**Project: Solar Orbiter SWA**

**Author:** **Gethyn Lewis**

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# Introduction

The primary objective of this document is to describe the in-flight commissioning plan of the SWA flight instrument. The proposed tests will demonstrate that the performance of the instrument meets the operational requirements. The aim is to define activities with an emphasis on performing tests that require real time contact with the spacecraft.

# Reference Documents

The documents listed below form a part of this document, to the extent specified and described herein.

|  |  |  |
| --- | --- | --- |
| Ref. | No | Title |
| NR1 | SOL-EST-IF-0050 | Solar Orbiter Experiment Interface Document Part A |
| NR2 | SOL-EST-RS-1937 | Solar Orbiter Product Assurance Requirements for Instruments |
| NR3 | SO-SWA-MSSL-SP-006 | SWA Instrument Scientific Requirements Report |
| NR4 | SO-SWA-MSSL-PL-006 | SWA Product Assurance Plan |
| NR5 | MSSL-SO-SWA-EID-B | SWA EID-B |
| NR6 | SO-SWA-LPP-LP-039\_MCP Acceptance Test | LPP MCP Acceptance and characterisation Plan |
| NR7 | SO-SWA-LPP-RP-078\_1\_1-MCP\_test\_report\_PartI | MCP detector characterisation test report |
| NR8 | SO-SWA-LPP-RP-092 EAS Det FM1 Test Report rev 1-4.pdf | LPP detector sub-system test report FM1 |
| NR9 | SO-SWA-LPP-RP-093 EAS Det FM2 Test Report rev 1-2.pdf | LPP detector sub-system test report FM2 |
| NR10 | SO-SWA-MSSL-SP-012\_EAS-DPU\_Interface\_Specification\_Issue\_2.pdf | EAS-DPU Interface Specification |
| NR11 | SO-SWA-MSSL-PL-013 | SWA EAS Calibration Plan |
| NR12 | SO-SWA-MSSL-UM-002 | SWA Instrument User manual |

# Acronym and Abbreviation List

|  |  |
| --- | --- |
| **Abbreviation** | **Meaning** |
| PDOR | Payload Direct Operations Request |
| MDOR | Memory Direct Operations Request |
| IA-FCP | Instrument (SWA) – Flight Control Procedure |
| TC | TeleCommand |
| IIC | Inter Instrument Check |
|  |  |
|  |  |

# General requirements

## Spacecraft Location and Plasma Environment

To be included

## Required Configuration of the Spacecraft

There is no particular spacecraft configuration required during SWA commission.

## Spacecraft Pointing

There is no designated pointing required during the SWA commission phase.

## Spacecraft-generated Gases

SWA commissioning, particularly involving high voltages, should not begin until sufficient time has elapsed for spacecraft outgassing to be essentially complete. It has been estimated that at least 20 days are required after launch, following assessment of data from TQCM.

No thruster firing should occur during SWA commissioning, and a sufficient time should be allowed between any thruster firing and the start of commissioning.

## Telemetry

A telemetry requirement of xxx will be required for SWA commissioning

## Required Configuration of other Instruments

It is accepted by SWA that some other instruments are powered on during the SWA commission. However if SWA feel that the other instruments are causing interference to SWA commission, then SWA will request that those instruments be powered down. It is also expected that no other instrument commanding will take place during SWA commission periods.

## Inter-Experiment Links - Service 20

The IEL inputs to SWA are from

* MAG
* RPW

Until completion of commissioning of each sensor, IEL inputs will be disabled at the DPU.

## Verification process during commissioning

### Performance Verification

Following each command in the commissioning sequence the experimenter will either confirm that the command was executed as expected or recommend that a contingency plan is executed.

### Spacecraft EGSE Real-time Housekeeping Parameters

Checking of the housekeeping parameters will be performed using the spacecraft EGSE. Visual checking of the real time housekeeping by a SWA team member viewing the ESOC video display.  **Unless otherwise stated, each command in the commissioning sequences given should be followed by inspection of the housekeeping by an SWA team member before the next command in the sequence is sent.**

### Real-time SWA Housekeeping Parameters

Visual checking of the near-real time housekeeping data by an SWA team member viewing the SWA EGSE display. Data will be acquired via tbd mechanism. The EGSE provides a range of graphical displays for the interpretation of the housekeeping and science data and will have limit checking similar to that used for ground testing. Specific parameters which will be checked in this way are listed in the detailed procedures in this document.

### Real-time SWA Science Data

Real-time assessment of science data from the SWA sensors will be required during commissioning. Interpretation and visualisation of the data will use SWA provided EGSE, both for engineering and science assessments.

## Order of commissioning of the DPU and SWA sensors

The basic order of commissioning of the different SWA units is as follows:

* DPU
* HIS
* PAS
* EAS
* All SWA

The outline plan for SWA commission is provided in the MOC NECP Timeline plan. Currently this is illustrated in Table 4.1

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **NECP Phase** | **NECP number** | **Date** | **Day** | **Start Time** | **End Time** | **Duration** | **One Way Light Time (Seconds)** | **Comments** |
| SWA-4 | IA-4 | 14 Apr | Tues | 10:29 | 18:29 | 08:00 | 90-101 | PAS. PAS left on overnight |
|  | IA-4 | 15 Apr | Wed | 10:56 | 18:56 | 08:00 | 90-101 | PAS |
| SWA-5 | IA-5 | 16 Apr | Thurs | 10:49 | 18:49 | 08:00 | 90-101 | EAS |
| SWA-6 | IA-6 | 22 Apr | Wed | 07:20 | 15:20 | 08:00 | 105-117 | SWA |
|  | IA-6 | 24 Apr | Fri | 07:20 | 15:20 | 08:00 | 105-117 | SWA |

Table 4.1 MOC Timeline for each SWA commission phase (version 5.1). All times are in UTC.

# 14th April. SWA-4 (IA-4)

Be sure that the “commissioning” patch of PAS has been installed to DPU. If this patch has not been installed, send the patch commands HERE.

Unblock all dangerous TCs

## MTL PDOR\_SSWA\_SWA\_MTL\_14Apr\_00002.SOL

| **Step N°** | **Commanding Flow** | **FCP ID or PDOR title & contents** | **Comments** |
| --- | --- | --- | --- |
|  | Power DPU on | IA-FCP-011 | 11:51:00 |
|  | Configure the DPU | IA-FCP-030 | 11:56:00 |

## PAS Power On

|  |  |  |  |
| --- | --- | --- | --- |
| **Step N°** | **Commanding Flow** | **FCP ID or PDOR title & contents** | **Comments** |
|  | Power Up PAS  Enable PAS HK  Disable Monitor Parameters  ( 29 parameters )  Power on PAS | **PDOR\_SSWA\_PAS\_Comm\_PowerOn\_00004.SOL**  ZIA58050, PIA58050 = PAS\_SENS\_HK  ZIA58064, PIA60452 = 28 NUM\_OF\_MON\_ID  PIA60449 = V\_MON\_C\_MI  PIA60449 = V\_MON\_L\_MI  PIA60449 = I\_MON\_C\_MI  PIA60449 = I\_MON\_L\_MI  PIA60449 = T\_MON\_C\_MI  PIA60449 = T\_MON\_L\_MI  PIA60449 = P24\_VCEMOUT\_MI  PIA60449 = P5\_VCEMOUT\_MI  PIA60449 = P12\_VHTOUT\_MI  PIA60449 = M12\_VHTOUT\_MI  PIA60449 = P3V\_3\_FPGA\_OMI  PIA60449 = P1V\_5\_FPGA\_OMI  PIA60449 = TEMP\_DCDC\_MI  PIA60449 = TEMP\_FPGA\_MI  PIA60449 = HK\_IP24V\_CEMMI  PIA60449 = HK\_IP5V\_CEMMI  PIA60449 = HK\_IP12V\_HTMI  PIA60449 = HK\_IM12V\_HTMI  PIA60449 = HK\_I3V3\_FPGAMI  PIA60449 = HK\_IP28V\_PRIMI  PIA60449 = HK\_IP28V\_PRIMI  PIA60449 = HK\_MHV\_POSMI  PIA60449 = HK\_MHV\_NEGMI  PIA60449 = TEMP\_HVPS\_MI  PIA60449 = HK\_IP28V\_PRSCI  PIA60449 = PASampOverCurr  PIA60449 = PASSPWHB\_MI}  PIA60449 = PASMISSACK\_MI  ZIA58858 |  |

WAIT AT LEAST 9 mins. Receive at least 3 HK packets and check contents.

## PAS Ramp up main HV

|  |  |  |  |
| --- | --- | --- | --- |
| **Step N°** | **Commanding Flow** | **FCP ID or PDOR title & contents** | **Comments** |
|  | Configure PAS  Set the Master control register to  Standby  Set the heater off  Enable MHV  Set the main HV to 650 V  Set the main HV to 1300 V  Set the main HV to 1950 V  Set the main HV to 2600 V  Set the main HV to 3250 V  Set the main HV to 3900 V  Set the main HV to 4550 V  Set the main HV to 5200 V  Set the main HV to 5850 V  Set the main HV to 6500 V | **PDOR\_SSWA\_PAS\_Comm\_HV\_00004.SOL**  ZIA58863, PIA60343 = 0x0000001A  Wait 00:00:05 (5 second)  ZIA58947, PIA60848 = OFF HEATHER  PIA60849 = 0x000 DUTY\_CYCLE  Wait 00:00:05 (5 second)  ZIA58863, PIA60343 = 0x0000001E  Wait 00:00:05 (5 second)  ZIA58869, PIA60344 = 0x00000199  **Wait for SWA Go Ahead**  ZIA58869, PIA60344 = 0x00000333  **Wait for SWA Go Ahead**  ZIA58869, PIA60344 = 0x000004CC  **Wait for SWA Go Ahead**  ZIA58869, PIA60344 = 0x00000666  **Wait for SWA Go Ahead**  ZIA58869, PIA60344 = 0x000007FF  **Wait for SWA Go Ahead**  ZIA58869, PIA60344 = 0x00000999  **Wait for SWA Go Ahead**  ZIA58869, PIA60344 = 0x00000B33  **Wait for SWA Go Ahead**  ZIA58869, PIA60344 = 0x00000CCC  **Wait for SWA Go Ahead**  ZIA58869, PIA60344 = 0x00000E66  **Wait for SWA Go Ahead**  ZIA58869, PIA60344 = 0x00000FFF | Check HV value and stability before  proceeding  Check HV value and stability before  proceeding.  Check HV value and stability before  proceeding.  Check HV value and stability before  proceeding.  Check HV value and stability before  proceeding.  Check HV value and stability before  proceeding.  Check HV value and stability before  proceeding.  Check HV value and stability before  proceeding.  Check HV value and stability before  proceeding.  Check HV value and stability before  proceeding. |

WAIT SWA FOR GO AHEAD

## PAS Engineering stepping

|  |  |  |  |
| --- | --- | --- | --- |
| **Step N°** | **Commanding Flow** | **FCP ID or PDOR title & contents** | **Comments** |
|  | Load the engineering table  Start Engineering scheme  Query Stop Engineering scheme  Abort Sequencer activity  Dump parameter | **PDOR\_SSWA\_PAS\_Eng\_Stepping\_00004.SOL**  ZIA58875, PIA60709 = 0x06004E8  PIA60711 = 0x416448  PIA60708 = 0x126FBD  PIA60706 = 0x1251B9  PIA60707 = 0x125F76  PIA60710 = 0x00003C  Wait 00:00:05 (5 second)  ZIA58873, PIA60347 = 0x00000003  Wait 00:08:20 (500 second)  ZIA58873, PIA60347 = 0x00000000  Wait 00:13:20 (800 second)  ZIA58873, PIA60347 = 0x000000FF  Wait 00:00:10 (10 second)  ZIA58942, PIA60776 = SequencerState | Wait at least 500s. And ground intervention.  Wait at least 800s. And ground intervention.  Wait at least 10s. And ground intervention. |

