| **Page** | **Section** | **Line** | **Type** | **Comment/ Rationale** | **Source of Comment (Name/Agency)** | **Suggested Disposition** | **Disposition****(Completed by Principal Editor)** |
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| N/A | N/A | N/A | N/A | ALL PAGE/SECTION/LINE NUMBERS RELATIVE TO "CHANGES ACCEPTED" VERSION | David S. Berry / NASA | N/A | N/A |
| 3-3 | Table 3-2 | N/A | ed/te | OBJECT\_NAME, OBJECT\_ID: Wording to indicate a recommendation (per Sec 1-3).Given that I have flagged the phrase "it is recommended that" to be replaced with "should" in the OCM (you'll come across these later), I note with more than a bit of chagrin that there are 10 instances of the phrase "it is recommended that..." in the ODM V.2 document (3 in OPM, 3 in OMM, and 4 in OEM). I plead ignorance! and inexperience! The ODM V.1 contains 8 instances, 4 in OPM and 4 in OEM. The CCSDS "Boot Camp" for Editors didn't exist when these books were created, and I wasn't Lead Editor for ODM V.1, and Tom Gannett wasn't working for CCSDS when ODM V.1 was produced, so some sloppy usage sneaked through. A flimsy excuse. I should have caught this earlier. | David S. Berry / NASA | Where feasible, change "it is recommended that" to "should" (which will usually be accompanied by a word or two later to preserve the intent of the sentence). |  |
| 3-3 | Table 3-2 | N/A | ed/te | CENTER\_NAME: we say the center could be another spacecraft, however, we don't have spacecraft in our "Orbit Centers" SANA registry(I should have caught this in CRM Part 1) | David S. Berry / NASA | We should discuss at Mountain View... do we remove "or another spacecraft" from the options for the value? or expand the "Orbit Centers" registry to include spacecraft? (probably undesirable) or do we refer to the "Spacecraft Identifiers" registry for that value? or do we point to UNOOSA? |  |
| 4-2 | Table 4-1 | N/A | ed/te | ORIGINATOR: I think the parenthetical comment should be documented in Section B, and not in every potentially applicable table row. | David S. Berry / NASA | Move the statement in the parenthetical comment to Section B1. |  |
| 4-3 | 4.2.3.2 NOTE | 1 | ed | Missing end parenthesis after OBJECT\_ID | David S. Berry / NASA | Add missing end parenthesis. |  |
| 4-5 | Table 4-2 | N/A | te | MESSAGE\_ID: This should be in the Header, as it is in the CDM & RDM. | David S. Berry / NASA | Move keyword to Header section. |  |
| 4-5 | Table 4-2 | N/A | te | MESSAGE\_CLASSIF: it is not clear why this is necessary. This seems to impose USA information classifications, or at least in general these classifications are probably not standardized. | David S. Berry / NASA | Discuss at Mountain View |  |
| 4-5 | Table 4-2 | N/A | ed/te | CENTER\_NAME keyword Description: general note... the parenthetical "(and note the procedure... use case)." should be moved into the Annex B, Section B2, and removed from the table. Several others are in this same table. | David S. Berry / NASA | Please move the parenthetical note to the Annex B. (This one and all the others in the document.) |  |
| 4-5 | Table 4-2 | N/A | ed/te | CENTER NAME: we say the center could be another spacecraft, however, we don't have spacecraft in our "Orbit Centers" SANA registry | David S. Berry / NASA | We should discuss at Mountain View... do we remove "or another spacecraft" from the options for the value? or expand the "Orbit Centers" registry to include spacecraft? (probably undesirable) or do we refer to the "Spacecraft Identifiers" registry for that value? or do we point to UNOOSA? |  |
| 4-6 | Table 4-2 | N/A | ed | Header row not shown. | David S. Berry / NASA | Use MS Word "Repeat Header Rows" feature on the Table. |  |
| 4-6 | Table 3-2 | N/A | ed/te | REF\_FRAME: One of the example values is "TEME", which doesn't seem to align with the "Note" in the table cell and is not a value in the reference frames SANA registry. | David S. Berry / NASA | From: "TEME"To: "TEMEOFDATE" |  |
