| **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 |  |
| 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. | Awaiting inputs from David. |
| E-1 | E1 |  | te | In the various equations, rTarget does not appear to be used. | David S. Berry / NASA | If it is not used, it should be removed from the "Definitions". | Awaiting inputs from Pat North |
| E-1 | E1 |  | te | In the equation of Etarget , the angle $θ$(in $τ$Atmosphere($θ$)) is not defined; it's not mentioned in the definition of $τ$Atmosphere | David S. Berry / NASA | Provide definition if it's used, or remove from equation if it's not. | Awaiting inputs from Pat North |
| E-2 | E1 |  | ed/te | In the paragraph starting with "From the above equations...", it's not clear how the substitutions into the equation for VMabsolute are correct. The equation for VMabsolute is not provided. | David S. Berry / NASA | Provide equation for VM absolute based on the Definitions provided in this section. | Awaiting inputs from Pat North |
| Annex M | M-4 |  | Ed | Verify link to document. I was not able to reach it.  | Patrick Zimmerman / NASA | Verify and update link if necessary | Awaiting current link from AGI |
| 8-9 | 8 | 0 | te | I have just reviewed the NDM/XML document. There are comments for that document, which if taken, should also be implemented in this section. | FMF/GMV/ESA | Implement agreements from NDM/XML as required | Awaiting input from David. |
| All | 8.48.4.28.4.38.5.18.5.2… | All | te | In this and the following sections I have tried to get rid of <x></x> pairs. Strictly speaking this would mean that an empty element is required whereas an actual section with structure and children is actually intended. I am trying to come up with a term better than ‘section’; something more XML like. | FMF/GMV/ESA | Review references to XML implementation to identify terminal elements with the term ‘element’ and complex type constructs with the term ‘section’ (or a better one thereof) | Awaiting input from David. |
| 8-19 | All | All | te | XML description for OCM missing | FMF/GMV/ESA | Add description | Awaiting input from David |
| D-8 | Annex D | 6-7 | ed | These 2 lines should probably be removed because they refer to a Silver Book (ODM 2.0) | David S. Berry / NASA | Remove. It's possible that I at some point suggested these lines be added, but now I think we should just go with the "3.0" for OPM version. I apologize for the re-work. | ? |
| F-1 | Annex F | 4-5 | ed | The lines which refer to a Silver book (ODM 2.0) should probably be removed. | David S. Berry / NASA | Remove from "Annex Fig. F-2... must be specified." It's possible that I at some point suggested this sentence be added, but now I think we should just go with the "3.0" for the OEM version. I apologize for the re-work. | ?? |
| 6-8 | 6.2.3 |  |  | the default value for ORB\_REF\_FRAME is ITRF2000 which is a non-inertial reference frame not suitable for many orbit definitions (except Cartesian), which changes every few years and has already been superseded several times (we have already seen ITRF2005, ITRF2008 and ITRF2014). I think the intent was to put EME2000 for the default. If the default is changed, the caption in figure G-1 should also be changed accordingly. | Luc Maisonobe (Orekit) |  | To discuss. |
| 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\_DURAPhase angle based: DC\_PA\_START, DC\_PA\_STOPCone 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" | Now modified to “… START\_ANGLE” and “… START\_TIME” |
| 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. | To discuss. |
| C-4C-5 | C2 |  | te | Note that a few of the definitions involve a unitless ratio between 0 and 1, but some of them appear in denominators (Phase(phi)), F, $τ$Atmosphere ), so should always be > 0. | David S. Berry / NASA | Not sure how you want to note this, but if zero is actually used some of these then the VMabsolute specified in physical characteristics won't have a physical interpretation. Maybe "unitless, 0 < F <=1" or something like that. | Fixed, and consulting with Pat North |
| 8-9thru8-20 | 8\* |  | ed/te | I know Fran has provided some comments directly to you on the XML; I requested that he review Section 8. However, he made some suggestions I'd like to discuss with the group. Reason is one of the drawbacks of putting the XML into the various standards... now they can diverge. While some divergence may be necessary and/or supportable, I'd prefer to minimize the ripple effect. | David S. Berry / NASA | Let's discuss Fran's comments Mountain View. | To discuss. |
| B-3 | Annex B |  |  | The link [B-6] for spacecraft frames is broken, no equivalent link has been found | Luc Maisonobe (Orekit) |  | Doesn’t appear to exist yet. |
|  |  |  |  | Per Peter Shames… “In [RDM] Sec B.1.2, re consequence of not applying security, isn't it possible that an RDM could be [corrupted or] tampered with and there is no mechanism defined to detect this? This is surely a more general concern in CCSDS in general, but the addition of a simple checksum, or a digital signature, would provide a significant boost in data confidence. | Dan Oltrogge (NASA/JPL) | Consider adding a checksum | Let’s discuss. |
| 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. | Added Cheryl’s write-up for Generalized Dilution of Precision, which can be used to represent the geometric diversity of a measurement set, and to provide an indicator of the observability of the orbit. |
| 6-23 | 6.2.6 | 6.2.6.21 | Te | The text asks for “in standard double precision”. Does this make sense in the context of ASCII formatted numbers? Is it not rather a request for certain minimum number of significant digits? | Frank Dreger / ESA | Consider re-wording | Fixed |
| All | 8 | All | ed | Format of XML content | FMF/GMV/ESA | Convert to Courier New all tags representing XML content. | Done – already was Courier New, but I made the font sizes more consistent |
| 8-128-13 | 8.8.108.9.10 | 1 | ed | Terse style | FMF/GMV/ESA | Remove ‘literature’ from requirements. | Qualifier removed. |
| 8-138-15 | 8.8.158.9.15 | 1 | ed | Use of e.g.(exempli gratia) | FMF/GMV/ESA | Replace by i.e. (id est) | Fixed |
| 8-16 | 8.10.108.10.11 | 1 | te/ed | Missing requirements for use of units in message XML tags | FMF/GMV/ESA | Add missing requirements for OCM consistently with requirements in OPM and OEM*8.10.10 Several of the OEM/XML keywords may have the unit attribute.**8.10.11 In all cases, the units shall match those defined in Section 5.* | Fixed. |
| 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. | Group decision is to forego this content as it quickly becomes complex [7 sensor types x 4 (MIN/AVG/MAX/SIGMA)= 28 parameters for just one sensor type; even more if you’d want them by sensor instance. |
| 6-1 | 6.1.3 | 2-3 | Te | Orbit state includes velocities and a maneuver is defined as delta-velocity. The OCM stipulates units to be km used for orbit state and m/s for maneuvers, but it is unclear which unit set should be used for orbit state velocity (or covariance terms for velocity), km/s or m/s? OPM uses km/s. | Cheryl Gramling/NASA GSFC | Clarify the units for velocity terms in orbit state and covariance. | Fixed. |
| 6-3 | Tab 6-1 |  | ed | Under “Content” column, there is inconsistency in the formatting in the rows, where sometimes “Optional: “ is used and other places “Optional” (no colon) is used. | Cheryl Gramling/NASA GSFC | Format consistently. | Fixed. |
| 6-5 | 6.2.3.8 | 3 | te | In the explanation of EGO: the parameters given for e and i imply a geosynchronous orbit and not a geostationary orbit. | Cheryl Gramling/NASA GSFC | Change from “**EGO**: Extended Geostationary Orbit” to “**EGO**: Extended Geosynchronous Orbit” | Fixed. |
| 6-5 & 6-6 | 6.2.3.8 | 6, 1 | te | The parameters given for GEO and GSO are not really different in the inclination parameter. General parlance is that a GSO maintains very low inclination (in the OCM-provided parameters, it’d be “<3°) and low e.  | Cheryl Gramling/NASA GSFC | Consider the differentiation used between GEO and GSO and align the parameters with a definition of GSO that reflects the stationary aspects. | Fixed. |
| 6-6 | 6.2.3.8 | 5 | te | HEO orbits may extend well past the ha and hp values given in the text; consider the MMS mission that is a HEO with apoapsis at 25 earth radii, periapsis at 1.2 earth radii. | Cheryl Gramling/NASA GSFC | Consider updating the definition of HEO to include the space above 40K km altitude. | I reorganized the text, but I think it already accommodated the MMS use case |
| 6-6 | 6.2.3.8 | 11 |  | The parameters for NSO do not cover the full spectrum of satellites used for navigation. E.g. the Beidou constellation includes GEO satellite(s), the TDRS at GEO are used for navigation. | Cheryl Gramling/NASA GSFC | Consider updating the definition of NSO to include the broader space of satellites that fall in that category. Of course, that’s only current constellations; this could change in the future. | These categories were extracted from the ESA categories. |
| 6-5 & 6-6 | 6.2.3.8 | All | ge | What is the intent of including these ORBIT\_TYPE definitions? Given the potential disparity or mis-representation of these definitions, and that not all possible orbits are included for which an OCM may be exchanged (E-S Lagrange, lunar, interplanetary/helio, distant retrograde, etc) is this list needed?  | Cheryl Gramling/NASA GSFC | Consider the usefulness of the list of ORBIT\_TYPES. | Clarified that “ORBIT\_TYPE” is optional, and added Lagrange, lunar and “other” |
| 6-8 | Tab 6-3 | Row 2 on pp | te | RE: “NEXT\_MESSAGE\_EPOCH”, I can envision a scenario where the “NEXT\_MESSAGE\_ID” can be provided, but the epoch of the next message is not known. Even though neither keyword is mandatory, it may be worthwhile stipulating that having one does not imply the other is needed. | Cheryl Gramling/NASA GSFC | Consider additional explanation on the use of NEXT\_MESSAGE\_xxx keywords. | Fixed. |
| 6-10 | Tab 6-3 | Row 7 | Te | Where are the fields in “OPS\_STATUS” defined for how they should be used in an OCM? E.g, is spacecraft in on-orbit storage PARTIALLY\_OPERATIONAL, BACKUP, STANDBY, or something else entirely? | Cheryl Gramling/NASA GSFC | Suggest defining what these terms mean for use in the OCM. | Will put OPS\_STATUS into SANA |
| 6-10 | Tab 6-3 | Bottom row | te | Reference comment above on ORBIT\_TYPE definitions. This could be very limiting and the current parameter sets provide overlapping definitions. In addition, many other ORBIT\_TYPES are not included. | Cheryl Gramling/NASA GSFC | Clarify why this keyword is needed. | Will put ORBIT\_TYPE into SANA |
|  |  |  |  | Is source of time coeff or Solar/Planetary ephems included? | Cheryl Gramling/NASA GSFC |  | Fixed. |
| 6-13 | 6.2.4.11 | 3 | Ed/te | RE: “such discontinuous time spans be stored in separate covariance data blocks”. Word choice: “stored”; suggest changing to “represented” or “provided” | Cheryl Gramling/NASA GSFC | Consider changing the word from “stored” to another that is more meaningful to message exchange. | Fixed. |
| 6-13 | 6.2.4.12 | 2 | Ed | Per CCSDS chief editor mandate to use Oxford comma, change from “the times, names and significance” to “the times, names, and significance” | Cheryl Gramling/NASA GSFC | Consider the recommended update. | Fixed. |
| 6-16 | Table 6-4 | Row 6 | Te | RE: “ORB\_BASIS”; how can it be both the specified values and free text? Suggest limiting to the specified values. If you want the option for something else, then can add a 5th value, like OTHER, that is identified in the comments. | Cheryl Gramling/NASA GSFC | Consider removing the “free text” statement from the Description. | Added “OTHER” |
| 6-16 | Table 6-4 | Row 7 | ed | Per CCSDS chief editor mandate to use Oxford comma, change from “orbit determination, navigation or Monte Carlo simulation” to “orbit determination, navigation, or Monte Carlo simulation” | Cheryl Gramling/NASA GSFC | Consider the recommended update. | Fixed. |
| 6-16 | Table 6-4 | Row 7 | te | RE: “ORB\_BASIS\_ID”, the simulation may be based on something besides Monte Carlo; please remove the words “Monte Carlo” from the statement. Similarly, it’s not clear what is meant by “navigation”; suggest defining the term as it applies to this keyword. Alternatively, just state “Optional alphanumeric free-text string containing the identification number for the navigation upon which this orbit state time history block is based.” | Cheryl Gramling/NASA GSFC | Consider the recommended updates. | Removed Monte Carlo and genericized |
| 6-16 | Table 6-4 | Row 8 | te | RE: “ORB\_AVERAGING”, it’s unclear if this is truly a free-text value or specified to be one of “OSCULATING”, “MEAN\_BROUWER”, “MEAN\_KOZAI”, and “OTHER”. If it’s free-text, why specify “If an alternate single- or double-averaging formulation is used than “MEAN\_BROUWER” or“MEAN\_KOZAI,” “? If the method used to obtain the mean elements is relevant, then perhaps that needs to be specified. | Cheryl Gramling/NASA GSFC | Clarify what is meant by “free-text” and amend the description to address the intent of the keyword to define the states as either osculating or mean.  | Clarified |
| 6-17 | Table 6-4 | Rows 3, 4, 7 | Ge | ORB\_TIME\_SYSTEM, ORB\_REF\_FRAME, & ORB\_TYPE each refer to a section in Annex B that in-turn refers to another section in Annex B that in-turn refers to SANA registries. Is it necessary to follow this circuitous route for referencing, or could Annex B be realigned to at least eliminate one of the nodes in the path? Alternatively, point directly to the respective SANA registry in the text of the field.NOTE: This comment applies throughout Section 6.  | Cheryl Gramling/NASA GSFC | Please consider reducing the search path to find potential ‘standard’ text for these fields. | Fixed. |
|  |  |  |  | RE: OES overall and AREA\_MIN\_FOR\_PC, AREA\_MAX\_FOR\_PC, and AREA\_AVG\_FOR\_PC specifically: it may be good to offer more explanation for these fields or alternatives. Some refer to a hardbody radius; would it be worthwhile to include HBR in 3 axes or should OES represent HBR? | Cheryl Gramling/NASA GSFC | Consider additional explanatory text for the purpose of these fields. | Clarified. |
| 6-21 | Tab 6-5 | Row 3 | te | RE: “AVG\_MANEUVER\_FREQ” Does this refer to orbit and attitude maneuvers? | Cheryl Gramling/NASA GSFC | Please consider clarifying intent of field in description. | Clarified to mean both. |
| 6-21 | Tab 6-5 | Row 4 | te | If you have the keyword MAX\_THRUST, shouldn’t there be a complementary keyword(s) to define the thrust direction in a specified ref frame? Else, what is the value of exchanging knowledge on max thrust? Alternatively, would it be good to have the option to identify Max dV (vector) over specified time (e.g. a thruster or prop system may have limited burn duration)? Perhaps I’m not understanding the intent of this field. | Cheryl Gramling/NASA GSFC | Consider clarifying intent of the field, adding descriptive text, and/or adding other keywords to complete a vector representation. | Skipping this per agreement in Mtn View. Intent is to help facilitate maximum available thrust to determine when an avoidance maneuver must be made. But componentized values could also be useful. For us to discuss. |