WAIT FOR SWA GO AHEAD

## PAS Detector commission

|  |  |  |  |
| --- | --- | --- | --- |
| **Step N°** | **Commanding Flow** | **FCP ID or PDOR title & contents** | **Comments** |
|  | Load the conf table  Dump Parameter  Master Control Register: Enable  CEMs  Master Control Register: CEMs On  Turn Pre Amps on  Load Static table  Start Static scheme  Set HV to 250V  Set HV to 500V  Set HV to 750V  Set HV to 1000V  Set HV to 1250V  Set HV to 1500V  Set HV to 1550V  Set HV to 1600V  Set HV to 1650V  Set HV to 1700V  Set HV to 1750V  Set HV to 1800V  Set HV to 1850V  Set HV to 1900V | **PDOR\_SSWA\_PAS\_Comm\_Det\_1\_00004.SOL**  ZIA58874, PIA60800 = 0x28F5C21A  PIA60801 = 0x3D700B85  PIA60802 = 0x1E063D70  PIA60803 = 0x1FD70A3C  PIA60804 = 0xF5C25614  PIA60805 = 0x7A6A3D70  PIA60806 = 0x7E147A8F  PIA60807 = 0x0A3D870A  PIA60808 = 0x3D6147AE  PIA60809 = 0x38F5C220  PIA60810 = 0xA3D7328F  PIA60811 = 0x5C570A3D  PIA60812 = 0x3147AE08  PIA60813 = 0xF5C20B85  PIA60814 = 0x1E228F5C  PIA60815 = 0x6B1E0DF1  PIA60816 = 0x6872F8A0  PIA60817 = 0x62937DEA  PIA60818 = 0x94932892  PIA60819 = 0x8DCF94B7  PIA60820 = 0xA892FBB7  PIA60821 = 0x96EFCF00  PIA60822 = 0x001585CD  PIA60823 = 0x800EB851  PIA60824 = 0x0EB85111  PIA60825 = 0xC28F1999  PIA60826 = 0x991D1EB8  PIA60827 = 0x191EB814  PIA60828 = 0x28F513D7  PIA60829 = 0x0A10F5C2  PIA60830 = 0x12E14714  PIA60831 = 0x28F50C28  PIA60832 = 0xF508F5C2  PIA60833 = 0x123D7012  PIA60834 = 0xE1471428  PIA60835 = 0xF50147AE  PIA60836 = 0x0B851E63  PIA60837 = 0x610070BF  PIA60838 = 0x8000003E  PIA60839 = 0x9C28F580  PIA60840 = 0x08008008  PIA60841 = 0x00800800  PIA60842 = 0x80080080  PIA60843 = 0x08008008  PIA60844 = 0x00000400  Wait 00:00:05 (5 second)  ZIA58942 PIA60776 = ConfTable  Wait 00:08:20 (500 second)  ZIA58863 PIA60343 = 0x0000001F  Wait 00:00:05 (5 second)  ZIA58863 PIA60343 = 0x00000007  Wait 00:00:05 (5 second)  ZIA58862, PIA58062 = ON  PIA58063 = ON  ZIA58876, PIA60700 = 0x000000  PIA60713 = 0x000008  PIA60705 = 0x000040  PIA60712 = 0x000000  PIA60704 = 0x000009  PIA60720 = 0x000001 (K)  PIA60721 = 0x000001  Wait 00:00:05 (5 second)  ZIA58873, PIA60347 = 0x00000001  Wait 00:08:20 (500 second)  ZIA58868, PIA60344 = 0x000000CD  **Wait for SWA Go Ahead**  ZIA58868, PIA60344 = 0x0000019A  **Wait for SWA Go Ahead**  ZIA58868, PIA60344 = 0x00000266  **Wait for SWA Go Ahead**  ZIA58868, PIA60344 = 0x00000333  **Wait for SWA Go Ahead**  ZIA58868, PIA60344 = 0x00000400  **Wait for SWA Go Ahead**  ZIA58868, PIA60344 = 0x000004CD  **Wait for SWA Go Ahead**  ZIA58868, PIA60344 = 0x000004F5  **Wait for SWA Go Ahead**  ZIA58868, PIA60344 = 0x0000051E  **Wait for SWA Go Ahead**  ZIA58868, PIA60344 = 0x00000547  **Wait for SWA Go Ahead**  ZIA58868, PIA60344 = 0x00000570  **Wait for SWA Go Ahead**  ZIA58868, PIA60344 = 0x00000599  **Wait for SWA Go Ahead**  ZIA58868, PIA60344 = 0x000005C2  **Wait for SWA Go Ahead**  ZIA58868, PIA60344 = 0x000005EB  **Wait for SWA Go Ahead**  ZIA58868, PIA60344 = 0x00000614 | Wait at least 500s. And ground intervention.  Wait 5s.  Wait 5s.  Such configuration is possible if the  Sequencer is patched to the  “Commissioning” version  ONLY. If NOT, K = 13500 (0x003F48)  Wait at least 500s. And ground intervention.  Wait for the HK with the corresponding  CEMs HV.  Continue in all these steps ONLY if there is  no problem with Science data and HK data  **IF CEM COUNT IS SATURATED STOP**  **THE PDOR.**  And proceed to the next PDOR |

WAIT AT LEAST 30 mins and ground intervention

## MTL PDOR\_SSWA\_SWA\_MTL\_14Apr\_00002.SOL

Before the activity starts, the end of day commanding is loaded onto the MTL. This is shown here as it is unknown at this point where this activity will end. Wherever the end is, the activity will be halted and PAS HV ramped down. Then the following day PAS will continue where this activity ended.

|  |  |  |  |
| --- | --- | --- | --- |
| Step N° | Commanding Flow | FCP ID or PDOR title & contents | Comments |
|  | Abort Sequencer activity  Set HV to 1000V  Enable the Monitoring parameters  Turn PAS Preamps Off | ZIA58873, PIA60347 = 0x000000FF  Wait 00:08:20 (500 second)  ZIA58868, PIA60344 = 0x00000333  Wait 00:08:20 (500 second)  ZIA58063, PIA60452 = 27  PIA60449 = V\_MON\_C\_MI  PIA60449 = V\_MON\_L\_MI  PIA60449 = I\_MON\_C\_MI  PIA60449 = I\_MON\_L\_MI  PIA60449 = T\_MON\_C\_MI  PIA60449 = T\_MON\_L\_MI  PIA60449 = P24\_VCEMOUT\_MI  PIA60449 = P5\_VCEMOUT\_MI  PIA60449 = P12\_VHTOUT\_MI  PIA60449 = M12\_VHTOUT\_MI  PIA60449 = P3V\_3\_FPGA\_OMI  PIA60449 = P1V\_5\_FPGA\_OMI  PIA60449 = TEMP\_DCDC\_MI  PIA60449 = TEMP\_FPGA\_MI  PIA60449 = HK\_IP24V\_CEMMI  PIA60449 = HK\_IP5V\_CEMMI  PIA60449 = HK\_IP12V\_HTMI  PIA60449 = HK\_IM12V\_HTMI  PIA60449 = HK\_I3V3\_FPGAMI  PIA60449 = HK\_IP28V\_PRIMI  PIA60449 = HK\_IP28V\_PRIMI  PIA60449 = HK\_MHV\_POSMI  PIA60449 = HK\_MHV\_NEGMI  PIA60449 = TEMP\_HVPS\_MI  PIA60449 = HK\_IP28V\_PRSCI  PIA60449 = PASSPWHB\_MI  PIA60449 = PASMISSACK\_MI  ZIA58862, PIA58062 = OFF  PIA58063 = OFF | 17:50  18:00  18:10  18:15  Pass ends at 18:29 |

After execution of this PAS stays ON until the next day commissioning activity.

# 15th April. SWA-4 (IA-4) Day 2

## PAS Resume detector

Obtain the PAS HK packets from the previous night and analyse before proceeding.

|  |  |  |  |
| --- | --- | --- | --- |
| **Step N°** | **Commanding Flow** | **FCP ID or PDOR title & contents** | **Comments** |
|  | Power on pre amps  Start the static scheme  Set CEM HV to 1250V  Set CEM HV to 1500V  Set CEM HV to 1550V  Set CEM HV to 1600V  Set CEM HV to 1650V  Set CEM HV to 1700V  Set CEM HV to 1750V  Set CEM HV to 1800V  Set CEM HV to 1850V  Set CEM HV to 1900V | **PDOR\_SSWA\_PAS\_Comm\_Det\_2\_00005.SOL**  ZIA58862, PIA58062 = ON  PIA58063 = ON  Wait 00:00:05 (5 second)  ZIA58873, PIA60347 = 0x00000001  Wait 00:06:40 (400 second)  ZIA58868, PIA60344 = 0x00000400  **Wait for SWA Go Ahead**  ZIA58868, PIA60344 = 0x000004CD  **Wait for SWA Go Ahead**  ZIA58868, PIA60344 = 0x000004F5  **Wait for SWA Go Ahead**  ZIA58868, PIA60344 = 0x0000051E  **Wait for SWA Go Ahead**  ZIA58868, PIA60344 = 0x00000547  **Wait for SWA Go Ahead**  ZIA58868, PIA60344 = 0x00000570  **Wait for SWA Go Ahead**  ZIA58868, PIA60344 = 0x00000599  **Wait for SWA Go Ahead**  ZIA58868, PIA60344 = 0x000005C2  **Wait for SWA Go Ahead**  ZIA58868, PIA60344 = 0x000005EB  **Wait for SWA Go Ahead**  ZIA58868, PIA60344 = 0x00000614 | Wait for the HK with the corresponding  CEMs HV, Continue if there is no problem  with Science data and HK data  From this point the step is 50 V  Continue in all these steps ONLY if there is no  problem with Science data and HK data  **IF CEM COUNT IS SATURATED STOP THE**  **PDOR.**  And proceed to the next PDOR |

WAIT AT LEAST 30 mins and ground intervention

|  |  |  |  |
| --- | --- | --- | --- |
|  | Abort the sequencer activity  Disable Monitoring parameters  Ramp the CEM HV to 0V in 500V  steps  Ramp the CEM HV back to 1250V  Ramp the CEM HV back to 1000V  Ramp the CEM HV back to 500V  Ramp the CEM HV back to 0V  Ramp the Main HV to 0V in 1000V  steps  Ramp the Main HV to 5000V  Ramp the Main HV to 4000V  Ramp the Main HV to 3000V  Ramp the Main HV to 2000V  Ramp the Main HV to 1000V  Ramp the Main HV to 0V | **PDOR\_SSWA\_PAS\_Post\_Det\_2\_00004.SOL**  ZIA58873, PIA60347 = 0x000000FF  Wait 00:05:00 (300 second)  ZIA58064, PIA60452 = 28  PIA60449 = V\_MON\_C\_MI  PIA60449 = V\_MON\_L\_MI  PIA60449 = I\_MON\_C\_MI  PIA60449 = I\_MON\_L\_MI  PIA60449 = T\_MON\_C\_MI  PIA60449 = T\_MON\_L\_MI  PIA60449 = P24\_VCEMOUT\_MI  PIA60449 = P5\_VCEMOUT\_MI  PIA60449 = P12\_VHTOUT\_MI  PIA60449 = M12\_VHTOUT\_MI  PIA60449 = P3V\_3\_FPGA\_OMI  PIA60449 = P1V\_5\_FPGA\_OMI  PIA60449 = TEMP\_DCDC\_MI  PIA60449 = TEMP\_FPGA\_MI  PIA60449 = HK\_IP24V\_CEMMI  PIA60449 = HK\_IP5V\_CEMMI  PIA60449 = HK\_IP12V\_HTMI  PIA60449 = HK\_IM12V\_HTMI  PIA60449 = HK\_I3V3\_FPGAMI  PIA60449 = HK\_IP28V\_PRIMI  PIA60449 = HK\_IP28V\_PRIMI  PIA60449 = HK\_MHV\_POSMI  PIA60449 = HK\_MHV\_NEGMI  PIA60449 = TEMP\_HVPS\_MI  PIA60449 = HK\_IP28V\_PRSCI  PIA60449 = PASampOverCurr  PIA60449 = PASSPWHB\_MI  PIA60449 = PASMISSACK\_MI  Wait 00:05:00 (300 second)  ZIA58868, PIA60344 = 0x00000400  Wait 00:05:00 (300 second)  ZIA58868, PIA60344 = 0x00000333  Wait 00:05:00 (300 second)  ZIA58868, PIA60344 = 0x0000019A  Wait 00:05:00 (300 second)  ZIA58868, PIA60344 = 0x00000000  **Wait for SWA Go Ahead**  ZIA58869, PIA60344 = 0x00000C4E  Wait 00:00:40 (40 second)  ZIA58869, PIA60344 = 0x000009D8  Wait 00:00:40 (40 second)  ZIA58869, PIA60344 = 0x00000762  Wait 00:00:40 (40 second)  ZIA58869, PIA60344 = 0x000004EC  Wait 00:00:40 (40 second)  ZIA58869, PIA60344 = 0x00000276  Wait 00:00:40 (40 second)  ZIA58869, PIA60344 = 0x00000000 | At this stage we should know what the  NOMINAL CEM HV is = **0x0NOMINAL**  Wait for the HK to show MHV < 200V. |