| 4-9 | 4.3 | 2 | ed | Says example OMMs are in Annex F, but they are actually in Annex E. | David S. Berry / NASA | From: "Annex F"To: "Annex E" |  |
| 5-5 | Table 5-3 | N/A | te | MESSAGE\_ID: This should be in the Header, as it is in the CDM & RDM. | David S. Berry / NASA | Move keyword to Header section. |  |
| 5-5 | Table 5-3 | N/A | te | MESSAGE\_CLASSIF: it is not clear why this is necessary. This seems to impose USA information classifications, or at least in general these classifications are probably not standardized. | David S. Berry / NASA | Discuss at Mountain View |  |
| 5-5 | Table 5-3 | N/A | ed/te | CENTER NAME: we say the center could be another spacecraft, however, we don't have spacecraft in our "Orbit Centers" SANA registry. (NOTE: we do show "STS 106" in the Example values in this table, so if we remove spacecraft,  | David S. Berry / NASA | We should discuss at Mountain View... do we remove "or another spacecraft" from the options for the value? or expand the "Orbit Centers" registry to include spacecraft? (probably undesirable) or do we refer to the "Spacecraft Identifiers" registry for that value? or do we point to UNOOSA? |  |
| 5-6 | Table 5-3 | N/A | te | REF\_FRAME: "EME2000" has been changed to "J2000". Using J2000 is fine, but many current users of OEMs use "EME2000" for deep space missions (JPL and ESOC, 2 of the biggest producers of OEMs). | David S. Berry / NASA | No action necessary except to take note. |  |
| 5-7 | Table 5-3 | N/A | te | INTERPOLATION: It's not clear how a user would use "PROPAGATE" as an interpolation method... is the implication that the states can be propagated with arbitrary step size so any particular time can be present in the ephemeris? | David S. Berry / NASA | Some clarification might be desirable. |  |
| 5-8 | 5.2.5.2 | 2, 3 | ed/te | The V.2 text refers to "COVARIANCE\_START" as the keyword to begin covariance matrix in the OEM. We probably ought to preserve that since there are implementations. It also seems asymmetric to start with COV\_START but end with COVARIANCE\_STOP. The WG probably should have used COV\_START and COV\_STOP, but that's water under the bridge now. | David S. Berry / NASA | From: COV\_STARTTo: COVARIANCE\_START |  |
| 5-8 | 5.3 | 2 | ed | Says example OEMs are in Annex G, but they are actually in Annex F. | David S. Berry / NASA | From: "Annex G"To: "Annex F" |  |
|  |  |  |  |  |  |  |  |
| 6-8 | Table 6-3 | N/A | ed | PREV\_MESSAGE\_EPOCH: I should have caught this in the "Part 1" CRM... when a new 7.5.2 specification was added in P2.38, it modified the time format specification number. There are a number of vestigial 7.5.9 format statements in P2.38. | David S. Berry / NASA | From: 7.5.9To: 7.5.10[But before you make this change, recall that we have discussed the specification 7.5.2 that was inserted that caused this offset, but there is an indication in the text that implies this is still a topic for discussion. I view this as a closed case given prior decisions of the WG. I think 7.5.2 must be removed. The specification 7.5.7 gives the requirement for the case of text values.] |  |
| 6-12 | 6.2.4.16.2.4.26.2.4.36.2.4.4 | Mult | ed | There are multiple references in these sections to Table 6-8. Due to planned section rearrangement, the Table number is now 6-4. | David S. Berry / NASA | From: "Table 6-8"To: "Table 6-4" |  |
| 6-12 | 6.2.4.56.2.4.7 | All | ed/te | These two sections seem redundant. | David S. Berry / NASA | You may be able to combine 6.2.4.5, 6.2.4.6, and 6.2.4.7 into a single requirement... but the redundancy should be resolved. I'd be tempted to put 6.2.4.6 at the end of 6.2.4.5 (same reqt #) and delete 6.2.4.7. |  |
| 6-12 | 6.2.4.8 | 1 | ed/te | Wording to indicate a recommendation (per Sec 1-3) | David S. Berry / NASA | From: "It is recommended that each data block be clearly differentiated..."To: "Each data should block be clearly differentiated..." |  |
| 6-12 | 6.2.4.9 | 1 | ed/te | Wording to indicate a recommendation (per Sec 1-3) | David S. Berry / NASA | From: "It is recommended that each orbit state data block be unique..."To: "Each orbit state data block should be unique..." |  |
