**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 | 10:30:00 UTC |
|  | Configure the DPU | IA-FCP-030 | 10:35:00 UTC |

## PAS Power On

|  |  |  |  |
| --- | --- | --- | --- |
| **Step N°** | **Commanding Flow** | **FCP ID or PDOR title & contents** | **Comments** |
|  | Power Up PASEnable PAS HKDisable Monitor Parameters ( 29 parameters )Power on PAS | **PDOR\_SSWA\_PAS\_Comm\_PowerOn\_00004.SOL**ZIA58050, PIA58050 = PAS\_SENS\_HKZIA58064, 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\_MIZIA58858 |  |

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 PASSet the Master control register to Standby Set the heater offEnable MHV Set the main HV to 650 V Set the main HV to 1300 VSet the main HV to 1950 VSet the main HV to 2600 VSet the main HV to 3250 VSet the main HV to 3900 VSet the main HV to 4550 VSet the main HV to 5200 VSet the main HV to 5850 VSet 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\_CYCLEWait 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 proceedingCheck 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 tableStart Engineering schemeQuery Stop Engineering schemeAbort Sequencer activityDump parameter | **PDOR\_SSWA\_PAS\_Eng\_Stepping\_00004.SOL**ZIA58875, PIA60709 = 0x06004E8 PIA60711 = 0x416448 PIA60708 = 0x126FBD PIA60706 = 0x1251B9 PIA60707 = 0x125F76 PIA60710 = 0x00003CWait 00:00:05 (5 second)ZIA58873, PIA60347 = 0x00000003Wait 00:08:20 (500 second)ZIA58873, PIA60347 = 0x00000000Wait 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 tableDump ParameterMaster Control Register: Enable CEMsMaster Control Register: CEMs OnTurn Pre Amps onLoad Static tableStart Static schemeSet HV to 250VSet HV to 500VSet HV to 750VSet HV to 1000VSet HV to 1250VSet HV to 1500VSet HV to 1550VSet HV to 1600VSet HV to 1650VSet HV to 1700V | **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 = ConfTableWait 00:08:20 (500 second)ZIA58863 PIA60343 = 0x0000001FWait 00:00:05 (5 second)ZIA58863 PIA60343 = 0x00000007Wait 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 = 0x000001Wait 00:00:05 (5 second)ZIA58873, PIA60347 = 0x00000001Wait 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** | 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 activitySet HV to 1000VEnable the Monitoring parametersTurn 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\_MIZIA58862, PIA58062 = OFF PIA58063 = OFF | 17:5018:0018:1018:15Pass 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 ampsStart the static schemeSet CEM HV to 1250VSet CEM HV to 1500VSet CEM HV to 1550VSet CEM HV to 1600VSet CEM HV to 1650VSet CEM HV to 1700VSet CEM HV to 1750VSet CEM HV to 1800VSet CEM HV to 1850VSet CEM HV to 1900V | **PDOR\_SSWA\_PAS\_Comm\_Det\_2\_00005.SOL**ZIA58862, PIA58062 = ON  PIA58063 = ONWait 00:00:05 (5 second)ZIA58873, PIA60347 = 0x00000001Wait 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 dataFrom 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 activityDisable Monitoring parametersRamp the CEM HV to 0V in 500V stepsRamp the CEM HV back to 1250VRamp the CEM HV back to 1000VRamp the CEM HV back to 500VRamp the CEM HV back to 0VRamp the Main HV to 0V in 1000V stepsRamp the Main HV to 5000VRamp the Main HV to 4000VRamp the Main HV to 3000VRamp the Main HV to 2000VRamp the Main HV to 1000VRamp the Main HV to 