WAIT AT LEAST 5 mins and ground intervention

## PAS Normal science check

|  |  |  |  |
| --- | --- | --- | --- |
| **Step N°** | **Commanding Flow** | **FCP ID or PDOR title & contents** | **Comments** |
|  | Set the PAS config  Ramp the PAS HV  Initial value = 0V  Nominal Value = **0x0NOMINAL**  Step size = 100V  Wait time = 50s  Enable monitoring parameters  Start science cyclogram | **PDOR\_SSWA\_PAS\_Comm\_NM\_00005.SOL**  ZIA58853  Wait 00:18:20 (1100 second)  ZIA58856, PIA60791 = 0x0000  PIA60790= **0x0NOMINAL**  PIA60792 = 0x0052  PIA60793 = 0x0032  **Wait for SWA Go Ahead**  ZIA58063, PIA60452 = 28  PIA60449 = V\_MON\_C\_MI  PIA60449 = V\_MON\_L\_MI  PIA60449 = I\_MON\_C\_MI  PIA60449 = I\_MON\_L\_MI  PIA60449 = T\_MON\_C\_MI  PIA60449 = T\_MON\_L\_MI  PIA60449 = P24\_VCEMOUT\_MI  PIA60449 = P5\_VCEMOUT\_MI  PIA60449 = P12\_VHTOUT\_MI  PIA60449 = M12\_VHTOUT\_MI  PIA60449 = P3V\_3\_FPGA\_OMI  PIA60449 = P1V\_5\_FPGA\_OMI  PIA60449 = TEMP\_DCDC\_MI  PIA60449 = TEMP\_FPGA\_MI  PIA60449 = HK\_IP24V\_CEMMI  PIA60449 = HK\_IP5V\_CEMMI  PIA60449 = HK\_IP12V\_HTMI  PIA60449 = HK\_IM12V\_HTMI  PIA60449 = HK\_I3V3\_FPGAMI  PIA60449 = HK\_IP28V\_PRIMI  PIA60449 = HK\_IP28V\_PRIMI  PIA60449 = HK\_MHV\_POSMI  PIA60449 = HK\_MHV\_NEGMI  PIA60449 = TEMP\_HVPS\_MI  PIA60449 = HK\_IP28V\_PRSCI  PIA60449 = PASampOverCurr  PIA60449 = PASSPWHB\_MI  PIA60449 = PASMISSACK\_MI  Wait 00:00:40 (40 second)  ZIA58943, PIA60777 = PASNc1 | Wait for the HK to show MHV = 6500V.  About 12 mins  INPUT from Ground  Wait about 20 mins to confirm CEM is nominal |

## MTL PDOR\_SSWA\_SWA\_MTL\_15Apr\_00002.SOL

Before the activity starts, the end of day commanding is loaded onto the MTL. This is shown here as it is unknown at this point where this activity will end. Wherever the end is, the activity will be halted and PAS will be powered off.

|  |  |  |  |
| --- | --- | --- | --- |
|  | Stop Science  Switch off the preamps  Disable the monitoring parameters  Ramp down the PAS CEM HV  Ramp down the PAS HV  Final value = 0V  Initial value = **0x0NOMINAL**  Step size = 200V  Wait time = 6s  Power OFF PAS  Power down DPU | ZIA58944  Wait 00:05:00 (300 second)  ZIA58862, PIA58062 = OFF  PIA58063 = OFF  ZIA58064, PIA60452 = 28  PIA60449 = V\_MON\_C\_MI  PIA60449 = V\_MON\_L\_MI  PIA60449 = I\_MON\_C\_MI  PIA60449 = I\_MON\_L\_MI  PIA60449 = T\_MON\_C\_MI  PIA60449 = T\_MON\_L\_MI  PIA60449 = P24\_VCEMOUT\_MI  PIA60449 = P5\_VCEMOUT\_MI  PIA60449 = P12\_VHTOUT\_MI  PIA60449 = M12\_VHTOUT\_MI  PIA60449 = P3V\_3\_FPGA\_OMI  PIA60449 = P1V\_5\_FPGA\_OMI  PIA60449 = TEMP\_DCDC\_MI  PIA60449 = TEMP\_FPGA\_MI  PIA60449 = HK\_IP24V\_CEMMI  PIA60449 = HK\_IP5V\_CEMMI  PIA60449 = HK\_IP12V\_HTMI  PIA60449 = HK\_IM12V\_HTMI  PIA60449 = HK\_I3V3\_FPGAMI  PIA60449 = HK\_IP28V\_PRIMI  PIA60449 = HK\_IP28V\_PRIMI  PIA60449 = HK\_MHV\_POSMI  PIA60449 = HK\_MHV\_NEGMI  PIA60449 = TEMP\_HVPS\_MI  PIA60449 = HK\_IP28V\_PRSCI  PIA60449 = PASampOverCurr  PIA60449 = PASSPWHB\_MI  PIA60449 = PASMISSACK\_MI  ZIA58868, PIA60344 = **0x0NOMINAL**  ZIA58857, PIA60790 = 0x0000  PIA60791= **0x0NOMINAL**  PIA60792 = 0x00B2  PIA60793 = 0x0006  Wait 00:05:00 (300 second)  ZIA58859  IA-FCP-002 | 18:20  18:28  Ensure all science packets have stopped  18:29  **18:30**  **18:32**  Wait the HK with the CEM V less than 200 V.  18:40  18:45  Pass ends at 18:56 |

# 16th April. SWA-5 (IA-5)

## MTL PDOR\_SSWA\_SWA\_MTL\_16Apr\_00002.SOL

| **Step N°** | **Commanding Flow** | **FCP ID or PDOR title & contents** | **Comments** |
| --- | --- | --- | --- |
|  | Power DPU on | IA-FCP-011 | 10:50:00 |
|  | Configure the DPU | IA-FCP-030 | 10:55:00 |
|  | Disable EAS1 FDIR | ZIA58064, PIA60452 = 12  PIA60449 = EAS1SPWHB\_MI  PIA60449 = E1\_3V3\_MI  PIA60449 = E1\_1V5\_MI  PIA60449 = E1OPTEMPMON  PIA60449 = E1HVOUTVMON  PIA60449 = E1MCPVMON  PIA60449 = E1GRIDVMON  PIA60449 = E110VAPOSVMON  PIA60449 = E128VPOSVMON  PIA60449 = E1HVGENTHERMON  PIA60449 = E1HVMODTHERMON  PIA60449 = EAS1MISSACK\_MI | 11:00:00 |
|  | Disable EAS2 FDIR | ZIA58064, PIA60452 = 12  PIA60449 = EAS2SPWHB\_MI  PIA60449 = E2\_3V3\_MI  PIA60449 = E2\_1V5\_MI  PIA60449 = E2OPTEMPMON  PIA60449 = E2HVOUTVMON  PIA60449 = E2MCPVMON  PIA60449 = E2GRIDVMON  PIA60449 = E210VAPOSVMON  PIA60449 = E228VPOSVMON  PIA60449 = E2HVGENTHERMON  PIA60449 = E2HVMODTHERMON  PIA60449 = EAS2MISSACK\_MI | 11:00:10 |
|  | Enable EAS1 HK  Power EAS1 on  POST macro on EAS1  IDLE macro on EAS1  Request EAS1 HK | ZIA58050, PIA58050 = EAS1\_SENS\_HK  Wait 00:00:01 (1 second)  ZIA58760  Wait 00:00:05 (5 second)  ZIA58934, PIA60739 = POST  Wait 00:00:05 (5 second)  ZIA58753  Wait 00:00:30 (30 second)  ZIA58782 | 11:01:00 |
|  | RUN macro on EAS1 | ZIA58758  Wait 00:00:20 (20 second) | 11:02:00 |
|  | Enable EAS2 HK  Power EAS2 on  POST macro on EAS2  IDLE macro on EAS2  Request EAS2 HK | ZIA58050, PIA58050 = EAS2\_SENS\_HK  Wait 00:00:01 (1 second)  ZIA58808  Wait 00:00:05 (5 second)  ZIA58936, PIA60740 = POST  Wait 00:00:05 (5 second)  ZIA58801  Wait 00:30:00 (30 second)  ZIA58830 | 11:03:00 |
|  | RUN macro on EAS2 | ZIA58806  Wait 00:00:20 (20 second) | 11:04:00 |
|  | Zero the Deflectors | ZIA58765, PIA60474 = 0x00  PIA60475 = 0x00  PLUS 96 BYTES | 11:05:00 |
|  | Zero the EAS2 Deflectors | ZIA58813, PIA60474 = 0x00  PIA60475 = 0x00  PLUS 96 BYTES | 11:05:10 |
|  | Master Control Register  EAS1 Heater Control | ZIA58776, PIA60423 = 0x00  PIA60424 = 0x40  PIA60425 = 0x60  ZIA58757, PIA60773 = 0x00  PIA60774 = 0x00  PIA60775 = 0xE8 | 11:05:20 |
|  | Master control Register  EAS2 Heater Control | ZIA58824, PIA60423 = 0x00  PIA60424 = 0x40  PIA60425 = 0x60  ZIA58805, PIA60773 = 0x00  PIA60774 = 0x00  PIA60775 = 0xE8 | 11:05:30 |
|  | Set the Hem ratio  Set the Hem Max to 800v  Rebuild Table | ZIA58766, PIA60441 = 0xDE  PIA60442 = 0xB8  PIA60443 = 0x51  ZIA58767, PIA60441 = 67  PIA60442 = 18  PIA60443 = A0  ZIA58771, PIA60031 = MBOX3  PIA60446 = 0  PIA60447 = 0  PIA60448 = 0x1 | 11:06:00 |
|  | Set the Hem ratio  Set the Hem Max to 800v  Rebuild Table | ZIA58814, PIA60441 = 0xDE  PIA60442 = 0xB8  PIA60443 = 0x51  ZIA58815, PIA60441 = 67  PIA60442 = 18  PIA60443 = A0  ZIA58819, PIA60031 = MBOX3  PIA60446 = 0  PIA60447 = 0  PIA60448 = 0x1 | 11:06:10 |
|  | Adjust the voltage offsets on EAS1 | ZIA58769, PIA60411 = 0x01  PIA60412 = 0x8C  PIA60415 = 0x70  PIA60416 = 0x01  PIA60417 = 0xF6  PIA60418 = 0x00  PIA60419 = 0x01  PIA60420 = 0xC9  PIA60421 = 0xD0  PIA60422 = 0x01  PIA60413 = 0xB6  PIA60414 = 0x00 | 11:06:20 |
|  | Adjust the voltage offsets on EAS2 | ZIA58817, PIA60411 = 0x01  PIA60412 = 0xE0  PIA60415 = 0x70  PIA60416 = 0x01  PIA60417 = 0xA7  PIA60418 = 0xD0  PIA60419 = 0x01  PIA60420 = 0xBD  PIA60421 = 0x70  PIA60422 = 0x01  PIA60413 = 0xB4  PIA60414 = 0x40 | 11:06:30 |
|  | Set the cadence to high | ZIA58728, PIA60096 = HIGH\_CADENCE  PIA60097 = HIGH\_CADENCE  PIA60099 = NOMINAL\_CADENCE  PIA60098 = NOMINAL\_CADENCE | 11:06:40 |
|  | Adjust Thresholds on EAS1 | ZIA58797, PIA60174 = 0x4C80  PIA60185 = 0x4C81  PIA60196 = 0x4C82  PIA60200 = 0x4C83  PIA60201 = 0x4C84  PIA60202 = 0x4C85  PIA60203 = 0x4C86  PIA60204 = 0x4C87  PIA60205 = 0x4C88  PIA60175 = 0x4C89  PIA60176 = 0x4C8A  PIA60177 = 0x4C8B  PIA60178 = 0x4C8C  PIA60179 = 0x4C8D  PIA60180 = 0x4C8E  PIA60181 = 0x4C8F  PIA60182 = 0x4C80  PIA60183 = 0x4C81  PIA60184 = 0x4C82  PIA60186 = 0x4C83  PIA60187 = 0x4C84  PIA60188 = 0x4C85  PIA60189 = 0x4C86  PIA60190 = 0x4C87  PIA60191 = 0x4C88  PIA60192 = 0x4C89  PIA60193 = 0x4C8A  PIA60194 = 0x4C8B  PIA60195 = 0x4C8C  PIA60197 = 0x4C8D  PIA60198 = 0x4C8E  PIA60199 = 0x4C8F | 11:07:00 | |
|  | Set the EAS2 threshold values to 0x4C8 | ZIA58845, PIA60174 = 0x4C80  PIA60185 = 0x4C81  PIA60196 = 0x4C82  PIA60200 = 0x4C83  PIA60201 = 0x4C84  PIA60202 = 0x4C85  PIA60203 = 0x4C86  PIA60204 = 0x4C87  PIA60205 = 0x4C88  PIA60175 = 0x4C89  PIA60176 = 0x4C8A  PIA60177 = 0x4C8B  PIA60178 = 0x4C8C  PIA60179 = 0x4C8D  PIA60180 = 0x4C8E  PIA60181 = 0x4C8F  PIA60182 = 0x4C80  PIA60183 = 0x4C81  PIA60184 = 0x4C82  PIA60186 = 0x4C83  PIA60187 = 0x4C84  PIA60188 = 0x4C85  PIA60189 = 0x4C86  PIA60190 = 0x4C87  PIA60191 = 0x4C88  PIA60192 = 0x4C89  PIA60193 = 0x4C8A  PIA60194 = 0x4C8B  PIA60195 = 0x4C8C  PIA60197 = 0x4C8D  PIA60198 = 0x4C8E  PIA60199 = 0x4C8F | 11:07:20 | |
|  | Ramp the EAS1 MCP | ZIA58784, PIA60218 = 0x8FB | 11:07:40 | |
|  | Start normal mode on EAS1 | ZIA58771, PIA60031 = MBOX1  PIA60446 = 0  PIA60447 = 0  PIA60448 = 0x2 | 11:08:20 | |
|  | Ramp the EAS2 MCP | ZIA58832, PIA60218 = 0x8E1 | 11:08:30 | |
|  | Start normal mode on EAS2 | ZIA58819, PIA60031 = MBOX1  PIA60446 = 0  PIA60447 = 0  PIA60448 = 0x2 | 11:09:10 | |

