6.2.10.6 to be the second sentence of 6.2.10.5 |  |
| 6-33 | 6.2.10.7.2 |  | te | ICD agreement: This doesn't feel like an area where an ICD would be necessary. I would remove this option for an ICD. We have already seen pushback from the CESG where there were too many options for using an ICD. Best to eliminate them wherever possible. | David S. Berry / NASA | Remove option for ICD. |  |
| 6-33 | 6.2.10.7.3(9) |  | ed | Contains residual reference to attitude determination. | David S. Berry / NASA | Remove reference to attitude determination |  |
| 6-33 | 6.2.10.7.3(9) |  | te | Specifies that one uniqueness criterion is defined by orbit determination, navigation solution, or Monte Carlo simulation. | David S. Berry / NASA | Indicate how the ORIGINATOR conveys this information to the recipient. It's not clear, since there is only a single orbit determination section, navigation solution may be synonymous with orbit determination, and there is no keyword that corresponds to identifying a Monte Carlo solution. |  |
| 6-34 | 6.2.10.15 |  | ed | Deals with both the time stamp and reference frame. | David S. Berry / NASA | Split into separate requirements as was done in 6.2.9.14 and 6.2.9.15 |  |
| 6-39 | Table 6-10 |  | ed/te | STM\_N and STM\_TYPE: When I read these, I feel like the order should be reversed in the table. | David S. Berry / NASA | Consider putting STM\_TYPE first, followed by STM\_N. |  |
| 6-40 | 6.2.11.1 |  | ed | Refers reader to Annex K, but now it is Annex O. | David S. Berry / NASA | From: Annex K  To: Annex O |  |
| 6-40 | 6.2.11.7 |  | ed/te | States "Each of these keywords shall appear on a line by itself". The intent is to refer back to 6.2.11.6, but it would be better to make this a second sentence of 6.2.11.6 | David S. Berry / NASA | Move 6.2.11.7 to be the second sentence of 6.2.11.6 |  |
| 6-40 | 6.2.11.8.2 |  | te | ICD agreement: This doesn't feel like an area where an ICD would be necessary. I would remove this option for an ICD. We have already seen pushback from the CESG where there were too many options for using an ICD. Best to eliminate them wherever possible. | David S. Berry / NASA | Remove option for ICD. |  |
| 6-40 | 6.2.11.8.3(2) |  | ed | Contains residual reference to attitude determination. | David S. Berry / NASA | Remove reference to attitude determination |  |
|  |  |  | te | Specifies that one uniqueness criterion is defined by orbit determination, navigation solution, or Monte Carlo simulation. | David S. Berry / NASA | Indicate how the ORIGINATOR conveys this information to the recipient. It's not clear, since there is only a single orbit determination section, navigation solution may be synonymous with orbit determination, and there is no keyword that corresponds to identifying a Monte Carlo solution. |  |
| 6-43 | Table 6-11 |  | ed | EC\_START: indefinite article | David S. Berry / NASA | From: "Start of a Ephemeris..."  To: "Start of an Ephemeris..." |  |
| 6-43 | Table 6-11 |  | ed | EC\_BASIS\_PROP: In paragraph 3 of the "Description", the parenthetical in the middle of the sentence makes it hard to understand. | David S. Berry / NASA | From: Existing text.  To: Something like the following (which I may have totally misunderstood, but the existing text is very hard to parse due to the long parenthetical in the middle of the long sentence):  Specifying EC\_BASIS\_PROP = NONE indicates that the EC representation is not a hybrid method and the returned functional values obtained from the EC representation correspond directly with desired orbit state information.  Specification of a message creator/recipient-shared orbit propagator indicates use of a “Hybrid EC representation” approach in the orbit element definition specified by “EC\_STATE\_TYPE = YYY” (below). The orbit propagator specified in this fashion is in free text, and includes any non-standardized force model or geodetic system implementations. Relevant integrator types include RK 4/5 or RK 8/9; Cowell 9. |  |
| 6-43 | Table 6-11 |  | ed | EC\_REF\_TIME: There is a long phrase in the "Mandatory" column that basically translates to "Maybe". | David S. Berry / NASA | I suggest changing the "Mandatory" column to "No", and moving the situational information into the "Description" section. |  |
| 6-43 | Table 6-11 |  | ed | EC\_ORB\_STATE: There is a long phrase in the "Mandatory" column that basically translates to "Maybe". | David S. Berry / NASA | I suggest changing the "Mandatory" column to "No", and moving the situational information into the "Description" section. |  |
