# COMMISSIONING

# Validation of configurations

# Agenda

- State of reception of commissioning documents by each team

- Details for each step of commissioning of configuration —> highlight of inconsistencies

- Details of nominal phase configurations

  - Default Science

  - Galaxy mode

  - Low rate

- Next steps

# Commissioning configurations

# State of configuration documents

| | 1 - First switch on | 2 - l-Boom depl. | 3 - ANT depl. | 4 - ANT calib rolls | 5 - SCM noise measur. | 6 - Interferences | 7 - PAS filtering |
|---|---|---|---|---|---|---|---|
| LFR | | X | X | X | X | X | |
| TDS | | X | X | X | X | X | X |
| TNR-HFR | | X | X | X | X | X | X |
| BIAS | | X | X | X | X | X | |

**DAS : no specific config. Only increase the HK frequencies up to 1 or 2 seconds**
**SCM : not configurable. Depends on LFR configuration**

# Operational constraints

- All equipments must always be in the same mode

- ROC is not sure to be able to get SBM1 data during commissioning phase

- **Change of configuration for an equipment —> downtime for other equipments.**

# 1 First Switch on - SFT

| | Mode | Duration | Sensors |
|---|---|---|---|
| LFR | ? | ? | ? |
| TDS | ? | ? | ? |
| TNR-HFR | ? | ? | ? |
| BIAS | ? | ? | ? |

- Inputs from CNES concerning the SFT configuration ?

- Same config as SFT test performed at CNES ?

# 2 - I-Boom deployment

| | Mode | Duration | Sensors |
|---|---|---|---|
| **LFR** | SBM1 | **1 config : 120 min.** | ? |
| **TDS** | SBM1 | **1 config : min. 65 sec.** | magnetic only |
| **TNR-HFR** | SBM1 | **1 config 10 min before and after ; 1 config during depl.** | V1-V2 B |
| **BIAS** | SBM1 | NA | NA |

LFR PAS filtering and LFR RW filtering should be both DISABLED

# 2 - I-Boom Deployement

- ## LFR : SBM1 mode with maximum frequency resolution in single ended mode (LFR snapshot and ASM periods are set the shortest.)

  LFR PAS filtering and LFR RW filtering should be both DISABLED

  duration ~120 min

- ## TDS : SBM1 mode, sampling the antennas in a monopole configuration HF_SE_1 for at least 65 seconds. Data is collected only for B_MF component, E-components are disabled.
  - Sampling rate 524 ksps.
  - High gain, single ended input configuration
  - Regular snapshot of 32k samples taken every 11 seconds. B component only.
  - MAMP (TDS maximum) product enabled at 128 sps.
  - Triggered snapshots and statistics disabled
  - Histograms disabled
  - SBM1 snapshots enabled: 2048 samples every 1 second

- ## TNR-HFR :

  - Conf1: 10 min pre/post deployment: TNR only (V1-V2 / B), one spectrum every 12 sec

  - Conf2: during deployment: TNR only (V1-V2 / B), one spectrum every 2 sec

- ## BIAS : No specific configuration (normal science)

# 3 - Antennas deployment

| | Mode | Duration | Sensors |
|---|---|---|---|
| LFR | SBM1 | ? | ? |
| TDS | SBM1 | **1 config : min. 65 sec.** | electric only |
| TNR-HFR | SBM1 | **1 config 10 min before and after ; 1 config during depl.** | electric only |
| BIAS | Disabled | NA | NA |

LFR PAS filtering and LFR RW filtering should be both DISABLED

# 3 - Antennas deployment

- ## LFR : SBM1 mode with maximum frequency resolution in single ended mode (LFR snapshot and ASM periods are set the shortest.)