At this point we are OFF the MTL 11:10:00.

## EAS 2 MCP commission

|  |  |  |  |
| --- | --- | --- | --- |
| **Step N°** | **Commanding Flow** | **FCP ID or PDOR title & contents** | **Comments** |
|  | Commission EAS2 MCP  Stop normal mode on EAS2  Perform Eng Mode 3  [Conversion = 1.022 ]  Set the EAS2 MCP back by 25V  Set the Hem Max to 800V  Rebuild the table  Start normal mode on EAS2 | **PDOR\_SSWA\_EAS2\_MCP3\_Comm\_00008.SOL**  ZIA58819, PIA60031 = MBOX1  PIA60446 = 0  PIA60447 = 0  PIA60448 = 0x0  ZIA58837, PIA60101 = [Start MCP]  PIA60100 = [Final MCP]  PIA60102 = 0x33 Step MCP  PIA60437 = 1 1st ramp time  PIA60444 = 1 Inter ramp time  PIA60165 = 40 Acq time  PIA60760 = 0xD Hem bin  PIA60761 = 0x8 Def number  PIA60762 = SWEEP\_MACRO ctrl  **TM(5,2) Expected**  Wait 00:00:45 (45 seconds)  ZIA58832, PIA60218 = [MCP Value]  ZIA58815, PIA60441 = 67  PIA60442 = 18  PIA60443 = A0  ZIA58819, PIA60031 = MBOX3  PIA60446 = 0  PIA60447 = 0  PIA60448 = 0x1  ZIA58819, PIA60031 = MBOX1  PIA60446 = 0  PIA60447 = 0  PIA60448 = 0x2  **SEND IN GROUPS OF 4 TCs THEN WAIT BEFORE SENDING THE NEXT 4** | This PDOR has the following sequence of procedures run for 25 times. Each loop has the following inputs.   |  |  |  |  | | --- | --- | --- | --- | |  | Start MCP | Final MCP | MCP Value | |  | PIA60101 | PIA60100 | PIA60218 | | 1 | 8FB | 8FC | 8E1 | | 2 | 915 | 916 | 8FB | | 3 | 92E | 92F | 915 | | 4 | 948 | 949 | 92E | | 5 | 961 | 962 | 948 | | 6 | 97B | 97C | 961 | | 7 | 994 | 995 | 97B | | 8 | 9AE | 9AF | 994 | | 9 | 9C7 | 9C8 | 9AE | | 10 | 9E1 | 9E2 | 9C7 | | 11 | 9FB | 9FC | 9E1 | | 12 | A0A | A0B | 9FB | | 13 | A19 | A1A | A0A | | 14 | A28 | A29 | A19 | | 15 | A38 | A39 | A28 | | 16 | A47 | A48 | A38 | | 17 | A56 | A57 | A47 | | 18 | A66 | A67 | A56 | | 19 | A75 | A76 | A66 | | 20 | A84 | A85 | A75 | | 21 | A94 | A95 | A84 | | 22 | AA3 | AA4 | A94 | | 23 | AB2 | AB3 | AA3 | | 24 | AC2 | AC3 | AB2 | | 25 | AD1 | AD2 | AC2 | |
| **SWA Operator Confirm to Proceed Round the Loop**  **SWA Operator to check Counts in 3d packets and EM3 packets** | | | |

## EAS 2 Zero Sweeps

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Set the Hem Voltage Offsets to zero. | **PDOR\_SSWA\_EAS2\_ZeroHemVoltOffset\_00001.SOL**  ZIA58817, PIA60411 = 0x01  PIA60412 = 0xE0  PIA60415 = 0x70  PIA60416 = 0x01  PIA60417 = 0xA7  PIA60418 = 0xD0  PIA60419 = 0x00  PIA60420 = 0x00  PIA60421 = 0x00  PIA60422 = 0x01  PIA60413 = 0xB4  PIA60414 = 0x40 | |  |
|  | Set the Hem Max to 0v  Rebuild Table | **PDOR\_SSWA\_EAS2\_ZeroHem\_00001.SOL**  ZIA58815, PIA60441 = 0  PIA60442 = 0  PIA60443 = 0  ZIA58819, PIA60031 = MBOX3  PIA60446 = 0  PIA60447 = 0  PIA60448 = 0x1 | |  |
|  | Start normal mode on EAS2 | | **PDOR\_SSWA\_EAS2\_NormalMode\_00001.SOL**  ZIA58819, PIA60031 = MBOX1  PIA60446 = 0  PIA60447 = 0  PIA60448 = 0x2 |  | |

## EAS2 Flight deflectors

|  |  |  |  |
| --- | --- | --- | --- |
|  | Adjust Deflectors on EAS2  Stop Normal Mode on EAS2  Adjust the Deflector Ratios | **PDOR\_SSWA\_EAS2\_Deflectors\_Flight\_00002.SOL**  ZIA58819, PIA60031 = MBOX1  PIA60446 = 0  PIA60447 = 0  PIA60448 = 0  ZIA58813, PIA60474 = 0xAD  PIA60475 = 0x0E  PIA60578 = 0x56  PLUS Other Bytes |  |

## EAS2 POST MCP commission

|  |  |  |  |
| --- | --- | --- | --- |
|  | Post EAS2 MCP Commission  Stop normal mode on EAS2  Set the EAS2 MCP to 2695V =  0xAC2  Start normal mode on EAS2 | **PDOR\_SSWA\_EAS2\_Post\_MCP\_Comm\_00002.SOL**  ZIA58819, PIA60031 = MBOX1  PIA60446 = 0  PIA60447 = 0  PIA60448 = 0  ZIA58832, PIA60218 = 0xAC2  ZIA58819, PIA60031 = MBOX1  PIA60446 = 0  PIA60447 = 0  PIA60448 = 2 |  |

## EAS 2 Flight Sweeps

|  |  |  |  |
| --- | --- | --- | --- |
|  |  |  |  |
|  | Stop normal mode on EAS2  Set the Hem ratio  Set the Hem Max to 800v  Rebuild Table | **PDOR\_SSWA\_EAS2\_FlightSweep\_00002.SOL**  ZIA58819, PIA60031 = MBOX1  PIA60446 = 0  PIA60447 = 0  PIA60448 = 0x0  ZIA58814, PIA60441 = 0xDE  PIA60442 = 0xB8  PIA60443 = 0x51  ZIA58815, PIA60441 = 67  PIA60442 = 18  PIA60443 = A0  ZIA58819, PIA60031 = MBOX3  PIA60446 = 0  PIA60447 = 0  PIA60448 = 0x1 |  |
|  | Adjust the voltage offsets on EAS2 | **PDOR\_SSWA\_EAS2\_FlightVoltOffset\_00002**  ZIA58817, PIA60411 = 0x01  PIA60412 = 0xE0  PIA60415 = 0x70  PIA60416 = 0x01  PIA60417 = 0xA7  PIA60418 = 0xD0  PIA60419 = 0x01  PIA60420 = 0xBD  PIA60421 = 0x70  PIA60422 = 0x01  PIA60413 = 0xB4  PIA60414 = 0x40 |  | |

## EAS2 Start Normal Mode

|  |  |  |  |
| --- | --- | --- | --- |
|  | Start normal mode on EAS2 | **PDOR\_SSWA\_EAS2\_NormalMode\_00001.SOL**  ZIA58819, PIA60031 = MBOX1  PIA60446 = 0  PIA60447 = 0  PIA60448 = 0x2 |  |

## EAS1 MCP commission

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Commission EAS1 MCP  Stop normal mode on EAS1  Perform Eng Mode 3  [Conversion = 1.022 ]  Set the EAS1 MCP back by 25V  Set the Hem Max to 800v  Rebuild the table  Start normal mode on EAS1 | **PDOR\_SSWA\_EAS1\_MCP3\_Comm\_00008.SOL**  ZIA58771, PIA60031 = MBOX1  PIA60446 = 0  PIA60447 = 0  PIA60448 = 0x0  ZIA58789, PIA60101 = [Start MCP]  PIA60100 = [Final MCP]  PIA60102 = 0x33 Step MCP  PIA60437 = 1 1st ramp time  PIA60444 = 1 Inter ramp time  PIA60165 = 40 Acq time  PIA60760 = 0xD Hem bin  PIA60761 = 0x8 Def number  PIA60762 = SWEEP\_MACRO ctrl  **TM(5,2) Expected**  Wait 00:00:45 (45 seconds)  ZIA58784, PIA60218 = [MCP Value]  ZIA58767, PIA60441 = 67  PIA60442 = 18  PIA60443 = A0  ZIA58771, PIA60031 = MBOX3  PIA60446 = 0  PIA60447 = 0  PIA60448 = 0x1  ZIA58771, PIA60031 = MBOX1  PIA60446 = 0  PIA60447 = 0  PIA60448 = 0x2  **SEND IN GROUPS OF 4 TCs THEN WAIT BEFORE SENDING THE NEXT 4.** | This PDOR has the following sequence of procedures run for 24 times. Each loop has the following inputs.   |  |  |  |  | | --- | --- | --- | --- | |  | Start MCP | Final MCP | MCP Value | |  | PIA60101 | PIA60100 | PIA60218 | | 1 | 915 | 916 | 8FB | | 2 | 92E | 92F | 915 | | 3 | 948 | 949 | 92E | | 4 | 961 | 962 | 948 | | 5 | 97B | 97C | 961 | | 6 | 994 | 995 | 97B | | 7 | 9AE | 9AF | 994 | | 8 | 9C7 | 9C8 | 9AE | | 9 | 9E1 | 9E2 | 9C7 | | 10 | 9FB | 9FC | 9E1 | | 11 | A0A | A0B | 9FB | | 12 | A19 | A1A | A0A | | 13 | A28 | A29 | A19 | | 14 | A38 | A39 | A28 | | 15 | A47 | A48 | A38 | | 16 | A56 | A57 | A47 | | 17 | A66 | A67 | A56 | | 18 | A75 | A76 | A66 | | 19 | A84 | A85 | A75 | | 20 | A94 | A95 | A84 | | 21 | AA3 | AA4 | A94 | | 22 | AB2 | AB3 | AA3 | | 23 | AC2 | AC3 | AB2 | | 24 | AD1 | AD2 | AC2 | |