0V | **PDOR\_SSWA\_PAS\_Post\_Det\_2\_00004.SOL**ZIA58873, PIA60347 = 0x000000FFWait 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\_MIWait 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 = 0x000009D8Wait 00:00:40 (40 second)ZIA58869, PIA60344 = 0x00000762Wait 00:00:40 (40 second)ZIA58869, PIA60344 = 0x000004ECWait 00:00:40 (40 second)ZIA58869, PIA60344 = 0x00000276Wait 00:00:40 (40 second)ZIA58869, PIA60344 = 0x00000000 | At this stage we should know what the NOMINAL CEM HV is = **0x570**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 configRamp the PAS HV Initial value = 0VNominal Value = **0x570**Step size = 100VWait time = 50sEnable monitoring parametersStart science cyclogram | **PDOR\_SSWA\_PAS\_Comm\_NM\_00006.SOL**ZIA58853Wait 00:18:20 (1100 second)ZIA58856, PIA60791 = 0x0000  PIA60790= **0x570** 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\_MIWait 00:00:40 (40 second)ZIA58943, PIA60777 = PASNc1 | Wait for the HK to show MHV = 6500V.About 12 minsINPUT from GroundWait 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 ScienceSwitch off the preampsDisable the monitoring parametersRamp down the PAS CEM HV Ramp down the PAS HV Final value = 0VInitial value = **0x0NOMINAL**Step size = 200VWait time = 6s Power OFF PASPower down DPU | ZIA58944Wait 00:05:00 (300 second)ZIA58862, PIA58062 = OFF  PIA58063 = OFFZIA58064, 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\_MIZIA58868, PIA60344 = **0x570** ZIA58857, PIA60790 = 0x0000  PIA60791= **0x570** PIA60792 = 0x00B2 PIA60793 = 0x0006 Wait 00:05:00 (300 second)ZIA58859IA-FCP-002 | 18:2018:28Ensure all science packets have stopped18:29**18:30****18:32**Wait the HK with the CEM V less than 200 V.18:4018:45Pass 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 onPOST macro on EAS1IDLE macro on EAS1Request EAS1 HK | ZIA58050, PIA58050 = EAS1\_SENS\_HKWait 00:00:01 (1 second)ZIA58760Wait 00:00:05 (5 second)ZIA58934, PIA60739 = POSTWait 00:00:05 (5 second)ZIA58753Wait 00:00:30 (30 second)ZIA58782 | 11:01:00 |
|  | RUN macro on EAS1 | ZIA58758Wait 00:00:20 (20 second) | 11:02:00 |
|  | Enable EAS2 HK Power EAS2 onPOST macro on EAS2IDLE macro on EAS2Request EAS2 HK | ZIA58050, PIA58050 = EAS2\_SENS\_HKWait 00:00:01 (1 second)ZIA58808Wait 00:00:05 (5 second)ZIA58936, PIA60740 = POSTWait 00:00:05 (5 second)ZIA58801Wait 00:30:00 (30 second)ZIA58830 | 11:03:00 |
|  | RUN macro on EAS2 | ZIA58806Wait 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 RegisterEAS1 Heater Control | ZIA58776, PIA60423 = 0x00 PIA60424 = 0x40 PIA60425 = 0x60ZIA58757, PIA60773 = 0x00  PIA60774 = 0x00 PIA60775 = 0xE8 | 11:05:20 |
|  | Master control RegisterEAS2 Heater Control | ZIA58824, PIA60423 = 0x00 PIA60424 = 0x40 PIA60425 = 0x60ZIA58805, PIA60773 = 0x00  PIA60774 = 0x00 PIA60775 = 0xE8 | 11:05:30 |
|  | Set the Hem ratioSet the Hem Max to 800vRebuild Table | ZIA58766, PIA60441 = 0xDE PIA60442 = 0xB8 PIA60443 = 0x51ZIA58767, PIA60441 = 67 PIA60442 = 18 PIA60443 = A0ZIA58771, PIA60031 = MBOX3 PIA60446 = 0 PIA60447 = 0 PIA60448 = 0x1 | 11:06:00 |
|  | Set the Hem ratioSet the Hem Max to 800vRebuild Table | ZIA58814, PIA60441 = 0xDE PIA60442 = 0xB8 PIA60443 = 0x51ZIA58815, PIA60441 = 67 PIA60442 = 18 PIA60443 = A0ZIA58819, 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 1&2 Eng Mode 6

