| **Page** | **Section** | **Line** | **Type** | **Comment/ Rationale** | **Source of Comment (Name/Agency)** | **Suggested Disposition** | **Disposition**  **(Completed by Principal Editor)** |
| --- | --- | --- | --- | --- | --- | --- | --- |
| 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 |
| 6-21 | 6.2.6.1  6.2.6.2  6.2.6.3  6.2.6.4 |  | ed | These sections all refer to Table 6-9, but the applicable table is 6-6 | David S. Berry / NASA | From: Table 6-9  To: Table 6-6 |  |
| 6-21 | 6.2.6.1 | 2 | ed | Missing word | David S. Berry / NASA | From: "...used in OCM"  To: "... used in an OCM" |  |
| 6-21 | 6.2.6.5  6.2.6.7 | All | ed/te | These two sections seem redundant. | David S. Berry / NASA | You may be able to combine 6.2.6.5, 6.2.6.6, and 6.2.6.7 into a single requirement... but the redundancy should be resolved. I'd be tempted to put 6.2.6.6 at the end of 6.2.6.5 (same reqt #) and delete 6.2.6.7. |  |
| 6-21 | 6.2.6.7 | 2 | ed | If this section is retained, add a period at the end. | David S. Berry / NASA | Add period. |  |
| 6-22 | 6.2.6.8 | 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 block should be clearly differentiated..." |  |
| 6-22 | 6.2.6.9 | 1 | ed/te | Wording to indicate a recommendation (per Sec 1-3) | David S. Berry / NASA | From: "It is recommended that each covariance data block be unique..."  To: "Each covariance data block should be unique..." |  |
| 6-22 | 6.2.6.10 |  | ed | Directs the reader to look at "Table B4 or B5", but those tables aren't in the list of Tables at the front of the doc. | David S. Berry / NASA | From: "Table B4 or B5"  To: "Annex B, Reference [B-4] or [B-5]" |  |
| 6-22 | 6.2.6.11 | 2 | te | Regarding "two consecutive lines containing a duplicate time stamp"... 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 Covariance Time History block, as has been recommended in 6.2.6.12). |  |
| 6-22 | 6.2.6.13 | 1-2 | ed/te | Wording to indicate a recommendation (per Sec 1-3) | David S. Berry / NASA | From: "... or times, it is recommended that the times, names and significance for such mission events should be provided..."  To: "... or times, the times, names, and significance for such mission events should be provided..." |  |
| 6-22 | 6.2.6.17 | 1-2 | ed/te | Wording to indicate a recommendation (per Sec 1-3) | David S. Berry / NASA | From: "... in the message, it is recommended that a corresponding perturbations section be included..."  To: "... in the message, a corresponding perturbations section should be included..." |  |
| 6-23 | 6.2.6.18 |  | te | As suggested previously, the "COV\_EPOCH\_TZERO" and "DEF\_EPOCH\_TZERO" should be reverted to "EPOCH\_TZERO". | David S. Berry / NASA | Please revert. Alternatively, discuss at Mountain View. I think it adds needless complexity. |  |
| 6-23 | 6.2.6.18 |  | ed | Refers to section 7.5.9, but the formatting is now in 7.5.10 | David S. Berry / NASA | Recall issue previously noted with these sections. |  |
| 6-23 | 6.2.6.19 | 2 | ed | Word order in text doesn't match the COV\_TYPE name or the order to be specified in the data line. | David S. Berry / NASA | From: eigenvectors and eigenvalues  To: eigenvalues and eigenvectors |  |
| 6-23 | 6.2.6.20.3 | 5 | te | The statement regarding units is insufficient and incorrect. | David S. Berry / NASA | See "Default Units/Type" column in "Covariance Matrices" SANA Registry. I think something like "Units are as specified in Reference [B-8]." would probably address this. |  |
| 6-24 | Table 6-6 |  | ed | COV\_BASIS: Examples of values don't match values shown in Description. | David S. Berry / NASA | From: DETERMINED  To: DETERMINED\_OD |  |
| 6-24 | Table 6-6 |  | te | COV\_EPOCH\_TZERO, COV\_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 virtually all situations. |  |