| 6-21 | Tab 6-5 | all | te | I’m struggling w the use of OES when inertia properties, given in body XYZ, if the message contains both. Should one be expected to translate between the parameters for OES and the body axes? Is there an assumption that XYZ maps to roll/pitch/yaw, respectively? (it doesn’t always...).  | Cheryl Gramling/NASA GSFC | Possibly consider some info on the OES and how to interpret wrt inertias? | Added a sentence which explains that the OEB describes the physical space occupied by the space object, which may not align with the inertia tensor. |
| 6-21 | 6.2.6.1 – 6.2.6.4 | -- | Ed | Each of these refers to Table 6-9; should be Table 6-6. | Cheryl Gramling/NASA GSFC | Correct the typo. | Already was fixed. |
| 6-22 | 6.2.6.9.2), 6.2.6.9.3), Tab 6-6, row 6 | 2, , 4. | Te | I assume MONTECARLO refers to a simulation. However, a covariance may be based on a simulation that does not stem from MC analysis. | Cheryl Gramling/NASA GSFC | Consider replacing “MONTECARLO” with “SIMULATED”, or something similar. | Fixed. |
| 6-22 | 6.2.6.15 | 1 | ed | Missing Oxford comma: change from “those of maneuver, orbit state and/orstate transition matrix time histories.” To “those of maneuver, orbit state, and/orstate transition matrix time histories.” | Cheryl Gramling/NASA GSFC | Consider making the recommended change. | Fixed. |
| 6-23 | 6.2.6.20.3 | 2 | te | The construct assumes only lower triangular representations will be used for non EigenV. Alternative representations should be included (e.g UDUT) | Cheryl Gramling/NASA GSFC | To allow a realisitic and original covariance to be exchanged, please consider alternative implementations to represent covariance. | Per agreement at Mtn View, only supporting LTM and Eigenvector/val format for now. Can add UDU later. |
| 6-25 | Tab 6-6 |  | Te | INPUT FROM CHERYL: You could specify a Wald test, a Chi-squared test, the log of likelihood, or a numerical representation per an ICD. Free text field. | Cheryl Gramling/NASA GSFC | Per request. | Incorporated |
| 6-26 | 6.2.7.9.2) | 2 | te | A simulation may originate from something other than Monte Carlo; it could be a single solution simulation. Suggest removing “Monte Carlo” and just referring to simulations | Cheryl Gramling/NASA GSFC | Consider not specifying “Monte Carlo” and just use the generic “simulation”. | Fixed. |
| 6-26 | 6.2.7.13 | 1 | Ed | Missing word. From “Discontinuous state transition matrix time spans be stored in separate state transitionmatrix data blocks. “ To “It is recommended that discontinuous state transition matrix time spans be stored in separate state transitionmatrix data blocks. “ | Cheryl Gramling/NASA GSFC | Consider the updated text. | Fixed. |
| 6-29 | Tab 6-7 | Row 7 | Te | RE: “STM\_BASIS”, the simulation may be based on something besides Monte Carlo; please remove the words “Monte Carlo” from the statement.  | Cheryl Gramling/NASA GSFC | Consider removing MONTE CARLO and just use simulation. | Fixed. |
| 6-30 | Tab 6-7 | Rows 6 & 7 | Ed | Since “STM\_N” is predicated on “STM\_TYPE”, should the ordering of the rows be switched? | Cheryl Gramling/NASA GSFC | Consider the comment. | Fixed. |
| 6-5 | 6.2.3.8 |  | ed | GEO and GSOwords to be exchanged:Geosynchronous to GSO and GeoStationary to GEOGEO: change “i > 3°” to “i < 3°” | M. Kirschner / DLR-GSOC |  | We agreed to move data to SANA and standardize it there.  |
| 6-18 | 6.2.5 |  |  | Wording refers to Table 6-4. Table is number 6-5. | Halverson/NASA | Fix | Fixed. |
| 6-19 | Table 6-5 |  |  | Why do you include <DEF\_EPOCH\_TZERO> in the Default column for OES\_PARENT\_FRAME\_EPOCH?  | Halverson/NASA | Remove? | This was intentional, to use the default epoch if not is provied |
| 6-20 | Table 6-5 |  |  | You have a coefficient of reflectivity example of 15. Shouldn’t that be no greater than 1? (Perhaps a typo from the line above) | Halverson/NASA | Fix | Fixed. |
| 6-20 | Table 6-5 |  |  | Your CONTROL\_MODES mix actual control mode types with control via different actuators. CMGs and THRUSTERS define the type of actuation used, as does ACTIVE\_MAG\_CONTROL.  | Halverson/NASA | Define control modes and then add another entry for type/actuator. | Fixed. |
| 6-21 | Table 6-5 |  |  | ATT\_CONTROL should be just the accuracy of the attitude control. Attitude POINTING accuracy encompasses both KNOWLEDGE and CONTROL.  | Halverson/NASA | Change wording to Accuracy of attitude control, or change wording to accuracy of attitude pointing.  | Fixed. |
| 6-21 | Table 6-5 |  |  | Fix wording in DV\_REMAINING | Halverson/NASA | Change description to Total DV capability remaining for the spacecraft | Fixed. |
| 6-31 | 6.2.8 |  |  | The opening statements are different from previous sections. | Halverson/NASA | Make the pre-amble for each table consistent. | Fixed. |
| 6-32 | 6.2.8 |  |  | Not sure additional table 6-8 is necessary. It is clear from the wording that you intend for 10 cases. | Halverson/NASA | Remove table 6-8 | I think the table is important to convey the adding of constituents; I just wasn’t sure if Cases 1 thru 4 were necessary. But I’m retaining for now. |
| 6-34 | Table 6-9 |  |  | In the descriptions for DV\_X, DV\_Y, and DV\_Z there is a reference to DV\_DUR. Should that be MAN\_DURA? Same comment applies to boxes DEPLOY\_DV\_X (Y and Z) | Halverson/NASA | Fix or add DV\_DUR keyword | Fixed. |
| 6-34 | Table 6-9 |  |  | Description for THR\_Y and THR\_Z refers to Tx, assume this should be Ty and Tz, respectively. | Halverson/NASA | Fix | Fixed. |
| 6-39 | Table 6-10 |  |  | In MAN\_EOI either refer to Section 6.2.8.16 or Table 6-9.  | Halverson/NASA | Fix | Fixed. |
| 6-39 | Table 6-10 |  |  | MAN\_PRED\_SOURCE refers to Table 6-10, do you mean Table 6-12 in the OD section? | Halverson/NASA |  | Fixed. |
| 6-39 | Table 6-10 |  |  | Do you intend to have the entries within < > in the Default column for both MAN\_EPOCH\_TZERO and MAN\_TIME\_SYSTEM?  | Halverson/NASA |  | Yes. |
| 6-42 | Table 6-10 |  |  | Extra comma in last Description box | Halverson/NASA | Fix | Couldn’t find these |
| 6-1 | 6.1 | 6.1.3 | ed/te | *The units universally used throughout the OCM are kilometers (for orbit state and covariance time histories) and m/s and m/s2 (for maneuvers), mass in kilograms and time in seconds.*Depending on the orbital elements and covariance types chosen the units will likely not be just km. Even for Cartesian position and velocity they would be km and km/s. Also there is a mix of using the full name of the unit and abbreviations. | A. Mancas/ESA | Think about rewording. | Done. |
| 6-4,6-7 | 6.2.2,6.2.3 | Table6-2,Table6-3 | ed/te | There is no MESSAGE\_ID in the header but in the metadata. This is inconsistent with the other NDMs (eg CDM), which have a MESSAGE\_ID in the header. | A. Mancas/ESA | Move MESSAGE\_ID to header for consistency with the other NDMs. Keep PREV\_MESSAGE\_ID in metadata section. | Fixed. |
| 6-4,6-7 | 6.2.2,6.2.3 | Table6-2,Table6-3, second entry | ed/te | Why is the ORIGINATOR keyword actually part of the METADATA (and not header)? | A. Mancas, V. Braun/ESA | Move ORIGINATOR to header for consistency with the other NDMs. Also ORIGINATOR could be used in conjunction with MESSAGE\_ID, so it would make more sense to keep them together. | Fixed. |
| 6-4 | 6.2.3 | 6.2.3.2 | ed | *The “OCM Metadata” section is mandatory; “mandatory” in the context of Table 6-3 denotes those keywords which must be included in this section*.Since the metadata section is now mandatory, I'm not sure the second sentence is needed (it might be leftover from when the metadata section was optional). | A. Mancas/ESA | Think about removing second sentence. | Fixed, per consensus agreement in Mtn View |
| 6-4 | 6.2.3 | 6.2.3.4 | ed/te | I think this normative statement applies to the entire OCM, not just the metadata, and should appear in a different section (eg OCM syntax). | A. Mancas/ESA | Think about relocating. | Fixed. |
| 6-56-6 | 6.2.3 | 6.2.3.76.2.3.8 | ed/te | While I really like the granular classification of object types (compared to the extremely basic CDM one), I feel this whole discussion should be moved to a SANA "object type" registry. Maybe the same for "orbit type". | A. Mancas/ESA | Think about. | Moving to SANA Registry. |
| 6-7 | 6.2.3 | Table 6-3 | te | Is there a reason to duplicate all the ORGINATOR\_\* with TECH\_\* keywords? | A. Mancas/ESA | Think about. | Yes – often, the technical person is separate from the one in charge of distributing messages and managing information flow. This provides an optional method for both to be shared. |
| 6-86-9 | 6.2.3 | Table 6-3 | te | For consistency with other messages, and to avoid confusion, OBJECT\_NAME and INTERNATIONAL\_DESIGNATOR should be mandatory. In the case the name or designator is not known, UNKNOWN can be used. | A. Mancas/ESA | Make OBJECT\_NAME and INTERNATIONAL\_DESIGNATOR mandatory. | Disagree – These values don’t exist and are unnecessary in the case of sharing a simulated fragmentation event with 10,000 pieces. |
| 6-10 | 6.2.3 | Table 6-3 | ed | CATALOG\_NAME is in the wrong position in the table. It should be just before OBJECT\_ID (which should be ID in the catalog specified by CATALOG\_NAME). | A. Mancas/ESA | Move. | Fixed. |
| 6-12 | 6.2.3 | Table 6-3 | ed/te | The example for the EOP\_SOURCE value should be changed to something simpler and all caps (eg CELESTRAK). | A. Mancas/ESA | Think about. | Fixed. |
| 6-12 | 6.2.3 | Table 6-3 | te | If the source of the Earth orientation parameters can be specified, why not the space weather data as well? | A. Mancas/ESA | Think about. | Fixed. |
| 6-12 | 6.2.4 | 6.2.4.4 | te | *The orbit state time history section is optional; “mandatory” in the context of Table 6-8 denotes those keywords which must be included in this section if this section is included.*This goes against the convention used in other NDMs, where all elements of optional blocks are marked as 'optional' and normative statements specify which, if any, must be present in every block.The OCM approach is also taken by one CEN/CENELEC standard, and almost every person reading the draft misses the fact that said keywords are mandatory only if the optional block is present.s | A. Mancas/ESA | Think about switching to the same approach as the other NDMs. | Fixed per consensus reached at Mtn View. |
| 6-12 | 6.2.4 | 6.2.4.6 | ed | *Each of these keywords shall appear on a line by itself.*I think this should be covered by a syntax requirement for the entire message somewhere else. | A. Mancas/ESA | Think about. | Fixed. |
| 6-12 | 6.2.4 | 6.2.4.8 | ed/te | *It is recommended that each data block be clearly differentiated from the others by a unique ORB\_BASIS value* ***or by one or more preceding explanatory comment(s).***Given that comments are not supposed to be needed to correctly interpret the message, I am not sure this is a good way to phrase things. The following normative paragraph (6.2.4.9) already requires that all orbit state time history be unique anyway. | A. Mancas/ESA | Think about removing. | Removed. |
| 6-13 | 6.2.4 | 6.2.4.106.2.4.11 | ed/te | Is there a reason for allowing repeating timestamps in the same ORB block, rather than requiring interpolation intervals be separated in different blocks? I think requiring separate blocks for that case would be better and consistent with the OEM (IIRC the OEM allows multiple segment especially for this use case). | A. Mancas/ESA | Think about not allowing duplicate timestamps in the same ORB block to signify interpolation delimiters, but requiring the use of separate blocks for that. | Removed. |
| 6-13 | 6.2.4 | 6.2.4.11 | ed | *While discontinuous orbit state time history spans could be accommodated via duplicate time stamps as noted above, it is recommended that such discontinuous time spans be stored in separate covariance data blocks.*I think there is a typo in this normative paragraph: it should say *orbit state time history* rather than covariance. | A. Mancas, V. Braun/ESA | Replace *covariance* with *orbit state time history* in the last sentence. | Removed this clause. |
| 6-13 | 6.2.4 | 6.2.4.16 | ed | Are the units always km, km/s and degrees? I think the units would be fixed by the value of the ORB\_TYPE keyword. | A. Mancas/ESA | Think about removing the units statement. | Fixed. |
| 6-17 | 6.2.4 | ORB\_TYPE, ORB\_N,ORB\_ELEMENTS | ed/te | *If set to ORB\_TYPE is set to ICD, then ORB\_N and ORB\_ELEMENTS are mandatory and shall define the orbit elements used.**Number of elements (excluding time) contained in the element set if ORB\_TYPE is set to ICD. If ORB\_TYPE is not set to ICD, then ORB\_N shall be ignored in deference to the number of elements corresponding to the selected ORB\_TYPE.**Free-text definition of each of the orbit elements, if ORB\_TYPE is set to ICD. If ORB\_TYPE is not set to ICD, then the number of elements coincides with the selected ORB\_TYPE. If ORB\_TYPE is not set to ICD, then ORB\_ELEMENTS shall be ignored in deference to the element definitions corresponding to the selected ORB\_TYPE.*I think the users should put the name of the element set as the value of ORB\_TYPE, and if it's not in SANA it should be specified, including number of elements, in an ICD. I'm not sure what ORB\_N is supposed to accomplish. If an ICD specified was the orbital element set is, the reader (software) will 'know' how many elements are in the set. Simply having the number there does not mean a reader can interpret the data correctly.Same with the ORB\_ELEMENTS. Having the names there means a human reader can try to understand what they are, but it would not help the software that much. If an ICD is used, I'm not sure this keyword is needed. | A. Mancas/ESA | Think about removing ORB\_N and ORB\_ELEMENTS. | So removed. |
| 6-18 | 6.2.5 | 6.2.5.2 | ed/te | *Keyword values shall be provided in the units specified in the “Units” column of Table 6-4.*I think this is a general requirement for all OCM keywords (with units), and should appear somewhere in the syntax section. | A. Mancas/ESA | Think about relocating. | Fixed. Good idea. |
| 6-18 | 6.2.5 | 6.2.5.3 | ed/te | *The order of occurrence of these OCM Space Objects Physical Characteristics keywords shall be fixed as shown in Table 6-4.*I think this is a general requirement for all OCM keywords, and should appear somewhere in the syntax section. | A. Mancas/ESA | Think about relocating. | Fixed. Good idea. |
| 6-18 | 6.2.5 | 6.2.5.7 | te | *The Space Object Optimally-Encompassing Shape (OES) parameters are defined in further detail in ANNEX C.*Annex C is marked as an informative annex, as the content does indeed appear as informative. I do not think CCSDS rules allow for normative statements to point to informative annexes. I think it would be best to have a clear formulation of OES parameters in normative section 6.2.5. | A. Mancas/ESA | Think about. | Fixed, per David’s guidance. |
| 6-19 | 6.2.5 | 4 | te | It might make sense to separate mass into DRY\_MASS and WET\_MASS, though MASS\_AT\_EOL might cover that. | A. Mancas/ESA | Think about. | Fixed, per agreement in Mtn View |
| 6-20 | 6.2.5 | 9 | te | It might make sense to add a range of values for RCS (similar to AREA\_\*\_FOR\_PC). | A. Mancas/ESA | Think about. | Fixed. |
| 6-20 | 6.2.5 | 13 | te | I think it might be helpful to add a range of apparent magnitudes, besides the VM\_ABS. | A. Mancas/ESA | Think about. | Fixed. |