|  |  |  |  |
| --- | --- | --- | --- |
| **Step N°** | **Commanding Flow** | **FCP ID or PDOR title & contents** | **Comments** |
|  | Stop normal mode on EAS1Perform Eng Mode 6 | **PDOR\_SSWA\_EAS1\_EngMode\_6\_00003.SOL**ZIA58771, PIA60031 = MBOX1 PIA60446 = 0 PIA60447 = 0 PIA60448 = 0x0ZIA58792, PIA60457 = 0xFF PIA60458 = 0x32 PIA60459 = 0x28 PIA60106 = 0x0 PIA60171 = 0xA PIA60165 = 10 |  |
|  | Stop normal mode on EAS2Perform Eng Mode 6 | **PDOR\_SSWA\_EAS2\_EngMode\_6\_00003.SOL**ZIA58819, PIA60031 = MBOX1 PIA60446 = 0 PIA60447 = 0 PIA60448 = 0x0ZIA58840, PIA60457 = 0xFF PIA60458 = 0x32 PIA60459 = 0x28 PIA60106 = 0x0 PIA60171 = 0xA PIA60165 = 10 |  |

## EAS 2 MCP commission

|  |  |  |  |
| --- | --- | --- | --- |
| **Step N°** | **Commanding Flow** | **FCP ID or PDOR title & contents** | **Comments** |
|  | Commission EAS2 MCPStop normal mode on EAS2Perform Eng Mode 3[Conversion = 1.022 ]Set the EAS2 MCP back by 25VSet the Hem Max to 800VRebuild the tableStart normal mode on EAS2  | **PDOR\_SSWA\_EAS2\_MCP3\_Comm\_00008.SOL**ZIA58819, PIA60031 = MBOX1 PIA60446 = 0 PIA60447 = 0 PIA60448 = 0x0ZIA58837, 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 = A0ZIA58819, PIA60031 = MBOX3 PIA60446 = 0 PIA60447 = 0 PIA60448 = 0x1ZIA58819, 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 0vRebuild Table | **PDOR\_SSWA\_EAS2\_ZeroHem\_00001.SOL**ZIA58815, PIA60441 = 0 PIA60442 = 0 PIA60443 = 0ZIA58819, 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 EAS2Stop Normal Mode on EAS2Adjust the Deflector Ratios | **PDOR\_SSWA\_EAS2\_Deflectors\_Flight\_00002.SOL**ZIA58819, PIA60031 = MBOX1 PIA60446 = 0 PIA60447 = 0 PIA60448 = 0ZIA58813, PIA60474 = 0xAD PIA60475 = 0x0E PIA60578 = 0x56PLUS Other Bytes |  |

## EAS2 POST MCP commission

|  |  |  |  |
| --- | --- | --- | --- |
|  | Post EAS2 MCP CommissionStop normal mode on EAS2 Set the EAS2 MCP to 2695V = 0xAC2Start normal mode on EAS2  | **PDOR\_SSWA\_EAS2\_Post\_MCP\_Comm\_00002.SOL**ZIA58819, PIA60031 = MBOX1 PIA60446 = 0 PIA60447 = 0 PIA60448 = 0ZIA58832, PIA60218 = 0xAC2ZIA58819, PIA60031 = MBOX1 PIA60446 = 0 PIA60447 = 0 PIA60448 = 2 |  |

## EAS 2 Flight Sweeps

|  |  |  |  |
| --- | --- | --- | --- |
|  |  |  |  |
|  | Stop normal mode on EAS2 Set the Hem ratioSet the Hem Max to 800vRebuild Table | **PDOR\_SSWA\_EAS2\_FlightSweep\_00002.SOL**ZIA58819, PIA60031 = MBOX1 PIA60446 = 0 PIA60447 = 0 PIA60448 = 0x0ZIA58814, PIA60441 = 0xDE PIA60442 = 0xB8 PIA60443 = 0x51ZIA58815, PIA60441 = 67 PIA60442 = 18 PIA60443 = A0ZIA58819, 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

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Commission EAS1 MCPStop normal mode on EAS1 Perform Eng Mode 3[Conversion = 1.022 ]Set the EAS1 MCP back by 25VSet the Hem Max to 800vRebuild the tableStart normal mode on EAS1  | **PDOR\_SSWA\_EAS1\_MCP3\_Comm\_00008.SOL**ZIA58771, PIA60031 = MBOX1 PIA60446 = 0 PIA60447 = 0 PIA60448 = 0x0ZIA58789, 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 = A0ZIA58771, PIA60031 = MBOX3 PIA60446 = 0 PIA60447 = 0 PIA60448 = 0x1ZIA58771, 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 0vRebuild Table | **PDOR\_SSWA\_EAS1\_ZeroHem\_00001.SOL**ZIA58767, PIA60441 = 0 PIA60442 = 0 PIA60443 = 0ZIA58771, 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

|  |  |  |  |
| --- | --- | --- | --- |
|  | Stop normal mode on EAS1 Set the Hem ratioSet the Hem Max to 800vRebuild Table | **PDOR\_SSWA\_EAS1\_FlightSweep\_00002.SOL**ZIA58771, PIA60031 = MBOX1 PIA60446 = 0 PIA60447 = 0 PIA60448 = 0x0ZIA58766, PIA60441 = 0xDE PIA60442 = 0xB8 PIA60443 = 0x51ZIA58767, PIA60441 = 67 PIA60442 = 18 PIA60443 = A0ZIA58771, PIA60031 = MBOX3 PIA60446 = 0 PIA60447 = 0 PIA60448 = 0x1 |  |

