| **Page** | **Section** | **Line** | **Type** | **Comment/ Rationale** | **Source of Comment (Name/Agency)** | **Suggested Disposition** | **Disposition**  **(Completed by Principal Editor)** |
| --- | --- | --- | --- | --- | --- | --- | --- |
| 1-2 | 1.4 |  | ed | There is only a partial listing of the annexes. It seems that there should either be a full listing of the annexes (which to a great extent, merely duplicates the Table of Contents); or whether they can be referred to en masse, e.g., "Following the principal content of the document, there are a number of annexes, both normative and informative, to guide the ODM user." | David Berry / NASA | Consider whether or not it is necessary to list all Annexes, or if they can be referred to en masse. | Used “Following the principal content of the document, there are a number of annexes, both normative and informative, to guide the ODM user.” |
| 1-3 | 1.6 |  | ed/te | There have been some slight changes in this section since originally written in the ODM early versions. | David Berry / NASA | Suggest to copy the currently approved text from the Publications Yellow Book, CCSDS A20.0-Y-4 | accepted |
| 1-4 | 1.7 |  | ed/te | Lists the Spacewarn Bulletin, which we have moved away from. | David Berry / NASA | Replace [2] with a reference to the UNOOSA Register of Objects Launched into Space | accepted |
| 2-1 | 2.1 | para 1 | ed | I think this first paragraph would be better placed in Section 1.1 | David Berry / NASA | Consider moving the text. | accepted |
| 2-1 | 2.1 | NOTE | te | This note is the first of several mentions of the "parent/child" scenario. I think this concept needs more elaboration in the document... it's not clear to me how the OCM can actually represent this. There is no example of this concept. | David Berry / NASA | Consider doing an example that has a parent and a few "children". | Maneuver section will be worked on next. |
| 2-1 | 2.2 | para2, 4 | ed/te | The material in the last sentence of paragraph 2, and the single sentence that constitutes paragraph 4, are related, but are separated by unrelated paragraph 3. | David Berry / NASA | Merge material in paragraph 4 into the end of paragraph 2. | accepted |
| 2-2 | 2.3 | para 2, line 2 | ed | Refers to "reference I-4", but Annex I has moved and now the informative references are in Annex K. NOTE: There are many occurrences of this in the document. | David Berry / NASA | Change "I-4" to "K-4". Better yet, change "I-4" to "[K4]" (with brackets and no dash), since that conforms with the CCSDS Publications notation for references (see section B2 of the Publications Guide. Otherwise, the CCSDS Editor will need to change all these, and it won't make him happy. | accepted |
| 6-13 (2nd pg of Sec 6) | 6.2.1 | para 1, line 2 | te | The bold statement prohibiting reordering is not "CCSDS requirement speak" | David Berry / NASA | Re-word, something like: "The order of  occurrence of the OCM sections shall be fixed as shown in table 6-1." Also, consider whether or not such a fixed ordering statement applies to the keywords in Tables 6-2 through 6-11. One could make an argument either way (i.e., yes or no). | Accepted. |
| 6-13 | 6.2.1(2) |  | te | I think we should revisit the notion that the metadata section is optional. | David Berry / NASA | Argument to appear later in this CRM. | Accepted. |
| 6-13 | 6.2.1(4) |  | te | I think we should revisit the notion of user defined data in the OCM. | David Berry / NASA | In my opinion, allowing for user defined data in the ODM was a judgment error. The OCM is very comprehensive; it's difficult to believe anything REALLY important has been omitted. | I’m still in favor of user-defined data; if it’s really not needed, then we don’t have anything to worry about. Whereas if it is employed, then that use likely permits this standardized content to be adjust slightly such that it can be used (w/o being discarded).  Let’s discuss. |
| 6-14 | Table 6-1 |  | te | I think we should revisit the notion that the metadata section is optional. | David Berry / NASA | Argument to appear later in this CRM. | Accepted. |