| 6-21 | 6.2.6 | 6.2.6.2 | ed/te | *Keyword values shall be provided in the units specified in the “Units” column of Table 6-9.*I think this is a general requirement for all OCM keywords (with units), and should appear somewhere in the syntax section. | A. Mancas/ESA | Think about relocating. | Fixed. |
| 6-21 | 6.2.6 | 6.2.6.3 | ed/te | *The order of occurrence of these orbit state covariance time history keywords shall be fixed as shown in Table 6-9.*I think this is a general requirement for all OCM keywords, and should appear somewhere in the syntax section. | A. Mancas/ESA | Think about relocating. | Fixed. |
| 6-21 | 6.2.6 | 6.2.6.4 | ed/te | *The orbit state covariance time history section is optional; “mandatory” in the context of Table 6-9 denotes those keywords which must be included in this section if his section is included.*This goes against the convention used in other NDMs, where all elements of optional blocks are marked as 'optional' and normative statements specify which, if any, must be present in every block.The OCM approach is also taken by one CEN/CENELEC standard, and almost every person reading the draft misses the fact that said keywords are mandatory only if the optional block is present. | A. Mancas/ESA | Think about. | Fixed per consensus reached at Mtn View. |
| 6-22 | 6.2.6 | 6.2.6.8 | te | *It is recommended that each data block be clearly differentiated from the others by a unique COV\_BASIS value or by one or more preceding explanatory comment(s).*My understanding is that COMMENTS are not supposed to be significant in interpreting the message, which 6.2.6.8 seems to go against. | A. Mancas/ESA | Think about. | Deleted. |
| 6-22 | 6.2.6 | 6.2.6.9 | ed | *It is recommended that each covariance data block be unique from all others in at least one of the following respects:*I think the technical editor would like this sentence phrased as "Each covaraince data block should be [...]". I know we discussed this in the Berlin meeting, but are we 100 % sure this should not be a 'shall' requirement? | A. Mancas/ESA | Think about. | Adopted. |
| 6-22 | 6.2.6 | 6.2.6.11 | te | Is there a reason for allowing repeating timestamps in the same COV block, rather than requiring interpolation intervals be separated in different blocks? I think requiring separate blocks for that case would be better and consistent with the OEM (IIRC the OEM allows multiple segment especially for this use case). The current OCM approach would not allow to have overlap in the timespans, which can make interpolation better.  | A. Mancas/ESA | Think about not allowing duplicate timestamps in the same COV block to signify interpolation delimiters, but requiring the use of separate blocks for that. | Removed, per agreement at Mtn View.Note that a number of tools already use this convention (of repeating timestamps) quite effectively, and this avoids duplicating blocks just for the sake of an event (like an impulsive maneuver) |
| 6-23 | 6.2.6 | 6.2.6.20.3 | te | *Directly following the time tag specification line, each of the “N” rows of the lower triangular covariance matrix shall be presented containing from one [1,1] to “N” numerical entries depending on what row of the matrix is being represented (first row has one element, second row has two, continuing in this fashion until the “Nth” row has “N” elements).* ***Units are km, km/s and degrees.***The units for the covariance elements are fixed by the value of the COV\_TYPE keyword, are not necessarily km, km/s, and degrees (I think they will rarely be those actually).  | A. Mancas, V. Braun/ESA | The bolded sentence about units should be removed. | Removed. |
| 6-24 | 6.2.6 | Table 6-6 | te | I am not sure I understand how COV\_PREV\_ID and COV\_NEXT\_ID are supposed to work. Is this for different covariance blocks in the same message? Different messages? If the latter how do you know which message. | A. Mancas/ESA | Think about. | Could be in the same message, but wouldn’t have to be. Up to the operator to decide. |
| 6-26 | 6.2.7 | 6.2.7.3 | ed/te | *The order of occurrence of these OCM state transition matrix time history keywords shall be fixed as shown in table 6-10.*I think this is a general requirement for all OCM keywords, and should appear somewhere in the syntax section. | A. Mancas/ESA | Think about relocating. | Fixed. |
| 6-26 | 6.2.7 | 6.2.7.4 | ed/te | *The OCM state transition matrix time history section is optional; “mandatory” in the context of Table 6-10 denotes those keywords which must be included in this section if this section is included.*This goes against the convention used in other NDMs, where all elements of optional blocks are marked as 'optional' and normative statements specify which, if any, must be present in every block.The OCM approach is also taken by one CEN/CENELEC standard, and almost every person reading the draft misses the fact that said keywords are mandatory only if the optional block is present. | A. Mancas/ESA | Think about. | Fixed per consensus reached at Mtn View. |
| 6-26 | 6.2.7 | 6.2.7.6 |  | *Each of these keywords shall appear on a line by itself.*I think this is a general requirement for all OCM keywords, and should appear somewhere in the syntax section. | A. Mancas/ESA | Think about relocating. | Fixed. |
| 6-26 | 6.2.7 | 6.2.7.8 | ed/te | *It is recommended that each data block be clearly differentiated from the others by a unique STM\_BASIS value or by one or more preceding explanatory comment(s).*My understanding is that COMMENTS are not supposed to be significant in interpreting the message, which 6.2.6.8 seems to go against. | A. Mancas/ESA | Think about. | Fixed. |
| 6-26 | 6.2.7 | 6.2.7.9 | ed | *It is recommended that each STM data block be unique from all others in at least one of the following respects:*I think the technical editor would like this sentence phrased as "Each STM data block should be [...]". I know we discussed this in the Berlin meeting, but are we 100 % sure this should not be a 'shall' requirement? | A. Mancas/ESA | Think about. | Fixed. |
| 6-27 | 6.2.7 | 6.2.7.20 | te | *Each row of each state transition matrix must be provided on a single line. The order in which data items are given shall be fixed. The elements in each row shall be defined commensurate with the STM\_TYPE keyword specification. The “N” rows of the state transition matrix shall each contain “N” numbers.* ***Units are km, km/s and degrees.***The units for the STM elements are fixed by the value of the STM\_TYPE keyword (taken from the SANA orbital elements registry), are not necessarily km, km/s, and degrees (I think they will rarely be those actually). | A. Mancas, V. Braun/ESA | The bolded sentence about units should be removed. | Fixed. |
| 6-29 | 6.2.7 | Table6-29 | te | I am not sure I understand how STM\_PREV\_ID and STM\_NEXT\_ID are supposed to work. Is this for different STM blocks in the same message? Different messages? If the latter how do you know which message. | A. Mancas/ESA | Think about. | Could be in the same message, but wouldn’t have to be. Up to the operator to decide. |
| 6-29 | 6.2.7 | Table6-29 | te | *Initial orbit state at STM\_EPOCH\_TZERO from which the state transition mapping is derived and referenced*I am not a big fan of giving multiple elements in the same line with spaces in between. It seem to really go against the KVN metaphor. Furthermore, since there is an ORB\_ID keyword in the orbit state history block, would it not make more sense to point to an ORB\_ID, with the requirements that said ORB\_ID be in the same message and contain only one epoch?I am not sure you can require units to be km, km/s, and deg, as they would depend on the orbital elements type. | A. Mancas/ESA | Think about. | Fixed, and fixed. |
| 6-31 | 6.2.8 | 6.2.8.1 | ed/te | *The “OCM Data: Maneuver Specification” section is optional; “mandatory” in the context of Table 6-10 denotes those keywords which must be included in this section if this section is included.*This goes against the convention used in other NDMs, where all elements of optional blocks are marked as 'optional' and normative statements specify which, if any, must be present in every block.The OCM approach is also taken by one CEN/CENELEC standard, and almost every person reading the draft misses the fact that said keywords are mandatory only if the optional block is present. | A. Mancas/ESA | Think about. | Fixed per consensus reached at Mtn View. |
| 6-31 | 6.2.8 | 6.2.8.3 | ed/te | *Each of these keywords shall appear on a line by itself.*I think this is a general requirement for all OCM keywords, and should appear somewhere in the syntax section. | A. Mancas/ESA | Think about. | Fixed. |
| 6-31 | 6.2.8 | 6.2.8.5 | ed/te | *The order of occurrence of these OCM Maneuver Specification keywords shall be fixed as shown in Table 6-10.*I think this is a general requirement for all OCM keywords, and should appear somewhere in the syntax section. | A. Mancas/ESA | Think about. | Fixed. |
| 6-32 | 6.2.8 | Table 6-8 | ed | Is the table really needed? Are the case numbers used somewhere elese? | A. Mancas/ESA | Think about removing the table. | Yes, as agreed in Mtn View |
| 6-32 | 6.2.8 | 6.2.8.14 | ed | *It is recommended that each maneuver data block be unique from all other maneuver data blocks in at least one of the following respects:*I think the technical editor would like this sentence phrased as "Each maneuver data block should be [...]". I know we discussed this in the Berlin meeting, but are we 100 % sure this should not be a 'shall' requirement? | A. Mancas/ESA | Think about. | Fixed. |
| 6-33 | 6.2.8 | 6.2.8.16 | ed/te | *The message creator shall specify the maneuver time history elements of information (MAN\_EOI) that follow the maneuver time tag (DT= or T= as discussed above) on each and every maneuver time history line, stipulated in comma-delimited format from any combination of the options shown in Table 6-9:*If I'm understanding this correctly, this would lead to something like:MAN\_EOI = DV\_X, DV\_Y, DV\_ZIf that is the case, should example of values be present in Table 6-9?Also, would it not be better to move the contents of the table to a SANA registry? | A. Mancas/ESA | Think about. | Yes, as agreed in Mtn View. |
| 6-35 | 6.2.8 | 6.2.8.17 | ed | *Importantly, note that such impulsive maneuvers can and should be accompanied by the duration of the actual maneuver if/when known.*The CCSDS technical editor would probably prefer this part in a NOTE statement. | A. Mancas/ESA | Think about. | Fixed. |
| 6-35 | 6.2.8 | 6.2.8.18.4 | ed | *The thrusting maneuver specifications include the ability to specify duty cycles (DUTY\_CYCLE\_TYPE ≠ NONE) based on either a reference direction or reference time. Relationships between such duty cycle parameters is described in ANNEX C, Section C3. When a duty cycle is invoked, specification of the reference direction, reference time and any/all other duty cycle parameters relevant to that duty cycle type is mandatory. Optionally, “Minimum number of repeats” and “Maximum number of repeats” may be specified.*This reads more like a descriptive than normative statement. | A. Mancas/ESA | Think about rewording. | Reworded. |
| 6-35 | 6.2.8 | 6.2.8.19 | ed | *Specification of acceleration parameters allows aggregate modeling of both maneuvers and any additional non-conservative perturbations that are not already specified in the “OCM Perturbations Specification” section (above). This allows the OCM originator to model and share such maneuver and perturbations information without the OCM recipient needing to do such modeling. Note that since additional non-conservative perturbations are allowed, thrust or ΔV specifications on the same line may be inconsistent with the accompanying acceleration parameters.*This reads more like a descriptive than normative statement. | A. Mancas/ESA | Think about rewording. | Fixed. |
| 6-38 | 6.2.8 | Table 6-10 | ed/te | I'm not sure the way to specify MAN\_PREV\_TIME and MAN\_NEXT\_TIME is the best way. If I'm interpreting the table correctly it would look something likeMAN\_PREV\_TIME = T = 2011-11-06T23:23:23.0orMAN\_PREV\_TIME = DT = 50.0This does not look that KVN (maybe K2VN?) or that esthetically pleasing. Why not allow values to be either CCSDS time strings (in which case it's absolute time), or double precision (in which case it's relative time). I do not think the two are easy to confuse.  | A. Mancas/ESA | Think about. | Fixed – Great idea. |
| 6-39 | 6.2.8 | Table 6-10 | ed/te | If table 6-9 is in the document, shouldn't MAN\_EOI point to it for "allowed values"? | A. Mancas/ESA | Think about. Maybe remove table 6-9 and make the values normative in table 6-10 for MAN\_EOI. | Fixed. |
| 6-41 | 6.2.8 | Table 6-10 | ed/te | I'm not sure the way to specify DC\_WIN\_OPEN and DC\_WIN\_CLOSE is the best way. If I'm interpreting the table correctly it would look something likeDC\_WIN\_CLOSE = T = 2011-11-06T23:23:23.0orDC\_WIN\_CLOSE = DT = 50.0This does not look that KVN (maybe K2VN?) or that esthetically pleasing. Why not allow values to be either CCSDS time strings (in which case it's absolute time), or double precision (in which case it's relative time). I do not think the two are easy to confuse.  | A. Mancas/ESA | Think about. | Fixed – Great idea. |
| 6-42 | 6.2.8 | Table 6-10 | ed/te | I'm not sure the way to specify DC\_EXEC\_BEGIN, DC\_EXEC\_END, and DC\_REF\_TIME is the best way. If I'm interpreting the table correctly it would look something likeDC\_EXEC\_END = T = 2011-11-06T23:23:23.0orDC\_REF\_TIME = DT = 50.0This does not look that KVN (maybe K2VN?) or that esthetically pleasing. Why not allow values to be either CCSDS time strings (in which case it's absolute time), or double precision (in which case it's relative time). I do not think the two are easy to confuse.  | A. Mancas/ESA | Think about. | Fixed – Great idea. |
| 6-43 | 6.2.9 | 6.2.9.3 | ed/te | *The order of occurrence of these OCM Perturbations Specification keywords shall be fixed as shown in Table 6-5.*I think this is a general requirement for all OCM keywords, and should appear somewhere in the syntax section. | A. Mancas/ESA | Think about. | Fixed. |
| 6-44 | 6.2.9 | 6.2.9.4 | ed/te | *The OCM Perturbations Specification section is optional; “mandatory” in the context of Table 6-5 denotes those keywords which must be included in this section if this section is included.*This goes against the convention used in other NDMs, where all elements of optional blocks are marked as 'optional' and normative statements specify which, if any, must be present in every block.The OCM approach is also taken by one CEN/CENELEC standard, and almost every person reading the draft misses the fact that said keywords are mandatory only if the optional block is present. | A. Mancas/ESA | Think about. | Fixed per consensus reached at Mtn View. |
| 6-44 | 6.2.9 | Table6-11 | te | *The name of the geopotential model for central body, followed by the degree and order of the spherical harmonic coefficients applied. Note that specifying a zero value for “order” (i.e. 2 0) denotes zonals (J2 … JD) only. This is a free text field, so if the examples on the right are insufficient, others may be used.*Other NDMs have a slightly different way of specifying degree and order:*The gravity model used in the simulation. The degree (D) and order (O) of the spherical harmonic coefficients applied should be given along with the name of the model.*This line would beATMOSPHERIC\_MODEL = EGM-96: 36D 36Oin the RDM, for example. | A. Mancas/ESA | Think about using the same formulation as CDM/RDM. | Fixed. |