| 6-24 | Table 6-6 | N/A | ed/te | COV\_REF\_FRAME 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. | David S. Berry / NASA | Please move the parenthetical note to the Annex B. (This one and all the others in the document.) |  |
| 6-25 | Table 6-6 | N/A | te | COV\_FRAME\_EPOCH: Shows units §7.5.9 and Default DEF\_EPOCH\_TZERO | David S. Berry / NASA | From: §7.5.9  To: n/a  From: DEF\_EPOCH\_TZERO  To: EPOCH\_TZERO |  |
| 6-25 | Table 6-6 | N/A | te | COV\_NNXNN: Shows a default of 6, but I'm thinking we shouldn't assign a default for this. There's only one case where it's required... COV\_TYPE=ICD | David S. Berry / NASA | From: 6  To: <blank> |  |
| 6-25 | Table 6-6 | N/A | te | COV\_SCALE\_MIN, COV\_SCALE\_MAX, COV\_CONFIDENCE: All three keywords relate to reality/realism of the covariance, however, the min/max imply a range of values, whereas the confidence seems to imply a single value. | David S. Berry / NASA | Is one realism factor sufficient? Are these measures contradictory or competing? Consider. |  |
| 6-25 | Table 6-6 | N/A | ed | <Insert covariance data here>: In the description, I would remove the specific section citations. As listed, some applicable specifications would be missed, e.g., 6.2.6.14, 6.2.6.19; and one section 6.2.6.17, wouldn't apply. | David S. Berry / NASA | Remove the specific section citations; end it at "... as described above." |  |
| 6-25 | Table 6-6 | N/A | ed | <Insert covariance data here>: the units column is not specific enough because the given units allowed by the Covariance Matrices 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 Covariance Matrices registry |  |
| 6-26 | 6.2.7.1  6.2.7.2  6.2.7.3  6.2.7.4 |  | ed | These sections all refer to Table 6-10, but the applicable table is 6-7 | David S. Berry / NASA | From: Table 6-10  To: Table 6-7 |  |
| 6-26 | 6.2.7.5  6.2.7.7 | All | ed/te | These two sections seem redundant. | David S. Berry / NASA | You may be able to combine 6.2.7.5, 6.2.7.6, and 6.2.7.7 into a single requirement... but the redundancy should be resolved. I'd be tempted to put 6.2.7.6 at the end of 6.2.7.5 (same reqt #) and delete 6.2.7.7. |  |
| 6-26 | 6.2.7.8 | 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 block should be clearly differentiated..." |  |
| 6-26 | 6.2.7.9 | 1 | ed/te | Wording to indicate a recommendation (per Sec 1-3) | David S. Berry / NASA | From: "It is recommended that each STM data block be unique..."  To: "Each STM data block should be unique..." |  |
| 6-26 | 6.2.7.10 |  | ed | Directs the reader to look at "Table B4", but this table isn't in the list of Tables at the front of the doc, and B4 is reference frames, not states. | David S. Berry / NASA | From: "Table B4"  To: "Annex B, Reference [B-7] or [B-8]" |  |
| 6-26 | 6.2.7.13 |  | ed/te | Statement lacks "requirement verb". | David S. Berry / NASA | From: "...time spans be stored..."  To: "... time spans shall be stored..." |  |
| 6-26 | 6.2.7.13 |  | ed/te | Definition: This requirement refers to "discontinuous state transition matrix time spans", however, in the STM there is no provision for identifying the discontinuity as there is in the orbit state time history and covariance (i.e., no duplicate time stamps). Thus it is not clear what constitutes a "discontinuous state transition matrix time span"... they are necessarily ALL "discontinuous" because we cannot in practice provide continuous time tags in any message. | David S. Berry / NASA | Identify the meaning of "discontinuous time spans" in this context. |  |
| 6-27 | 6.2.7.19 |  | te | As suggested previously, the "STM\_EPOCH\_TZERO" and "DEF\_EPOCH\_TZERO" should be reverted to "EPOCH\_TZERO". | David S. Berry / NASA | Please revert. Alternatively, discuss at Mountain View. I think it adds needless complexity. |  |
| 6-27 | 6.2.7.20 | 5 | te | The statement regarding units is insufficient and incorrect. | David S. Berry / NASA | See "Default Units/Type" column in "Orbital Elements" and "Covariance Matrices" SANA Registries. I think something like "Units are as specified in Reference [B-7] or [B-8]." would probably address this. |  |