| 6-15 | Table 6-2 |  | te | The EPOCH\_TZERO really constitutes a metadata item, given its relationship to virtually all of the data in the OCM. | David Berry / NASA | Move EPOCH\_TZERO to the metadata section, and make the metadata section mandatory. Since you do not specify "META\_START" and "META\_STOP" delimiters (ala OEM), there is effectively no difference, but it makes the OCM a bit more consistent with the other messages in the ODM. | Accepted. |
| 6-16 | Table  6-3 | Row 2 | ed | Row 2 is a duplicate of Row 1 and can safely be deleted. | David Berry / NASA | Delete Row 2 of table (second "COMMENT" row). | Accepted. |
| 6-16 | Table 6-3 | n/a | te | There is no information as to the catalog in which the satellite catalog designator is listed. | David Berry / NASA | Consider adding a "CATALOG" row. | Accepted. |
| 6-16 | Table 6-3 | START\_TIME | te | Text only indicates "relative time", but STOP\_TIME indicates "epoch or relative time". Should START\_TIME include "epoch" as well? Seems like they should be consistent. | David Berry / NASA | Consider, and amend as necessary. | Accepted. |
| 6-17 | Table 6-3 | See desc | te | Is UT1MUTC\_RATE\_TZERO really necessary here? I don't understand the use case (the example at least is in 10ths of microseconds). | David Berry / NASA | Is it really necessary? | This is an optional field. While of potentially limited use, it still may be useful and is innocuous. |
| 6-17 | Table 6-4 | Row 1, 3 | ed/te | There are COMMENT lines both before and after "PHYS\_START". I think the first (row 1) is superfluous. The duplicate COMMENTs are not present in Tables 6-9 through 6-11. | David Berry / NASA | Remove row 1 (COMMENT) of Table 6-4 | Accepted. |
| 6-17 | Table 6-4 | See desc | te | Question: How is the DRAG\_SCALE used? Why wouldn't it just be factored into the DRAG\_COEFFICIENT? | David Berry / NASA | Consider. | Understandable. This is used to allow the CdA/m to represent the nominal drag case, and then apply an uncertainty about that nominal ballistic coefficient value. Added clarification description. |
| 6-18 | Table 6-4 | See desc | te | PHYSDIM\_FRAME\_EPOCH: The "Units" column contains format info. I think the units are actually "n/a". | David Berry / NASA | Change units to "n/a", as was done on COV/STM/EC\_FRAME\_EPOCH. | Accepted. |
| 6-18 | Table 6-4 | OEB | te | Observation: The table essentially allows for 2 attitude states... a fixed state, as defined by the OEB, and tumbling (-999 for ROLL, PITCH, YAW). This leaves a lot of states in between unspecified, which would seem to limit the usefulness of the OEB concept. | David Berry / NASA | Consider how useful this really is to the OCM objective. | Added attitude section (also addresses SMM-related requirements). |
| 6-18 | Table 6-4 | See desc | ge | PHYSDIM\_PITCH, \*\_ROLL, \*\_YAW: The description lists these as "Yaw/Pitch/Roll". Should the keywords be in this same order? | David Berry / NASA | Consider. | Accepted. |
| 6-18 | Table 6-4 | See desc | te | SOLAR\_RAD\_AREA is described as "additional" to that provided by the AREA\_ALONG\_OEB\* parameters. However, it is not clear how those OEB parameters indicate how much area is facing the Sun. | David Berry / NASA | Consider. | Accepted, and clarified. |
| 6-19 | Table 6-5 | Row 1, 3 | ed/te | There are COMMENT lines both before and after "FORCE\_START". I think the first (row 1) is superfluous. The duplicate COMMENTs are not present in Tables 6-9 through 6-11. | David Berry / NASA | Remove row 1 (COMMENT) of Table 6-5 | Accepted. |
| 6-19 | Table 6-5 | See desc | te | QUESTION: For the keyword N\_BODY\_PERTURBATIONS, you may recall that I have had an Action Item to file a corrigendum to the CDM... it's been quite a while since the Action Item was opened, and I confess that the content of the corrigendum has now receded into a lost memory (MEA CULPA!!!). I checked the Meeting Minutes when the Action Item was opened, but there is no detail. It now appears that the OCM, CDM, and RDM are all using the same convention... a comma separated list of the values. Do you recall the nature of the corrigendum? Is it possibly that I should indicate it is a "comma separated list of body names" or something like that? | David Berry / NASA | Help! | I believe that I’d adopted the CDM specification previously, a.k.a. “Accepted.” |
| 6-21 | 6.2.6.2 | 1 | ed | Contains the word "obligatory", which we have moved away from. | David Berry / NASA | Change "obligatory" to "mandatory". | Accepted. |
