



esoc

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MEETING

Meeting Date	08/09/2016	Ref	SOL-ESC-MN-10007
Meeting Place	ESOC	Chairman	I. Tanco
Minute's Date	06/10/2016	Participants	SWT, SOWG, MOC, SOC, Project
Subject	Instrument Workshop	Commanding Copy	L. Sanchez, F. Marliani, P. Kletzkine, A. Accomazzo,

Agenda

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Day 1 [Room H-I @ 09:00]

1. Solar Orbiter Commanding concept (SOL-ESC-HO-5008)
2. Glossary
3. IOR [v0_2]
4. Commanding guidelines for instruments (SOL-ESC-HO-05012)
5. Procedure generation & Demos (SOL-ESC-HO-05011)

Day 2 [Room H-I @ 09:00]

6. Commanding I/F (SOL-ESC-HO-05014)
7. Tour of ESOC premises & control rooms

Minutes of Meeting

1 COMMANDING CONCEPT

- MOC clarified that 'open loop' commanding effectively means that failure to execute a telecommand will not affect the release or execute of next telecommands. It is expected that the FDIR of the instrument will prevent any permanent damage to the instrument.
- The definition of the Instrument 'Default State' is important to allow prompt recovery by ground in case of anomaly. Without definition of a Default State, instrument recovery might be delayed up to the start of the next planning cycle (about one week). Multi-sensor instruments are expected to define procedures to return their sensors to their default states individually.
- It was confirmed that Instruments are required to respect the limit of 150 TC/day and IOR, and a maximum of 1 or 2 files per day.
- It was clarified that if the iVSTP commands are not received in time, or get rejected, then the original STP commands will execute. There will be no removal of previously loaded telecommands. The commands for iVSTP come out of the 150 TCs/day allocation.
- MOC stressed the need for the instruments to have a complete definition of Out-of-Limit conditions for HK parameters in the DB, both Soft and Hard limits, as this will be the basis for Ground to monitor the instruments' health. Furthermore, only TM routed to the OMM will be used for health monitoring.
- MOC confirmed that TM produced during a pass (i.e. after the dumps have been started) will not be received during that pass, but rather in the successive ground contact.



- In terms of Planning, MOC will issue daily pass reports to all users, notifying only of failures of execution. Currently there are no plans for making plan visualisation tools available to external users. It is also confirmed that any iterations are expected between Instrument Teams and SOC, and not between SOC and MOC.
- MOC clarified that TC History will include a link to the respective sequence name. Eventually it is expected to include POR name as well, although this is not yet supported.
- SOC confirmed that the SPICE time kernel will support time correlation processing for instruments, and it will avoid discontinuities in between different Time Correlation fits by applying a smoothing function. SOC explained that the instruments must retrieve TM packets from the TM Archive and use the SPICE time kernel to interpret the OBT timestamp in TM packet headers.

2 GLOSSARY

- MOC clarified that PDORs and MDORs are not part of routine commanding and as such are not subject to the 150 TCs/day command limit. The use of these interfaces is limited to specific conditions (e.g. Commissioning phase).

3 IORS

- SOC confirmed that sequence contents are deterministic and do not support branching.
- It is important to define delta times for all telecommands in a sequence, and this must be done in multiples of 1 second, such that sequence timing is fixed and deterministic.
- SOC confirmed EMC noisiness during EMC-quiet periods will be a determinant factor for IOR acceptance in the planning process. This will be controlled in a dedicated document and refined through flight experience.
- SOC also clarified that any IOR rejection will result in iteration of the inputs to resolve any non-compliance. This loop however will not be possible for VSTP cycles.
- MOC explained that dedicated planning reports will be issued to all users at the end of each planning cycle (LTP, MTP and STPs), and this will serve as positive confirmation that all checks are passed. STP rejections are expected to be exceedingly rare, as the actual operations validation takes place at MTP level.
- Instrument IOR tool development poll:
 - MAG: new development
 - EPD: TBD
 - SWA: new development, based on experience
 - RPW: new development
 - SPICE: new development, based on experience
 - PHI: based on legacy system
 - SOLOHI: new development and legacy system
 - METIS: TBD
 - STIX: new development
 - EUI: new development, based partially on legacy
- It is agreed to aim for a first set of simple IORs, not necessarily written by SW, delivered to SOC by early 2017. This will imply the definition of the associated Instrument procedures, such that MOC can define the appropriate sequences to be referenced in the IORs. **ACTION ICMD#01:** SOC to investigate means for the Instrument Teams to pre-validate their IORs before formal submission. **ACTION ICMD#02:** SOC to look into mechanism to provide



feedback to Instrument Teams about the acceptance state of their submitted planning products.

