ANT/i-Boom Deployment & Commissioning

All

i-Boom deployment

Known

- Operated during the LEOP

- Only MAG/RPW ON

- SSMM Available

- Driven by MOC

Unknown

- Constraints (power, TM rate, TC)

- Detailed operation timeline at S/C level

- Organisation/responsibilities on-ground

- **Specific Instrument modes during the deployment. From RPW UM:**

  - *RPW MEB and SCM preamplifier should be switched ON 10 min before the beginning of the BOOM deployment sequence and set in SURVEY_NORMAL mode with a specific configuration in order to record data. It shall then be switched OFF 10 min after the end of the BOOM deployment sequence. The active deployment phase lasts no more than two hours. The data recorded during this time will be used to:*

    - *Collect information on the magnetic sensitivity levels in a stowed configuration*

    - *Collect information on the magnetic sensitivity level after the deployment*

ANTs deployment

Known

- Operated during the LEOP

- Only RPW ON

- SSMM Available

- ANT deployment latencies (cf. RPW ANT UM)

- Driven by MOC (using the TCs prepared by RPW)

- RPW ANT team provides the TCs for the deployment. ROC provides the TCs for the instrument modes.

Unknown

- Constraints (power, TM rate, TC)

- Operation timeline

- Organisation/responsibilities on-ground

- **Specific Instrument configuration during the deployment. From RPW UM:**

  - *RPW MEB and ANT preamplifiers should be switched ON 10 min before the beginning of the ANT deployment sequence and set in SURVEY_NORMAL mode with a specific configuration in order to record data. It shall then be switched OFF 10 min after the end of the ANT deployment sequence. The data recorded during this time will be used to:*

    - *Collect information on the electric sensitivity levels in an ANT undeployed configuration.*

    - *The magnetic sensitivity levels in a stowed configuration*

    - *Check that the ANT monopole has been successfully and totally deployed*

ANTs deployment

Baseline timeline (RPW ANT UM):

- Before deployment sequence:

    - Monitor PA temperatures and boom hinge heater power consumption. Verify End Of Travel (EOT) indicators nominal (no deployment) for both the stub boom and Stacer monopole.
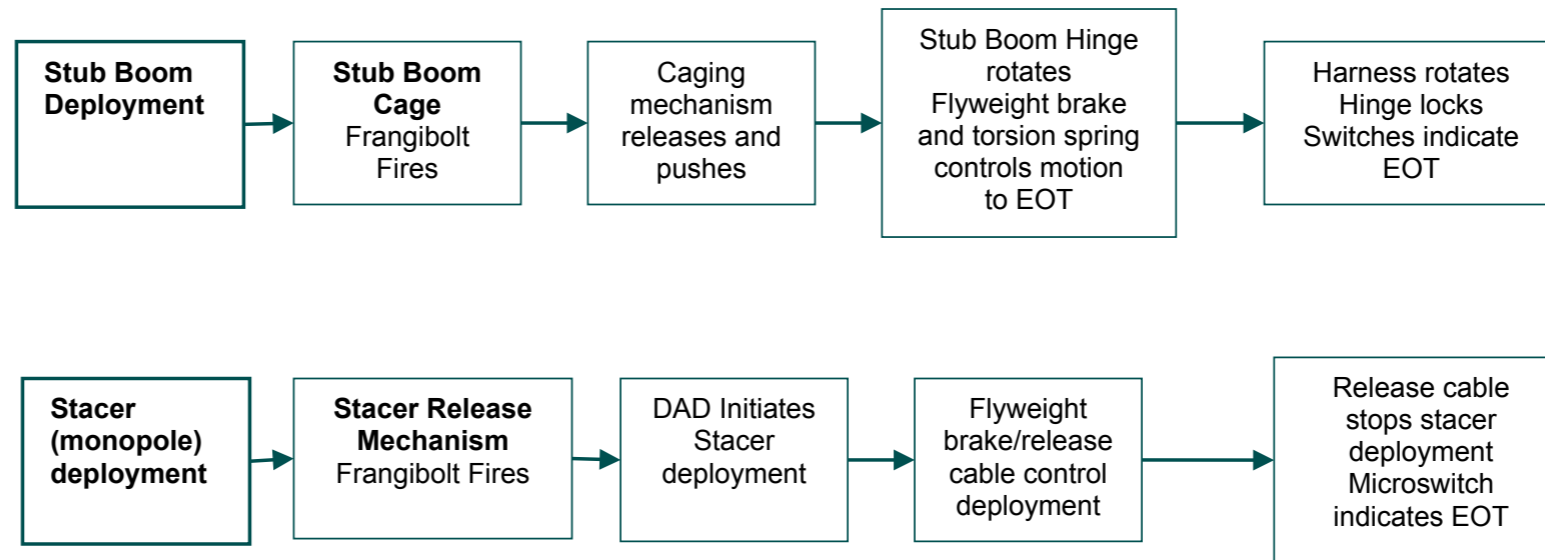
- At deployment:

| Stub Boom Deployment | → | Stub Boom Cage Frangibolt Fires | → | Caging mechanism releases and pushes | → | Stub Boom Hinge rotates Flyweight brake and torsion spring controls motion to EOT | → | Harness rotates Hinge locks Switches indicate EOT |

| Stacer (monopole) deployment | → | Stacer Release Mechanism Frangibolt Fires | → | DAD Initiates Stacer deployment | → | Flyweight brake/release cable control deployment | → | Release cable stops stacer deployment Microswitch indicates EOT |

Figure 44: RPW Antenna deployment functional elements and relationships

    - 3 antennas will deployed one by one.

    - One deployment takes around ~4 min (Frangibolt)

- Constraints: deployment should occur at a heliocentric distance >0.9 AU.

NOTE: The above order may be altered depending on the requirements of the SO spacecraft; i.e., all three Antenna stub booms may be deployed first, followed by all three Stacer monopoles, etc.

Commissioning

Known

- Operated during the LEOP

- Only RPW ON (at least during interference, RPW-PAS filtering tune and)

- SSMM Available

- Driven by MOC (using the TCs prepared by IT)

Unknown

- Constraints (power, TM rate, TC)

- Detailed operation timeline at S/C level

- Organisation/responsibilities on-ground

- **Specific Instrument configurations during the commissioning**

Will be discussion in the next SWOG#10 on July

Auto compatibility of the « inter-instruments interference » campaign

	RPW	MAG	EPD	SWA	PHI	EUI	SPICE	STIX	METIS	SOLOHI
T0 to T1=T0 + 80 min	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
T1 to T2=T1 + 80 min	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
T2 to T3=T2 + 80 min	ON	OFF	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF
T3 to T4=T3 + 80 min	ON	OFF	OFF	ON	OFF	OFF	OFF	OFF	OFF	OFF
T4 to T5=T4 + 80 min	ON	OFF	OFF	OFF	ON	OFF	OFF	OFF	OFF	OFF
T5 to T6=T5 + 80 min	ON	OFF	OFF	OFF	OFF	ON	OFF	OFF	OFF	OFF
T6 to T7=T6 + 80 min	ON	OFF	OFF	OFF	OFF	OFF	ON	OFF	OFF	OFF
T7 to T8=T7 + 80 min	ON	OFF	OFF	OFF	OFF	OFF	OFF	ON	OFF	OFF
T8 to T9=T8 + 80 min	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	OFF
T9 to T10=T9 + 80 min	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON
T10 to T11=T10 + 80 min	ON	ON	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF
T11 to T12=T11 + 80 min	ON	OFF	OFF	OFF	ON	ON	ON	ON	ON	ON
T12 to T13=T12 + 80 min	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON
T13 to T14=T13 + TBD min	All the instruments shall be OFF Auto compatibility with the platform shall be performed - high gain antenna angle changes - high gain antenna radiation effects on preamplifiers shall be tested - solar panel angle changes									

The interference campaign shall consist in 13 steps of equal duration. This duration is set by the LFR characterization, which requires at least one snapshot of f3-waveform data (nominally every 2 x 150 s) for each LFR possible configuration (see below). The TDS, BIAS & TNR-HFR require shorter characterization periods but will remain functioning during the whole 80 minutes for each step.