| 6-21 | 6.2.6.7 | last | te | Since the OCM only applies to the parent spacecraft, wouldn't the mass of the deployed object be treated in essentially the same way as a mass decrement from the standpoint of the parent spacecraft? So is the mass of the deployed object entered as a positive or negative number? | David Berry / NASA | Specify sign of deployed object mass. |  |
| 6-21 | 6.2.6.9 | 3, 5 | te | It is specified that there are "10" (and "ten") parameters... but I count 11:   1. T relative 2. Thruster ID 3. Tx 4. Ty 5. Tz 6. 1 sigma 7. duration 8. interpolation mode 9. Isp 10. efficiency 11. delta-mass | David Berry / NASA | Change "10"/"ten" to either "11" or "eleven" (i.e., make numbering convention consistent, either both "11" or both "eleven"). Also, fix example 6-3 (I didn't look much at the examples, but looked at this one to see if there were 11 parameters and found only 8). | Accepted. |
| 6-21 | 6.2.6.9 | 6 | te | I have a feeling that if anyone is using this THRUST maneuver type, there would need to be an ICD in place that maps the thrusters to integers (e.g., missions may call their thrusters by names for certain functions plus a number, not just a number). | David Berry / NASA | Consider. | Let’s discuss… should there be a free-text string ID instead ? |
| 6-21 to 6-22 | 6.2.6.7, 6.2.6.9, 6.2.6.10 | n/a | te | I note that all 3 maneuver types have a few elements that are in EVERY maneuver specification, and some that are unique to the particular MAN\_TYPE. But the common elements are in different positions in the line. I think there could be some value to having the 7 items that are common to all 3 in the same order on each line, followed by the items that are unique to the given MAN\_TYPE. | David Berry / NASA | Consider re-ordering the elements of the maneuver specification. | I am open to doing so, but in looking at it, I believe there are nuanced differences between almost every element that seems the same. |
| 6-22 | 6.2.6.9 | 7 | te | I'm not completely sure I understand the "abutting, overlapping, alternating, or even intermingled" phrase. | David Berry / NASA | Consider adding an example that shows the phenomenon. | Modified existing example to demonstrate. |
| 6-22 | 6.2.6.11 | 1 | te | I'm not sure I understand the uniqueness criterion requirement... Why couldn't there be more than one PREDICTED maneuver specified? or more than one DETERMINED maneuver? and since the BASIS is not mandatory, how would you even know? | David Berry / NASA | Consider . | **Omission of this non-mandatory field defaults to PREDICTED.**  This is unambiguous.  Note that a series of maneuvers is fine if the maneuver time intervals don’t overlap.  Also added “different thruster ID” to list of acceptable multiple maneuvers. |
| 6-22 | 6.2.6.11 | 4 | ed | Since there are only 2 options allowed, the "etc." seems superfluous | David Berry / NASA | Remove the "etc." | Accepted. |
| 6-23 | Table 6-6 | Row 1, 3 | ed/te | There are COMMENT lines both before and after "MAN\_START". I think the first (row 1) is superfluous. The duplicate COMMENTs are not present in Tables 6-9 through 6-11. | David Berry / NASA | Remove row 1 (COMMENT) of Table 6-6 | Accepted. |
| 6-23 | Table 6-6 | See desc | ed/te | All of the keywords in the table start with "MAN\_" except "BASIS". I think it would be good to call this "MAN\_BASIS" (similar to what was done with "COV\_BASIS" and "EC\_BASIS\_PROP"). | David Berry / NASA | Consider. | Agree and accepted. |
| 6-23 | Table 6-6 | See desc | ed/te | Is there a default for the maneuver basis? | David Berry / NASA | In order to regulate the uniqueness criterion, you might need to have one. | Yes. |
| 6-23 | Table 6-6 | See desc | te | MAN\_FRAME\_EPOCH: The "Units" column contains format info. I think the units are actually "n/a". | David Berry / NASA | Change units to "n/a", as was done on COV/STM/EC\_FRAME\_EPOCH. | Accepted. |
| 6-23 | Table 6-6 | Last row | ed/te | There is no indication where the maneuver lines appear... it might be good to have a row just before "MAN\_STOP" where you indicate that is where the maneuver specification data lines should appear. | David Berry / NASA | Consider. | Accepted. |