  LFR PAS filtering and LFR RW filtering should be both DISABLED

- ## TDS : SBM1 mode, sampling the antennas in a monopole configuration HF_SE_1 for at least 65 seconds.
  - Sampling rate 524 ksps.
  - High gain, single ended input configuration
  - Regular snapshot of 32k samples taken every 11 seconds.
  - MAMP (TDS maximum) product enabled at 128 sps.
  - Triggered snapshots and statistics disabled
  - Histograms disabled
  - SBM1 snapshots enabled: 1024 samples every 1 second

- ## TNR-HFR :

  - Conf1: 10 min pre/post deployment: full scan config: TNR all bands, HFR all frequencies; one spectrum every 8 sec

  - Conf2: during deployment: TNR (B) band B only, HFR (20 frequencies equally spaced) one spectrum every 0.42 sec

- ## BIAS : disabled; single-ended signals on each antenna

# 4 - Antennas calibration rolls

| | Mode | Duration | Sensors |
|---|---|---|---|
| LFR | **Normal** | **240 min with BIAS + 240 min without BIAS possibly** | ? |
| TDS | **SBM1** | ? | Antenna in monopole |
| TNR-HFR | Normal/SBM1 | continuous | electric only |
| BIAS | Enabled/Disabled | NA | V1DC, V2DC, V3DC, V12AC and V23AC |

LFR PAS filtering and LFR RW filtering should be both DISABLED. Measurement will be done with and without BIAS unit.

# 4 - Antennas calibration rolls

- **LFR :** NORMAL mode with maximum time resolution in order to get snapshots at F0 (24kHz) in single-ended mode

  LFR PAS filtering and LFR RW filtering should be both DISABLED. Measurement will be done with and without BIAS unit.

  Duration : 240 min with BIAS + 240 min without BIAS

- **TDS :** SBM1 mode, sampling the antennas in a monopole configuration HF_SE_1 for at least 65 seconds.
  - Sampling rate 524 ksps.
  - High gain, single ended input configuration
  - Regular snapshot of 32k samples taken every 11 seconds.
  - MAMP (TDS maximum) product enabled at 128 sps.
  - Triggered snapshots and statistics disabled
  - Histograms disabled
  - SBM1 snapshots enabled: 1024 samples every 1 second

- **TNR-HFR :**

  - TNR: direction Finding mode ; one spectrum every 12 sec

  - HFR: 200 frequencies linearly distributed to cover the full HFR frequency range; one spectrum every 12 sec

- **BIAS :** outputs are V1DC, V2DC, V3DC, V12AC and V23AC. Each probe is biased with a current value that is a free parameter.

# 5 - SCM Noise measurement campaign

| | Mode | Duration | Sensors |
|---|---|---|---|
| LFR | SBM1 | ? | ? |
| TDS | SBM1 | ? | Antenna monopole |
| TNR-HFR | Normal/SBM1 | continuous | electric + magnetic |
| BIAS | Normal science | NA | NA |

LFR PAS filtering and LFR RW filtering should be both DISABLED

# 5 - SCM Noise measurement campaign

- **LFR :** SBM1 mode with maximum frequency resolution in single ended mode (LFR snapshot and ASM periods are set the shortest.)

  LFR PAS filtering and LFR RW filtering should be both DISABLED

- **TDS :** SBM1 mode, sampling the antennas in a monopole configuration HF_SE_1 for at least 65 seconds.
  - Sampling rate 524 ksps.
  - High gain, single ended input configuration
  - Regular snapshot of 32k samples taken every 11 seconds.
  - MAMP (TDS maximum) product enabled at 128 sps.
  - Triggered snapshots and statistics disabled
  - Histograms disabled
  - SBM1 snapshots enabled: 1024 samples every 1 second

- **TNR-HFR :** TNR only (CH2 on B). one spectrum <u>every 12 sec</u>

- **BIAS :** No specific configuration (normal science)

# 6 - Inter-Instrument interference campaign

| 6 - Interferences | Mode | duration | sensors |
|---|---|---|---|
| **LFR** | SBM1 | **min. 200 s for each config** | 9 configs |
| **TDS** | SBM1 | 65 s for each config | 2 configs : monopole or diff mode |
| **TNR-HFR** | SBM1 | continuous | electric only |
| **BIAS** | SBM1 | see LFR | see LFR |

LFR : 9 different configurations with a return to SERVICE mode between each configuration.

# 6 - Inter-Instrument interference campaign

- LFR : 9 different configurations with a return to STANDBY mode between each configuration.

  SBM1 mode with maximum frequency resolution (LFR snapshot and ASM periods are set the shortest.)