## EAS1 Flight deflectors

|  |  |  |  |
| --- | --- | --- | --- |
|  | Adjust Deflectors on EAS1Stop Normal Mode on EAS1Adjust the Deflector Ratios | **PDOR\_SSWA\_EAS1\_Deflectors\_Flight\_00002.SOL**ZIA58771, PIA60031 = MBOX1 PIA60446 = 0 PIA60447 = 0 PIA60448 = 0ZIA58765, PIA60474 = 0xB0 PIA60475 = 0xC4 PIA60578 = 0x9BPLUS Other Bytes |  |

## EAS1 POST MCP commission

|  |  |  |  |
| --- | --- | --- | --- |
|  | Post EAS1 MCP CommissionStop normal mode on EAS1 Set the EAS1 MCP to 2695V = 0xAC2Start normal mode on EAS1  | **PDOR\_SSWA\_EAS1\_Post\_MCP\_Comm\_00002.SOL**ZIA58771, PIA60031 = MBOX1 PIA60446 = 0 PIA60447 = 0 PIA60448 = 0x0ZIA58784, PIA60218 = 0xAC2ZIA58771, 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 EAS2Stop normal mode on EAS2Eng mode 4 (Threshold Sweep) | **PDOR\_SSWA\_EAS2\_EngMode4\_00005.SOL**ZIA58819, PIA60031 = MBOX1 PIA60446 = 0 PIA60447 = 0 PIA60448 = 0ZIA58838, 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 |  |

|  |  |  |  |
| --- | --- | --- | --- |
|  | Adjust Thresholds on EAS2Adjust the Thresholds | **PDOR\_SSWA\_EAS2\_Thresh\_4C8\_00001.SOL**ZIA58845, PIA60174 = 0x4C80 PIA60185 = 0x4C81 PIA60196 = 0x4C82Plus other bytes |  |

|  |  |  |  |
| --- | --- | --- | --- |
|  | Perform Eng mode 3 on EAS2Stop normal mode on EAS2Eng mode 3 (Gain Test) | **PDOR\_SSWA\_EAS2\_EngMode3\_00005.SOL**ZIA58819, PIA60031 = MBOX1 PIA60446 = 0 PIA60447 = 0 PIA60448 = 0ZIA58837, 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 |  |

|  |  |  |  |
| --- | --- | --- | --- |
|  | Stop normal mode on EAS1 Reset the MCP to AC2 | **PDOR\_SSWA\_EAS2\_FlightMCP\_00001.SOL**ZIA58819, PIA60031 = MBOX1 PIA60446 = 0 PIA60447 = 0 PIA60448 = 0x0ZIA58832, 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 0vRebuild Table | **PDOR\_SSWA\_EAS2\_ZeroHem\_00001.SOL**ZIA58815, PIA60441 = 0 PIA60442 = 0 PIA60443 = 0ZIA58819, PIA60031 = MBOX3 PIA60446 = 0 PIA60447 = 0 PIA60448 = 0x1 |  |

|  |  |  |  |
| --- | --- | --- | --- |
|  | Eng mode 5 (Threshold Sweep)Stop ScienceStart Eng Mode 5 | **PDOR\_SSWA\_EAS2\_HV\_EngMode\_5\_00002.SOL**ZIA58819, PIA60031 = MBOX1 PIA60446 = 0 PIA60447 = 0 PIA60448 = 0Wait 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 timeWait 00:01:10 (70 second) |  |