| 6-24 | 6.2.7.3, 6.2.7.6,  6.2.7.7 | Several | ed | These sections refer to ORBEPH\_START and/or ORBEPH\_STOP, but in Table 6-7 ORBEPH\_ has been shortened to ORB\_ (which I think is better). | David Berry / NASA | Change "ORBEPH\_" to "ORB\_" throughout the document (note examples also have "ORBEPH\_\*" and should be changed too). | Accepted. |
| 6-24 | 6.2.7.6 | item 2 | ed | Indicates "PREDICTED, ACTUAL, etc.", but Table 6-7 says the options are PREDICTED and SOLVED. | David Berry / NASA | Change "ACTUAL" to "SOLVED", and remove "etc." since there are only two options. | Accepted. |
| 6-24 | 6.2.7.6 | all | te | Lists a number of uniqueness factors, but since the basis and reference frame are not mandatory, it may not be possible to use them as uniqueness factors. | David Berry / NASA | Should add language to say that if there are multiple orbit state time histories provided, the uniqueness factors must be specified in the message. | No ambiguity here:  **Omission of this non-mandatory field defaults to PREDICTED.**  **Where the reference frame is not intrinsic to the selected orbit set, omission of this non-mandatory field defaults to ITRF-97.** |
| 6-24 | 6.2.7.6 | (4) | te | It isn't possible to use the orbit center as a uniqueness factor since it is in the Metadata Section, not Table 6-7, and there is only a single metadata section in the OCM. | David Berry / NASA | Move the CENTER\_NAME to Table 6-7. (ORB\_CENTER?) or remove the center as one of the uniqueness factors. | Accepted: Moved orbit center to orbit section. |
| 6-26 | Table 6-7 | Row 1, 3 | ed/te | There are COMMENT lines both before and after "ORB\_START". I think the first (row 1) is superfluous. The duplicate COMMENTs are not present in Tables 6-9 through 6-11. | David Berry / NASA | Remove row 1 (COMMENT) of Table 6-7 | Accepted. |
| 6-26 | Table 6-7 | See desc | te | Technical opinion on ORB\_N... I feel like the OCM is complicated enough already, and offers sufficient options, that allowing someone to override the number in ORB\_TYPE is an unnecessary complication. KISS Principle... | David Berry / NASA | Remove text relating to override of the number of elements. This may be a matter of discussion for the WG. | Agree that the OCM is complicated. But if someone e.g. wanted to provide a series of mean Keplerian elements in the form of TLE elements of info, there are more than 6 elements to be provided. This is what I’m trying to facilitate. |
| 6-26 | Table 6-7 | See desc | ed/te | You have a nice convention going for most of the OCM tables, in that the keywords are mostly prefixed with a table mnemonic (in this case, "ORB\_". The "BASIS" and "ELEMENT\_AVERAGING" are exceptions. | David Berry / NASA | Consider adding the "ORB\_" prefix to cited keywords (in particular, "BASIS", since it has been prefixed in a few cases (see comment from p.6-23, Table 6-6) | Accepted. |
| 6-26 | Table 6-7 | See desc | ed | In the Description of ELEMENT\_AVERAGING, there is a closing parenthesis that is not matched with an opening parenthesis. | David Berry / NASA | Fielder's choice. | Accepted. |
| 6-26 | Table 6-7 | See desc | te | ORB\_FRAME\_EPOCH: The "Units" column contains format info. I think the units are actually "n/a". | David Berry / NASA | Change units to "n/a", as was done on COV/STM/EC\_FRAME\_EPOCH. | Accepted. |
| 6-27 | 6.2.8.6 | All | ed/te | I'm not sure what the CCSDS Editor will do with this... but since we have normative language in Sec 1.6 that allows for "statements of fact", I think there is a way to "fix" this. | David Berry / NASA | Consider for 6.2.8.6: "Definition: an 'observation' is a unique measurement..."  Add a 6.2.8.7: "Definition: a 'sensor track' is a set..." | Accepted. |
| 6-29 | Table 6-8 | Row 1, 3 | ed/te | There are COMMENT lines both before and after "OD\_START". I think the first (row 1) is superfluous. The duplicate COMMENTs are not present in Tables 6-9 through 6-11. | David Berry / NASA | Remove row 1 (COMMENT) of Table 6-8. | Accepted. |
| 6-29 | Table 6-8 | See desc | ed/te | "DAYS\_SINCE\_\*\_OB" keywords refer to "EPOCH\_OD", an apparent keyword that is not in the table | David Berry / NASA | Add "EPOCH\_OD" or other keyword to indicate the OD state epoch. | Accepted. Added TIME\_OF\_OD\_EPOCH |
| 6-29 | Table 6-8 | See desc | ed/te | "DAYS\_SINCE\_\*\_OB" keywords have values that are potentially ambiguous. Examples are effectively integer days, but could also be interpreted as having a fractional portion. | David Berry / NASA | Clarify the data type: integer or float/double. | Accepted; clarified to be floating/doubles. |