## EAS1 Zero Sweeps

|  |  |  |  |
| --- | --- | --- | --- |
|  |  | **PDOR\_SSWA\_EAS1\_ZeroHemOffset\_00001.SOL**  ZIA58769, PIA60411 = 0x01  PIA60412 = 0x8C  PIA60415 = 0x70  PIA60416 = 0x01  PIA60417 = 0xF6  PIA60418 = 0x00  PIA60419 = 0x00  PIA60420 = 0x00  PIA60421 = 0x00  PIA60422 = 0x01  PIA60413 = 0xB6  PIA60414 = 0x00 |  |
|  | Set the Hem Max to 0v  Rebuild Table | **PDOR\_SSWA\_EAS1\_ZeroHem\_00001.SOL**  ZIA58767, PIA60441 = 0  PIA60442 = 0  PIA60443 = 0  ZIA58771, PIA60031 = MBOX3  PIA60446 = 0  PIA60447 = 0  PIA60448 = 0x1 |  |
|  | Start normal mode on EAS1 | **PDOR\_SSWA\_EAS1\_NormalMode\_00001.SOL**  ZIA58771, PIA60031 = MBOX1  PIA60446 = 0  PIA60447 = 0  PIA60448 = 0x2 |  |

## EAS1 Flight Sweeps

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| --- | --- | --- | --- |
|  | Stop normal mode on EAS1  Set the Hem ratio  Set the Hem Max to 800v  Rebuild Table | **PDOR\_SSWA\_EAS1\_FlightSweep\_00002.SOL**  ZIA58771, PIA60031 = MBOX1  PIA60446 = 0  PIA60447 = 0  PIA60448 = 0x0  ZIA58766, PIA60441 = 0xDE  PIA60442 = 0xB8  PIA60443 = 0x51  ZIA58767, PIA60441 = 67  PIA60442 = 18  PIA60443 = A0  ZIA58771, PIA60031 = MBOX3  PIA60446 = 0  PIA60447 = 0  PIA60448 = 0x1 |  |

## EAS1 Flight deflectors

|  |  |  |  |
| --- | --- | --- | --- |
|  | Adjust Deflectors on EAS1  Stop Normal Mode on EAS1  Adjust the Deflector Ratios | **PDOR\_SSWA\_EAS1\_Deflectors\_Flight\_00002.SOL**  ZIA58771, PIA60031 = MBOX1  PIA60446 = 0  PIA60447 = 0  PIA60448 = 0  ZIA58765, PIA60474 = 0xB0  PIA60475 = 0xC4  PIA60578 = 0x9B  PLUS Other Bytes |  |

## EAS1 POST MCP commission

|  |  |  |  |
| --- | --- | --- | --- |
|  | Post EAS1 MCP Commission  Stop normal mode on EAS1  Set the EAS1 MCP to 2695V =  0xAC2  Start normal mode on EAS1 | **PDOR\_SSWA\_EAS1\_Post\_MCP\_Comm\_00002.SOL**  ZIA58771, PIA60031 = MBOX1  PIA60446 = 0  PIA60447 = 0  PIA60448 = 0x0  ZIA58784, PIA60218 = 0xAC2  ZIA58771, PIA60031 = MBOX1  PIA60446 = 0  PIA60447 = 0  PIA60448 = 0x2 |  |

## EAS1 Flight Voltage Offsets

|  |  |  |  |
| --- | --- | --- | --- |
|  | Adjust the voltage offsets on EAS1 | **PDOR\_SSWA\_EAS1\_FlightVoltOffset\_00002.SOL**  ZIA58769, PIA60411 = 0x01  PIA60412 = 0x8C  PIA60415 = 0x70  PIA60416 = 0x01  PIA60417 = 0xF6  PIA60418 = 0x00  PIA60419 = 0x01  PIA60420 = 0xC9  PIA60421 = 0xD0  PIA60422 = 0x01  PIA60413 = 0xB6  PIA60414 = 0x00 |  |

## EAS1 Start Normal Mode

|  |  |  |  |
| --- | --- | --- | --- |
|  | Start normal mode on EAS1 | **PDOR\_SSWA\_EAS1\_NormalMode\_00001.SOL**  ZIA58771, PIA60031 = MBOX1  PIA60446 = 0  PIA60447 = 0  PIA60448 = 0x2 |  |

**PAUSE. WAIT FOR SWA TO CONTINUE**

## EAS 2 Engineering modes

|  |  |  |  |
| --- | --- | --- | --- |
| **Step N°** | **Commanding Flow** | **FCP ID or PDOR title & contents** | **Comments** |
|  | Perform Eng mode 4 on EAS2  Stop normal mode on EAS2  Eng mode 4 (Threshold Sweep) | **PDOR\_SSWA\_EAS2\_EngMode4\_00005.SOL**  ZIA58819, PIA60031 = MBOX1  PIA60446 = 0  PIA60447 = 0  PIA60448 = 0  ZIA58838, PIA60104 = 0x6BC Start Thresh  PIA60103 = 0x4BE End Thresh  PIA60105 = 0x1E Thresh step  PIA60106 = 0xA94 MCP Value  PIA60165 = 0xA MCP wait  PIA60851 = 20 Acq time  PIA60760 = 0xD Hem bin  PIA60761 = 0x8 Def number |  |

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|  | Adjust Thresholds on EAS2  Adjust the Thresholds | **PDOR\_SSWA\_EAS2\_Thresh\_4C8\_00001.SOL**  ZIA58845, PIA60174 = 0x4C80  PIA60185 = 0x4C81  PIA60196 = 0x4C82  Plus other bytes |  |

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|  | Perform Eng mode 3 on EAS2  Stop normal mode on EAS2  Eng mode 3 (Gain Test) | **PDOR\_SSWA\_EAS2\_EngMode3\_00005.SOL**  ZIA58819, PIA60031 = MBOX1  PIA60446 = 0  PIA60447 = 0  PIA60448 = 0  ZIA58837, PIA60101 = 0x869  PIA60100 = 0xA94  PIA60102 = 0x1E Step MCP  PIA60437 = 0xA 1st ramp time  PIA60444 = 0x1 Inter ramp time  PIA60165 = 40 Acq time  PIA60760 = 0xD Hem bin  PIA60761 = 0x8 Def number  PIA60762 = SWEEP\_MACRO ctrl |  |

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|  | Stop normal mode on EAS1  Reset the MCP to AC2 | **PDOR\_SSWA\_EAS2\_FlightMCP\_00001.SOL**  ZIA58819, PIA60031 = MBOX1  PIA60446 = 0  PIA60447 = 0  PIA60448 = 0x0  ZIA58832, PIA60218 = 0xAC2 |  |

|  |  |  |  |
| --- | --- | --- | --- |
|  |  | **PDOR\_SSWA\_EAS2\_ZeroVoltOffset\_00001.SOL**  ZIA58817, PIA60411 = 0x00  PIA60412 = 0x00  PIA60415 = 0x00  PIA60416 = 0x00  PIA60417 = 0x00  PIA60418 = 0x00  PIA60419 = 0x00  PIA60420 = 0x00  PIA60421 = 0x00  PIA60422 = 0x00  PIA60413 = 0x00  PIA60414 = 0x00 |  |

|  |  |  |  |
| --- | --- | --- | --- |
|  | Set the Hem Max to 0v  Rebuild Table | **PDOR\_SSWA\_EAS2\_ZeroHem\_00001.SOL**  ZIA58815, PIA60441 = 0  PIA60442 = 0  PIA60443 = 0  ZIA58819, PIA60031 = MBOX3  PIA60446 = 0  PIA60447 = 0  PIA60448 = 0x1 |  |

|  |  |  |  |
| --- | --- | --- | --- |
|  | Eng mode 5 (Threshold Sweep)  Stop Science  Start Eng Mode 5 | **PDOR\_SSWA\_EAS2\_HV\_EngMode\_5\_00002.SOL**  ZIA58819, PIA60031 = MBOX1  PIA60446 = 0  PIA60447 = 0  PIA60448 = 0  Wait 00:00:01 (1 second)  ZIA58839, PIA60454 = 0x32 PA1 stim  PIA60455 = 0x32 PA2 stim  PIA60040 = 0x500 Start Thresh  PIA60039 = 0x47E End Thresh  PIA60041 = 0x4 Thresh step  PIA60106 = 0xAC2 MCP value  PIA60171 = 1 MCP wait  PIA60165 = 2 Acq time  Wait 00:01:10 (70 second) |  |

|  |  |  |  |
| --- | --- | --- | --- |
|  | Perform Eng mode 4 on EAS2  Stop normal mode on EAS2  Eng mode 4 (Threshold Sweep) | **PDOR\_SSWA\_EAS2\_EngMode4\_00005.SOL**  ZIA58819, PIA60031 = MBOX1  PIA60446 = 0  PIA60447 = 0  PIA60448 = 0  ZIA58838, PIA60104 = 0x6BC Start Thresh  PIA60103 = 0x4BE End Thresh  PIA60105 = 0x1E Thresh step  PIA60106 = 0xA94 MCP Value  PIA60165 = 0xA MCP wait  PIA60851 = 20 Acq time  PIA60760 = 0xD Hem bin  PIA60761 = 0x8 Def number |  |

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|  | Perform Eng mode 3 on EAS2  Stop normal mode on EAS2  Eng mode 3 (Gain Test) | **PDOR\_SSWA\_EAS2\_EngMode3\_00005.SOL**  ZIA58819, PIA60031 = MBOX1  PIA60446 = 0  PIA60447 = 0  PIA60448 = 0  ZIA58837, PIA60101 = 0x869  PIA60100 = 0xA94  PIA60102 = 0x1E Step MCP  PIA60437 = 0xA 1st ramp time  PIA60444 = 0x1 Inter ramp time  PIA60165 = 40 Acq time  PIA60760 = 0xD Hem bin  PIA60761 = 0x8 Def number  PIA60762 = SWEEP\_MACRO ctrl |  |

## EAS 2 Reset Sweeps

|  |  |  |  |
| --- | --- | --- | --- |
|  | Stop normal mode on EAS2  Set the Hem Ratio  Set the Hem Max to 800v  Rebuild Table | **PDOR\_SSWA\_EAS2\_FlightSweep\_00002.SOL**  ZIA58819, PIA60031 = MBOX1  PIA60446 = 0  PIA60447 = 0  PIA60448 = 0x0  ZIA58814, PIA60441 = 0xDE  PIA60442 = 0xB8  PIA60443 = 0x51  ZIA58815, PIA60441 = 67  PIA60442 = 18  PIA60443 = A0  ZIA58819, PIA60031 = MBOX3  PIA60446 = 0  PIA60447 = 0  PIA60448 = 0x1 |  |

|  |  |  |  |
| --- | --- | --- | --- |
|  | Adjust Deflectors on EAS2  Stop Normal Mode on EAS2  Adjust the Deflector Ratios | **PDOR\_SSWA\_EAS2\_Deflectors\_Flight\_00002.SOL**  ZIA58819, PIA60031 = MBOX1  PIA60446 = 0  PIA60447 = 0  PIA60448 = 0  ZIA58813, PIA60474 = 0xAD  PIA60475 = 0x0E  PIA60578 = 0x56  PLUS Other Bytes |  |