  LFR PAS filtering and LFR RW filtering should be both DISABLED

  duration : as long as possible - minimum 200s for each configuration

- TDS : SBM1 mode, 2 identical configurations except that sampling the antennas in a monopole configuration HF_SE_1 in config 1 and then in HF_DIFF_1 in config 2 for at least 65 seconds each
    - Sampling rate 524 ksps.
    - High gain, single ended input configuration, then basic dipole input configuration
    - Regular snapshot of 32k samples taken every 11 seconds.
    - MAMP (TDS maximum) product enabled at 128 sps.
    - Triggered snapshots and statistics enabled
    - Histograms disabled
    - SBM1 snapshots enabled: 1024 samples every 1 second

- TNR-HFR : Two successive THR configuration
    - full scan config: TNR all bands, HFR all frequencies; one spectrum every 8 sec
    - TNR: direction Finding mode ; one spectrum every 12 sec - HFR: 200 frequencies linearly distributed to cover the full HFR frequency range; one spectrum every 12 sec

- BIAS : 9 different configurations synchronised with LFR measurements.

# 7 - PAS filtering

- LFR : Not provided yet

- TDS : SBM1 mode, 2 identical configurations except that sampling the antennas in a monopole configuration HF_SE_1 in config 1 and then in HF_DIFF_1 in config 2 for at least 65 seconds each
  - Sampling rate 524 ksps.
  - High gain, single ended input configuration, then basic dipole input configuration
  - Regular snapshot of 32k samples taken every 11 seconds.
  - MAMP (TDS maximum) product enabled at 128 sps.
  - Triggered snapshots and statistics enabled
  - Histograms disabled
  - SBM1 snapshots enabled: 1024 samples every 1 second

- TNR-HFR : NO specific need - THR survey normal mode

- BIAS : Not provided yet

# Cruise phase configurations

# Nominal phase : Low rate configuration

The average daily data rate has been set up to 2.4 kbit/s. Three propositions :

| | LFR | TDS | TNR-HFR | Modes | Data rate (kbit/s) |
|---|---|---|---|---|---|
| Config 1 | RSWF every 30 min<br>ASM every 1h<br>BP every 8s<br>Cross & auto every 40s | RWSF every 30 min<br>TSWF every 2h | **As default science** | 10 min BURST/day else NORMAL<br>**NO SBM1** | 2,43 |
| Config 2 | RSWF every 1h<br>ASM every 1h<br>BP every 16s<br>Cross & auto every 60s | RWSF every 1h<br>TSWF every 2h | measurment every 24s (12s of measurement, 12s of waiting …) | 10 min BURST/day else NORMAL<br>**SBM1 half day** | 2,43 |
| Config 3 | RSWF every 2h<br>ASM every 2h<br>**BP every 60s**<br>Cross & auto every 180s | RWSF every 2h<br>TSWF every 2h | **measurment every 36s (12s of measurement, 24s of waiting …)<br>on 1 Band only** | 10 min BURST/day<br>**SBM1 during 1200 min** and NORMAL the 200 min left | 2,34 |

# Nominal phase : Galaxy configuration

Configuration dedicated to measure the radio galaxy background spectrum at high frequencies (i.e. > 1 MHz)

- LFR : Switched off

- TDS : Switched off

- TNR-HFR : sweep of all frequencies at high cadence

- BIAS : Switched off

- SCM : Switched off

# Nominal phase : Default science configuration

The average daily data rate has been set up to 5.5 kbit/s

- NORMAL mode : https://confluence-lesia.obspm.fr/display/ROC/RPW_SCIENCE+NORMAL-DEFAULT

- BURST mode : https://confluence-lesia.obspm.fr/display/ROC/RPW_SCIENCE+BURST-DEFAULT

- SBM detection mode : https://confluence-lesia.obspm.fr/display/ROC/RPW_SCIENCE+DETECTION-DEFAULT

# Next steps

- Instrument teams : We are waiting as soon as possible the missing inputs—> before mid-October

  - LFR : config Reaction wheels test

- Concerning RPW-1 and 7 : PAS filtering and first switch on, ROC needs more inputs from CNES.

- ROC : Prepare the corresponding sequences for each configuration and operation timelines —> before mid-October

- Prepare the general document with all the commissioning/CP configurations and send to instrument team to be approved —> before the end of October