| 6-45 | 6.2.9 | Table6-11 | te | I think it might make sense to change CENTRAL\_BODY\_ROTA to CENTRAL\_BODY\_ROTATION. | A. Mancas/ESA | Think about | Fixed |
| 6-45 | 6.2.9 | Table6-11 | te | Why is there no "CONICAL" option for the keyword SHADOW\_MODEL? | V. Braun/ESA | Think about | Fixed |
| 6-45 | 6.2.9 | Table6-11 | te | Would SPACE\_WEATHER\_\* or SW\_\* not make more sense than SPACE\_WX\_\*? It's called SPWX in the next row. I admit I have only seen the SW acronym used in Europe, so there might a Euro-bias there for me. | A. Mancas/ESA | Think about | Fixed. |
| 6-48 | 6.2.10 | 6.2.10.3 | ed/te | *The order of occurrence of these OCM Orbit Determination Data keywords shall be fixed as shown in Table 6-6.*I think this is a general requirement for all OCM keywords, and should appear somewhere in the syntax section. | A. Mancas/ESA | Think about. | Fixed. |
| 6-48 | 6.2.10 | 6.2.10.4 |  | *The “OCM Data: Orbit Determination Data” section is optional; “mandatory” in the context of Table 6-6 denotes those keywords which must be included in this section if this section is included.*This goes against the convention used in other NDMs, where all elements of optional blocks are marked as 'optional' and normative statements specify which, if any, must be present in every block.The OCM approach is also taken by one CEN/CENELEC standard, and almost every person reading the draft misses the fact that said keywords are mandatory only if the optional block is present. | A. Mancas/ESA | Think about. | Fixed per consensus reached at Mtn View. |
| 6-48 | 6.2.10 | 6.2.10.7 | ed/te | *All orbit determination event times shall be specified relative to the orbit determination epoch specified via the OD\_EPOCH keyword (in SI days, with one day = 86400.0 s) as a double precision number. Event times may be negative, zero or positive, depending upon the definition of the event time (i.e., OD\_EPOCH with respect to event time versus event time with respect to OD\_EPOCH).*Is there a reason for using SI days here, as opposed to seconds, which is how relative time in the rest of the OCM works (I think). | A. Mancas/ESA | Think about | Fixed per consensus reached in Mtn View |
| 6-48 | 6.2.10 | NOTE | ed | *NOTE: THIS SECTION APPLIES TO ALL ORBIT AND COVAR DATA BASED UPON “DETERMINED” ORBIT SOLUTIONS*I think this should be made into a normative paragraph, not a note (and not all caps). | A. Mancas/ESA | Think about. | Fixed. |
| 6-50 | 6.2.10 | Table6-12 | ed/te | I am not fully sure how OD\_PREV\_ID is supposed to work? Within the same message? This would go against the requirement to have only one OD section in an OCM. If it is supposed to work across messages, how would the user know in which message to look for the previous OD block? | A. Mancas/ESA | Think about. | This would be only for other messages. It is presumed that the mission would have a unique identifier, and sending OCMs between centers would contain that ID |
| 6-50 | 6.2.10 | Table6-12 | ed/te | It would make sense to expand the OD\_METHOD examples, so the software used is also listed. For example, a value such as:OD\_METHOD = BWLS: BAHNorOD\_METHOD = BWLS: ODINwould make a lot of sense. | A. Mancas/ESA | Think about. | Agree |
| 6-50 | 6.2.10 | Table6-12,6.2.10.7 | te | There seems to be an inconsistency between normative paragraph 6.2.10.7:*[...] (in SI days, with one day = 86400.0 s) [...]*and some rows in Table 6-12:*Actual time span in days (defined by SEC\_PER\_DAY duration in the OCM metadata section) [...]* | A. Mancas/ESA | Fix inconsitency. | Fixed |
| 6-50 | 6.2.10 | Table6-12 | te | OD\_EPOCH\_\* and OD\_MIN\_\* is this not a duplicate of the data in the covariance section? | A. Mancas/ESA | Think about. | No, these serve a different purpose. I could introduce COV\_MIN\_\* if there was a need to, but I don’t think there is. |
| 6-51 | 6.2.10 | Table6-12 | ed | There are two entries in the table for CONSIDER\_PARAMS. The second one should be something like OBSERVATION\_GAP? | A. Mancas/ESA | ? | Fixed. |
| 6-51 | 6.2.10 | Table6-12 | ed | I am not sure if this is possible, but it would be better to be explicit in the standard on how to compute GDOP (similar to RMS), as opposed to pointing to a reference. | A. Mancas/ESA | Think about. | Agreed. Closing this, as Cheryl has the action to define this. |
| 6-53 | 6.2.11 | 6.2.11.2 | ed/te | *The “OCM Data: User-Defined Parameters” section is optional; “mandatory” in the context of Table 6-13 denotes those keywords which must be included in this section if this section is included.*This goes against the convention used in other NDMs, where all elements of optional blocks are marked as 'optional' and normative statements specify which, if any, must be present in every block.The OCM approach is also taken by one CEN/CENELEC standard, and almost every person reading the draft misses the fact that said keywords are mandatory only if the optional block is present. | A. Mancas/ESA | Think about. | Fixed per consensus reached at Mtn View. |
| 6-53 | 6.2.11 | 6.2.11.4 | ed/te | Each user-defined user parameter line may be preceded by one or more comment lines.While I really like having a comment to go with each user defined keyword, is this doable in XML as well? | A. Mancas/ESA | Think about. | Yes, confirmed this with Fran and David in Mtn VIew |
| n/a | n/a | n/a | te | The ephemeris compression sections seems to be missing, but it is referred to in various places in the document. Was it removed due to prototyping issues? | A. Mancas/ESA | ? | Fixed. |
| multiple | Annex D | n/a | ed | The titles of the figures appear as "Annex Fig. D-[whatever]". They should be "Figure D-[whatever]" | A. Mancas/ESA | Fix in a future version | I’ll let the editor fix this. |
| multiple | Annex D | n/a | ed | The page numbering for the section starts at D-8. This could be due to a missing section end at the end of Annex C. | A. Mancas/ESA | Think about fixing or just leave it to the CCSDS technical editor. | Fixed. |
| D-8 | Annex D | Figure D-1 | ed | The name of the object in the message is 'GODZILLA 5'. I know it is the same in the current Blue Book, but maybe we should go for something more 'professional'? | A. Mancas/ESA | Think about either a real satellite or a less... proprietary fake one.  | Fixed. |
| D-10 | Annex D | Figure D-3 | ed | The name of the object in the message is 'GODZILLA 5'. I know it is the same in the current Blue Book, but maybe we should go for something more 'professional'? | A. Mancas/ESA | Think about either a real satellite or a less... proprietary fake one. | Fixed. |
| D-11 | Annex D | Figure D-4 | ed | The OPM in Figure D-4 shows a mix of units for some keywords and no units for the covariance keywords. | A. Mancas/ESA | Think about adding units to all keyword values. Figure D-3 shows most the same stuff without units already. | Done. |
| D-12 | Annex D | Figure D-5 | ed | The XML OPM in figure D-5 has the following comment line in the header:THIS EXAMPLE CONFORMS TO FIGURE 3-1 IN 502.0-B-2I think this made sense in the NDM XML Blue Book, but should be removed in the ODM v3 Blue Book. | A. Mancas/ESA | Think about. | Fixed. |
| D-12 | Annex D | Figure D-5 | ed | There is a weird comment line in the data block of the XML OPM in figure D-5:<COMMENT>OBJECT\_ID: 1998-057A</COMMENT>I'm not sure what this is supposed to be about, as there already is a different COSPAR ID in the metadata. | A. Mancas/ESA | Think about removing. | Removed. |
| 3-63-7 | 3.2.4 | 3.2.4.7,3.2.4.8, Table 3-3 | te | For maneuver specifications, all parameters shall be present in OPM v2, as specified in the table. One of the parameters is MAN\_DELTA\_MASS, which must be a negative number. This is problematic for SSA/SST application, as MAN\_DV\_x can be estimated/determined, but the change in mass cannot be known for uncooperative targets. As the OPM is used as an interface for some ESA SST/Space Debris collision avoidance processes, it would make sense to make MAN\_DELTA\_MASS optional in the maneuver block. | A. Mancas/ESA | Think about making MAN\_DELTA\_MASS optional, or at least allowing 0 (zero) as a valid value. | MAN\_DELTA\_MASS is already optional. Removed requirement that all parameters must be supplied. Good catch. |
| 5-8 | 5.2.5 | 5.2.5.3 | ed/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.*One of my colleagues ran into an issue with this recently. An external operator provided an OEM with multiple covariance matrices, but only the first one had the COV\_REF\_FRAME keyword. All the matrices were in the reference frame of COV\_REF\_FRAME, but correctly interpreting the message would mean all but the first would be in the reference frame of REF\_FRAME in the metadata. While this is a case of users being dummies, it would make sense to clarify that COV\_REF\_FRAME must be included for each covariance matrix, not just the first. | A. Mancas/ESA | Think about adding something like: “The COV\_REF\_FRAME keyword must be provided for **each** matrix that is not the same frame as the ephemeris”. | Fixed. |
| Annex C | Throughout |  | Ed | Figure labels and in-line callouts to figures in Annex C use different naming convention. Annex C identifies as e.g. “Fig C-1”, whereas Annex E identifies as e.g. “Annex Fig E-1” | Patrick Zimmerman / NASA | Update Annex C figure labels and in-line references to be similar to the other Annexes (i.e. Annex Fig. C-#) | Fixed to not include “Annex” per Mancas |
| Annex E | Annex Fig E-5 | 6 | Ed | The ‘Comment’ refers to a Figure 4-3 in ODM doc. This Figure is now mapped as Annex Fig. E-3.Of note though, is that while the majority of the KVN and XML message match, the covariance elements in the XML do not. | Patrick Zimmerman / NASA | Update Comment in XML to new Figure identifierPotentially update the covariance elements in the XML to match the KVN | Fixed. |
| Annex F |  |  | Ed | Opening paragraph indicates Annex Fig F-2 and F-3 are unique to ODM Version 2. This will no longer be true. Therefore the “CCSDS\_OEM\_VERS=2.0 must be specified” statement is incorrect – as well as not matching the version number that are now indicated in all the subsequent Examples (they all show Version 3.0) | Patrick Zimmerman / NASA | Update paragraph and Annex F example Version numbers as required. | Fixed. |
| Annex J |  |  | Ed | Missing line space at the end of the paragraph and the top of the table, cutting off the top of the box outline | Patrick Zimmerman / NASA | Add spacing | Fixed. |
| Annex J |  | Item 9 | Ed | Indicates Annex N, should be Annex L. | Patrick Zimmerman / NASA | Correct Annex reference name | Fixed. |
| Annex J |  | Item 10 | Ed | Missing closing parenthesis at end of sentence | Patrick Zimmerman / NASA | Add ‘)’ | Fixed. |
| Annex J |  | Item 11 | Ed | Awkward second sentence, perhaps just missing an ‘as’. “…elapsed days are to be used **as** relative time…” | Patrick Zimmerman / NASA | Add ‘as’ | Fixed. |
| Annex K | K1 |  | Ed | K1 2. – is empty. Delete item if not being used. | Patrick Zimmerman / NASA | Delete item if not being used. | Fixed. |
| Annex L |  |  | Ed | Annex title “Security, SANA, and Patent Considerations” is preceded with a ‘5.’, appears to be a numbering spillover from Annex KThis should also correct the missing title for Annex L in the Table of Contents | Patrick Zimmerman / NASA | Remove numbering and format as a titleVerify Table of Contents Annex L title is updated correctly | Fixed. |
| Annex L |  |  | Ed | L1 title “Security Consideration” is missing its number | Patrick Zimmerman / NASA | Add L1 numbering and format as a title | Fixed. |
| Annex L | L2 |  | Ed | Erroneous word repetition in the first sentence “items items” | Patrick Zimmerman / NASA | Delete either one of the ‘items’. Your choice. | Fixed. |
| Annex L | L2 |  | Ed | Time Systems is missing a semi-colon at end of line | Patrick Zimmerman / NASA | Add semi-colon | Fixed. |
| Annex L | L2 |  | Ed | Last line in normative elements list should end with a period, not a semi-colon | Patrick Zimmerman / NASA | Replace semi-colon with period | Fixed. |
| viii | N/A | N/A | ed | OCM tables are not listed (they all show as OEM Metadata) | David S. Berry / NASA | FYI... you can probably leave this to the CCSDS Editor to fix if you like. | Okay, will let the editor fix this. I wasn’t able to quickly figure this out. |
| 1-1 | 1.1 | para 1 line 1  | ed | Document title should be plural since there are 4 messages in the doc. | David S. Berry / NASA | From: "Orbit Data Message"To: "Orbit Data Messages" | Fixed. |
| 1-1 | 1.1 | para 4 line 1  | ed | Document title should be plural since there are 4 messages in the doc. | David S. Berry / NASA | From: "Orbit Data Message"To: "Orbit Data Messages" | Fixed. |
| 1-1 | 1.1 | para 6 line 3  | ed/te | This line refers to "... specified in an ICD". Given the CESG aversion to ICDs, I wonder if we can circumvent this by simply saying "... should be mutually agreed between exchange partners" or "... between data exchange participants" and let the exchange partners figure out how they want to document their agreement.  | David S. Berry / NASA | From: "... should be specified in an ICD."To: "... should be mutually agreed between data exchange partners." I'm thinking we could maybe appease the CESG if we do something like this throughout the document rather than referring specifically to ICDs. | Fixed per consensus in Mtn VIew |
| 1-2 | 1.2 | para 3 | ed/te |  | David S. Berry / NASA | From: "... is detailed in an integrated XML schema document for all Navigation Data Message Recommended Standards. (See reference [4].)"To: "... is detailed in Section 8. | Fixed. |
| 1-2 | 1.4 |  | ed | Section 8 is missing. | David S. Berry / NASA | Add Section 8 detailing the XML instantiation. | Fixed. |
| 1-3 | 1.5 | (f) | ed/te | Red text replacement suggestion. | David S. Berry / NASA | From: "... within NMINTRK minutes..." To: "... within a specified number of minutes..." | Fixed. |
| 1-4 | 1.7 | [9] [10] | ed | Lists Pink Books in the references. | David S. Berry / NASA | Change to current Blue Book issues... the editor will fix the versions if newer standards have been published. | Fixed. |
| 2-3 | 2.5 | 2 |  | Lists the Ephemeris Compression specification, which has been removed. | David S. Berry / NASA | Remove Ephemeris Compression list item. | Fixed. |
| 2-3 | 2.6 | 3 | te | Untested claim. | David S. Berry / NASA | From: "... a single, self-contained OCM is typically sufficient."To: "... a single, self-contained OCM may be sufficient." | Fixed. |
| 3-2 | Table 3-1 |  | 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. | Fixed. |
| 3-3 | Table 3-2 |  | te | MESSAGE\_ID: This should be in the Header, as it is in the CDM and RDM. | David S. Berry / NASA |  | Fixed. |
| 3-3 | Table 3-2 |  | 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 | We agreed as a group that this is a global concern for space State Actors (governments and companies) that should be supported. We decided to use CLASSIFICATION as the Keyword. This is an optional field.  |
| 3-3 | Table 3-2 |  | 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. | David S. Berry / NASA | Please move the parenthetical note to the Annex B. (This one and all the others in the document.) | Fixed. |
| 3-4 | Table 3-2 |  | ed/te | REF\_FRAME: We formerly had "ICRF" as an acceptable value. This is apparently changing.  | David S. Berry / NASA | Discuss implications at Mountain View. | Adding ICRF to SANA (generic terms refer to the latest instantiation of this frame) |
