

# CMS Ops Team Cruise #16 2021-12-02

## Attendance:

D. Williams, Claude Mercier, Jeff Lesho, Frédéric Auchère, Rad Perry, Tim Grundy, Scott Wallace.

## CMS ops

Currently executing on board is STP-179, in the three-month period known as LTP05, which runs through the end of the year. Programmatically, we are now in Nominal Mission Phase, having got safely past the Earth GAM on 27 Nov 2021 .

Since the last meeting on 21 Oct 2021 , Payload continued observing the Sun in a more or less "synoptic" way, until DOY 324, by which time the heatshield doors were shut for all instruments with such doors.

Earth GAM was successfully carried out, with no additional risk from the "new debris cloud" recently introduced in LEO.

## Anomalies (if any)

None since last meeting.

## CMS data and interpretation

See IAS CMS data tool

Operations times shown for CMS since the last meeting. Mainly discussed during the meeting were the measurements around and just after the VGAM.

LTP05:

1. STP-171: 2021-10-20T12:00:00Z – 2021-10-20T15:00:00Z (DOY 293) around **SA rotation 56° 30°**
2. STP-173: 2021-11-01T00:05:00Z – 2021-11-01T09:15:00Z (DOY 305) around **WOL (01:03)** + TCM (unused)
3. STP-174: 2021-11-08T00:05:00Z – 2021-11-08T03:05:00Z (DOY 312) around **WOL** (unused?)
4. STP-174: 2021-11-12T09:00:00Z – 2021-11-12T12:00:00Z (DOY 316) around **SA rotation 30° 0° ()**
5. STP-175: 2021-11-15T00:05:00Z – 2021-11-15T09:10:00Z (DOY 319) around **WOL ()** + ~~TCM (EGAM - 2 weeks; not used)~~
6. STP-176: 2021-11-20T15:05:00Z – 2021-11-21T08:25:00Z (DOY 324–325) around **WOL () + TCM (EGAM - 1 week; V = 2.4 cm/s )** Drop in temperature only. Unlikely that there was accumulation of mass.
7. STP-177: 2021-11-24T04:40:00Z – 2021-11-24T23:55:00Z (DOY 328) around **WOL () + TCM (EGAM - 3 days)** Stabilised at 10 with peltier (steep rise corresponding to cooling of CMS 1. CMS-2 heater ran to +5 to warm a little bit, rather than 0°. Slight rise on CMS-1 and a slight decrease on CMS-2. Slow rate of increase. SW: maybe there's a bit of hysteresis on CMS-2. CMS-2 started just below 0, went to +5 after a few mins. CMS-1 ramped down 1°/minute or so. We didn't know what the start T was , so made a guess to within a few degrees. RP: CMS-2 overshot to about 8° and then came back down. Could be that at or just below the eq evaporation temperature then we'd see a slow removal. Something like a 3 Hz drop with very little change in T. SW: When you hit the stable T, after more than 8000 seconds, there should be no hysteresis effect. on CMS-1 what we're saying is that starting 24th 08:00 stable crystal. Everything past that would be deposition. The small wiggle might be 1 Hz, but OE thinks too small to say anything. Likely isothermal from 0800 onwards. so 13:00 of isothermal data showing a 1 Hz shift. When it went cold, maybe it went past a deposition temperature. Maybe going above a certain temperature again, it came off.
  - a. OE there's a difference in the T sensor and the crystals. Sometimes if IR shines on the crystal surface, there's a -ve 14:30 to 15:30.
  - b. Shape doesn't match the temperature curve. RP: MK-18 remains consistent between dep and freq. The Yellow curve seems appropriate. The Mk-24 does not.
  - c. SW May be that it's the heatsink changing T, rather than the FOV. Was there a change in attitude? **AI on SOC to check this out.** Jump also between 09:33 and 09:35 – OE: could be a glitch in the data acquisition. Could be a heat pump, but would there be a reason for that.
  - d. Heater spike seen at 04:05, likely the CMS-2 heater.
  - e. Dumping heat out of CMS-1 but not as much as before.
  - f. Slow enough ramp down in T avoids the thermal runaway.
  - g. 1st 3 hours of the period was TCM : slight sight at around 05:07 of the 05:01 TCM itself. 2021-11-24 00:00:00A
  - h. JL: A drop-down vertical marker would be useful. Shading in the EFCS events like TCM, SA-ROT, WOL, ...
8. STP-178: 2021-11-25T12:05:00Z – 2021-11-25T21:15:00Z (DOY 329) around **WOL ()** + TCM (EGAM - 2 days; not used)
9. STP-179: 2021-11-26T16:20:00Z – 2021-11-28T03:55:00 (DOY 330 – 332) around **EGAM (closest approach 2021-11-27T04:30; 04:10 to 05:01 thrusters seen firing in HK)**
  - a. **DECO heaters had to be off, so CMS-1 temperature is changing**
  - b. **The spike on a wider is likely lack of illumination.**
  - c. **SOC to find information on when in shadow.**
10. STP-179: 2021-11-30T02:00:00Z – 2021-11-30T13:35:00Z (DOY 334) around **WOL () + 7 S/C rolls** (2021-11-30T05:15:00Z to 2021-11-30T13:31:00Z)
11. STP-179: 2021-11-30T22:30:00Z – 2021-12-01T12:05:00Z (DOY 334 – 335) around **WOL () + 9 S/C rolls** (2021-12-01T01:45:00Z to 2021-12-01T12:01:40Z)
12. STP-179: 2021-12-01T22:30:00Z – 2021-12-01T12:05:00Z (DOY 335 – 336) around **WOL () + 9 S/C rolls** (2021-12-02T01:45:00Z to 2021-12-02T12:01:40Z)