| 6-29 | Table 6-8 | See desc | ed/te | There are a number of keywords for which the specified units are "days", however, "d" is the allowed SI unit for days. | David Berry / NASA | Change "days" to "d" in Table 6-8 | Accepted. |
| 6-29 | Table 6-8 | See desc | ed/te | There are a number of keywords for which the specified units are "Obs" or "Trks"... should we use "n/a" for these? | David Berry / NASA | Consider changing "Obs" and "Trks" units to "n/a" | Accepted. |
| 6-30 | Table 6-8 | See desc | ed/te | For "WEIGHTED\_RMS", it is noted at the end "useful only for Batch OD systems". Thus I wonder if the text on "Extended Kalman Filter methods" is relevant here. | David Berry / NASA | Consider removing text on "Extended Kalman Filter methods" | Accepted. |
| 6-30 | Table 6-8 | See desc | ed/te | For "OD\_LAST\_OB\_EIG\*", the units are shown as "Km", however, "km" (all lower case) is the SI unit for kilometers. | David Berry / NASA | Change "Km" to "km". | Accepted. |
| 6-31 | 6.2.9.4 | (4) | te | It isn't possible to use the orbit center as a uniqueness factor since it is in the Metadata Section, not Table 6-9, and there is only a single metadata section in the OCM. | David Berry / NASA | Add the CENTER\_NAME to Table 6-9. (COV\_CENTER? ORB\_CENTER?) or remove the center as one of the uniqueness factors. | Accepted; removed “orbit center” |
| 6-32 | 6.2.9.12 | All | te | There are some ambiguities in the description of interpolating covariance matrices, e.g., "linear (or higher order) interpolation" is specified in the description, but it is not clear how the selected polynomial degree is to be conveyed to the recipient. | David Berry / NASA | The method of interpolating the covariance matrices should probably be added to an informative annex, since it involves several steps. | Accepted; added reference [K16]. |
| 6-33 | Table 6-9 | See desc | ed/te | As stated, the Description of the COMMENT statement allows comments in between lines of the covariance matrix... this seems improper (and wouldn't be allowed in other ODM covariance matrices). | David Berry / NASA | Consider whether comments are useful between lines of the covariance matrix, and exclude the possibility of they are not useful. | Let’s discuss. I’m trying to offer flexibility, and I’m anticipating that any reader of an OCM would first read in a line and ignore it if the “COMMENT” KVN tag is present. So I fail to see the harm in this. |
| 6-33 | Table 6-9 | See desc | ed/te | The COV\_BASIS is shown as optional (Mandatory=No) but there is no default provided. It seems that the basis could make a difference, but if the keyword is not used, it is indeterminate, and it cannot be used as one of the uniqueness criteria. | David Berry / NASA | Consider: (a) Mandatory=Yes, or (b) add a default (Orbit Time History has a default). | Accepted. |
| 6-33 | Table 6-9 | See desc | te | Technical opinion on COV\_NNXNN... I feel like the OCM is complicated enough already, and offers sufficient options, that allowing someone to override the number implied by COV\_TYPE is an unnecessary complication. KISS Principle... | David Berry / NASA | Remove text relating to override of the number of elements. This may be a matter of discussion for the WG. | This was introduced to make the message meet ESA and Spain requests for covariances that include other elements beyond what the orbit state requires. |
| 6-33 | Table 6-9 | See desc | ed | COV\_NNXNN description makes reference to "(Annex B, subsection" but ends without identifying the applicable subsection. | David Berry / NASA | Supply mission subsection number. | Accepted. |
| 6-33 | Table 6-9 | See desc | ed | COV\_TYPE description specifies values from "Annex B, subsection B5", but isn't subsection B4 applicable too? | David Berry / NASA | Add "B4" if it is an applicable subsection. | Accepted. |
| 6-33 | Table 6-9 | T | te | Should probably mention that if "T" is not specified, the default is zero. | David Berry / NASA | Consider. | Accepted. |
| 6-34 | 6.2.10.5 | (2) | te | It's not clear how the unique OD or nav solution is indicated... STM\_REF\_TIME? | David Berry / NASA | Clarify how this uniqueness factor is determined. | Accepted; removed “basis”. |