| 6-27 | 6.2.7.23 NOTE |  | ed | In the reference to [M-9], there is a closing parenthesis after the last page citation 809, but no opening parenthesis. | David S. Berry / NASA | Balance parentheses... add one before the list of page numbers, or remove the one after 809. |  |
| 6-29 | Table 6-7 |  | ed | STM\_NEXT\_ID: In the Description, there is a reference to "EC\_NEXT\_ID" | David S. Berry / NASA | From: EC\_NEXT\_ID  To: STM\_NEXT\_ID |  |
| 6-29 | Table 6-7 |  | ed/te | STM\_ORB\_STATE: Units are incorrect/insufficient since there are several orbital element sets that use units other than km, km/s, deg | David S. Berry / NASA | See "Default Units/Type" column in "Orbital Elements" SANA Registr7. I think something like "Units are as specified in Reference [B-7]." would probably address this. |  |
| 6-29 | Table 6-7 |  | ed/te | STM\_ORB\_STATE: I don't think there can really be a default for this keyword. | David S. Berry / NASA | Consider and remove default if you come to same conclusion I did. |  |
| 6-29 | Table 6-7 |  | ed/te | STM\_BASIS: Example values has a value not listed in the Description. | David S. Berry / NASA | From: DETERMINED  To: DETERMINED\_OD |  |
| 6-29 | Table 6-7 |  | ed/te | STM\_BASIS: The "Note" at the bottom of the cell refers to COV\_BASIS but should be STM\_BASIS. | David S. Berry / NASA | From: COV\_BASIS  To: STM\_BASIS |  |
| 6-30 | Table 6-7 |  | ed/te | STM\_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 "ISS" in the Example values in this table, so if we remove spacecraft, then we would need to remove this example value as well.) | 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? |  |
| 6-30 | Table 6-7 |  | ed/te | STM\_EPOCH\_TZERO: I've recommended removal of this keyword because I think it adds unnecessary complexity to the OCM, but if it is retained, there are some issues here, e.g., the value in the "Units" column is not a unit. | David S. Berry / NASA | Set units to "n/a" if the keyword persists. |  |
| 6-30 | Table 6-7 |  | ed/te | STM\_EPOCH\_TZERO: I've recommended removal of this keyword because I think it adds unnecessary complexity to the OCM, but if it is retained, there are some issues here, e.g., the value in the "Units" column is not a unit. | David S. Berry / NASA | Set units to "n/a" if the keyword persists. |  |
| 6-30 | Table 6-7 |  | ed/te | STM\_EPOCH\_TZERO: I've recommended removal of this keyword because I think it adds unnecessary complexity to the OCM, but if it is retained, there are some issues here, e.g., it doesn't make sense to provide a default value (DEF\_EPOCH\_TZERO in this case), but have "Mandatory" set to "Yes". | David S. Berry / NASA | Either remove the default value, or change "Mandatory" to "No" |  |
| 6\_30 | Table 6-7 |  | te | STM\_TIME\_SYSTEM: I think this keyword introduces unnecessary complexity into the OCM. | David S. Berry / NASA | Remove the keyword. |  |
| 6-30 | Table 6-7 |  | ed/te | STM\_FRAME\_EPOCH: The value in the "Units" column is not a unit. | David S. Berry / NASA | Set units to "n/a". |  |
| 6-30 | Table 6-7 |  | ed/te | STM\_N: | David S. Berry / NASA |  |  |
| 6-30 | Table 6-7 | N/A | te | STM\_N: Shows a default of 6, but I'm thinking we shouldn't assign a default for this. There's only one case where it's required... STM\_TYPE=ICD | David S. Berry / NASA | From: 6  To: <blank> |  |
| 6-30 | Table 6-7 | N/A | ed | <Insert STM data here>: In the description, I would remove the specific section citations. As listed, some relevant specifications would be missed, e.g., 6.2.7.11, 6.2.7.15, 6.2.7.16, 6.2.7.21, 6.2.7.22. | David S. Berry / NASA | Remove the specific section citations; change "as specified in sections 6.2.7.17 - 6.2.7.20" to "as specified above" |  |