| 6-43 | Table 6-11 |  | te | EC\_ORB\_STATE: The fact that this involves "one or more subseqent rows" seems like an unnecessary complication in the middle of the table. | David S. Berry / NASA | Move this closer to the bottom of the table, closer to the actual <EC data>. |  |
| 6-45 | Table 6-11 |  | ed | EC\_REPR\_N: This row seems too far removed from the keywords to which it applies. | David S. Berry / NASA | Move this closer to EC\_REPRESENT and EC\_STATE\_TYPE. |  |
| 6-45 | Table 6-11 |  | te | EC\_REPR\_N: The Description uses the term "selected EC representation", but to my mind that phrase is used ambiguously because it is used in both EC\_REPRESENT and EC\_STATE\_TYPE, but with different meanings (at least as I read it). | David S. Berry / NASA | See if it is possible to make it clearer to which keyword EC\_REPR\_N applies, and make it contiguous. |  |
| 6-40 thru 6-45 | 6.2.11 |  | te | I have to say I think this section of the OCM is the least well presented. It has a feel that it will be difficult to use properly. Woodburn's comment accentuates this feeling. Is this section really necessary? Does it add sufficient value? | David S. Berry / NASA | Consider removing 6.2.11. Let's discuss at Berlin. |  |
| 6-46 | 6.2.12.3 | 2 | ed | Refers to Table 6-13, but the table in this section is 6-12 | David S. Berry / NASA | From: Table 6-13  To: Table 6-12 |  |
| 6-46 | 6.2.12.4 | 1 | ed | Refers to Table 6-13, but the table in this section is 6-12 | David S. Berry / NASA | From: Table 6-13  To: Table 6-12 |  |
| 6-46 | Table 6-12 |  | ed/te | (USER-DEFINED): Is not consistent with the OPM, OMM, and RDM. | David S. Berry / NASA | Please define in same fashion as is defined for the OPM, OMM, and RDM: USER\_DEFINED\_x , where the "x" is replaced by the user specified character string.  From: (USER-DEFINED)  To: USER\_DEFINED\_x |  |
| 6-46 | Table 6-12 |  | ed/te | (USER-DEFINED): The example is not consistent with the definition. | David S. Berry / NASA | From: EARTH\_MODEL=WGS-84  To: USER\_DEFINED\_EARTH\_MODEL = WGS-84 |  |
| 6-46 | Table 6-12 |  | ed/te | (USER-DEFINED): We should add that if units are required, they are as defined in 7.6.1.1 | David S. Berry / NASA | Add to description that units are as defined in 7.6.1.1 |  |
| 6-46 | Table 6-12 |  | ed/te | (USER-DEFINED): A qualification should be included. | David S. Berry / NASA | Add that this method is too unwieldy for user defined matrices, so no user defined matrices. |  |
| 6-46 | 6.3 |  | ed | Where to find examples | David S. Berry / NASA | From: I-19  To: Annex I |  |
| 7-1 | 7.4.1.5 |  | ed | This seems to be redundant with 7.3.5 | David S. Berry / NASA | Remove 7.4.1.5 |  |
| 7-1 | 7.4.2 |  | ed | Placement of quote. I think the opening quote should be outside the opening bracket. | David S. Berry / NASA | From: [wild card]'\_START'  To: '[wild card]\_START'  Analogous for STOP. |  |
| 7-3 | 7.5.10 |  | ed/te | Refers to TIME\_SYSTEM. Note that this keyword is no longer in the OCM. | David S. Berry / NASA | Add TIME\_SYSTEM back into the OCM, so it is not the only Nav WG standard that doesn't use this keyword. |  |
| 7-4 | 7.6.1.1 |  | ed/te | Refers to tables 6-4 through 6-12. However, Table 6-3 has some keywords with units, and 6-12 has none. | David S. Berry / NASA | From: 6-4 through 6-12  To: 6-3 through 6-11 |  |
| 7-4 | 7.6.1.2 |  | ed | Refers to "OPM, OCM or OMM". | David S. Berry / NASA | List in order they appear in document, also add Oxford comma.  From: OPM, OCM or OMM  To: OPM, OMM, or OCM |  |
| 7-6 | 7.7.9 |  | ed/te | Lists all the OCM sections individually, but the names don't all match the section names (Force Model is used, not Perturbations), and one is left out (Orbit Determination). | David S. Berry / NASA | I think it would be better to just state the situation generally. This is easier, and more resilient to future changes.  From: Existing text  To: "Comments in the OCM may appear only at the positions shown in the defining tables (generally at the top of each section)." |  |
| 7-8 | 7.8.2.4 |  | ed | Lists each OCM table | David S. Berry / NASA | I think it would be better to just state the requirement more generally since there are so many tables.  From: existing list  To: "... tables 6-2 through 6-12..." |  |