| 6-34 | 6.2.10.5 | (3) | te | The data basis is not specified in Table 6-10 | David Berry / NASA | Clarify how this uniqueness factor is determined. | Accepted; removed “basis” |
| 6-34 | 6.2.10.5 | (5) | te | It isn't possible to use the orbit center as a uniqueness factor since it is in the Metadata Section, not Table 6-10, and there is only a single metadata section in the OCM. | David Berry / NASA | Add the CENTER\_NAME to Table 6-10. (STM\_CENTER? ORB\_CENTER?) or remove the center as one of the uniqueness factors. | Accepted. |
| 6-34 | 6.2.10.6 | 1 | ed/te | I think the language style you used in 6.2.7.5 and 6.2.9.5 is better than that used here. | David Berry / NASA | Consider modeling 6.2.10.6 after 6.2.7.5/6.2.9.5 | Accepted. |
| 6-35 | 6.2.10.13 | 2 | ed/te | The "T" keyword is shown in Table 6-9, but not Table 6-10. | David Berry / NASA | Add "T" keyword to Table 6-10. | Accepted. |
| 6-36 | Table 6-10 | See desc | ed/te | The COMMENT statement is shown in Row 4 of the table, but by analogy with other tables in the OCM, should appear in Row 2 of the table. | David Berry / NASA | Move COMMENT to Row 2 of table. | Accepted. |
| 6-36 | Table 6-10 | See desc | ed/te | As stated, the Description of the COMMENT statement allows comments in between lines of the state transition matrix... this may not be particularly useful. | David Berry / NASA | Consider whether comments are useful between lines of the state transition matrix, and exclude the possibility of they are not useful. | As above, I do see the utility of this and not a downside. |
| 6-36 | Table 6-10 | See desc | te | Technical opinion on STM\_N... I feel like the OCM is complicated enough already, and offers sufficient options, that allowing someone to override the number implied by STM\_TYPE is an unnecessary complication. KISS Principle... | David Berry / NASA | Remove text relating to override of the number of elements. This may be a matter of discussion for the WG. | We can discuss. Since STMs are complicated, this degree of flexibility is provided to make sure it can meet needs. I just don’t want to see someone precluded from using the OCM because we don’t have that flexibility. |
| 6-36 | 6.2.11 | All | ed/te | I think this section might be better organized right behind 6.2.7, which deals with the Orbit State Time History, since it deals with compressing that data. | David Berry / NASA | Consider moving this section. | Accepted. |
| 6-36  6-37 | 6.2.11.1  6.2.11.4 | All | te | Most of this material should be in an informative annex, not in a normative section. | David Berry / NASA | Move most material to informative annex, including at least one example; revise as needed to retain applicable "shall" statements. | Accepted. |
| 6-38 | 6.2.11.7 | 3 | ed | Word Choice: I think "preceding" is intended instead of "precluding" | David Berry / NASA | Change "precluding" to "preceding" | Accepted. |
| 6-38 | 6.2.11.7 | (8) | te | It's not clear how the unique OD or nav solution is indicated... | David Berry / NASA | Clarify how this uniqueness factor is determined. | Accepted; removed BASIS. |
| 6-38 | 6.2.11.7 | (9) | te | The "data basis" is not present in Table 6-11, so it's not clear how it can be used as a uniqueness factor, unless the ephemeris compression is used in conjunction with the metadata in Table 6-7. | David Berry / NASA | Clarify how this uniqueness factor is determined. | Accepted. |
| 6-38 | 6.2.11.7 | (12) | te | It isn't possible to use the orbit center as a uniqueness factor since it is in the Metadata Section, not Table 6-11, and there is only a single metadata section in the OCM. | David Berry / NASA | Add the CENTER\_NAME to Table 6-11. (EC\_CENTER? ORB\_CENTER?) or remove the center as one of the uniqueness factors. | Accepted. Added EC\_Center. |
| 6-38 | 6.2.11.8 | 1 | ed/te | I think the language style you used in 6.2.7.5 and 6.2.9.5 is better than that used here. | David Berry / NASA | Consider modeling 6.2.10.6 after 6.2.7.5/6.2.9.5 | Accepted. |
| 6-38 | 6.2.11.8 | 2 | ed | Word choice: I know what you mean, but the English "with the exception of" or "not including" might be better than "sans". Same comment applies to p.6-40, Table 6-11, "EC\_STATE\_TYPE" description. | David Berry / NASA | Consider replacing "sans" with an appropriate English phrase. Same suggested disposition applies to p.6-40, Table 6-11, "EC\_STATE\_TYPE" description. | Accepted. |