| 6-12 | 6.2.4.9(2) | 2 | ed | Missing words... (all recommendations except this one repeat the uniqueness attribute) | David S. Berry / NASA | From: "2) the orbit basis... HYPOTHETICAL)"To: "2) the orbit basis... HYPOTHETICAL) is unique" |  |
| 6-13 | 6.2.4.10 | 2 | te | Regarding "two consecutive lines containing a duplicate time stamp"... I've never been in favor of this, but it occurs to me that the same convention for indicating an interpolation boundary could be used in an OCM as is used in the OEM, i.e., a second Orbit State Time History. | David S. Berry / NASA | Consider abandoning the notion of duplicate time stamps, and using a boundary that doesn't require timetag checking (i.e., a second Orbit State Time History block). |  |
| 6-13 | 6.2.4.11 | 2 | ed/te | Wording to indicate a recommendation (per Sec 1-3) | David S. Berry / NASA | From: "It is recommended that such discontinuous time spans be stored..."rom: "Such discontinuous time spans should be stored..." |  |
| 6-13 | 6.2.4.11 | 2 | ed | Word choice consistency... there are 3 instances of "time stamp" in the document, and 10 instances of "timestamp". |  | Pick one. |  |
| 6-13 | 6.2.4.12 | 1-2 | ed/te | Wording to indicate a recommendation (per Sec 1-3) | David S. Berry / NASA | From: "... it is recommended that the times, names... are listed..."rom: "the times names... should be listed... " |  |
| 6-13 | 6.2.4.15 |  | te | As suggested previously, the "ORB\_EPOCH\_TZERO" and "DEF\_EPOCH\_TZERO" should be reverted to "EPOCH\_TZERO". | David S. Berry / NASA | Please revert. |  |
| 6-13 | 6.2.4.16 | 3 | te | The bolded statement regarding units is insufficient and incorrect. | David S. Berry / NASA | See "Default Units/Type" column in "Orbital Elements" SANA Registry. I think something like "Units are as specified in Reference B-7." would probably address this. |  |
| 6-14 | 6.2.4.19 | 1-2 | ed/te | Wording to indicate a recommendation (per Sec 1-3) | David S. Berry / NASA | From: "... it is recommended that a corresponding perturbations section be included..."rom: "a corresponding perturbations section should be included..." |  |
| 6-16 | Table 6-4 | N/A | te | ORB\_BASIS: Description says this is a "free text field" with "suggested values". | David S. Berry / NASA | I don't think we should allow this to be free text, particularly if the value is to be used in processing decisions. We should add "OTHER" to the list of suggested values. |  |
| 6-16 | Table 6-4 | N/A | te | ORB\_BASIS: There is a "Note" at the bottom of the Description cell that contains a "shall" statement; requirements are not allowed in a "Note". | David S. Berry / NASA | From: "... shall be considered..."To: "... will be considered..." |  |
| 6-17 | Table 6-4 | N/A | ed | Header row not shown. | David S. Berry / NASA | Use MS Word "Repeat Header Rows" feature on the Table. |  |
| 6-17 | Table 6-4 | N/A | ed/te | CENTER NAME: we say the center could be another spacecraft, however, we don't have spacecraft in our "Orbit Centers" SANA registry. | David S. Berry / NASA | We should discuss at Mountain View... do we remove "or another spacecraft" from the options for the value? or expand the "Orbit Centers" registry to include spacecraft? (probably undesirable) or do we refer to the "Spacecraft Identifiers" registry for that value? or do we point to UNOOSA? |  |
| 6-17 | Table 6-4 |  | te | Answer to "QUESTION": I think the Orbit Centers registry is pretty complete (ignoring question #2 for the moment), and you have a procedure identified for extending the registry that includes use of an ICD if necessary. | David S. Berry / NASA | Discuss at Mountain View, but as much as possible I don't think we want free text in keywords that are used operationally. |  |