| 6-30 | Table 6-7 | N/A | ed | <Insert STM data here>: the units column is not specific enough because the given units allowed by the Orbital Elements and Covariance Matrices registries 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 or Covariance Matrices registry |  |
| 6-31 | 6.2.8.4 | 2 | ed/te | Lists units in Table 6-10, but Table 6-10 only shows "s" and "deg" | David S. Berry / NASA | From: "m/s, m/s2, N, kg and degrees"  To: "s and deg"  or  From: "Table 6-10"  To: "Tables 6-9 and 6-10" |  |
| 6-31 | 6.2.8.8 | 1 | ed/te | This specification partially duplicates 6.2.8.14 | David S. Berry / NASA | Maybe 6.2.8.8 should be deleted (?) |  |
| 6-31 | 6.2.8.8 | 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 block should be clearly differentiated..." |  |
| 6-31 | 6.2.8.10 |  | ed/te | Statement lacks "requirement verb". | David S. Berry / NASA | From: "...time spans be stored..."  To: "... time spans shall be stored..." |  |
| 6-31 | 6.2.8.10 |  | ed/te | Definition: This requirement refers to "discontinuous maneuver sequence time spans", however, there is no provision for identifying the discontinuity as there is in the orbit state time history and covariance. Furthermore, 6.2.8.9 allows for any delta-T between successive lines (negative, 0, positive). Thus it is not clear what constitutes a "discontinuous maneuver sequence time span"... they are necessarily ALL "discontinuous" because we cannot in practice provide continuous time tags in any message. | David S. Berry / NASA | Identify the meaning of "discontinuous time spans" in this context. |  |
| 6-31 | 6.2.8.11 |  | te | This specification requires an integer thruster ID. In my experience, missions often have groups of thrusters used for various purposes, e.g., reaction control (RCS) thrusters, trajectory correction maneuver (TCM) thrusters, etc., and the numbering is not uniform. | David S. Berry / NASA | It might be better to allow a user specified thruster ID, not restricted to integer), and force it to be the first entry in the MAN\_EOI. |  |
| 6-32 | 6.2.8.13, Table 6-8 |  | te | The purpose of identifying 10 possible maneuver description cases is not. The concept of "Case" in this context does not appear anywhere else after being identified in Table 6-8. | David S. Berry / NASA | Clarify purpose of identifying these 10 cases. |  |
| 6-32 | 6.2.8.14 | 1 | ed/te | Wording to indicate a recommendation (per Sec 1-3). | David S. Berry / NASA | From: "It is recommended that each maneuver data block be unique..."  To: "Each maneuver data block should be unique..." |  |
| 6-32 | 6.2.8.14 | (2) | ed | Missing words... (all recommendations except this one repeat the uniqueness attribute) | David S. Berry / NASA | From: "2) the maneuver basis (MAN\_BASIS)"  To: "2) the maneuver basis (MAN\_BASIS) is unique" |  |
| 6-33 | 6.2.8.15 |  | te | As suggested previously, the "MAN\_EPOCH\_TZERO" and "DEF\_EPOCH\_TZERO" should be reverted to "EPOCH\_TZERO". | David S. Berry / NASA | Please revert. Alternatively, discuss at Mountain View. I think it adds needless complexity. |  |
| 6-34 | Table 6-9 |  | ed/te | MAN\_DURA: this maneuver field name only appears here and in 2 examples, but it seems maybe the field name might have changed to (or from) "DV\_DUR", since that name apears in DV\_X, DV\_Y, DV\_Z maneuver fields. | David S. Berry / NASA | Is "MAN\_DURA" changed to "DV\_DUR"? or vice versa? |  |
| 6-34 | Table 6-9 |  | te | MAN\_DURA: the description says MAN\_DURA, if not 0, is "non-zero", but this allows for negative maneuver durations. | David S. Berry / NASA | From: "non-zero"  To: "greater than zero" |  |
| 6-34 | Table 6-9 |  | te | DV\_X, DV\_Y, DV\_Z: for consistency with OPM, the units should be km/s. | David S. Berry / NASA | Discuss at Mountain View. |  |
| 6-34 | Table 6-9 |  | te | DEPLOY\_DV\_X, \*\_Y, \*\_Z: It's not clear why these are necessary, since each of the child objects would have to have its own OCM. | David S. Berry / NASA | Discuss at Mountain View why these are not simply DV\_X, DV\_Y, DV\_Z with respect to the host. |  |