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| --- | --- | --- | --- |
|  | Adjust Thresholds on EAS2  Adjust the Thresholds | **PDOR\_SSWA\_EAS2\_Thresh\_4C8\_00001.SOL**  ZIA58845, PIA60174 = 0x4C80  PIA60185 = 0x4C81  Plus other bytes |  |

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| --- | --- | --- | --- |
|  | Adjust the voltage offsets on EAS2 | **PDOR\_SSWA\_EAS2\_FlightVoltOffset\_00002.SOL**  ZIA58817, PIA60411 = 0x01  PIA60412 = 0xE0  PIA60415 = 0x70  PIA60416 = 0x01  PIA60417 = 0xA7  PIA60418 = 0xD0  PIA60419 = 0x01  PIA60420 = 0xBD  PIA60421 = 0x70  PIA60422 = 0x01  PIA60413 = 0xB4  PIA60414 = 0x40 |  |

|  |  |  |  |
| --- | --- | --- | --- |
|  | Start normal mode on EAS2 | **PDOR\_SSWA\_EAS2\_NormalMode\_00001.SOL**  ZIA58819, PIA60031 = MBOX1  PIA60446 = 0  PIA60447 = 0  PIA60448 = 0x2 |  |

**PAUSE. WAIT FOR SWA TO CONTINUE**

## EAS 1 Engineering modes

|  |  |  |  |
| --- | --- | --- | --- |
| **Step N°** | **Commanding Flow** | **FCP ID or PDOR title & contents** | **Comments** |
|  | Perform Eng mode 4 on EAS1  Stop normal mode on EAS1  Eng mode 4 (Threshold Sweep) | **PDOR\_SSWA\_EAS1\_EngMode4\_00005.SOL**  ZIA58771, PIA60031 = MBOX1  PIA60446 = 0  PIA60447 = 0  PIA60448 = 0  ZIA58790, PIA60104 = 0x6BC Start Thresh  PIA60103 = 0x4BE End Thresh  PIA60105 = 0x1E Thresh step  PIA60106 = 0xA94 MCP Value  PIA60165 = 0xA MCP wait  PIA60851 = 20 Acq time  PIA60760 = 0x13 Hem bin  PIA60761 = 0x8 Def number |  |
|  | Adjust Thresholds on EAS1  Adjust the Thresholds | **PDOR\_SSWA\_EAS1\_Thresh\_4C8\_00001.SOL**  ZIA58797, PIA60174 = 0x4C80  PIA60185 = 0x4C81  Plus other bytes |  |

|  |  |  |  |
| --- | --- | --- | --- |
|  | Perform Eng mode 3 on EAS1  Stop normal mode on EAS1  Eng mode 3 (Gain Test) | **PDOR\_SSWA\_EAS1\_EngMode3\_00005.SOL**  ZIA58771, PIA60031 = MBOX1  PIA60446 = 0  PIA60447 = 0  PIA60448 = 0x0  ZIA58789, PIA60101 = 0x869  PIA60100 = 0xA53  PIA60102 = 0x1E Step MCP  PIA60437 = 0xA 1st ramp time  PIA60444 = 0x1 Inter ramp time  PIA60165 = 40 Acq time  PIA60760 = 0xD Hem bin  PIA60761 = 0x8 Def number  PIA60762 = SWEEP\_MACRO ctrl |  |

|  |  |  |  |
| --- | --- | --- | --- |
|  | Stop normal mode on EAS1  Reset the MCP to AC2 | **PDOR\_SSWA\_EAS1\_FlightMCP\_00001.SOL**  ZIA58771, PIA60031 = MBOX1  PIA60446 = 0  PIA60447 = 0  PIA60448 = 0x0  ZIA58784, PIA60218 = 0xAC2 |  |

|  |  |  |  |
| --- | --- | --- | --- |
|  |  | **PDOR\_SSWA\_EAS1\_ZeroVoltOffset\_00002.SOL**  ZIA58769, PIA60411 = 0x00  PIA60412 = 0x00  PIA60415 = 0x00  PIA60416 = 0x00  PIA60417 = 0x00  PIA60418 = 0x00  PIA60419 = 0x00  PIA60420 = 0x00  PIA60421 = 0x00  PIA60422 = 0x00  PIA60413 = 0x00  PIA60414 = 0x00 |  |

|  |  |  |  |
| --- | --- | --- | --- |
|  | Set the Hem Max to 0v  Rebuild Table | **PDOR\_SSWA\_EAS1\_ZeroHem\_00001.SOL**  ZIA58767, PIA60441 = 0  PIA60442 = 0  PIA60443 = 0  ZIA58771, PIA60031 = MBOX3  PIA60446 = 0  PIA60447 = 0  PIA60448 = 0x1 |  |

|  |  |  |  |
| --- | --- | --- | --- |
|  | Eng mode 5 (Threshold Sweep)  Stop Science  Start Eng Mode 5 | **PDOR\_SSWA\_EAS1\_HV\_EngMode\_5\_00002.SOL**  ZIA58771, PIA60031 = MBOX1  PIA60446 = 0  PIA60447 = 0  PIA60448 = 0  Wait 00:00:01 (1 second)  ZIA58791, PIA60454 = 0x32 PA1 stim  PIA60455 = 0x32 PA2 stim  PIA60040 = 0x500 Start Thresh  PIA60039 = 0x47E End Thresh  PIA60041 = 0x4 Thresh step  PIA60106 = 0xAC2 MCP value  PIA60171 = 1 MCP wait  PIA60165 = 2 Acq time  Wait 00:01:10 (70 second) |  |

|  |  |  |  |
| --- | --- | --- | --- |
|  | Perform Eng mode 4 on EAS1  Stop normal mode on EAS1  Eng mode 4 (Threshold Sweep) | **PDOR\_SSWA\_EAS1\_EngMode4\_00005.SOL**  ZIA58771, PIA60031 = MBOX1  PIA60446 = 0  PIA60447 = 0  PIA60448 = 0  ZIA58790, PIA60104 = 0x6BC Start Thresh  PIA60103 = 0x4BE End Thresh  PIA60105 = 0x1E Thresh step  PIA60106 = 0xA94 MCP Value  PIA60165 = 0xA MCP wait  PIA60851 = 20 Acq time  PIA60760 = 0xD Hem bin  PIA60761 = 0x8 Def number |  |

|  |  |  |  |
| --- | --- | --- | --- |
|  | Perform Eng mode 3 on EAS1  Stop normal mode on EAS1  Eng mode 3 (Gain Test) | **PDOR\_SSWA\_EAS1\_EngMode3\_00005.SOL**  ZIA58771, PIA60031 = MBOX1  PIA60446 = 0  PIA60447 = 0  PIA60448 = 0x0  ZIA58789, PIA60101 = 0x869  PIA60100 = 0xA53  PIA60102 = 0x1E Step MCP  PIA60437 = 0xA 1st ramp time  PIA60444 = 0x1 Inter ramp time  PIA60165 = 40 Acq time  PIA60760 = 0xD Hem bin  PIA60761 = 0x8 Def number  PIA60762 = SWEEP\_MACRO ctrl |  |

## EAS 1 Reset Sweeps

|  |  |  |  |
| --- | --- | --- | --- |
|  | Stop normal mode on EAS1  Set the Hem Ratio  Set the Hem Max to 800v  Rebuild Table | **PDOR\_SSWA\_EAS1\_FlightSweep\_00002.SOL**  ZIA58771, PIA60031 = MBOX1  PIA60446 = 0  PIA60447 = 0  PIA60448 = 0x0  ZIA58766, PIA60469 = DE  PIA60470 = B8  PIA60471 = 53  ZIA58767, PIA60441 = 67  PIA60442 = 18  PIA60443 = A0  ZIA58771, PIA60031 = MBOX3  PIA60446 = 0  PIA60447 = 0  PIA60448 = 0x1 |  |
|  | Adjust Deflectors on EAS1  Stop Normal Mode on EAS1  Adjust the Deflector Ratios | **PDOR\_SSWA\_EAS1\_Deflectors\_Flight\_00002.SOL**  ZIA58771, PIA60031 = MBOX1  PIA60446 = 0  PIA60447 = 0  PIA60448 = 0  ZIA58765, PIA60474 = 0xB0  PIA60475 = 0xC4  PIA60578 = 0x9B  PLUS Other Bytes |  |
|  | Adjust Thresholds on EAS1  Adjust the Thresholds | **PDOR\_SSWA\_EAS1\_Thresh\_4C8\_00001.SOL**  ZIA58797, PIA60174 = 0x4C80  PIA60185 = 0x4C81  Plus other bytes |  |
|  | Adjust the voltage offsets on EAS1 | **PDOR\_SSWA\_EAS1\_FlightVoltOffset\_00002.SOL**  ZIA58769, PIA60411 = 0x01  PIA60412 = 0x8C  PIA60415 = 0x70  PIA60416 = 0x01  PIA60417 = 0xF6  PIA60418 = 0x00  PIA60419 = 0x01  PIA60420 = 0xC9  PIA60421 = 0xD0  PIA60422 = 0x01  PIA60413 = 0xB6  PIA60414 = 0x00 |  |

|  |  |  |  |
| --- | --- | --- | --- |
|  | Start normal mode on EAS1 | **PDOR\_SSWA\_EAS1\_NormalMode\_00001.SOL**  ZIA58771, PIA60031 = MBOX1  PIA60446 = 0  PIA60447 = 0  PIA60448 = 0x2 |  |

**PAUSE. WAIT FOR SWA TO CONTINUE**

## EAS Flight Like Gain Test

|  |  |  |  |
| --- | --- | --- | --- |
|  | Perform Eng mode 3 on EAS1  Stop normal mode on EAS1  Stop normal mode on EAS2  Sweep Eng mode 3 (Gain Test)  On EAS1  Fixed Eng mode 3 (Gain Test)  On EAS2  Wait  Fixed Eng mode 3 (Gain Test)  On EAS1  Sweep Eng mode 3 (Gain Test)  On EAS2  Wait | **PDOR\_SSWA\_EAS\_GainTest\_00003.SOL**  ZIA58771, PIA60031 = MBOX1  PIA60446 = 0  PIA60447 = 0  PIA60448 = 0x0  ZIA58819, PIA60031 = MBOX1  PIA60446 = 0  PIA60447 = 0  PIA60448 = 0  ZIA58789, PIA60101 = 0x869  PIA60100 = 0xA53  PIA60102 = 0x1E Step MCP  PIA60437 = 0xA 1st ramp time  PIA60444 = 1 Inter ramp time  PIA60165 = 40 Acq time  PIA60760 = 0xD Hem bin  PIA60761 = 0x8 Def number  PIA60762 = SWEEP\_MACRO ctrl  No time between these.  ZIA58837, PIA60101 = 0x869  PIA60100 = 0xA53  PIA60102 = 0x1E Step MCP  PIA60437 = 0xA 1st ramp time  PIA60444 = 1 Inter ramp time  PIA60165 = 40 Acq time  PIA60760 = 0xD Hem bin  PIA60761 = 0x8 Def number  PIA60762 = FIXED\_MACRO ctrl  Wait 20\*steps +2  ZIA58789, PIA60101 = 0x869  PIA60100 = 0xA53  PIA60102 = 0x1E Step MCP  PIA60437 = 10 1st ramp time  PIA60444 = 1 Inter ramp time  PIA60165 = 40 Acq time  PIA60760 = 0xD Hem bin  PIA60761 = 0x8 Def number  PIA60762 = FIXED\_MACRO ctrl  No time between these.  ZIA58837, PIA60101 = 0x869  PIA60100 = 0xA53  PIA60102 = 0x1E Step MCP  PIA60437 = 10 1st ramp time  PIA60444 = 1 Inter ramp time  PIA60165 = 40 Acq time  PIA60760 = 0xD Hem bin  PIA60761 = 0x8 Def number  PIA60762 = SWEEP\_MACRO ctrl  Wait 20 x steps +2 |  |