| 6-17 | Table 6-4 |  | te | Answer to "QUESTION #2": We do state in the text of CENTER\_NAME "... or another spacecraft". This text jumped out at me in this review, and I wonder if we really want to have a spacecraft as a CENTER\_NAME (however, this IS legacy in ODM V.1 and V.2). My initial response to this was "keep it simple... No.", but that may be wrong headed. | David S. Berry / NASA | Discuss at Mountain View... but for simplicity we might want to exclude spacecraft as centers... however, this is a legacy feature in the ODM. |  |
| 6-17 | Table 6-4 |  | te | ORB\_EPOCH\_TZERO, ORB\_TIME\_SYSTEM. I think these introduce needless complexity. | David S. Berry / NASA | I think the OCM is complex enough already without introducing this additional complexity. I think these should be removed. EPOCH\_TZERO and TIME\_SYSTEM in the Metadata should be sufficient for nearly all situations. |  |
| 6-17 | Table 6-4 |  | te | ORB\_N, ORB\_ELEMENTS: We have 15 different possible orbital element sets defined in the registry. I don't see a need for this additional complexity. It seems unlikely that people are using other things in actual operations. | David S. Berry / NASA | I'd be in favor of KISSing these goodbye. |  |
| 6-17 | Table 6-4 |  | ed | <Insert orbit lines here>: In the description, I would remove the specific section citations. As listed, an important specification would be missed, i.e., 6.2.4.10. | David S. Berry / NASA | Remove the specific section citations; end it at "... as described above." |  |
| 6-17 | Table 6-4 |  | ed | <Insert orbit lines here>: the units column is not specific enough because the given units allowed by the Orbital Elements registry are much more varied. | David S. Berry / NASA | Remove the listed units from the Units cell. Add text in the Description to indicate units are as specified in the SANA Orbital Elements registry |  |
| 6-18 | 6.2.5.16.2.5.26.2.5.36.2.5.4 |  | ed | These sections all refer to Table 6-4, but the applicable table is 6-5 | David S. Berry / NASA | From: Table 6-4To: Table 6-5 |  |
| 6-18 | 6.2.5.7 |  | te | It's not clear why it was necessary to introduce further complexity (from OEB to OES). | David S. Berry / NASA | Discuss at Mountain View. |  |
| 6-18 | Table 6-5 |  | ed/te | MANUFACTURER, BUS\_MODEL, DESIGNED\_LIFETIME, DOCKED\_WITH, IN\_FORMATION\_WITH | David S. Berry / NASA | Not clear why these are added at P2.38, and not seen as necessary previously. Discuss at Mountain View |  |
| 6-18 | Table 6-5 |  | te | DRAG\_AREA: Given concern with people not being able to handle leap seconds, it is interesting that the DRAG\_AREA has been redefined here as "Additional area ... not already incorporated into" OES. I wonder how different this is empirically from the AREA\_ALONG\_OES\_\* values. And there's a DRAG\_SCALE for good measure on top of these. | David S. Berry / NASA | Discuss at Mountain View |  |
| 6-19 | Table 6-5 |  | ed | OES\_MAX, OES\_MED: The descriptions still use "OEB" as the subscript. | David S. Berry / NASA | From: OEBTo: OES |  |
| 6-20 | Table 6-5 |  | ed | OES\_MIN, AREA\_ALONG\_OES\_\* | David S. Berry / NASA | From: OEBTo: OES |  |
| 6-20 | Table 6-5 |  | te | SOLAR\_RAD\_AREA: Given concern with people not being able to handle leap seconds, it is interesting that the SOLAR\_RAD\_AREA has been redefined here as "Additional area ... not already incorporated into" OES. I wonder how different this is empirically from the AREA\_ALONG\_OES\_\* values. And there's a SOLAR\_RAD\_SCALE for good measure on top of these. | David S. Berry / NASA | Discuss at Mountain View |  |
| 6-20 | Table 6-5 |  | te | SOLAR\_RAD\_SCALE: You may want to add some more text similar to what was added for DRAG\_SCALE. | David S. Berry / NASA | Consider. |  |
| 6-20 | Table 6-5 |  | te | REFLECTIVITY: For "Typical" on RCS, you added "50th percentile", but not on REFLECTIVITY. | David S. Berry / NASA | Do you want to add "50th percentile" here too? |  |
| 6-21 | Table 6-5 |  | te | DV\_BOL, DV\_REMAINING: More new items. Units in m/s should be discussed. Other maneuver units in the ODM are km/s. | David S. Berry / NASA | Discuss at Mountain View. |  |