| 6-34 | Table 6-9 |  | te | DEPLOY\_DV\_X, \*\_Y, \*\_Z: if these keywords remain, for consistency with OPM, the units should be km/s. | David S. Berry / NASA | Discuss at Mountain View. |  |
| 6-34 | Table 6-9 |  | te | DEPLOY\_MASS: It's not clear why this is necessary, since each of the child objects would have to have its own OCM. | David S. Berry / NASA | Discuss at Mountain View why this is not simply a DV\_DMASS with respect to the host. |  |
| 6-34 | Table 6-9 |  | te | This specification requires a non-negative integer thruster ID. In my experience, missions often have groups of thrusters used for various purposes, e.g., reaction control (RCS) thrusters, trajectory correction maneuver (TCM) thrusters, etc., and the numbering is not uniform. | David S. Berry / NASA | It might be better to allow a user specified thruster ID, not restricted to integer), and force it to be the first entry in the MAN\_EOI. |  |
| 6-34 | Table 6-9 |  | ed | THR\_DMASS: Units should be "kg", not "Kg" | David S. Berry / NASA | From: "Kg"  To: "kg" |  |
| 6-34 | Table 6-9 |  | ed/te | ACC\_X, ACC\_Y, ACC\_Z: The unit notation differs from that described in 7.6.1.1(e). Also, for consistency with the OEM, the units should be km/s\*\*2 | David S. Berry / NASA | From: m/s^2  To: km/s\*\*2 |  |
| 6-34 | Table 6-9 |  | ed/te | THR\_DMASS, ACC\_DMASS: There is a difference in the description with respect to the rocket equation, the reason for which is not apparent (but could be due to ignorance on my part) | David S. Berry / NASA | Consider. |  |
| 6-35 | 6.2.8.17.2 |  | te | I think the specification goes beyond the requirements of the OCM... the deltaV should only be represented as the effect on the host. The child spacecraft should have its own OCM, with its deployment deltaVas the initial velocity. | David S. Berry / NASA | Re-word to indicate that the deltaV of the child spacecraft is only represented by the effect on the host... Child S/C need their own OCM. |  |
| 6-35 | 6.2.8.17.3 |  | te | Same as above. The deployments should only be with respect to the host/parent. It is beyond the requirements of the OCM to reflect the deployed objects' velocities in the same OCM. | David S. Berry / NASA | Re-word to indicate that the deltaV of the child spacecraft is only represented by the effect on the host... Child S/C need their own OCM. |  |
| 6-35 | 6.2.8.18.1 |  | te | I don't understand this specification... as I interpret it, it seems to contradict the specification 6.2.8.9. | David S. Berry / NASA | Discuss at Mountain View. |  |
| 6-35 | 6.2.8.18.1 |  | ed/te | If this specification survives, I think we could need a different requirements verb. | David S. Berry / NASA | From: "may only"  To: "shall" |  |
| 6-35 | 6.2.8.18.4 |  | ed/te | This specification needs a re-write using the appropriate requirements verbs. One "may" is expressed; I see one more "may" and one "shall". | David S. Berry / NASA | Re-work sentence #1 with "may". Re-work sentence #3 with shall. Sentence #4 is OK. Move sentence #2 to end of paragraph: "See Annex C, Section C3". Sentences #1, #3, #4 could each be separate specifications if desired. |  |
| 6-35 | 6.2.8.19 |  | ed/te | This seems to be mostly a "NOTE". There is one requirements verb in the last sentence. | David S. Berry / NASA | Make this a NOTE. Change "may" in last sentence to "could" or "might" since this use of "may" doesn't reflect an OCM originator option. |  |
| 6-35 | 6.2.8.19 | 3 | ed | Refers to 'the "OCM Perturbations Specification" section (above). But it's not above in the document. | David S. Berry / NASA | From: (above)  To: (Section 6.2.9) |  |
| 6-38 | Table 6-10 |  | ed | Keyword order... seems like the "MAN\_PREV\_\* and MAN\_NEXT\_\* keywords maybe ought to be immediately following the MAN\_ID keyword. | David S. Berry / NASA | Consider. |  |