| 3-5 | Table 3-3 |  | ed/te | COV\_REF\_FRAME: has "non-units" in the "Units" column. | David S. Berry / NASA | From: examplesTo: "n/a"The SANA registry will list all the values, not just samples. | Fixed. |
| 3-6 | Table 3-3 |  | te | MAN\_DV\_n: I don't think the units change from "km/s" to "m/s" is acceptable. | David S. Berry / NASA | Change units from "m/s" back to "km/s". Discuss at Mountain View. | Fixed. |
| 3-7 | 3.3 | 2 | ed | Says examples are in Annex E, but they are now in Annex D. | David S. Berry / NASA | From: Annex ETo: Annex D | Fixed. |
|  |  |  |  |  |  |  |  |
| 6-1 | 6.1.3 | 2 | te | Units listed for maneuvers are inconsistent with units provided for the OPM version 2. (Note: OPM maneuver units were unilaterally changed in P2.38, but this requires discussion. | David S. Berry / NASA | Preferred: Make the maneuver units consistent with the OPM Version 2.2nd choice: Explicitly indicate that the OCM units are different from those used in the OPM. | Fixed. |
| 6-1 | 6.1.3 | 1 | te | States that the units "universally used throughout the OCM are...", but this is not completely true given that some of the entries in the SANA registries use units besides km, m/s, m/s^2, kg, and s. | David S. Berry / NASA | Revise the statement to reflect either "generally" or "default" or something given that sometimes the units will not be as specified. | Fixed. |
| 6-1 | 6.1.5 | 5 | te | Recipient encouragement is probably not sufficient. | David S. Berry / NASA | From: "... the message recipient is encouraged to use a suitable interpolation method." To: "... the message recipient must use a suitable interpolation method." | Fixed. |
| 6-1 | 6.1.5 | 8 | ed | Word choice ("use" instead of "have") | David S. Berry / NASA | From: "... the recipient must have a suitably-compatible orbit propagator"To: ".. the recipient must use a suitably-compatible orbit propagator" | Fixed. |
| 6-1 | 6.2.1 | 1-3 | ed | The second and third sentences in this section are redundant. | David S. Berry / NASA | Remove the second sentence. The third sentence is sufficient. | Cleaned up this section and removed duplication. |
| 6-2 | 6.2.1 | all | ed | This list of header, metadata, and optional data sections is entirely redundant with Table 6-1. | David S. Berry / NASA | I would remove this material and leave 6.2.1 as simply the two sentences at bottom of p.6-1. | Fixed. |
| 6-3 | 6.2.1 Table 6-1 |  | ed/te | Somewhere it should be stated that "at least one of the optional data sections must be provided", or words to that effect. Otherwise, a degenerate OCM of header and metadata would be "valid", but that shouldn't be our intent. | David S. Berry / NASA | Add text indicating at least one data section. | Fixed. |
| 6-4 | 6.2.2 | Table 6-2 | te | The "ORIGINATOR" field and "MESSAGE\_ID" fields should in the Header, not the Metadata. | David S. Berry / NASA | Move "ORIGINATOR" and "MESSAGE\_ID" fields from Metadata to Header. This would be consistent with the other ODMs, CDM, and the RDM. | Fixed. |
| 6-4 | 6.2.3.3 | 1 | ed | Word choice. | David S. Berry / NASA | From: "Each metadata section..."To: "The metadata section..."Since you have designed the OCM to have a single metadata section, "Each" is equivalent to "The", and "The" better expresses the singular nature and is consistent with 6.2.3.2. | Fixed. |
| 6-4 | 6.2.3.4 | 1 | ed/te | Unclear requirement. | David S. Berry / NASA | I think the intent of "Each of these..." refers to "META\_START" and "META\_STOP", but it could also apply to any metadata keyword. The statement in 6.2.3.4 could be easily appended to 6.2.3.3, which would make the requirement clear. | Fixed. |
| 6-4 | 6.2.3.5 | NOTES | ed/te | The three "NOTEs" that appear after 6.2.3.5 seem premature. | David S. Berry / NASA | Suggest moving these NOTEs to right before the Table 6-3. | Fixed. |
| 6-4 | 6.2.3.5 | NOTE1 | te | Should we specify "reference [2]" for the OBJECT\_NAME and OBJECT\_ID? | David S. Berry / NASA | Consider | Done. |
| 6-4 | 6.2.3.5 | NOTE2 | te | Wording to indicate a recommendation. | David S. Berry / NASA | From: "... it is recommended that one of these three keywords be supplied"To: "... at least one of these three keywords should be supplied" | Fixed. |
| 6-5 | 6.2.3.7 | All | ed/te | The material in this section (which is entirely new) should be consistent with similar material that already appears in the published CDM and the very mature RDM. The excess detail seems unnecessary. | David S. Berry / NASA | Use the specifications already provided in the CDM and RDM. | Moving this content to SANA registry so that this can evolve according to user needs. My list was based upon what’s used in practice at ESA + CelesTrak.  |
| 6-56-6 | 6.2.3.8 | All | te | This material is entirely new in this version, and has not seemed necessary to date. | David S. Berry / NASA | Consider whether or not this material is really necessary... does it really add anything useful to the OCM? What if someone codes it incorrectly? If it is seen to be necessary, how does it align with SC14 standards? | Moving this content to SANA registry so that this can evolve according to user needs. My list was based upon what’s used in practice at ESA + CelesTrak.  |
| 6-7 | Table 6-3 | First line | ed/te | The "META\_START" keyword specified in 6.2.3.3 is missing. | David S. Berry / NASA | Add "META\_START" keyword after table heading row. | Fixed. |
| 6-7 | Table 6-3 |  | te | ORIGINATOR keyword: As noted above, for consistency with other NavWG standards, this should be in the Header. | David S. Berry / NASA | Move to header. | Fixed. |
| 6-7 | Table 6-3 |  | ed/te | ORIGINATOR keyword Description: general note... the parenthetical "(and note the procedure... use case)." should be moved into the Annex B, Section B1, 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.) | Fixed. |
| 6-7 | Table 6-3 |  | ed/te | MESSAGE\_ID keyword: As noted above, for consistency with other NavWG standards, this should be in the Header. | David S. Berry / NASA | Move to header. | Fixed. |
| 6-76-8 | Table 6-3 |  | te | PREV\_MESSAGE\_ID, PREV\_MESSAGE\_EPOCH keywords not consistent with RDM | David S. Berry / NASA | From: PREVTo: PREVIOUS | Fixed. |
| 6-8  | Table 6-3 |  | te | PREV\_MESSAGE\_EPOCH... the time scale should be UTC, just as it is for "CREATION\_DATE". | David S. Berry / NASA | From: "The time scale of this epoch is controlled via the DEF\_TIME\_SYSTEM keyword."To: "The time scale of this epoch is UTC". | Fixed. |
| 6-8 | Table 6-3 |  | te | NEXT\_MESSAGE\_EPOCH... not clear why this is necessary. | David S. Berry / NASA | Discuss at Mountain View | Fixed. |
| 6-8  | Table 6-3 |  | te | NEXT\_MESSAGE\_EPOCH... if this is seen as necessary, the description text is not relevant to the keyword. | David S. Berry / NASA | Remove the second sentence of existing text and replace with "The time scale of this epoch is UTC". | Fixed. |
| 6-8 | Table 6-3 |  | 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 | Classification is a global aspect for space State Actors. Discuss at Mountain View | We agreed as a group that this is a global concern for space State Actors (governments and companies) that should be supported. We decided to use CLASSIFICATION as the Keyword. This is an optional field.  |
| 6-8 | Table 6-3 |  | te | \*\*\*\_MSG\_LINK: Let's discuss whether these fields are desirable or necessary. They may well be, but let's discuss because if they are adopted here they could engender corrigenda to other standards. | David S. Berry / NASA | Discuss at Mountain View | Fixed per consensus in Mtn View |
| 6-9 | Table 6-3 |  | te | INTERNATIONAL\_DESIGNATOR: Why is this different from what we are asking for in "OBJECT\_ID" for the OPM, OMM, OEM? | David S. Berry / NASA | Seems like we should be consistent here with UNOOSA. Let's discuss at Mountain View whether or not UNOOSA or NSSDC is best for this data. | Fixed, per Mtn View agreement. |
| 6-9 | Table 6-3 |  | te | OPERATOR, OWNER | David S. Berry / NASA | Not sure why these are relevant to the orbit given that there is already ORIGINATOR\_POC, TECH\_ORG, and TECH\_POC.  | It is often important to know who the operator is (not always the same as the originator or owner), who the Owner is (for policy matters) etc. |
| 6-9 | Table 6-3 |  | te | MISSION: In my experience, this is very ambiguous, and not at all standardized. | David S. Berry / NASA | Review necessity for this field. We have lots of other info that better identifies the applicable spacecraft. | Agree, and removed. |
| 6-9 | Table 6-3 |  | te | CONSTELLATION | David S. Berry / NASA | Not sure why this is necessary as a keyword. | This content is standardized content stored in the SATCAT and the ESA DISOS Database. I’m  |
| 6-9 | Table 6-3 |  | te | LAUNCH\_\*: These keywords look like an attempt to create the Launch Data Message, and I don't think they are relevant to the trajectory per se. | David S. Berry / NASA | Discuss removal. | Agree, and removed. |
| 6-10 | Table 6-3 |  | te | RELEASE\_EPOCH: I'm not sure what "most recent deployment of this space object" means. Presumably "this space object" is the one that was deployed... at best that phrase is ambiguous. | David S. Berry / NASA | Discuss removal. | Agree, and removed. |
| 6-10 | Table 6-3 |  | te | MISSION\_\*\_EPOCH: The ODM is not really a Mission Description Document, so I'm not sure why these are here. Since "mission" is ambiguous, and missions are often measured in years, it's not clear why these are useful in the ODM. | David S. Berry / NASA | Discuss removal. | Agree, and removed. |
| 6-10 | Table 6-3 |  | te | REENTRY\_EPOCH, LIFETIME: At this time, this data is properly in the RDM. | David S. Berry / NASA | Discuss removal. | Agree, and removed. |
| 6-10 | Table 6-3 |  | te | OBJECT\_TYPE: Values should be the same as specified in the CDM/RDM | David S. Berry / NASA | Modify values to be consistent with CDM/RDM | Moving to SANA registry and can standardize there. |
| 6-10 | Table 6-3 |  | te | OPS\_STATUS: It's not clear that a value can be uniquely defined. In particular, "PARTIALLY\_OPERATIONAL" may be excessively vague. | David S. Berry / NASA | Ensure that the values don't overlap. Ensure clear definition of "PARTIALLY\_OPERATIONAL" | Addressed per Cheryl’s similar comment. |
| 6-10 | Table 6-3 |  | te | ORBIT\_TYPE: Not sure if this is necessary. What if the ORBIT\_TYPE and the ephemeris data are inconsistent? | David S. Berry / NASA | Discuss operational need for this keyword. | Addressed per Cheryl’s similar comment. |
| 6-11 | Table 6-3 |  | te | DEF\_EPOCH\_TZERO: We need to reconsider this notion. It introduces unnecessary complexity to have a different EPOCH\_TZERO for each section of the OCM with overrides. I can see where having this type of flexibility might be desirable in the code used by an OCM PRODUCER to create an OCM, but it introduces a lot of unnecessary processing complexity for an OCM USER. I predict it will be error prone. | David S. Berry / NASA | Return to "EPOCH\_TZERO" for the entire OCM. | Fixed. |
| 6-11 | Table 6-3 |  | te | DEF\_TIME\_SYSTEM: Once again, I don't see the compelling need to have more than one TIME SYSTEM for an OCM. | David S. Berry / NASA | TIME\_SYSTEM should be sufficient. | Fixed. |
| 6-11 | Table 6-3 |  | te | SEC\_PER\_DAY: I'm having trouble imagining a scenario where this would be useful for navigating the spacecraft. Interesting from a science standpoint, but how to use this in orbit processing or tracking. | David S. Berry / NASA | Discuss at Mountain View. | Switched to SI Days, with a NOTE: Days nominally consist of 86400s. When orbiting another celestial body, one might by ICD arrange  |
| 6-11 | Table 6-3 |  | te | EARLIEST\_TIME, LATEST\_TIME: Keywords are not consistent with other Nav WG standards, and it shouldn't be necessary for the OCM recipient to calculate these.  | David S. Berry / NASA | Let's use START\_TIME and STOP\_TIME please, and make them absolute times. | Fixed. |
| 6-12 | Table 6-3 | Last line | ed/te | The "META\_STOP" keyword specified in 6.2.3.3 is missing. | David S. Berry / NASA | Add "META\_STOP" keyword after table last row. | Fixed. |
| 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). | Fixed. |
| 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? | On 21 Oct 2019, we agreed to adopt the new Orbit time history text and propagate that to other sections as well. |
| 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. | Fixed. |
| 4-3 | 4.2.3.2 NOTE | 1 | ed | Missing end parenthesis after OBJECT\_ID | David S. Berry / NASA | Add missing end parenthesis. | Already was fixed. |
| 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. | Fixed. |
| 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 | Classification is a global aspect for space State Actors. Discuss at Mountain View | We agreed as a group that this is a global concern for space State Actors (governments and companies) that should be supported. We decided to use CLASSIFICATION as the Keyword. This is an optional field.  |
| 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.) | Fixed. |
| 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? | On 21 Oct 2019, we agreed to adopt the new Orbit time history text and propagate that to other sections as well. |
| 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. | Fixed. |
| 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" | Fixed. |
| 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" | Fixed. |
| 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. | Fixed. |
| 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 | Classification is a global aspect for space State Actors. Discuss at Mountain View | We agreed as a group that this is a global concern for space State Actors (governments and companies) that should be supported. We decided to use CLASSIFICATION as the Keyword. This is an optional field.  |
| 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? | On 21 Oct 2019, we agreed to adopt the new Orbit time history text and propagate that to other sections as well. |
| 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. | Understood. |
| 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. | Fixed. |
| 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 | Fixed. |
| 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" | Fixed. |
|  |  |  |  |  |  |  |  |
| 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.] | Per agreement on 21 Oct 2019, we will retain the new language, which states that COMMENTS and non-normative FREE TEXT can use mixed case, and all normative content must use ALL UPPERCASE \*or\* ALL LOWERCASE. |
| 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" | Fixed. |
| 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. | Fixed, per agreed-upon “should” language. |
| 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..." | Fixed, per agreed-upon “should” language. |
| 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..." | Fixed, per agreed-upon “should” language. |
| 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" | Fixed. |
| 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 time tag checking (i.e., a second Orbit State Time History block). | Fixed. But considered, and still considering. Still have problems with this, as I know of multiple tools and SDA practices that rely upon it. |