For each of the 13 steps it is important that each instrument, which is powered ON runs all its possible operation modes with potentially different EMC fingerprints in both DC & AC.

At the end of the 13 interference steps, all the instruments shall be set to OFF and an Auto compatibility with the platform shall be performed as described in the table above.

Commissioning

LFR modes during the interference campaign

- For the in-flight interference campaign, the LFR measurement mode should be the SBM1 mode (which records simultaneously SBM1 data and NM data). Different LFR and BIAS configurations should be tested (R0, R1 and R2 parameters, BW parameter, as well as SP0 & SP1 parameters).

- The duration of a campaign for a given LFR configuration should be as long as possible. Indeed one need enough time to record at least one snapshot of f3-waveform data: nominally this means 2 x 150 s. Maybe for the campaign the SWF_P parameter can be changed to a smaller value.

- Multiplexer configurations for LFR-BIAS:

    - Conf 1: BIAS (V1_DC, V2_DC, V3_DC), SCM (SCM1, SCM2, SCM3), LFR (R0=R1=R2=1, SP0=SP1=0, BW=1)

    - Conf 2: BIAS (V12_DC, V23_DC), SCM (SCM1, SCM2, SCM3), LFR (R0=R1=R2=1, SP0=SP1=0, BW=1)

    - Conf 3: BIAS (V13_DC, V23_DC), SCM (SCM1, SCM2, SCM3), LFR (R0=R1=R2=1, SP0=SP1=0, BW=1)

    - Conf 4: BIAS (V12_AC (gain 5), V23_AC (gain 5)), SCM (SCM1, SCM2, SCM3), LFR (R0=R1=R2=0, SP0=SP1=0, BW=1)

    - Conf 5: BIAS (V13_AC (gain 5), V23_AC (gain 5)), SCM (SCM1, SCM2, SCM3), LFR (R0=R1=R2=0, SP0=SP1=0, BW=1)

    - Conf 6: BIAS (V12_AC (gain 100), V23_AC (gain 100)), SCM (SCM1, SCM2, SCM3), LFR (R0=R1=R2=0, SP0=SP1=0, BW=1)

    - Conf 7: BIAS (V13_AC (gain 100), V23_AC (gain 100)), SCM (SCM1, SCM2, SCM3), LFR (R0=R1=R2=0, SP0=SP1=0, BW=1)

    - Conf 8: no BIAS, HF inputs, SCM (SCM1, SCM2, SCM3), LFR (R0=R1=R2=0, SP0=SP1=0, BW=0)

    - Conf 9: o BIAS, HF inputs, SCM (SCM1, SCM2, SCM3), LFR (R0=R1=R2=0, SP0=SP1=1, BW=0)

Commissioning

TDS modes during the interference campaign

- TDS shall be commanded to run in two specific configurations (different from nominal science modes):

    - • BURST mode single ended- at least 1 minute

        - Sampling rate 524 ksps.

        - High gain, single ended input configuration

        - Regular snapshot of 32k samples taken every 10 seconds.

        - MAMP (TDS maximum) product enabled at 128 sps.

        - Triggered snapshots and statistics enabled in nominal configuration

        - Histograms disabled

- At the end of the one minute run, triggered snapshot queue should be dumped and 16 triggered snapshots saved.

- This operation shall be performed using procedure IW-FCP-027.

    - • BURST mode dipole - at least 1 minute

        - Sampling rate 524 ksps.

        - High gain, basic dipole input configuration

        - Regular snapshot of 32k samples taken every 10 seconds.

        - MAMP (TDS maximum) product enabled at 128 sps.

        - Triggered snapshots and statistics enabled in nominal configuration

        - Histograms disabled

- At the end of the one minute run, triggered snapshot queue should be dumped and 16 triggered snapshots saved. This operation shall be performed using procedure IW-FCP-028.

Commissioning

THR modes during the interference campaign

- TNR-HFR shall run in all possible modes for equal times during each 80 minutes step. This includes the direction-finding modes, which allow testing the different antenna configurations.

- In addition and within the 80 minutes steps, a sweep of all the HF frequencies shall be performed.