| 6-38 | Table 6-10 |  | te | MAN\_IS\_ADDITIVE: Contains the phrase "when they share the same maneuver basis (MAN\_BASIS)", but this seems superfluous since everything in a given maneuver time history block shares the same MAN\_BASIS. | David S. Berry / NASA | I think "when they share the same maneuver basis (MAN\_BASIS)" can be removed. |  |
| 6-38 | Table 6-10 |  | te/ed | MAN\_IS\_ADDITIVE: The "Mandatory" column says this keyword is mandatory, but it has a default of "NO". | David S. Berry / NASA | Remove the default. A mandatory keyword with a default is contradictory. |  |
| 6-39 | Table 6-10 |  | te | MAN\_PURPOSE: Even though the list is long, my guess is that people will come up with other purposes. This keyword isn't used in operational processing, so it's essentially just a comment. | David S. Berry / NASA | Make it free text? |  |
| 6-39 | Table 6-10 |  | ed | MAN\_EOI: I think the referback at the end of the Description is too general. | David S. Berry / NASA | From: 6.2.8.1  To: Table 6-9 |  |
| 6-39 | Table 6-10 |  | ed/te | MAN\_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 "ISS" in the Example values in this table, so if we remove spacecraft, then we would need to remove this example value as well.) | 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? |  |
| 6-39 | Table 6-10 | N/A | te | MAN\_EPOCH\_TZERO: Shows units §7.5.9, but these are not units | David S. Berry / NASA | From: §7.5.9  To: n/a  From: DEF\_EPOCH\_TZERO  To: EPOCH\_TZERO |  |
| 6-39 | Table 6-10 | N/A | te | MAN\_EPOCH\_TZERO, MAN\_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 virtually all situations. |  |
| 6-40 | Table 6-10 | N/A | te | MAN\_FRAME\_EPOCH: Has units referback to §7.5.9 (which aren't units) and 7.5.10. | David S. Berry / NASA | From: §7.5.9 (in Units)  To: n/a  See earlier comment about addition of 7.5.2 that caused the shift. |  |
| 6-40 | Table 6-10 | N/A | te | GRAV\_ASSIST\_NAME: It's hard for me to imagine a plausible use of "another spacecraft" for a gravity assist. | David S. Berry / NASA | Consider removing "or another spacecraft", and "ISS" from the examples (the only other spacecraft that could plausibly be a gravity assist body might be the ISS). |  |
| 6-40 | Table 6-10 | N/A | ed | GRAV\_ASSIST\_NAME: the Description refers to "CENTER\_NAME values", but it should probably be "GRAV\_ASSIST\_NAME". | David S. Berry / NASA | From: CENTER\_NAME  To: GRAV\_ASSIST\_NAME |  |
| 6-41 | Table 6-10 | 1 | ed | DUTY\_CYCLE\_TYPE: subject/verb agreement | David S. Berry / NASA | From: "... for these maneuver time history section:"  To: "... for this maneuver time history section:" |  |
| 6-41 | Table 6-10 | 1 | te | DUTY\_CYCLE\_TYPE: The description of PHASE\_ANGLE (as I read it) doesn't seem to correspond to Figure C-5. In that diagram, the reference direction appears to occur past the trigger direction (appears to me to be opposite of the description here)... but this could be my ignorance of the topic. | David S. Berry / NASA | Consider if the drawing and text are consistent. If not, make them consistent. |  |
| 6-41 | Table 6-10 | N/A | te | DC\_WIN\_OPEN, DC\_WIN\_CLOSE, DC\_MIN\_CYCLES, DC\_MAX\_CYCLES: These table entries have an issue in that they each have a "Note" that expresses a requirement; in CCSDS Recommended Standards, requirements cannot appear in Notes. | David S. Berry / NASA | I think we may be able to do something similar to what was done in a section separator in ODM Table 3-3 and Table 4-3: "If DUTY\_CYCLE\_TYPE 'NONE', all of the parameters of this block must be given." |  |
| 6-41 | Table 6-10 | N/A | ed | DC\_WIN\_OPEN, DC\_WIN\_CLOSE, DC\_MIN\_CYCLES, DC\_MAX\_CYCLES: The "Mandatory" column should only contain "Yes" or "No". | David S. Berry / NASA | From: "(see Note 1)" or statements about defaults  To: "No". |  |