|  |  |  |  |
| --- | --- | --- | --- |
|  | Perform Eng mode 4 on EAS2Stop normal mode on EAS2Eng mode 4 (Threshold Sweep) | **PDOR\_SSWA\_EAS2\_EngMode4\_00005.SOL**ZIA58819, PIA60031 = MBOX1 PIA60446 = 0 PIA60447 = 0 PIA60448 = 0ZIA58838, 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 EAS2Stop normal mode on EAS2Eng mode 3 (Gain Test) | **PDOR\_SSWA\_EAS2\_EngMode3\_00005.SOL**ZIA58819, PIA60031 = MBOX1 PIA60446 = 0 PIA60447 = 0 PIA60448 = 0ZIA58837, 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 RatioSet the Hem Max to 800vRebuild Table | **PDOR\_SSWA\_EAS2\_FlightSweep\_00002.SOL**ZIA58819, PIA60031 = MBOX1 PIA60446 = 0 PIA60447 = 0 PIA60448 = 0x0ZIA58814, PIA60441 = 0xDE PIA60442 = 0xB8 PIA60443 = 0x51ZIA58815, PIA60441 = 67 PIA60442 = 18 PIA60443 = A0ZIA58819, PIA60031 = MBOX3 PIA60446 = 0 PIA60447 = 0 PIA60448 = 0x1 |  |

|  |  |  |  |
| --- | --- | --- | --- |
|  | Adjust Deflectors on EAS2Stop Normal Mode on EAS2Adjust the Deflector Ratios | **PDOR\_SSWA\_EAS2\_Deflectors\_Flight\_00002.SOL**ZIA58819, PIA60031 = MBOX1 PIA60446 = 0 PIA60447 = 0 PIA60448 = 0ZIA58813, PIA60474 = 0xAD PIA60475 = 0x0E PIA60578 = 0x56PLUS Other Bytes |  |

|  |  |  |  |
| --- | --- | --- | --- |
|  | Adjust Thresholds on EAS2Adjust the Thresholds | **PDOR\_SSWA\_EAS2\_Thresh\_4C8\_00001.SOL**ZIA58845, PIA60174 = 0x4C80 PIA60185 = 0x4C81Plus other bytes |  |

|  |  |  |  |
| --- | --- | --- | --- |
|  | 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 EAS1Stop normal mode on EAS1Eng mode 4 (Threshold Sweep) | **PDOR\_SSWA\_EAS1\_EngMode4\_00005.SOL**ZIA58771, PIA60031 = MBOX1 PIA60446 = 0 PIA60447 = 0 PIA60448 = 0ZIA58790, 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 EAS1Adjust the Thresholds | **PDOR\_SSWA\_EAS1\_Thresh\_4C8\_00001.SOL**ZIA58797, PIA60174 = 0x4C80 PIA60185 = 0x4C81Plus other bytes |  |

|  |  |  |  |
| --- | --- | --- | --- |
|  | Perform Eng mode 3 on EAS1Stop normal mode on EAS1Eng mode 3 (Gain Test) | **PDOR\_SSWA\_EAS1\_EngMode3\_00005.SOL**ZIA58771, PIA60031 = MBOX1 PIA60446 = 0 PIA60447 = 0 PIA60448 = 0x0ZIA58789, 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 = 0x0ZIA58784, 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 0vRebuild Table | **PDOR\_SSWA\_EAS1\_ZeroHem\_00001.SOL**ZIA58767, PIA60441 = 0 PIA60442 = 0 PIA60443 = 0ZIA58771, PIA60031 = MBOX3 PIA60446 = 0 PIA60447 = 0 PIA60448 = 0x1 |  |

|  |  |  |  |
| --- | --- | --- | --- |
|  | Eng mode 5 (Threshold Sweep)Stop ScienceStart Eng Mode 5 | **PDOR\_SSWA\_EAS1\_HV\_EngMode\_5\_00002.SOL**ZIA58771, PIA60031 = MBOX1 PIA60446 = 0 PIA60447 = 0 PIA60448 = 0Wait 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 timeWait 00:01:10 (70 second) |  |

