

amt-2010-183:

Space and Ground Segment Performance of the FORMOSAT-3/COSMIC Mission: Four Years in Orbit

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Referee general comment:

The paper reviews FORMOSAT-3/COSMIC (F3/C) mission and system performances after 4 years in orbit, trying to put in evidence all the problems arose, their causes and what should be done in the future follow on FORMOSAT-7/COSMIC-2 (F7/C2) operative mission in order to outperform the good results already obtained up to now.

The paper well describes all what happens to F3/C satellites and payloads during the 4 year in orbit and fit quite well with AMT topics. It does not present novel concepts or ideas since it is a review paper, but the description given allow interested readers to well understand what have been main problems occurred. The performances have been analyzed considering several point of views (mission, constellation, spacecraft, Radio Occultation payload, spacecraft batteries, ground station) and given a very honest overview, highlighting also lacks noticed since mission was planned.

The presentation is well structured. As a general comment, authors used too much acronyms inside the text, and sometimes the readability is definitively lost. As a suggestion, in some cases the authors should avoid the acronym, directly using the extended words. Several times the authors refers to “working capabilities” which are not defined for who is not an expert (i.e.: Nadir mode, Nadir-Yaw mode, ...). Finally, there are a lot of references to papers owning to the author, but from their title it is difficult to understand if they are appropriate or not when they are referenced. Moreover some cited papers are not reported in the bibliography list.

Please read carefully before final submission to avoid typos. For a detailed revision, please check the attached pdf file.

Referee specific comments and technical corrections:

p. 600, row 5: ...the atmospheric profiles derived by processing Radio Occultation signals are retrieved... instead of the Radio Occultation signals are retrieved

p. 600, row 12: pls use a more appropriate term instead of transitions

p. 600, row 15: 12 satellites and data latency of 45 min are two completely different aspects. Please address better the point

p. 601, row 6: Earth's observation instead of Earth

p. 601, row 7-9: Ware, Kursinski, Rius, Hall, Melbourne references are not reported in the References list.

p. 601, row 9-15: No reference to the GRAS on-board METOP-A mission is given. No reference to ROSA on-board OCEANSAT-2 is given. Please update the list.

p. 601, row 19: ...operational exploitation of global... instead of ...operational global...

p. 601, row 25-28: the sentence is bad written.

p. 602, row 1-2: did you intend that FS-7/C-2 will provide the next generation of GNSS-RO data to scientific community? What does next generation of GNSS-RO data users mean?

p. 602, row 3-6: The objectives you described are the actual objectives of FS-3/C. What will be the real innovation of the follow-on mission? The operativity? Please better address this crucial point.

p. 602, row 11: pls use a more appropriate term instead of comprised

p. 602, row 17: pls use a more appropriate sentence instead of "was to have"

p. 602-603 row 25-7: It is not clear what are main differences between Local and Remote Tracking Stations.

p. 603, row 12-15: Will double differences be used to extract excess-phases? If it is true please specify.

p. 603, row 24: why did you use "etc."? This means that other meteo centers can in future operatively exploit the follow-on mission RO data? If it so, better address the point. The last sentence should be written before the list of Meteo Centers...

p. 604, row 5-6: pls use a more appropriate sentence instead of "the spacecraft...as anticipated"

p. 605, row 1-15: please describe better what Fig. 1 shows before starting the description of the performances. Since performances are correlated with beta angle, please introduce here this angle instead of in p 606, row 2-4.

p. 605, row 24-25: for the four year since... is repeated

p. 606, row 7: what does "occluding precision orbit determination antenna" mean? In my knowledge, the occultation antenna is different from the antenna necessary for POD purposes, isn't it?

p. 606, row 9-10: POD1 or POD2. What does 1 or 2 mean. In general, several times you used a number after some system component. A Table showing all these conventions should be added

p. 606, row 11-13: the sentence is bad written

p. 606, row 15: what does flip-flopped mean?

p. 606, row 19-23: the sentence is bad written. It is not clear what are you describing.

p. 606, row 25: what is the "nadir" mode?

p. 607, row 16: what is the "nadir-Yaw" mode?

p. 607, row 23: what does "stabilize/safehold/thrust" mode mean?

p. 607, row 25: unexpected or ununexpected?

p. 607, row 25: deviation instead of diveation.

p. 608, row 1: the acronym TT & C is defined after (row 26).

p. 608, row 12: what does variation rate mean? Time variation and rate are synonyms... Is it a technical idiom? Could you specify?

p. 609, row 16-17: what does "uplinked the time-tagged commands loads" mean?

p. 609, row 23: what is the Phoenix reset? Please specify

p. 610, row 18: world wide web instead of open internet

p. 610, row 18-25: From Fig 4 it is clear that someone will make available Ephemeris and Schedule (for operations? It is not clear what Schedule mean). Who? As far as the data coming from ground fiducial network are concerned, here nothing is said. The overall aspects that

guarantee the data latency expected should be addressed better here. A better detailed description of Fig. 4 should be given here.

p. 610, row 24: the time related to the spacecraft loss of signal is intended as the time when the satellite-ground connection cannot be established because of ground station is not yet in view from the spacecraft download antenna? Please specify.

p. 611, row 20-24: what does 16000 ho mean? Acronyms CERTO and GTS are not defined.

p. 613, row 1: is it correct that spacecraft state of health is directly related to the payload performance? I think that viceversa is better.

References:

Liou et al. (row 28, pag. 618) is never cited in the paper.

Tab. 1: What does “Low Beta Operating” means? Please add a description in the caption or in the paper paragraph where you describe Tab. 1.

Tab. 1: You use S/C or SC to define SpaceCraft number? Please use always the same acronym.

Tab. 2: What does “Operation solution” mean?

Tab. 2 and Tab. 4: here you made a lot of reference to PODn, ANTn, RFn, OCCn. See my comment for p. 606, row 9-10

Tab. 3: some statistics should be added (i.e. atmo/iono profile per day)

Tab. 5: see my comment for p. 608, row 12

Tab. 5: what does the number defined by the SOC mean?

Tab. 7, p. 626: IInd row, IIIrd column: RO observed occultations number instead of RO number

Tab. 7, p. 627: Ist row, IInd column: the sentence in the second bullet is bad written

Tab 8: please describe in the caption what “single string design strategy” is.

Tab 8, p.628, IInd row, IVth column: Second bullet: implement and implementation... please avoid the repetition.

Tab 8, p.629, IInd row, all columns: all sentences are very bad written. Please check.

Fig. 1: This is one of the most important figure, but there are too many informations shown together. Please describe all the details in the paper, as I already suggested in my comment for p. 605, row 1-15. Subplots are too small. Could you improve the overall quality?

Fig. 5: What does Mission OPS mean? What does DPC mean?

Fig. 6: w-inc means Low-inc? The text box is covered by figure.

Fig. 7: please describe better this figure. What does the yellow circle show? The projection of Ground based antenna's coverage from LEO? What does the two red lines mean?