4 COMMANDING GUIDELINES

- MOC clarified that use of TC group repeaters is not supported by the Mission Control System, and instrument teams will be contacted to resolve any problematic TC definitions.
- Sequences should also map directly to state transitions and configuration changes in the unit.
- MOC explained that logical branching is not supported as general for instrument routine procedures.
- MOC clarified that instruments are required to cover their entire TC database with the procedures defined for launch. Only TCs that are contained in defined procedures may be used for flight operations. Since TM checks are only performed off-line, procedures must contain wait periods in between critical that encompass worst-case durations.
- MOC confirmed that phase-specific procedures are expected to be defined only in case of operations that take place during a specific mission phase.
- It is agreed to update the FOPPP with the proposed instrument procedure ranges. **ACTION ICMD#03:** MOC to update FOPPP with instrument procedure ranges.

5 PROCEDURE INPUTS

- MOC clarified valid procedure versioning of any inputs is fundamental to allow operators to trace changes in operational definitions.
- The FOP Procedure tool will use the latest reference SRDB issue. MOC agrees to make available to the instruments the release note of the relevant DB version.
- MOC clarified that it will populate in the MIB the instrument sequence definition that will be used for flight operations, but not the one to be used for ground validation by the instruments. It is agreed that in the future this database definition will be made available to the instruments as well.
- MOC explained that the final reference for flight procedure and sequence definition is the FOP, which will be distributed to the instruments as the procedures are written.
- It is confirmed that the procedure tool currently does not report the MIB version that is being used. **ACTION ICMD#04:** SOC/MOC to look into adding a link in the tool to show the MIB release note.
- The tool currently does not support native format saving or editing. **ACTION ICMD#05:** SOC/MOC to propose to BC development team adding native format saving/edit functionality.
- It is the general agreement that the procedure tool is interesting to the instrument teams and will be used if the prototype is completed and made available.

6 COMMANDING I/F

- SOC explained that the format for IORs and PDORs will be XML common for both, but the interface definition are different, because the use of the two products is different: IOR must pass through the SOC planning system, to meet the resources constraint. The process by which the two products are populated is complete different: IOR is automated, PDOR is fairly manual.
- MOC stressed that MDOR and PDOR are not to be used for routine operations, as they may change instrument resources and planning.
- MOC agreed to send as part of the meeting a sample TC hex pattern for every instrument, in the same format that will be used for the validation process.
- MOC clarified that realistically the instruments should consider no more than 8 hour slot during SVT-1.



- Instrument Flight procedure generation poll. Instrument teams were polled as to a delivery of instrument flight procedures covering a generic science operations scenario, which would be used by MOC to create the TC sequences to be used in the SOC IORs test in 2017.
 - SOLOHI: End of January 2017
 - MAG: end January 2017
 - RPW: End of 2016
 - EPD: End of 2016, TBC
 - SWA: first set by end of 2016, second batch by end Jan 2017.
 - EUI: End of 2016
 - METIS: End of Jan 2017
 - PHI: First set by end of 2016.
 - STIX: End of 2016.
 - SPICE: End of Jan 2017.
- **ACTION ICMD#06:** EPD to confirm the dates for submission of the first batch of Instrument Flight Operations procedure inputs.
- MOC confirmed that a full FOP definition is needed by the Oct/2017.
- MOC clarified that any received TM will have to be pulled by the instrument teams from the ESOC Archive. No TM pushing is baselined.

7 AOB

- It was agreed to hold **SOWG #9 on 24-25 January 2017 in ESAC.**

8 ACTION SUMMARY

ICMD#01: SOC to investigate means for the Instrument Teams to pre-validate their IORs before formal submission.

ICMD#02: SOC to look into mechanism to provide feedback to Instrument Teams about the acceptance state of their submitted planning products.

ICMD#03: MOC to update FOPPP with instrument procedure ranges.

ICMD#04: SOC/MOC to look into adding a link in the tool to show the MIB release note.

ICMD#05: SOC/MOC to propose to BC development Team adding native format saving/edit functionality.

ICMD#06: EPD to confirm the dates for submission of the first batch of Instrument Flight Operations procedure inputs.