| 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..." | Deleted. |
| 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. | Fixed. |
| 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... " | Fixed. |
| 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. | Fixed. |
| 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. | Fixed. |
| 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..." | Fixed. |
| 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. | Moved to SANA. |
| 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..." | Fixed. |
| 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. | Fixed. |
| 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? | On 21 Oct 2019, we agreed to adopt the new Orbit time history text and propagate that to other sections as well. |
| 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. | On 21 Oct 2019, we agreed to adopt the new Orbit time history text and propagate that to other sections as well. |
| 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. | On 21 Oct 2019, we agreed to adopt the new Orbit time history text and propagate that to other sections as well. |
| 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. | Fixed. |
| 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. | Fixed. |
| 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." | Fixed. |
| 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 | Fixed. |
| 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 | Fixed. |
| 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. | Fixed. |
| 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 | Retained just manufacturer and model |
| 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 | Clarified.This approach lets the user invoke either an attitude-independent constant value, an att-dependent one, or a combination. |
| 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 | Removed OES. |
| 6-20 | Table 6-5 |  | ed | OES\_MIN, AREA\_ALONG\_OES\_\* | David S. Berry / NASA | From: OEBTo: OES | Removed 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 | Clarified.This approach lets the user invoke either an attitude-independent constant value, an att-dependent one, or a combination. |
| 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. | Fixed. |
| 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? | Fixed. |
| 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. | Fixed. |
| 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 | 6.2.6.16.2.6.26.2.6.36.2.6.4 |  | ed | These sections all refer to Table 6-9, but the applicable table is 6-6 | David S. Berry / NASA | From: Table 6-9To: Table 6-6 | Fixed. |
| 6-21 | 6.2.6.1 | 2 | ed | Missing word | David S. Berry / NASA | From: "...used in OCM"To: "... used in an OCM" | Fixed. |
| 6-21 | 6.2.6.56.2.6.7 | 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. | Fixed. |
| 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. | Fixed. |
| 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..." | Fixed. |
| 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..." | Fixed. |
| 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]" | Fixed. |
| 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). | Fixed. |
| 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..." | Fixed. |
| 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..." | Fixed. |
| 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. | Fixed. |
| 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. | Fixed. Searched for all 7.5.X references to ensure correct |
| 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 eigenvaluesTo: eigenvalues and eigenvectors | Fixed. |
| 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. | Fixed. |
| 6-24 | Table 6-6 |  | ed | COV\_BASIS: Examples of values don't match values shown in Description. | David S. Berry / NASA | From: DETERMINEDTo: DETERMINED\_OD | Fixed. |
| 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. | Fixed. |
| 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.) | Fixed. |
| 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: §7.5.9To: n/aFrom: DEF\_EPOCH\_TZEROTo: EPOCH\_TZERO | Fixed. |
| 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: 6To: <blank> | Removed. |
| 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. | Considered. Each are independently needed to match what is operationally being done for conjunction assessment Pc |
| 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." | Fixed. |
| 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 | Fixed. |
| 6-26 | 6.2.7.16.2.7.26.2.7.36.2.7.4 |  | ed | These sections all refer to Table 6-10, but the applicable table is 6-7 | David S. Berry / NASA | From: Table 6-10To: Table 6-7 | Fixed. |
| 6-26 | 6.2.7.56.2.7.7 | 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. | Fixed. |
| 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..." | Fixed. |
| 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..." | Fixed. |
| 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]" | Fixed. |
| 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..." | Fixed. |
| 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. | Fixed. |
| 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. | Fixed. |
| 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. | Fixed. |
| 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. | Fixed. |
| 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\_IDTo: STM\_NEXT\_ID | Fixed. |
| 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. | Fixed. |
| 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. | Fixed. |
| 6-29 | Table 6-7 |  | ed/te | STM\_BASIS: Example values has a value not listed in the Description. | David S. Berry / NASA | From: DETERMINEDTo: DETERMINED\_OD | Fixed. |
| 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\_BASISTo: STM\_BASIS | Fixed. |
| 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? | To discuss. |
| 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. | Fixed. |
| 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. | Fixed. |
| 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" | Fixed. |
| 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. | Fixed. |
| 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". | Fixed. |
| 6-30 | Table 6-7 |  | ed/te | STM\_N:  | David S. Berry / NASA |  | Fixed. |
| 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: 6To: <blank> | Fixed. |
| 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" | Fixed. |
| 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 | Fixed. |
| 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"orFrom: "Table 6-10"To: "Tables 6-9 and 6-10" | Fixed. |
| 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 (?) | Fixed. |
| 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..." | Fixed. |
| 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..." | Fixed. |
| 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. | Fixed. |
| 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. | Fixed. |
| 6-32 | 6.2.8.13, Table 6-8 |  | te | The purpose of identifying 10 possible maneuver description cases is not clear. 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. | Deleted. |
| 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..." | Fixed. |
| 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" | Fixed. |
| 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. | Fixed. |
| 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? | Fixed. |
| 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" | Fixed. |
| 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. | Fixed. |
| 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. | As agreed on 21 Oct 2019, this is and has been a long-standing goal (and agreement) to be able to depict a deployment scenario in a single message. We chose to have deploy\_mass be negative (to reflect the decrement to the host vehicle). |
| 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. | Fixed. |
| 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. | As agreed on 21 Oct 2019, this is and has been a long-standing goal (and agreement) to be able to depict a deployment scenario in a single message. We chose to have deploy\_mass be negative (to reflect the decrement to the host vehicle). |
| 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. | Fixed. |
| 6-34 | Table 6-9 |  | ed | THR\_DMASS: Units should be "kg", not "Kg" | David S. Berry / NASA | From: "Kg"To: "kg" | Fixed. |
| 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^2To: km/s\*\*2 | Fixed. |
| 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. | This is because when acceleration is supplied, you won’t know what the inputs are sufficient to compute the rocket equation. |
| 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. | As agreed on 21 Oct 2019, this is and has been a long-standing goal (and agreement) to be able to depict a deployment scenario in a single message. We chose to have deploy\_mass be negative (to reflect the decrement to the host vehicle). |
| 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. | As agreed on 21 Oct 2019, this is and has been a long-standing goal (and agreement) to be able to depict a deployment scenario in a single message. We chose to have deploy\_mass be negative (to reflect the decrement to the host vehicle). |
| 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. | For Dan to work on. |
| 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" | Fixed. |
| 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. | Fixed. |
| 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. | Fixed. |
| 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) | Fixed. |
| 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. | Fixed. |
| 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. | No, this is designed to be additive across multiple blocks of maneuvers. |
| 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. | Fixed. |
| 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? | Already listed as 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: 6.2.8.1To: Table 6-9 | Fixed. |
| 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? | On 21 Oct 2019, we agreed to adopt the new Orbit time history text and propagate that to other sections as well. |
| 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: §7.5.9To: n/aFrom: DEF\_EPOCH\_TZEROTo: EPOCH\_TZERO | Fixed. |
| 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. | Fixed. |
| 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/aSee earlier comment about addition of 7.5.2 that caused the shift. | Fixed. |
| 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). | Fixed. |
| 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\_NAMETo: GRAV\_ASSIST\_NAME | Fixed. |
| 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:" | Fixed. |
| 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. | Will be updated |
| 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 $\ne $ 'NONE', all of the parameters of this block must be given." | Fixed. |
| 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 defaultsTo: "No". | Fixed |
| 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" | Fixed |
| 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. | Fixed |
| 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? | Added “N” cycles of DC\_Period … |
| 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? | Fixed. |
| 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? | Clarified. |
| 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." | Fixed. |
| 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". | Fixed. |
| 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. | Deleted. |
| 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". | Fixed. |
| 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." | Fixed. |
| 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." | Fixed. |
| 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. | These are not relevant to the conical-based duty cycle |
| 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." | Fixed. |
| 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." | Fixed. |
|  |  |  |  |  |  |  |  |
| 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. | Fixed. |
| 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. | Fixed. |
| 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 |  | Deleted. |
| 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\_TYPETo: DUTY\_CYCLE\_TYPE | Fixed. |
| 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. | Fixed. |
| 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. | Fixed. |
| 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" | Fixed. |
| 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\_TYPETo: DUTY\_CYCLE\_TYPE | Fixed. |
| 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 = CONETo: MAN\_DUTY\_CYCLE\_TYPE = CONE\_ANGLE | Fixed. |
| 6-43 | 6.2.9.16.2.9.26.2.9.3 |  | ed | These sections all refer to Table 6-5, but the applicable table is 6-11 | David S. Berry / NASA | From: Table 6-5To: Table 6-11 | Fixed. |
| 6-44 | 6.2.9.4 |  | ed | This section refers to Table 6-5, but the applicable table is 6-11 | David S. Berry / NASA | From: Table 6-5To: Table 6-11 | Fixed. |
| 6-44 | Table 6-11 |  | ed/te | PERT\_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? | On 21 Oct 2019, we agreed to adopt the new Orbit time history text and propagate that to other sections as well. |
| 6-44 | Table 6-11 | N/A | ed/te | PERT\_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.  | David S. Berry / NASA | Please move the parenthetical note to the Annex B. (This one and all the others in the document.) | Fixed. |
| 6-44 | Table 6-11 | N/A | te | PERT\_CENTER\_NAME: Is there a reason why this wouldn't just be the orbit center? We already have N\_BODY\_PERTURBATIONS listed. | David S. Berry / NASA | Discuss at Mountain View. | Fixed. |
| 6-44 | Table 6-11 | N/A | te | ATMOSPHERIC\_MODEL: you raise the question of making the values SANA entries. | David S. Berry / NASA | Discuss at Mountain View. We will want to be consistent with the CDM and RDM as well. | (Moving to SANA) |
| 6-44 | Table 6-11 | N/A | te | GRAVITY\_MODEL: you raise the question of making the values SANA entries. | David S. Berry / NASA | Discuss at Mountain View. We will want to be consistent with the CDM and RDM as well. | (Moving to SANA) |
| 6-44 | Table 6-11 | N/A | te | EQUATORIAL\_RADIUS: Units are in meters, but should be kilometers. | David S. Berry / NASA | From: Units = "m"To: Units = "km" | Fixed. |
| 6-44 | Table 6-11 |  | ed/te | N\_BODY\_PERTURBATIONS: we say these could include 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? | Fixed. |
| 6-45 | Table 6-11 | 3 | ed | INTERP\_METHOD\_SPWX: In this line there is a list of the various indices and proxies associated with space weather. They are separated by spaces, but commas would be better. | David S. Berry / NASA | Make the list of indices and proxies a comma separated list. | Fixed. |
| 6-46 | Table 6-11 |  | ed | FIXED\_F10P7: In the "units" column, there is a notation for the Solar Flux Units "W/m2\*Hz". This is different from all other similar SFU notations in Table 6-11, which are "W/m\*\*2\*Hz". This notation is consistent with 7.6.1.1(e). Unfortunately, due to the "Units" column width, this displays as:W/(m\*\*2\*Hz)which is hard to read. | David S. Berry / NASA | From: "W/m2\*Hz"To: "W/m\*\*2\*Hz"Possibly consider narrowing the "Examples of Values" column and widening the "Units" column. | Fixed. |