## Highlights/recommendations

- CMS operations to be performed weekly, capturing interesting events where possible.
- CMS Operator should switch on CMS 30 minutes earlier than the time at which the observations would start, particularly if the observations to catch (for example) a WOL would need to start at midnight. CMS operations in SOOP Kitchen are timed such that they start 30 minutes after assumed switch-on.
- Note that From LTP04 onwards (i.e., starting from STP-154), SOC has not been indicating CMS operations in the EFECs with an RSW\_EXT\_SPICE. They will still be indicated with CMS "observations" in the LTP plan however.

## Future operations:

### Already planned

Upcoming planned CMS Ops:

LTP05 runs until the end of the year

1. 2021-12-02T21:05:00Z around WOL + TCM (EGAM + 1 week; V = 1.55 m/s, **less than 4.9 m/s originally expected**)
  - a. To be investigated in Jan meeting!
2. 2021-12-03T20:30:00Z around SA relubrication
3. 2021-12-13T19:30:00Z around TCM (Type -1 so may be significant)
4. 2021-12-20T00:05:00Z around WOL

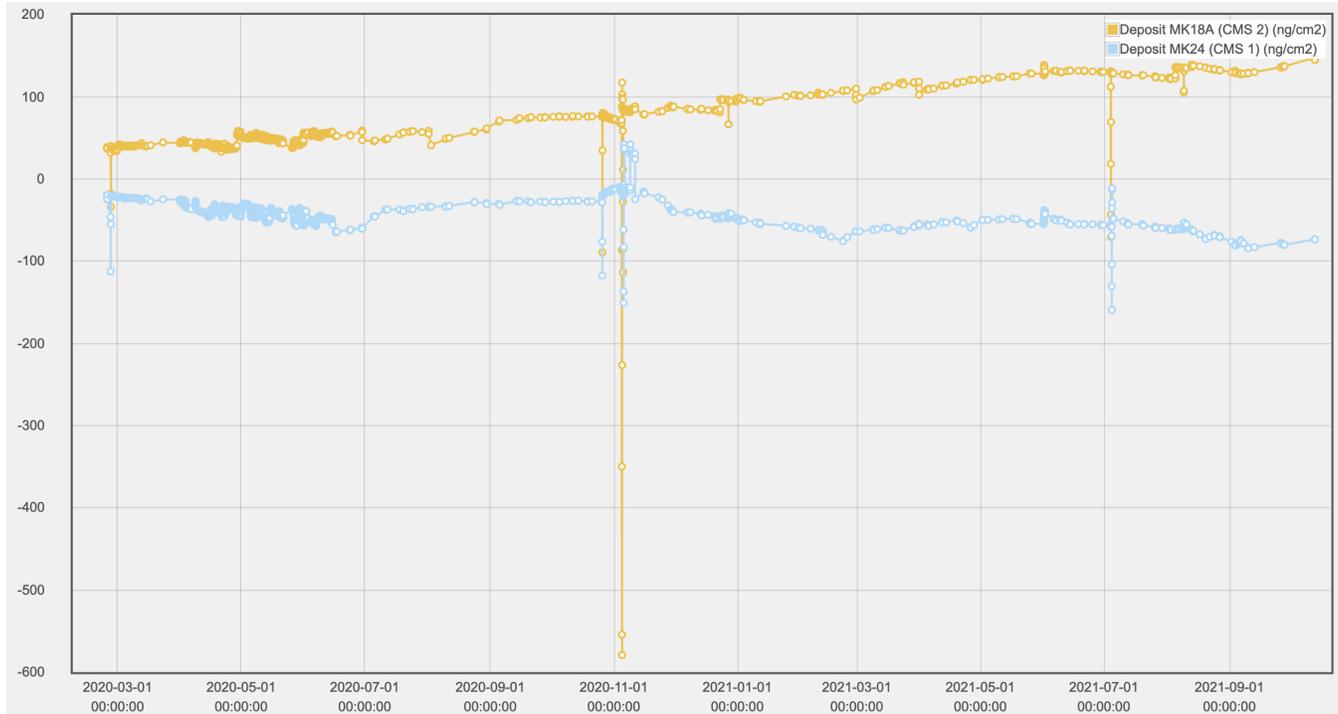
LTP06 will start between now and our next meeting:

1. 2021-12-27T23:00:00Z around SA relubrication
2. ...

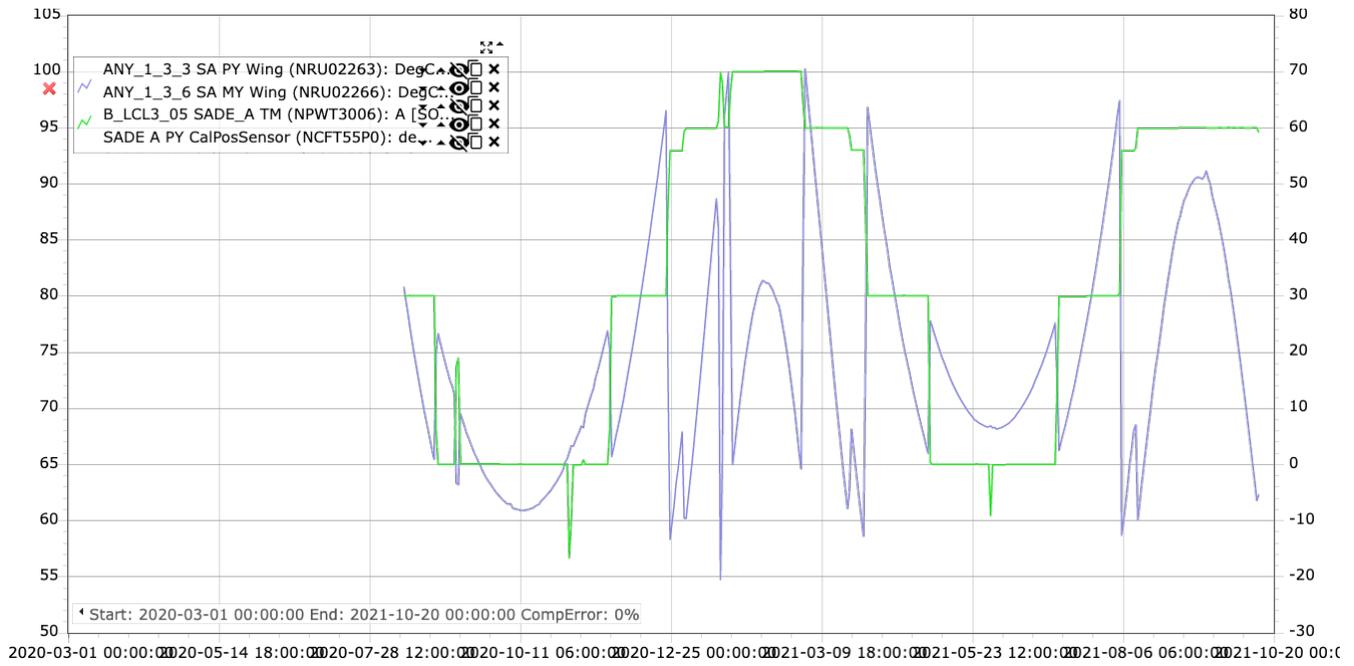
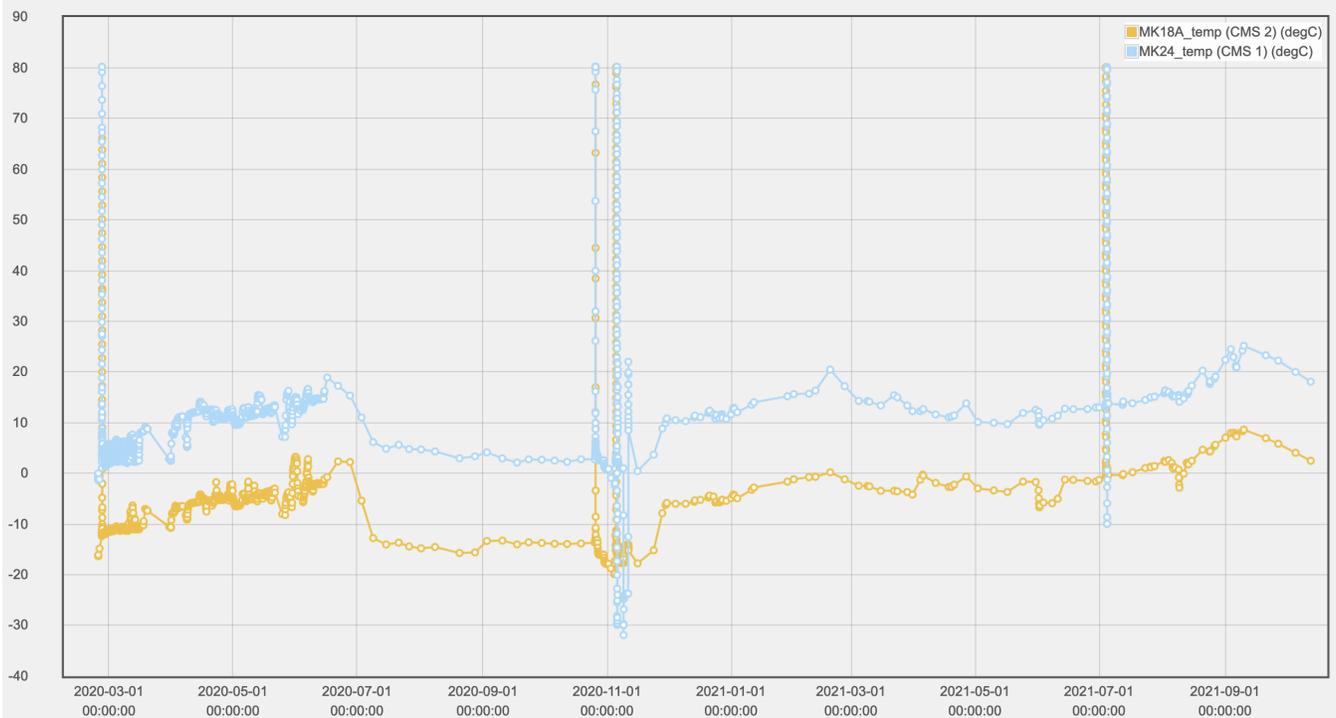
*This is the LTP in which we get much warmer and the SA rotations will be much more inclined. To be discussed in next meeting what should be done around higher temperatures.*

## AOB

The long-term trend of deposition will be updated here each month.



In addition, the CMS sensor temperatures and Solar Array temperatures:



Orcun has also shared the in-flight analysis by Airbus. Will share among CMS Ops team.

## Next meeting

Unless there is an ad-hoc request to have another meeting in 2021, we could meet next in January

27 Jan 2022 . resumes natural schedule.

## Action Items

*New AIs arising from this meeting in **bold**.*

AI-12: MS to provide CMS1 & CMS2 FoV Open (DW will ask MS) important for next VGAM

AI-13: David Williams to investigate SWA temperatures 28th Jan – Open

AI-16: OE will contact Airbus to see what inputs they need from CMS and SOC to compare with their thermal model

Contacted ADS: Awaiting an answer when the responsible person is back from holidays.

AI-25: Rad and Orcun to take a look at the TGA data when possible, and compare with previous TGAs.

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