## EAS Reset MCP

|  |  |  |  |
| --- | --- | --- | --- |
|  | Stop normal mode on EAS1  Reset the MCP to AC2 | **PDOR\_SSWA\_EAS1\_FlightMCP\_00002.SOL**  ZIA58771, PIA60031 = MBOX1  PIA60446 = 0  PIA60447 = 0  PIA60448 = 0x0  ZIA58784, PIA60218 = 0xA94 |  |
|  | Stop normal mode on EAS2  Reset the MCP to AC2 | **PDOR\_SSWA\_EAS2\_FlightMCP\_00002.SOL**  ZIA58819, PIA60031 = MBOX1  PIA60446 = 0  PIA60447 = 0  PIA60448 = 0x0  ZIA58832, PIA60218 = 0xA94 |  |

## EAS Start Normal Mode

|  |  |  |  |
| --- | --- | --- | --- |
|  | Start normal mode on EAS1 | **PDOR\_SSWA\_EAS1\_NormalMode\_00001.SOL**  ZIA58771, PIA60031 = MBOX1  PIA60446 = 0  PIA60447 = 0  PIA60448 = 0x2 |  |
|  | Start normal mode on EAS2 | **PDOR\_SSWA\_EAS2\_NormalMode\_00001.SOL**  ZIA58819, PIA60031 = MBOX1  PIA60446 = 0  PIA60447 = 0  PIA60448 = 0x2 |  |

RAMP MCP To Zero

## EAS 1&2 Eng Mode 7

|  |  |  |  |
| --- | --- | --- | --- |
|  | Eng mode 7 (HV Sweep TEST)  Stop Science  Start Eng Mode 7 | **PDOR\_SSWA\_EAS1\_EngMode\_7\_00001.SOL**  ZIA58771, PIA60031 = MBOX1  PIA60446 = 0  PIA60447 = 0  PIA60448 = 0  ZIA58793  Wait 00:02:00 (120 second) |  |
|  | Eng mode 7 (HV Sweep TEST)  Stop Science  Start Eng Mode 7 | **PDOR\_SSWA\_EAS2\_EngMode\_7\_00001.SOL**  ZIA58819, PIA60031 = MBOX1  PIA60446 = 0  PIA60447 = 0  PIA60448 = 0  ZIA58841  Wait 00:02:00 (120 second) |  |

## EAS FDIR Commission

|  |  |  |  |
| --- | --- | --- | --- |
|  |  | **PDOR\_SSWA\_EAS1\_ENABLE\_FDIR\_00001.SOL**  ZIA58063, PIA60452 = 12  PIA60449 = EAS1SPWHB\_MI  PIA60449 = E1\_3V3\_MI  PIA60449 = E1\_1V5\_MI  PIA60449 = E1OPTEMPMON  PIA60449 = E1HVOUTVMON  PIA60449 = E1MCPVMON  PIA60449 = E1GRIDVMON  PIA60449 = E110VAPOSVMON  PIA60449 = E128VPOSVMON  PIA60449 = E1HVGENTHERMON  PIA60449 = E1HVMODTHERMON  PIA60449 = EAS1MISSACK\_MI |  |
|  |  | **PDOR\_SSWA\_EAS2\_ENABLE\_FDIR\_00001.SOL**  ZIA58063, PIA60452 = 12  PIA60449 = EAS2SPWHB\_MI  PIA60449 = E2\_3V3\_MI  PIA60449 = E2\_1V5\_MI  PIA60449 = E2OPTEMPMON  PIA60449 = E2HVOUTVMON  PIA60449 = E2MCPVMON  PIA60449 = E2GRIDVMON  PIA60449 = E210VAPOSVMON  PIA60449 = E228VPOSVMON  PIA60449 = E2HVGENTHERMON  PIA60449 = E2HVMODTHERMON  PIA60449 = EAS2MISSACK\_MI |  |

## EAS Reset MCP

|  |  |  |  |
| --- | --- | --- | --- |
|  | Stop normal mode on EAS1  Reset the MCP to AC2 | **PDOR\_SSWA\_EAS1\_FlightMCP\_00002.SOL**  ZIA58771, PIA60031 = MBOX1  PIA60446 = 0  PIA60447 = 0  PIA60448 = 0x0  ZIA58784, PIA60218 = 0xA94 |  |
|  | Stop normal mode on EAS2  Reset the MCP to AC2 | **PDOR\_SSWA\_EAS2\_FlightMCP\_00002.SOL**  ZIA58819, PIA60031 = MBOX1  PIA60446 = 0  PIA60447 = 0  PIA60448 = 0x0  ZIA58832, PIA60218 = 0xA94 |  |

## EAS Start Normal Mode

|  |  |  |  |
| --- | --- | --- | --- |
|  | Start normal mode on EAS1 | **PDOR\_SSWA\_EAS1\_NormalMode\_00001.SOL**  ZIA58771, PIA60031 = MBOX1  PIA60446 = 0  PIA60447 = 0  PIA60448 = 0x2 |  |
|  | Start normal mode on EAS2 | **PDOR\_SSWA\_EAS2\_NormalMode\_00001.SOL**  ZIA58819, PIA60031 = MBOX1  PIA60446 = 0  PIA60447 = 0  PIA60448 = 0x2 |  |

## EAS Configure heater

| **Step N°** | **Commanding Flow** | **FCP ID or PDOR title & contents** | **Comments** |
| --- | --- | --- | --- |
|  | Turn the manual heater on for EAS1  Master Control Register  Heater Control | **PDOR\_SSWA\_EAS1\_Full\_Heater\_00001.SOL**  ZIA58776, PIA60423 = 0x00  PIA60424 = 0x40  PIA60425 = 0x60  ZIA58757, PIA60773 = 0x00  PIA60774 = 0x01  PIA60775 = 0x60 | Control EAS heaters to max  0x160 |
|  | Turn the manual heater on for EAS2  Master control Register  Heater Control | **PDOR\_SSWA\_EAS2\_Full\_Heater\_00001.SOL**  ZIA58824, PIA60423 = 0x00  PIA60424 = 0x40  PIA60425 = 0x60  ZIA58805, PIA60773 = 0x00  PIA60774 = 0x01  PIA60775 = 0x60 | Control EAS1 heaters to max  0x160 |

**At this point, EAS 1&2 are now commissioned for use.**

## MTL PDOR\_SSWA\_SWA\_MTL\_16Apr\_00001.SOL

Before the activity starts, the end of day commanding is loaded onto the MTL. This is shown here as it is unknown at this point where this activity will end. Wherever the end is, the activity will be halted, EAS powered down. Then the following day will power up and continue where this activity ended.

| **Step N°** | **Commanding Flow** | **FCP ID or PDOR title & contents** | **Comments** | |
| --- | --- | --- | --- | --- |
|  | EAS1 Stop Science  EAS1 Ramp MCP to zero  EAS2 Stop Science  EAS2 Ramp MCP to zero  Turn EAS1 heater off  Turn EAS2 heater off  EAS1 Switch Off  EAS2 Switch Off  Stop EAS1 HK  Stop EAS2 HK  Power down DPU | ZIA58771, PIA60031 = MBOX1  PIA60446 = 0  PIA60447 = 0  PIA60448 = 0x0  ZIA58784, PIA60218 = 0  ZIA58819, PIA60031 = MBOX1  PIA60446 = 0  PIA60447 = 0  PIA60448 = 0x0  ZIA58832, PIA60218 = 0  ZIA58757, PIA60773 = 0  PIA60774 = 0  PIA60775 = 0  ZIA58805, PIA60773 = 0  PIA60774 = 0  PIA60775 = 0  ZIA58756  ZIA8804  ZIA58051, PIA58050 = EAS1\_SENS\_HK  ZIA58051, PIA58050 = EAS2\_SENS\_HK  IA-FCP-002 | | 19:20:30  19:21:00  19:21:30  19:22:00  19:23:00  19:24:00  19:25:00  19:25:30  19:26:00  19:26:01  19:27:00 |

# 22nd April. SWA-6 (IA-6)

This section will test the SWA suite in Normal mode. It will then test the SWA Burst mode. The various cadences of the SWA sensors are also tested.

## MTL PDOR\_SSWA\_SWA\_MTL\_22Apr\_00001.SOL

| **Step N°** | **Commanding Flow** | **FCP ID or PDOR title & contents** | **Comments** |
| --- | --- | --- | --- |
|  | Power DPU on | IA-FCP-011 | 10:50:00 |
|  | Configure the DPU | IA-FCP-030 | 10:55:00 |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |

## SWA Normal mode

|  |  |  |  |
| --- | --- | --- | --- |
| **Step N°** | **Commanding Flow** | **FCP ID or PDOR title & contents** | **Comments** |
|  | Power up & configure HIS with ramped-up High Voltage ready to sweep. | **PDOR\_SSWA\_HIS\_PowerUpConfig\_00001.SOL**  IA-FCP-017  ZIA58913, PIA60001 = 9 |  |
|  | Wait 1 hour 22 mins | Wait 01:22:00 (4920 seconds) |  |
|  | Power up & configure PAS in No science  Enable HK  Disable FDIR  Power On  Master Control Register  Enable Monitor parameter  Enable Monitor parameter  Enable Monitor parameter  Disable Monitor parameter  Enable Monitor parameter  Master Control Register  PAS Config  Enable Moniter parameter  Master Control Register  Master Control Register  PAS HV Ramp up  Report Config parameters  Modify Config parameters  Accept  Report Config parameters  Enable FDIR monitoring  Turn Preamps on  Enable FDIR monitoring | **PDOR\_SSWA\_PAS\_PowerUpConfig\_00002.SOL**  ZIA58050, PIA58050 = PAS\_SENS\_HK  ZIA58064, PIA60452 = 28  PIA60449 = V\_MON\_C\_MI  PIA60449 = V\_MON\_L\_MI  PIA60449= I\_MON\_C\_MI  PIA60449 = I\_MON\_L\_MI  PIA60449 = T\_MON\_C\_MI  PIA60449 = T\_MON\_L\_MI  PIA60449 = P24\_VCEMOUT\_MI  PIA60449 = P5\_VCEMOUT\_MI  PIA60449 = P12\_VHTOUT\_MI  PIA60449 = M12\_VHTOUT\_MI  PIA60449 = P3V\_3\_FPGA\_OMI  PIA60449 = P1V\_5\_FPGA\_OMI  PIA60449 = TEMP\_DCDC\_MI  PIA60449 = TEMP\_FPGA\_MI  PIA60449 = HK\_IP24V\_CEMMI  PIA60449 = HK\_IP5V\_CEMMI  PIA60449 = HK\_IP12V\_HTMI  PIA60449 = HK\_IM12V\_HTMI  PIA60449 = HK\_I3V3\_FPGAMI  PIA60449 = HK\_IP28V\_PRIMI  PIA60449 = HK\_I1V5\_FPGAMI  PIA60449 = HK\_MHV\_POSMI  PIA60449 = HK\_MHV\_NEGMI  PIA60449 = TEMP\_HVPS\_MI  PIA60449 = HK\_IP28V\_PRSCI  PIA60449 = PASampOverCurr  PIA60449 = PASSPWHB\_MI  PIA60449 = PASMISSACK\_MI  ZIA58858  ZIA58863, PIA60343 = 0x0000001A  ZIA58063, PIA60452 = 1  PIA60449 = PASSPWHB\_MI  ZIA58063, PIA60452 = 1  PIA60449 = PASMISSACK\_MI=  ZIA58063, PIA60452 = 1  PIA60449 = HK\_IP28V\_PRIMI  ZIA58064, PIA60452 = 1  PIA60449 = HK\_IP28V\_PRIMI  ZIA58063, PIA60452 = 1  PIA60449 = HK\_IP28V\_PRSCI  ZIA58863, PIA60343 = 0x0000001E  ZIA58853  ZIA58063, PIA60452 = 6  PIA60449 = HK\_MHV\_POSMI  PIA60449 = HK\_MHV\_NEGMI  PIA60449 = P12\_VHTOUT\_MI  PIA60449 = M12\_VHTOUT\_MI  PIA60449 = HK\_IP12V\_HTMI  PIA60449 = HK\_IM12V\_HTMI  ZIA58863, PIA60343 = 0x0000001F  ZIA58863, PIA60343 = 0x00000007  ZIA58856, PIA60791 = 0  PIA60790 = **0x0NOM**  PIA60792 = 0x29  PIA60793 = 0x0014  Wait 00:20:00 (1200 seconds)  ZIA58707, PIA60137 = 1  PIA60138 = 3004  ZIA58706, PIA60133 = 1  PIA60136 = 3004  PIA60135 = 4  PIA60134 = **MSB of 0x0NOM**  PIA60134 = **LSB of 0x0NOM**  PIA60134 = 0  PIA60134 = 0x29  ZIA58708  ZIA58707, PIA60137 = 1  PIA60138 = 3004  ZIA58063, PIA60452 = 4  PIA60449 = V\_MON\_C\_MI  PIA60449 = V\_MON\_L\_MI  PIA60449 = I\_MON\_C\_MI  PIA60449 = I\_MON\_L\_MI  ZIA58862, PIA58062 = ON  PIA58063 = ON  ZIA58063, PIA60452 =13  PIA60449 = T\_MON\_C\_MI  PIA60449 = T\_MON\_L\_MI  PIA60449 = P24\_VCEMOUT\_MI  PIA60449 = P5\_VCEMOUT\_MI  PIA60449 = P3V\_3\_FPGA\_OMI  PIA60449 = P1V\_5\_FPGA\_OMI  PIA60449 = TEMP\_DCDC\_MI  PIA60449 = TEMP\_FPGA\_MI  PIA60449 = HK\_IP24V\_CEMMI  PIA60449 = HK\_IP5V\_CEMMI  PIA60449 = HK\_I3V3\_FPGAMI  PIA60449 = HK\_I1V5\_FPGAMI  PIA60449 = TEMP\_HVPS\_MI  Wait 00:30:00 (1800 seconds) |  |
|  | Puts HIS into NM | **PDOR\_SSWA\_HIS\_NORMSCI\_00001.SOL**  ZIA58913, PIA60001 = 15 |  |
|  | Test the Suite in Normal Mode  PAS into NM  HIS to HVSTBY  EAS 1&2 into NM | **PDOR\_SSWA\_Suite\_Comm\_NM\_00001.SOL**  IA-FCP-061, XF061A01 = 22  Wait 00:10:00 (600 seconds)  ZIA58917, PIA59011 = HVSTDBY  IA-FCP-041  IA-FCP-051  Wait 00:10:00 (600 seconds) |  |
|  | Puts HIS into NM | **PDOR\_SSWA\_HIS\_NORMSCI\_00001.SOL**  ZIA58913, PIA60001 = 15 |  |
|  | Wait 00:10:00 (600 seconds) |  |  |
|  | Enable Compression | IA-FCP-101 |  |