| 6-46 | Table 6-11 |  | ed | FIXED\_M10P7: In the notes at the bottom of the table cell, there are a couple of odd text strings, one of which I think I know what was intended, the other not. | David S. Berry / NASA | From: "core--- o---wing"To: "core-to-wing"From: "NOAA---16, ---17, ---18"To (I think): "NOAA-16, -17, -18".  | Fixed. |
| 6-44 thru 6-47 | Table 6-11 |  | ed/te | Perturbations section general comment. It might be useful to identify those items that are only useful in Earth orbit and those that are useful in any orbit.  | David S. Berry / NASA | Consider. A single sentence in each cell could do it, or alternatively, the table could be divided into two sections: "Any Orbit" and "Earth Orbit Only" | I believe they are all general purpose. |
| 6-48 | 6.2.10.16.2.10.26.2.10.36.2.10.4 |  | ed | These sections all refer to Table 6-6, but the applicable table is 6-12 | David S. Berry / NASA | From: Table 6-6To: Table 6-12 | Fixed. |
| 6-48 | 6.2.10.7 | 3-5 | ed/te | Phrase starting with "depending..." through the end of the specification seems unnecessary given the first 3 lines up to the word "depending". Also, the parenthetical remark "(i.e., ..)" actually seems to contradict the first line of the section. | David S. Berry / NASA | Remove phrase starting with "depending". | Fixed. |
| 6-48 | 6.2.10.8 |  | ed/te | States that '"Track" is defined in Section 1.6', however, the term defined is "sensor track", and it is defined in Section 1.5. | David S. Berry / NASA | From: "Track" To: "sensor track"From: 1.6To: 1.5 | Fixed. |
| 6-48 | 6.2.10.10 |  | ed/te | Wording to indicate a recommendation (per Sec 1.6) | David S. Berry / NASA | From: "... it is recommended that a corresponding perturbations section be included..."To: "... a corresponding perturbations section should be included..." | Fixed. |
| 6-48 | 6.2.10.10 |  | ed | I think the NOTE immediately following this section would be better placed right after the section title (i.e., after 6.2.10) or right after section 6.2.10.1). Right after the title is best. | David S. Berry / NASA | Move "NOTE" to position between 6.2.10 and 6.2.10.1 | Fixed. |
| 6-48 | 6.2.10.10 |  | ed | In the NOTE, might as well spell out the full word "COVARIANCE". | David S. Berry / NASA | From: COVARTo: COVARIANCE | Fixed. |
| 6-50 | Table 6-12 |  | te | DAYS\_SINCE\_FIRST\_OBS, DAYS\_SINCE\_LAST\_OBS, RECOMMENDED\_OD\_SPAN, ACTUAL\_OD\_SPAN: These all state that the number of days is "(defined by the SEC\_PER\_DAY duration in the OCM metadata section)", but this contradicts the length of day specified in 6.2.10.7 (i.e, 86400 seconds). | David S. Berry / NASA | Resolve contradiction. I favor the 86400 per 6.2.10.7 because it's the most plausible case (at least for the first 5 years of the OCM, and probably much longer). | Fixed. |
| 6-51 | Table 6-12 |  | te | CONSIDER\_PARAMS: This keyword appears twice. The first instance appears to have the correct Description. The Description for the second instance suggests a keword such as "MEASUREMENT\_UPD\_INTV" or something like that. | David S. Berry / NASA | Select a new keyword name for second instance of CONSIDER\_PARAMS keyword. | Fixed. |
| 6-52 | Table 6-12 |  | ed | There is a sentence in the middle of the description that seems out of place. | David S. Berry / NASA | Consider removing the sentence "Orbit determine event times are in double precision days." from the middle of the Description text. | Fixed. |
| 6-53 | 6.2.11.5 | 2 | ed | This section refers to Table 6-12, but the applicable table is 6-13 | David S. Berry / NASA | From: Table 6-12To: Table 6-13 | Fixed. |
| 6-53 | Table 6-13 |  | ed/te | COMMENT: The Description text contradicts 6.2.11.4 | David S. Berry / NASA | Either delete 6.2.11.4 (my preference) or re-word the Description to reflect 6.2.11.4. | Fixed. |
| 6-53 | Table 6-13 |  | ed | COMMENT: The Description text has two opening parentheses but only one closing parenthesis. | David S. Berry / NASA | Either delete 6.2.11.4 (my preference) or re-word the Description to reflect 6.2.11.4. | Fixed. |
| 6-53 | Tables6-2 through 6-7, 6-10 through 6-13 |  | ed | COMMENT: I just noticed this after reading over it many times in P2.37 and P2.38... last table in the document. Subject/verb agreement in the Description... subject "set" is singular, verb "are" is plural. Can either make the subject plural or the verb singular. | David S. Berry / NASA | From: "a contiguous set of one or more comment lines are allowed"To: "a contiguous set of one or more comment lines is allowed"or To: "one or more comment lines are allowed" | Fixed. |
| 6-53 | Table 6-13 |  | te | (USER-DEFINED): Note that the formation of the user defined keyword is different in the OPM and OMM. | David S. Berry / NASA | Please consider making the formation of the user defined keywords consistent with that defined in the OPM and OMM. | Considered. Extra string length not warranted, in my opinion, as it is inside of USER\_START/USER\_STOP |
| 6-53 | 6.3 |  | ed | Says example OCMs are "in G-1", but for consistency with other document sections, "in Annex G" would be preferred. | David S. Berry / NASA | From: "in G-1"To: "in Annex G" | Fixed. |
| 7-0 | 7.2 | 1 | ed | Word choice, also missing Oxford comma. | David S. Berry / NASA | From: "(OPM, OMM, OEM or OCM)"To: "(OPM, OMM, OEM, and OCM)" | Fixed. |
| 7-0 | 7.2 | 2 | ed | May want to include final subsection in the specification. | David S. Berry / NASA | From: "through 7.7"To: "through 7.8" | Fixed. |
| 7-1 | 7.4.1.5 | 1 | ed | Word choice (per section 1.6) | David S. Berry / NASA | From: "lines can contain"To: "lines may contain" | Fixed. |
| 7-1 | 7.4.1.5 |  | te | Note that this specification really applies throughout the ODM (see 7.3.5), so it's somewhat redundant and could be deleted. | David S. Berry / NASA | Consider deleting. | Fixed. |
| 7-1 | 7.4.1.7 |  | ed | Section reference has changed. | David S. Berry / NASA | From: 6.2.5To: 6.2.6 | Fixed. |
| 7-1 | 7.4.1.9 |  | ed | Section reference looks garbled (this might be a mashup of page number and section number) | David S. Berry / NASA | From: 6-316.2.8To: 6.2.8 |  |
| 7-2 | 7.5.2 |  | ed/te | This specification should be deleted because it conflicts with 7.5.7 and is not consistent with prior issues of the ODM. | David S. Berry / NASA | You have flagged this "To discuss", which is fine, so let's do that at Mountain View. But for consistency it should be deleted. I have previously provided the rationale for 7.5.7. | Per agreement on 21 Oct 2019, we will retain the new language, which states that COMMENTS and non-normative FREE TEXT can use mixed case, and all normative content must use ALL UPPERCASE \*or\* ALL LOWERCASE. |
| 7-2 | 7.5.2 |  | ed | If this requirement survives the consensus process, the reference for comment formatting should be fixed. Also, it can be placed at 7.5.7, which should correct other issues associated with inserting a new requirement when there are existing references. | David S. Berry / NASA | From: 6.2.5To: 7.7 | Deleted. |
| 7-3 | 7.5.11 |  | ed/te | Refers to the TIME\_SYSTEM keyword, which I believe should be the proper specification. However, if the multiple time systems introdued in P2.38 survive the consensus process, then this specification must be re-written. | David S. Berry / NASA | As noted elsewhere, I think the proper solution to the issue is to replace \*\_TIME\_SYSTEM with simply TIME\_SYSTEM. To my mind there is no necessity to introduce the additional complexity of having multiple time systems in a single OCM. | Eliminated multiple time systems. |
| 7-4 | 7.6.1.1 | 3 | ed/te | List of tables containing units should be revised. | David S. Berry / NASA | From: 5-3To: 6-3NOTE: Table 5-3 doesn't have any unit specs in it, Table 6-3 does. | Fixed. |
| 7-4 | 7.6.3.1 |  | te | While it is true that the units in an OCM orbit state data line are based on degrees, kilometers, and seconds, the units for any given element in the orbit state component is not apparent except as it is represented in the Orbital Elements SANA Registry. | David S. Berry / NASA | It might be better to refer the reader to the units specification as it exists in the Orbital Elements SANA Registry. | Fixed. |
| 7-5 | 7.6.3.2 |  | te | While it is true that the units in an OCM covariance matrix data line are based on degrees, kilometers, and seconds, the units for any given element in the covariance matrix component is not apparent except as it is represented in the Orbital Elements or Covariance Matrices SANA Registry. | David S. Berry / NASA | It might be better to refer the reader to the units specification as it exists in the Orbital Elements or Covariance Matrices SANA Registry. | Fixed. |
| 7-5 | 7.6.3.3 |  | te | While it is true that the units in an OCM state transition matrix data line are based on degrees, kilometers, and seconds, the units for any given element in the state transition matrix component is not apparent except as it is represented in the Orbital Elements or Covariance Matrices SANA Registry. | David S. Berry / NASA | It might be better to refer the reader to the units specification as it exists in the Orbital Elements or Covariance Matrices SANA Registry. | Fixed. |
| 7-5 | 7.6.3.4 |  | ed | This section is obsolete due to removal of the ephemeris compression section. | David S. Berry / NASA | Delete 7.6.3.4 | Fixed. |
| 7-5 | 7.6.3.5 | 1 | ed/te | Referring the reader to section 6.2 might not be sufficiently specific. | David S. Berry / NASA | Add "Tables 6-4 through 6-12" after "Section 6.2" | Fixed. |
| 7-6 | 7.7.9 | 3 | ed | Refers to "Ephemeris Compression", which has been removed from the OCM. | David S. Berry / NASA | Delete phrase "Ephemeris Compression" | Fixed. |
| 7-6 | 7.7.9 | 4-5 | ed | It might help the OCM creator to provide more specific guidance on placement of comments. | David S. Berry / NASA | From: "(generally at the top of each section)"To: "(generally at the top of each section, following the \*\_START section delimiting keyword)" | Fixed. |
| 7-7 | 7.8.1 |  | ed | In "Version Number" column, center the values (as shown in the first 2 table entries). | David S. Berry / NASA | Consider. | Fixed. |
| 7-8 | 7.8.2.4 | 2 | ed/te | Table list should be revised. | David S. Berry / NASA | Remove "table 6-8, table 6-9" since they have no keywords. Add "table 6-12, table 6-13" since they do have keywords. | Fixed. |
| A-3 | A2.4 |  | ed/te | Version shown is a draft version; there is no risk in putting the eventual Production version here. | David S. Berry / NASA | From: P2.38To: 3 | Fixed. |
| B-1 | B1 | 1 | ed | Subject/verb agreement. | David S. Berry / NASA | From: "The set of acceptable values... are provided..."To: "The set of acceptable values ... is provided..."Alternatively:From: same as above"Acceptable values ... are provided..." | Fixed. |
| B-1 | B1 |  | ed/te | The reference chaining construct here may not be readily apparent to an ODM user, e.g., in Table 3-1, we refer them to Annex B, Section B1, which is fine. However, in B1 we then further direct the user to "normative reference [B-1]". Since references are in Section 1.7, and [B-1] is not present there, the user could get confused. It might be better in Section B1 to refer them specifically to Section B9. (Makes the reference chaining clearer.) | David S. Berry / NASA | From: "... provided in ANNEX B normative reference [B-1]."To: "... provided in ANNEX B, Section B9, normative reference [B-1]." | Fixed. |
| B-1 | B2 |  | ed/te | Similar reference chaining comment as for Section B1 and reference [B-1]. | David S. Berry / NASA | Consider. | Fixed. |
| B-1 | B2 | 1, 4 | ed | Subject/verb agreement. | David S. Berry / NASA | From: "The set of acceptable values... are provided..."To: "The set of acceptable values ... is provided..."Alternatively:From: same as above"Acceptable values ... are provided..." | Fixed. |
| B-1 | B2 | 4 | ed | Contains reference to "EC\_CENTER\_NAME", which is no longer in the OCM. | David S. Berry / NASA | Delete "EC\_CENTER\_NAME" reference. | Fixed. |
| B-1 | B2 | para2, line 1 | ed/te | Removal of "Note" from normative statement; subject/verb agreement. | David S. Berry / NASA | From: "Note that this values..."To: "These values..." | Fixed. |
| B-2 | B3 |  | ed/te | Similar reference chaining comment as for Section B1 and reference [B-1] | David S. Berry / NASA | Consider. | Fixed. |
| B-2 | B3 | 1 | ed | Subject/verb agreement. | David S. Berry / NASA | From: "The set of acceptable values... are provided..."To: "The set of acceptable values ... is provided..."Alternatively:From: same as above"Acceptable values ... are provided..." | Fixed. |
| B-2 | B4 |  | ed/te | Similar reference chaining comment as for Section B1 and reference [B-1] | David S. Berry / NASA | Consider. | Fixed. |
| B-2 | B4 | 1,2 | ed | Subject/verb agreement. | David S. Berry / NASA | From: "The set of non-orbit-relative... are provided..."To: "The set of non-orbit-relative ... is provided..." | Fixed. |
| B-2 | B5 | 1 | ed/te | Normative language... can=>may | David S. Berry / NASA | From: "... covariance data can be specified..."To: "... covariance data may be specified..." | Fixed. |
| B-2 | B5 |  | ed/te | Similar reference chaining comment as for Section B1 and reference [B-1] | David S. Berry / NASA | Consider. | Fixed. |
| B-2 | B6 | 1 | ed | Subject/verb agreement. | David S. Berry / NASA | From: "An additional set... are acceptable..."To: "An additional set... is acceptable..." | Fixed. |
| B-2 | B6 |  | ed/te | Similar reference chaining comment as for Section B1 and reference [B-1] | David S. Berry / NASA | Consider. | Fixed. |
| B-2 | B7 | 1 | ed | Subject/verb agreement. | David S. Berry / NASA | From: "The set of acceptable values... are provided..."To: "The set of acceptable values ... is provided..."Alternatively:From: same as above"Acceptable values ... are provided..." | Fixed. |
| B-2 | B7 |  | ed/te | Similar reference chaining comment as for Section B1 and reference [B-1] | David S. Berry / NASA | Consider. | Fixed. |
| B-2 | B7 | para4, line 1 | ed/te | It might be good to try to eliminate the double negative (non/not) contained in this specification. | David S. Berry / NASA | Consider:"When employing inertial element sets, inertial reference frames must be specified." or something like that. This also suggests we may need to modify the "Orbital Elements" registry to definitively state whether or not an element set is inertial or not. | Fixed. |
| B-3 | B7 |  | ed/te | Companion to previous comment. | David S. Berry / NASA | Consider:"When employing non-inertial element sets, non-inertial reference frames must be specified." or something like that. Alternatively: "When employing non-inertial element sets, inertial reference frames shall not be specified." Yes, this contains a double negative too, but it seems easier to me to understand. | Fixed. |
| B-3 | B8 | 1 | ed/te | Normative language... can=>may | David S. Berry / NASA | From: "... covariance data can be specified..."To: "... covariance data may be specified..." | Fixed. |
| B-3 | B8 |  | ed/te | Similar reference chaining comment as for Section B1 and reference [B-1] | David S. Berry / NASA | Consider. | Fixed. |