| 6-40 | Table 6-11 | See desc | ed/te | I found the Description of this keyword inscrutable. | David Berry / NASA |  | ?? |
| 6-41  6-42 | 6.2.12  Table 6-12 | All | te | I think we should revisit the notion of user defined data in the OCM. | David Berry / NASA | In my opinion, allowing for user defined data in the ODM was a judgment error. The OCM is very comprehensive; it's difficult to believe anything REALLY important has been omitted. | As above, I believe it still makes sense in the OCM context. |
| 6-43 ff | Figure 6-\* | 1 | te | I didn't spend a lot of time on the examples, but did note a few items. For the CCSDS\_OCM\_VERS we should use "3.0". This is because using "1.0" could be interpreted by users to look in ODM version 1 for OCM descriptive material, but they won't find anything. The same convention was used for the OMM, which was introduced in ODM V.2 (see section 7.8.1) | David Berry / NASA | Change "CCSDS\_OCM\_VERS = 1.0" to "3.0" in all examples | Accepted.  Should the OMM, OPM and OEM version examples also be updated ? |
| 7-49 | 7.3.3 | 2 | te | I'm not sure why the OCM header line states it is "mandatory in line #1". It's effectively the same as 7.3.7 and contradicts 7.3.6. | David Berry / NASA | Consider whether or not the parenthetical is really necessary. | Accepted. |
| 7-49 | 7.3.3 | 3 | te | I don't think the categorization of "spacecraft physical characteristics or force model parameter line" clause is necessary, since they are effectively specialized metadata lines. | David Berry / NASA | There are a couple of options... (1) consider making this line simply "Metadata line", or (2) add "OCM" to 7.3.1 (also adding "Comment line"... not sure how that got missed!"). Another consideration... wouldn't the "Orbit Determination Data" be in the same category as the spacecraft physical characteristics and force model lines? | Accepted. |
| 7-49 | 7.3.1 | n/a | te | The line types don't mention comments, as is done in 7.3.3. This may have been an oversight (or it could just have considered "header comments" as "header lines", "metadata comments" as "metadata lines", etc. | David Berry / NASA | Consider adding "Comment line" to 7.3.1, regardless of decision on prior suggestion. | Accepted. |
| 7-50 | 7.4.2 | All | ed | We should figure out a better way than an exhaustive list to describe the exceptions... as you note, there are more besides those listed... | David Berry / NASA | Is there a better way, e.g., \*\_START, \*\_STOP, etc.? | Accepted. |
| 7-51 | 7.4.8 | All | te | I think this line applies to the OCM too... at least the sections are fixed order. | David Berry / NASA | Add OCM if applicable. If not, somewhere it should state that the OCM keyword order within the sections is not fixed. | Accepted. |
| 7-52 | 7.5.10 | n/a | te | There are a number of OCM values that represent times too. Similar to the 7.4.2, it might be nice to figure out how to state the applicable TIME\_SYSTEM without exhaustively listing. | David Berry / NASA | Consider... e.g., something like (a) "The time system for \*\_EPOCH keywords and \*\_TIME keywords is determined by the TIME\_SYSTEM keyword", or (b) The time system for CREATION\_DATE is UTC; for all other keywords representing times or epochs, the time system is determined by the TIME\_SYSTEM keyword. | Accepted (option b) |
| 7-53 | 7.6.1.1 | 3 | ed/te | The list of tables containing units should be augmented to include the OCM tables that contain units. | David Berry / NASA | Add Tables 6-4, 6-5, 6-9, which have units. | Accepted. |
| 7-53 | 7.6.1.2 | 3 | ed/te | Add OCM | David Berry / NASA | Change "OPM or OMM" to "OPM, OMM, or OCM". | Accepted. |
| 7-54 | 7.7.5 | 1 | ed | Section 6 is left out of the list of applicable sections. | David Berry / NASA | Add section 6 to existing 3, 4, 5. | Accepted. |
| 7-55 | 7.7.9 | All | ed/te | Are there any restrictions? If not simplify this section. (NOTE: there are a few comments earlier in this CRM questioning the utility of comments within matrix lines) | David Berry / NASA | Consider. | I’m pushing for no restrictions. |
| 7-55 | 7.7.10 | 2 | ed/te | I think the parenthetical comment can be removed, since the Annex to which it refers has been removed. | David Berry / NASA | Remove parenthetical. | Accepted. |