## PAS Calibration mode

|  |  |  |  |
| --- | --- | --- | --- |
| **Step N°** | **Commanding Flow** | **FCP ID or PDOR title & contents** | **Comments** |
|  | Run calibration test on PAS  Stop Science on PAS  Start Calibration Mode  Adjust the Thresholds  Start Science on PAS | **PDOR\_SSWA\_PAS\_Calibration\_00003.SOL**  ZIA58944  Wait 00:05:00 (300 seconds)  ZIA58850, PIA60780 = 0x0SRT  PIA60781 = 0x0029  PIA60782 = 0x0STP  PIA60783 = 0x0FFB  PIA60784 = 0x0FF7  PIA60785 = 0x0FEF  PIA60786 = 0x0FDF  PIA60787 = 0x0FBF  PIA60788 = 0x0NOM  PIA60789 = 0x0000  Wait 00:05:00 (300 seconds)  ZIA58943, PIA60777 = PASNc1 | Calculate SRT and STP as:  **SRT** = HEX( 0x0NOM - 200.0) / 1.221)  **STP** = HEX( 0x0NOM +200.0) / 1.221) |

## SWA Burst mode

|  |  |  |  |
| --- | --- | --- | --- |
| **Step N°** | **Commanding Flow** | **FCP ID or PDOR title & contents** | **Comments** |
|  | Test Burst Mode  All sensors into BM for 5 mins  5m = 300s / 8 = 2400  PAS only into BM for 5 mins  5m = 300s / 8 = 2400 | **PDOR\_SSWA\_Suite\_Comm\_BM\_00001.SOL**  Wait 00:10:00 (600 seconds)  ZIA58726, PIA60157 = 2400  PIA60158 = 0  PIA60159 = 2400  PIA60160 = 0  PIA60163 = 2400  PIA60164 = 0  PIA60170 = DYNAMIC  PIA60161 = 2400  PIA60162 = 0  Wait 00:20:00 (1200 seconds)  ZIA58726, PIA60157 = 0  PIA60158 = 0  PIA60159 = 0  PIA60160 = 0  PIA60163 = 2400  PIA60164 = 0  PIA60170 = DYNAMIC  PIA60161 = 0  PIA60162 = 0  Wait 00:20:00 (1200 seconds) |  |

## SWA Cadence test

|  |  |  |  |
| --- | --- | --- | --- |
| **Step N°** | **Commanding Flow** | **FCP ID or PDOR title & contents** | **Comments** |
|  | Test SWA Cadences  Decrease All SWA cadence  Increase EAS cadence  All SWA at nominal cadence | **PDOR\_SSWA\_Suite\_Comm\_Cadence\_00002.SOL**  ZIA58728, PIA60096 = 2  PIA60097 = 2  PIA60099 = 2  PIA60098 = 2  Wait 00:10:00 (600 seconds)  ZIA58728, PIA60096 = 0  PIA60097 = 0  PIA60099 = 1  PIA60098 = 1  Wait 00:10:00 (600 seconds)  ZIA58728, PIA60096 = 1  PIA60097 = 1  PIA60099 = 1  PIA60098 = 1  Wait 00:10:00 (600 seconds) |  |
|  | Enter Low Cadence Mode  Select Product Configuration Table 3 for Max Res  VDF  Select "SWA\_HIS\_LOW\_1TENTH" PHA  Select "SWA\_HIS\_LOW\_1TENTH" VDF  Select "SWA\_HIS\_LOW\_QUARTER" PHA  Select "SWA\_HIS\_LOW\_QUARTER" VDF  Select "SWA\_HIS\_LOW\_HALF" PHA  Select "SWA\_HIS\_LOW\_HALF" VDF  Select "SWA\_HIS\_LOW\_2THIRDS" PHA  Select "SWA\_HIS\_LOW\_2THIRDS" VDF  Enter Normal Cadence Mode  Select "SWA\_HIS\_NORMAL\_5X" PHA  Select "SWA\_HIS\_NORMAL\_5X" VDF  Select "SWA\_HIS\_NORMAL\_3X" PHA  Select "SWA\_HIS\_NORMAL\_3X" VDF  Select "SWA\_HIS\_NORMAL\_2X" PHA  Select "SWA\_HIS\_NORMAL\_2X" VDF  Select Product Configuration Table 0 for Half  Res VDF  Select "SWA\_HIS\_NORMAL" PHA  Select "SWA\_HIS\_NORMAL" VDF  Select Burst PHA  Select Burst PHA  Select Burst VDF  Select Burst VDF  Setup DPU for 5-minute HIS core burst  Setup DPU for 5-minute HIS optional burst  Command NOP to hold wait time | **PDOR\_SSWA\_HIS\_DATA\_RATE\_CADENCES\_00002.SOL**  Wait 0:00:01 (1 seconds)  ZIA58913, PIA60001 = 8  Wait 0:01:00 (60 seconds)  ZIA58919, PIA60356 = PR\_CONF\_TAB\_NO  PIA60352 = 3  Wait 0:00:01 (1 seconds)  ZIA58919, PIA60356 = PHA\_MAX\_NORMAL  PIA60352 = 5654  Wait 0:00:01 (1 seconds)  ZIA58919, PIA60356 = VDF\_EN\_NORM  PIA60352 = 0  Wait 0:22:00 (1320 seconds)  ZIA58919, PIA60356 = PHA\_MAX\_NORMAL  PIA60352 = 8928  Wait 0:00:01 (1 seconds)  ZIA58919, PIA60356 = VDF\_EN\_NORM  PIA60352 = 1  Wait 0:22:00 (1320 seconds)  ZIA58919, PIA60356 = PHA\_MAX\_NORMAL  PIA60352 = 11904  Wait 0:00:01 (1 seconds)  ZIA58919, PIA60356 = VDF\_EN\_NORM  PIA60352 = 1  Wait 0:22:00 (1320 seconds)  ZIA58919, PIA60356 = PHA\_MAX\_NORMAL  PIA60352 = 23808  Wait 0:00:01 (1 seconds)  ZIA58919, PIA60356 = VDF\_EN\_NORM  PIA60352 = 7  Wait 0:22:00 (1320 seconds)  ZIA58913, PIA60001 = 15  Wait 0:00:10 (10 seconds)  ZIA58919, PIA60356 = PHA\_MAX\_NORMAL  PIA60352 = 11904  Wait 0:00:01 (1 seconds)  ZIA58919, PIA60356 = VDF\_EN\_NORM  PIA60352 = 7  Wait 0:17:00 (1020 seconds)  ZIA58919, PIA60356 = PHA\_MAX\_NORMAL  PIA60352 = 13094  Wait 0:00:01 (1 seconds)  ZIA58919, PIA60356 = VDF\_EN\_NORM  PIA60352 = 1  Wait 0:12:00 (720 seconds)  ZIA58919, PIA60356 = PHA\_MAX\_NORMAL  PIA60352 = 5654  Wait 0:00:01 (1 seconds)  ZIA58919, PIA60356 = VDF\_EN\_NORM  PIA60352 = 1  Wait 0:12:00 (720 seconds)  ZIA58919, PIA60356 = PR\_CONF\_TAB\_NO  PIA60352 = 0  Wait 0:00:01 (1 seconds)  ZIA58919, PIA60356 = PHA\_MAX\_NORMAL  PIA60352 = 5357  Wait 0:00:01 (1 seconds)  ZIA58919, PIA60356 = VDF\_EN\_NORM  PIA60352 = 1  Wait 0:12:00 (720 seconds)  ZIA58919, PIA60356 = PHA\_MAX\_BURST\_1  PIA60352 = 4000  Wait 0:00:01 (1 seconds)  ZIA58919, PIA60356 = PHA\_TLM\_MAX\_B2  PIA60352 = 4000  Wait 0:00:01 (1 seconds)  ZIA58919, PIA60356 = VDF\_EN\_BURST\_1  PIA60352 = 0x3F  Wait 0:00:01 (1 seconds)  ZIA58919, PIA60356 = VDF\_EN\_B2  PIA60352 = 0x3F  Wait 0:00:01 (1 seconds)  ZIA58726, PIA60157 = 0  PIA60158 = 0  PIA60159 = 0  PIA60160 = 0  PIA60163 = 0  PIA60164 = 0  PIA60170 = DYNAMIC  PIA60161 = 2400  PIA60162 = 0  Wait 0:10:00 (600 seconds)  ZIA58726, PIA60157 = 0  PIA60158 = 0  PIA60159 = 0  PIA60160 = 0  PIA60163 = 0  PIA60164 = 0  PIA60170 = DYNAMIC  PIA60161 = 0  PIA60162 = 2400  Wait 0:10:00 (600 seconds)  ZIA58915 |  |

# SWA Commission conclusion

At this point, SWA is fully commissioned. It is expected to leave SWA operating in Normal Mode until any wheel offloads force SWA sensors into the safe state.

# Appendices

## Emergency Contingency Plans

The following procedure are to be used in the event of any un-expected or dangerous issues.