| B-3 | B9 | [B-1] |  | In general I think we want people to try to use the "Abbreviation" column in the cited registry... however, a lot of them do not have an abbreviation assigned. | David S. Berry / NASA | After the link, consider adding "(preferably the 'Abbreviation' column, if specified)" | Fixed. |
| B-3 | B9 | [B-4] |  | Link refers to "absolute\_reference\_frames", but Section A2 of our source document refers to "celestial\_body\_reference\_fames". | David S. Berry / NASA | Discuss at Mountain View if name change to "absolute\_reference\_frames" is necessary and/or desirable, respond accordingly. It might make sense given "Orbit-Relative Reference Frames". | Fixed. |
| C-1 | C1 | para6 line 2 | te | The annex is labelled informative. The paragraph contains a normative statement, which is not permitted. | David S. Berry / NASA | From: "... dimensions are equivalent, the user shall select XOES\_MAX as the direction along one of those longest..."To: "... dimensions are equivalent, XOES\_MAX is defined as the direction along one of those longest..."  | Fixed. |
| C-1 | C1 | para8line 2 | te | The annex is labelled informative. The paragraph contains a normative statement, which is not permitted. | David S. Berry / NASA | From: "... dimensions are equivalent, the user shall select XOES\_MAX as the direction along one of those longest..."To: "... dimensions are equivalent, XOES\_MAX is defined as the direction along one of those longest..."  | Fixed. |
| C-2 | C1 | 1 | te | The annex is labelled informative. The paragraph contains a normative statement, which is not permitted. | David S. Berry / NASA | From: "The OES z-axis shall always be defined as..."To: ""The OES z-axis is always defined as..."  | Fixed. |
| C-2 | C1 | Fig C-1 | te | The diagram shows the OES frame axes and OES\_PARENT\_FRAME axes as always being having the same letter name. It strikes me that this is not necessarily so, e.g., couldn't XOES\_MAX be on the same side of the shape as YOES\_PARENT\_FRAME or ZOES PARENT FRAME? | David S. Berry / NASA | If true, add a stat | Fixed. |
| C-3 | C1 | 2 | te | The annex is labelled informative. The paragraph contains a normative statement, which is not permitted. | David S. Berry / NASA | From: "... the ELLIPTICAL CYLINDER OES z-axis shall always be defined as..."To: "... the ELLIPTICAL CYLINDER OES z-axis is always defined as..."  | Fixed. |
| C-4 | C2 |  | te | In the various equations, rTarget does not appear to be used. | David S. Berry / NASA | If it is not used, it should be removed from the "Definitions". | (Closing this, as it duplicates prior comment) |
| C-4 | C2 |  | te | ETarget : In the note, there is a question as to whether or not this definition should be removed, but I think it should not since it appears in several of the equations. | David S. Berry / NASA | Recommend to retain ETarget in the definitions. | Fixed. |
| C-4 | C2 |  | ed/te | In the equation of Etarget , the angle $θ$(in $τ$Atmosphere($θ$)) is not defined; it's not mentioned in the definition of $τ$Atmosphere | David S. Berry / NASA | Provide definition if it's used, or remove from equation if it's not. | (Closing this, as it duplicates prior comment) |
| C-5 | C2 | 4 | ed/te | In the paragraph starting with "From the above equations...", it's not clear how the substitutions into the equation for VMabsolute are correct. The equation for VMabsolute is not provided. | David S. Berry / NASA | Provide equation for VM absolute based on the Definitions provided in this section. | (Closing this, as it duplicates prior comment) |
| 6-20 | Table 6-5 |  | ed | VM\_ABS: The description refers the reader to "Annex C, Section C-4" but the material has moved. | David S. Berry / NASA | From: "Annex C, Section C-4"To: Annex C, Section C2 | Fixed. |
| D-8 thruG-8 |  |  | N/A | In general I skipped the annexes containing examples... we can catch these later when the OCM content converges. | David S. Berry / NASA | N/A |  |
| H-1 | Annex H |  | ed | Given the migration of material to SANA, there are some acronyms that can be removed, if desired, because they no longer appear in the document except in this Annex: ECI, GCRF, ITRS, TCG. | David S. Berry / NASA | Consider removing, but OK if they stay... they don't hurt anything. | Fixed. |
| I-3 | I2.2 | Hdr | ed | Header row for the table is not present. | David S. Berry / NASA | Use MS Word "Repeat Header Rows" on the table. | Fixed. |
| I-3 | I2.2 | H3 | te | The columns for OPM?, OMM?, OEM? have "N" as the value, but since we decided to add MESSAGE\_ID to the older messages, I think we can change this to "Y". | David S. Berry / NASA | Consider. | Fixed. |
| J-1 | Title + J1 |  | ed | Maybe if we added "(ICD)" after the word "Document" in the title, we could use just the acronym instead of the full expansion + acronym in line 2 and line 6 of the first paragraph in section J1. | David S. Berry / NASA | Consider. | Fixed. |
| J-1 | J1 |  | ed | Item 6): Section reference needs an update. | David S. Berry / NASA | From: 6.2.12To: 6.2.11 | Fixed. |
| J-1 | J1 |  | ed | Item 7): The "Note" which contained the mention of ICD for floating point numbers in extended precisions in 7.5.5 (now 7.5.6) has been removed, so this item can be removed from J1 | David S. Berry / NASA | Remove item 7) | Fixed. |
| J-2 | J1 |  | te | Item 11): There are only 2 references in the document to SCLK, but neither of them is in Annex B. | David S. Berry / NASA | From: Annex BTo: 7.5.10 (but this would also require adding the proviso about transforming the SCLK to a standardized time system). | Fixed. |
| J-2 | J1 |  | ed/te | Item 11): The bolded text does not seem related to the preceding unbolded text. | David S. Berry / NASA | Move the bolded text into a new table row, with appropriate text reference. | Fixed. |
|  | J1 |  | te | There are a references to using an ICD in the document that are not in the table. | David S. Berry / NASA | Consider adding items for: * ORB\_AVERAGING 6.2.4 Table 6-4
* ORB\_TYPE 6.2.4, COV\_TYPE 6.2.6, STM\_TYPE 6.2.7 when = ICD to Item (10) in J1
* OD\_CONFIDENCE 6.2.10
* OCM Max line length 7.3.3
 | Fixed. |
| K-1 | K1 |  | ed/te | Mention that MESSAGE\_ID was added to the OPM, OMM, and OEM to provide better satisfaction of requirement P10 (identification and annotation of messages). | David S. Berry / NASA | Consider. | Fixed. |
| K-1 | K2 |  | ed/te | Item 1, line 2. The SANA Registry reference is too specific. | David S. Berry / NASA | From: SANA Registry of OrganizationsTo: SANA Registry | Fixed. |
| K-1 | K2 |  | ed/te | Item 1, line 3. The SANA Registry link should be updated. | David S. Berry / NASA | From: https://.../r/organizationsTo:https://.../r/navigation\_standard\_normative\_annexes | Fixed. |
| L-2 | L2 | 3 | ed | It might be helpful to the reader to point them to Annex B, which has all the required details. | David S. Berry / NASA | From: "... from the SANA registry:"To: "... from the SANA registry (see Annex B):" | Fixed. |
| M-1 |  |  | ed | There are several informative annexes that are not referenced in the document, and could conceivably be removed. | David S. Berry / NASA | Consider removing M-2, M-5, M-10, M-11, M-13, M-14, M-15, which are no longer referred to in the ODM. | M-13, M-14 and M-15 are all still used. Removing M-2, M-5, M-10, M-11 |
|  | 6.2.5 |  |  | Refers to Table 6-4 | Brian Swinburne/UKSA | Should this be Table 6-5? | Fixed. |
|  | 6.2.9 |  |  | Refers to Table 6-5 | Brian Swinburne/UKSA | Should be 6-11 | Fixed. |
|  |  |  |  | Table 6-11 PER\_CENTRE\_NAME and INTERP\_METHOD\_SPWX seem to have their example values centred | Brian Swinburne/UKSA | should they be left justified? | Fixed. |
|  |  |  |  | References to ICDs should be replaced where possible by the following language… |  | The OD confidence metric shall be as mutually defined by message exchange participants. | Fixed. |
| 6-7 to 6-12 | 6.2.3 |  |  | As per section 6.2.3.6, the order of the keys in this section is mandatory (just like all other sections). In this section, though, many \_EPOCH keys should be interpreted according to DEF\_TIME\_SYSTEM and appear before this key (PREV\_MESSAGE\_EPOCH, NEXT\_MESSAGE\_EPOCH, LAUNCH\_EPOCH, RELEASE\_EPOCH, MISSION\_START\_EPOCH, MISSION\_END\_EPOCH, REENTRY\_EPOCH). The LIFETIME key also appears before DEF\_EPOCH\_TZERO but refers to it. This implies to delay evaluation while parsing data whereas the mandatory ordering could have been used to simplify parsing. Would it be possible to move both DEF\_TIME\_SYSTEM and DEF\_EPOCH\_TZERO earlier in table 6-3 OCM Metadata, for example between TECH\_ADDRESS and MESSAGE\_ID? | Luc Maisonobe (Orekit) |  | Fixed. |
| 6-7 | 6.2.3 |  |  | ORIGINATOR belongs to header section in OPM, OEM and OMM but belongs to metadata section in OCM. Shouldn’t it be moved to header for consistency? If not, it would be fair to at least explain in the table that for OCM the move from header to metadata is intentional and is known to be inconsistent with other messages. | Luc Maisonobe (Orekit) |  | Fixed. |
| 6-7 to 6-9 | 6.2.3 |  |  | example entries for keys MESSAGE\_ID, PREV\_MESSAGE\_ID, NEXT\_MESSAGE\_ID, ATT\_MSG\_LINK, CDM\_MSG\_LINK, PRM\_MSG\_LINK, RDM\_MSG\_LINK an TDM\_MSG\_LINK all contains underscore characters that in these cases seem significant. Section 7.5.9 however enforces that underscore characters in values must be replaced by single space (which has always been the case in previous versions). Either the examples should be changed (to use dash instead of underscore for example), or rule 7.5.9 should be removed, or the keys should be declared not as free text but has text where underscore are preserved (because underscore is often used in file naming conventions in space systems). Examples for LAUNCH\_PLATFORM and INTERP\_METHOD\_EOP also exhibits underscores, but here I am not sure they are significant and it could be considered that rule 7.5.9 applies and they are converted to space. | Luc Maisonobe (Orekit) |  | See 7.5.9 – It does not specify that underscores shall be replaced, but rather that underscores shall be retained (as underscores). |
| 6-7 | 6.2.3 |  |  | RFC 2606 (https://tools.ietf.org/html/rfc2606) specifies reserved top level DNS nand RFC 6761 (https://tools.ietf.org/html/rfc6761) ames fydocumentation purposes and examples. The mai address JOHN.DOE@SOMEWHERE.NET should be replaced by JOHN.DOE@EXAMPLE.ORG | Luc Maisonobe (Orekit) |  | Fixed. |
| 6-8 | 6.2.3 |  |  | example entries for keys ATT\_MSG\_LINK, CDM\_MSG\_LINK, PRM\_MSG\_LINK, RDM\_MSG\_LINK an TDM\_MSG\_LINK all contains mix of uppercase and lowercase that is significant (at least on Linux filenames are case-sensitive). The rules for handling this are inconsistent (7.5.2 allows mixing case and 7.5.7 forbids mixing case). As case is significant in several applications, it would seem reasonable to say case is not managed at all in values and will be preserved on parsing, so users can specify what the want in an ICD. | Luc Maisonobe (Orekit) |  | Per agreement on 21 Oct 2019, we will retain the new language, which states that COMMENTS and non-normative FREE TEXT can use mixed case, and all normative content must use ALL UPPERCASE \*or\* ALL LOWERCASE. |
| 6-17 | 6.2.3 |  |  | the key ORBIT\_TYPE is both declared as mandatory and has having a default value of CARTPV. The other keys that hav default values (ORB\_REF\_FRAME and CENTER\_NAME) are not declared as mandatory. For consistency, ORBIT\_TYPE should not be mandatory. Indeed, it is not present in example G-1. | Luc Maisonobe (Orekit) |  | Fixed. |
| B-3 | Annex B |  |  | The link [B-4] for reference frames is wrong. It reads https://sanaregistry.org/r/absolute\_reference\_frames and should probably be https://sanaregistry.org/r/celestial\_body\_reference\_frames | Luc Maisonobe (Orekit) |  | Fixed. |
| B-3 | Annex B |  |  | The link [B-5] for orbit reference frames is broken, no equivalent link has been found | Luc Maisonobe (Orekit) |  | Fixed. |
| B-3 | Annex B |  |  | The link [B-8] for covariance frames is broken, no equivalent link has been found | Luc Maisonobe (Orekit) |  | Fixed. |
| E-1 | Annex E |  |  | ORIGINATOR in figure E-2 is set to NOAA/USA whereas the acceptable list from SANA uses only NOAA without reference to country. As table 3.1 was changed to remove the /USA for both INTELSAT and INMARSAT, I guess it should be removed for NOAA too in the example | Luc Maisonobe (Orekit) |  | Fixed. |
| E-2 | Annex E |  |  | ditto for figure E-3 | Luc Maisonobe (Orekit) |  | Fixed. |
| E-3 | Annex E |  |  | ditto for figure E-4 | Luc Maisonobe (Orekit) |  | Fixed. |
| E-4 | Annex E |  |  | ditto for figure E-5 | Luc Maisonobe (Orekit) |  | Fixed. |
| BG-1 | Annex G |  |  | figure G-1 misses the mandatory ORIGINATOR key | Luc Maisonobe (Orekit) |  | Fixed. |
| G-2 | Annex G |  |  | figure G-2 refers to non-existent key TAIMUTC\_TZERO, it should probably be TAIMUTC\_AT\_TZERO | Luc Maisonobe (Orekit) |  | Fixed. |
| G-2 | Annex G |  |  | figure G-2 refers to non-existent key UT2MUTC\_TZERO, it should probably be UT1MUTC\_AT\_TZERO | Luc Maisonobe (Orekit) |  | Fixed. |
| G-2 | Annex G |  |  | ditto LM-004, replacing email@email.XXX by email@example.org | Luc Maisonobe (Orekit) |  | Fixed. |
| G-2 | Annex G |  |  | figure G-2 refers to non-existent key UT1MUTC\_RATE\_TZERO, should this key be added in table 6-3 or removed in this example? | Luc Maisonobe (Orekit) |  | Fixed. |
| G-3 | Annex G |  |  | figure G-3 misses the mandatory key DEF\_TIME\_SYSTEM | Luc Maisonobe (Orekit) |  | Made it optional to specify (default=UTC) |
| G-3 | Annex G |  |  | in the orbit determination of figure G-3, all entries between OD\_START and OD\_STOP miss the '=' sign between the keywords (OD\_ID, OD\_PREV\_ID, OD\_EPOCH, OBS\_USED and TRACKS\_USED) and their values | Luc Maisonobe (Orekit) |  | Fixed. |
| G-3 | Annex G |  |  | figure G-3 misses the mandatory ORIGINATOR key | Luc Maisonobe (Orekit) |  | Fixed. |
| G-3 | Annex G |  |  | in figure G-3 the last entry in orbital state, just before ORB\_STOP, has only 6 components after date, not 9. The acceleration is missing | Luc Maisonobe (Orekit) |  | Fixed. |
|  | OCM Metadata |  |  | Many \_EPOCH keys should be interpreted according to DEF\_TIME\_SYSTEM and appear before this key (PREV\_MESSAGE\_EPOCH, NEXT\_MESSAGE\_EPOCH, LAUNCH\_EPOCH,RELEASE\_EPOCH, MISSION\_START\_EPOCH, MISSION\_END\_EPOCH, REENTRY\_EPOCH).The LIFETIME key also appears before DEF\_EPOCH\_TZERO but refers to it.This implies to delay evaluation while parsing data whereas the mandatory ordering could have been used to simplify parsing. |  | Would it be possible to move both DEF\_TIME\_SYSTEM and DEF\_EPOCH\_TZERO earlier in table 6-3 OCM Metadata, for example between TECH\_ADDRESS and MESSAGE\_ID? | Fixed. |
|  | Chapter 6 |  |  | Should avoid allowing user to mix relative and absolute times within same data block. Cannot see a valid use case for doing so, and it will introduce inefficiencies with the parsers | Tom Johnson, AGI | Enforce having only relative OR absolute time w/in a data block | Agreed – fixed. |
|  | 6.2 |  |  | Need to be very clear on which data set has override authority on the others, if all that is being altered in any given data block is the ORB/COV/STM/MNVR\_TYP, REF\_FRAME or CENTER\_NAME. Everyone converts things slightly different |  | Introduce a mechanism to clearly state what overrides  | Agreed – fixed. The first such instance in the message takes precedence . |