| 7-56 | 7.8.1 | See desc | ed/te | The table of version keywords, version numbers, and applicable recommendations will need to be updated. | David Berry / NASA | I have put what I think should be included at the bottom of this CRM, IF we decide such a table is the right way to go (see next comment). | Accepted. |
| 7-56 | 7.8.1 | 8 | ed/te | I'm not sure we necessarily want to say "The following version numbers are supported", since technically Silver Books are no longer supported standards: "CCSDS Historical designation (Silver Books) is reserved for any approved CCSDS document that has been superseded by a more recent version or is for any other reason considered to be obsolete. | David Berry / NASA | Consider. Discuss with WG. | Yes, looking for your guidance here. |
| B-7 | B2 | Title | te | We should consider changing "REF\_FRAME Keyword" to "Reference Frame Keywords" since there are many OCM frames that cite an entry from B2. | David Berry / NASA | Consider | Accepted. |
| B-8 | B3 | Title | te | Similar issue as above... "MAN\_REF\_FRAME" and "COV\_REF\_FRAME" are not the only frames mentioned in the OCM that can come from B3. | David Berry / NASA | Consider | Accepted. |
| B-9 | B4 | Title, B4 text | te | Should be expanded because several other OCM constructs cite use of an entry from B4 (COV, STM, EC) | David Berry / NASA | Consider | Accepted. |
| B-10 | B5 | All | te | Question: The "Meaning" column lists the elements for each element set (e.g., (X, Y, Z)). My question is... should we explicitly list the time element (T, X, Y, Z), etc.? | David Berry / NASA | Consider | I’m thinking not because the element sets themselves correspond to a time, rather than include it. |
| C-12 | Annex C | Last 2 paras | ed | These paragaphs refer to PHYSDIM\_MAX, PHYSDIM\_MED, PHYSDIM\_MIN, which appear to have been replaced by "OEB\_\*" keywords. | David Berry / NASA | Change "PHYSDIM\_MAX, MED, MIN" to "OEB\_MAX, MED, MIN" | Not correct, but I need to work on this. |
| D-1 | Annex D | All | ed/te | I think this annex could be combined with Annex C and have only a single technical informative annex. To this could be added the informative material about the compression method, interpolating covarianc matrices, | David Berry / NASA |  | Perhaps. But I already remapped everything again, so sticking with this for now. |
| E-3 | Annex E | n/a | ed | Add "CIO" and "CIP" to list of acronyms. | David Berry / NASA | Add. | Accepted. |
| H-12 | Annex H | n/a | ge | This annex should be extensively revised to cover changes between ODM Version 3 and Version 2 (e.g., ICS annex was added, Annexes were re-ordered, the reference frames annex was greatly expanded, informative annex was added, "Checklist ICD was phased out since the OCM obsoleted it, XML section was added, SPACEWARN Bulletin replaced by UNOOSA Register, OCM added). | David Berry / NASA | Not necessary to do now... we can wait until just before submitting to the Secretariat for their document formatting. | Agreed. |
| J-17 | Annex J | n/a | te | We need to expand this annex to include the required patent and SANA information. | David Berry / NASA | Best bet may be to copy the applicable annex from the PRM and modify as needed (probably very little modification required). | Accepted. |
| Sec 6 | OCM | n/a | ge | As noted in some previous comments, throughout the OCM section there is a fair amount of material that would not qualify as "terse". | David Berry / NASA | Consider where supplementary material should be added to an informative annex. | Can discuss. |

See comment for page 7-56, section 7.8.1 above...

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| **Version Keyword** | **Version Number** | **Applicable Recommendation** |
| CCSDS\_OPM\_VERS | 1.0 | Silver Book 1.0, 09/2004 |
| CCSDS\_OPM\_VERS | 2.0 | Silver Book 2.0, 09/2009 |
| CCSDS\_OMM\_VERS | 2.0 | Silver Book 2.0, 09/2009 |
| CCSDS\_OEM\_VERS | 1.0 | Silver Book 1.0, 09/2004 |
| CCSDS\_OEM\_VERS | 2.0 | Silver Book 2.0, 09/2009 |
| CCSDS\_OPM\_VERS | 3.0 | Blue Book 3.0 (this document) |
| CCSDS\_OMM\_VERS | 3.0 | Blue Book 3.0 (this document) |
| CCSDS\_OEM\_VERS | 3.0 | Blue Book 3.0 (this document) |
| CCSDS\_OCM\_VERS | 3.0 | Blue Book 3.0 (this document) |