| 6-41 | Table 6-10 | N/A | ed | DC\_MIN\_CYCLES, DC\_MAX\_CYCLES: To my knowledge, "DCs" are not units | David S. Berry / NASA | From: "DCs"  To: "n/a" |  |
| 6-42 | Table 6-10 | N/A | ed | DC\_EXEC\_BEGIN, DC\_EXEC\_END: Each starts with "(Provided for informational purposes only)". The reason for this is not clear. Many of the keywords in the ODM are not used in processing decisions, and function largely as commentary. It's not clear why these 2 keywords are called out specially. | David S. Berry / NASA | Consider removing the cited phrase. |  |
| 6-42 | Table 6-10 | N/A | te | DC\_REF\_TIME: The significance of this keyword is not apparent from the illustration in Fig C-4. | David S. Berry / NASA | Clarify... how is this actually used in processing? |  |
| 6-42 | Table 6-10 | N/A | te | DC\_REF\_TIME: Units show as "s", which makes sense for relative times, but all other keywords in Table 6-10 for which a relative time is possible are shown with units as "n/a". | David S. Berry / NASA | Should be consistent... either "n/a" or "s". Units of "s" make sense for relative times, but not absolute times. Alternatively, maybe show one example of each time type, with both units in the column, aligned horizontally with the proper time type? |  |
| 6-42 | Table 6-10 | N/A |  | DC\_REF\_TIME, Note 2: Since it's not clear how this is used in processing, the significance of a negative DC\_REF\_TIME is not apparent. | David S. Berry / NASA | Clarify... how is this actually used in processing? |  |
| 6-42 | Table 6-10 | N/A | te | DC\_REF\_TIME, DC\_ON\_DURA, DC\_OFF\_DURA: These table entries have an issue in that they each have a "Note" that expresses a requirement; in CCSDS Recommended Standards, requirements cannot appear in Notes. | David S. Berry / NASA | I think we may be able to do something similar to what was done in a section separator in ODM Table 3-3 and Table 4-3: "If DUTY\_CYCLE\_TYPE = 'TIME', all of the parameters of this block must be given." |  |
| 6-42 | Table 6-10 | N/A | ed | DC\_REF\_TIME, DC\_ON\_DURA, DC\_OFF\_DURA: The "Mandatory" column should only contain "Yes" or "No". | David S. Berry / NASA | From: "(see Note 1)"  To: "No". |  |
| 6-42 | Table 6-10 | N/A | ed/te | DC\_ON\_DURA, DC\_OFF\_DURA: The Description starts out as if it applies to time-based duty cycles (first 3 lines), but then seems to switch so as to also apply to phase angle duty cycles (line 4). | David S. Berry / NASA | Resolve ambiguity associated with mentioning phase angle constraints. |  |
| 6-43 | Table 6-10 | N/A | ed | DC\_REF\_DIR, DC\_BODY\_TRIGGER, DC\_PA\_START, DC\_PA\_STOP, DC\_CONE\_ON, DC\_CONE\_OFF: The "Mandatory" column should only contain "Yes" or "No". | David S. Berry / NASA | From: "(see Note 1)"  To: "No". |  |
| 6-43 | Table 6-10 | N/A | te | DC\_REF\_DIR, DC\_BODY\_TRIGGER: These table entries have an issue in that they each have a "Note" that expresses a requirement; in CCSDS Recommended Standards, requirements cannot appear in Notes. | David S. Berry / NASA | I think we may be able to do something similar to what was done in a section separator in ODM Table 3-3 and Table 4-3: "If DUTY\_CYCLE\_TYPE = 'PHASE\_ANGLE' or 'CONE\_ANGLE', all of the parameters of this block must be given." |  |
| 6-43 | Table 6-10 | N/A | te | DC\_PA\_START, DC\_PA\_STOP: These table entries have an issue in that they each have a "Note" that expresses a requirement; in CCSDS Recommended Standards, requirements cannot appear in Notes. | David S. Berry / NASA | I think we may be able to do something similar to what was done in a section separator in ODM Table 3-3 and Table 4-3: "If DUTY\_CYCLE\_TYPE = 'PHASE\_ANGLE', all of the parameters of this block must be given." |  |
| 6-43 | Table 6-10 | N/A | te | DC\_PA\_START, DC\_PA\_STOP: Note the inconsistency in keyword names...  Time based: DC\_ON\_DURA, DC\_OFF\_DURA  Phase angle based: DC\_PA\_START, DC\_PA\_STOP  Cone angle based: DC\_CONE\_ON, DC\_CONE\_OFF | David S. Berry / NASA | Consider renaming keywords to DC\_PA\_ON, DC\_PA\_OFF. This is also consistent with the annotation on Figure C-5 (which mentions "ON" and "OFF", not "START" and "STOP" |  |
| 6-43 | Table 6-10 | N/A | te | DC\_CONE\_ON, DC\_CONE\_OFF: These table entries have an issue in that they each have a "Note" that expresses a requirement; in CCSDS Recommended Standards, requirements cannot appear in Notes. | David S. Berry / NASA | I think we may be able to do something similar to what was done in a section separator in ODM Table 3-3 and Table 4-3: "If DUTY\_CYCLE\_TYPE = 'CONE\_ANGLE', all of the parameters of this block must be given." |  |
| 6-43 | Table 6-10 | N/A | ed | <Insert covariance data here>: In the description, I would remove the specific section citation. As listed, some applicable specifications would be missed, e.g., 6.2.8.15, 6.2.8.17, 6.2.8.18. | David S. Berry / NASA | Remove the specific section citations; end it at "... as described above." |  |
|  |  |  |  |  |  |  |  |
| N/A | N/A | N/A | N/A | THESE COMMENTS ARE DISJOINT, BUT THE FOLLOWING APPLY TO THE DUTY CYCLE DISCUSSION IN SECTION 6.2.8 | David S. Berry / NASA | N/A | N/A |
| C-6 | C3 | N/A | te | At the beginning of the section, it might be good to give a one or two sentence description of what is meant by "duty cycle". | David S. Berry / NASA | Consider. |  |
| C-6 | C3 | 2 | ed | The sentences seems to have been started but not completed (it ends with an opening parethesis, but no closing parenthesis or other punctuation). | David S. Berry / NASA | Complete the sentence. |  |
| C-6 | C3 | Fig C-4 | ed/te | Uses a term (DC\_PERIOD) that looks like a keyword but is not defined elsewhere. | David S. Berry / NASA |  |  |
| C-6 | C3 | Fig C-4 | te | The figure shows DC\_REF\_TIME and DC\_WIN\_OPEN, but there is no actual thruster/actuator operation until "DC\_EXEC\_BEGIN", and the ending at "DC\_EXEC\_END". It's not clear how DC\_REF\_TIME, DC\_WIN\_OPEN, and DC\_WIN\_CLOSE affect the actual trajectory modeling. This could be due to ignorance on my part. | David S. Berry / NASA | Discuss at Mountain View. Clarify how the OCM and its use would suffer if the delimiters outside the time bounds of "DC\_PERIOD" are not included. |  |
| C-6 | C3 | Fig C-4 | ed | Caption refers to "MAN\_DUTY\_CYCLE\_TYPE", but that keyword is not in Table 6-10. | David S. Berry / NASA | From: MAN\_DUTY\_CYCLE\_TYPE  To: DUTY\_CYCLE\_TYPE |  |
| C-6 | C3 | Fig C-5 | ed | Figure is not labelled on this page (label appears on p.C-7) | David S. Berry / NASA | Move label directly under diagram. |  |
| C-6 | C3 | Fig C-5 | te | There are keywords DC\_PA\_START and DC\_PA\_STOP in Table 6-10 that seem to be relevant to the figure, but they are not indicated in the figure. | David S. Berry / NASA | Add DC\_PA\_START/STOP to the figure if applicable. |  |
| C-7 | C3 | para 1 | ed | I observe that text for time-based duty cycle appears BEFORE diagram, text for phase angle based duty cycle appears AFTER diagram, text for cone angle based duty cycle appears BEFORE diagram | David S. Berry / NASA | Consider moving text BEFORE figure in each case. |  |
| C-7 | C3 | 2 | ed | Word choice: In discussion of phase angle duty cycle, the phrase "this time" is used... could use a different phrase to ensure no confusion with time-based duty cycle. | David S. Berry / NASA | From: "this time"  To: "in this case" |  |
| C-7 | C3 | Fig C-5, C-6 | ed | Caption refers to "MAN\_DUTY\_CYCLE\_TYPE", but that keyword is not in Table 6-10. | David S. Berry / NASA | From: MAN\_DUTY\_CYCLE\_TYPE  To: DUTY\_CYCLE\_TYPE |  |
| C-7 | C3 | Fig C-6 | ed | Caption refers to "MAN\_DUTY\_CYCLE\_TYPE=CONE", but CONE\_ANGLE is specified in the DUTY\_CYCLE\_TYPE keyword in Table 6-10 | David S. Berry / NASA | From: MAN\_DUTY\_CYCLE\_TYPE = CONE  To: MAN\_DUTY\_CYCLE\_TYPE = CONE\_ANGLE |  |