|  |  |  |  |
| --- | --- | --- | --- |
|  | Perform Eng mode 4 on EAS1Stop normal mode on EAS1Eng mode 4 (Threshold Sweep) | **PDOR\_SSWA\_EAS1\_EngMode4\_00005.SOL**ZIA58771, PIA60031 = MBOX1 PIA60446 = 0 PIA60447 = 0 PIA60448 = 0ZIA58790, 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 EAS1Stop normal mode on EAS1Eng mode 3 (Gain Test) | **PDOR\_SSWA\_EAS1\_EngMode3\_00005.SOL**ZIA58771, PIA60031 = MBOX1 PIA60446 = 0 PIA60447 = 0 PIA60448 = 0x0ZIA58789, 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 RatioSet the Hem Max to 800vRebuild Table | **PDOR\_SSWA\_EAS1\_FlightSweep\_00002.SOL**ZIA58771, PIA60031 = MBOX1 PIA60446 = 0 PIA60447 = 0 PIA60448 = 0x0ZIA58766, PIA60469 = DE PIA60470 = B8 PIA60471 = 53ZIA58767, PIA60441 = 67 PIA60442 = 18 PIA60443 = A0ZIA58771, PIA60031 = MBOX3 PIA60446 = 0 PIA60447 = 0 PIA60448 = 0x1 |  |
|  | Adjust Deflectors on EAS1Stop Normal Mode on EAS1Adjust the Deflector Ratios | **PDOR\_SSWA\_EAS1\_Deflectors\_Flight\_00002.SOL**ZIA58771, PIA60031 = MBOX1 PIA60446 = 0 PIA60447 = 0 PIA60448 = 0ZIA58765, PIA60474 = 0xB0 PIA60475 = 0xC4 PIA60578 = 0x9BPLUS Other Bytes |  |
|  | Adjust Thresholds on EAS1Adjust the Thresholds | **PDOR\_SSWA\_EAS1\_Thresh\_4C8\_00001.SOL**ZIA58797, PIA60174 = 0x4C80 PIA60185 = 0x4C81Plus 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 EAS1Stop normal mode on EAS1Stop normal mode on EAS2Sweep Eng mode 3 (Gain Test)On EAS1Fixed Eng mode 3 (Gain Test)On EAS2WaitFixed Eng mode 3 (Gain Test)On EAS1Sweep Eng mode 3 (Gain Test)On EAS2Wait | **PDOR\_SSWA\_EAS\_GainTest\_00003.SOL**ZIA58771, PIA60031 = MBOX1 PIA60446 = 0 PIA60447 = 0 PIA60448 = 0x0ZIA58819, PIA60031 = MBOX1 PIA60446 = 0 PIA60447 = 0 PIA60448 = 0ZIA58789, 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 ctrlNo 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 ctrlWait 20\*steps +2ZIA58789, 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 ctrlNo 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 ctrlWait 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 = 0x0ZIA58784, 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 = 0x0ZIA58832, 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 ScienceStart Eng Mode 7 | **PDOR\_SSWA\_EAS1\_EngMode\_7\_00001.SOL**ZIA58771, PIA60031 = MBOX1 PIA60446 = 0 PIA60447 = 0 PIA60448 = 0ZIA58793Wait 00:02:00 (120 second) |  |
|  | Eng mode 7 (HV Sweep TEST)Stop ScienceStart Eng Mode 7 | **PDOR\_SSWA\_EAS2\_EngMode\_7\_00001.SOL**ZIA58819, PIA60031 = MBOX1 PIA60446 = 0 PIA60447 = 0 PIA60448 = 0ZIA58841Wait 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 = 0x0ZIA58784, 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 = 0x0ZIA58832, 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 EAS1Master Control RegisterHeater Control | **PDOR\_SSWA\_EAS1\_Full\_Heater\_00001.SOL**ZIA58776, PIA60423 = 0x00 PIA60424 = 0x40 PIA60425 = 0x60ZIA58757, PIA60773 = 0x00 PIA60774 = 0x01 PIA60775 = 0x60 | Control EAS heaters to max0x160 |
|  | Turn the manual heater on for EAS2Master control RegisterHeater Control | **PDOR\_SSWA\_EAS2\_Full\_Heater\_00001.SOL**ZIA58824, PIA60423 = 0x00 PIA60424 = 0x40 PIA60425 = 0x60ZIA58805, PIA60773 = 0x00  PIA60774 = 0x01 PIA60775 = 0x60 | Control EAS1 heaters to max0x160 |

**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 ScienceEAS1 Ramp MCP to zeroEAS2 Stop ScienceEAS2 Ramp MCP to zeroTurn EAS1 heater offTurn EAS2 heater offEAS1 Switch OffEAS2 Switch OffStop EAS1 HKStop EAS2 HKPower down DPU | ZIA58771, PIA60031 = MBOX1 PIA60446 = 0 PIA60447 = 0 PIA60448 = 0x0ZIA58784, PIA60218 = 0ZIA58819, PIA60031 = MBOX1 PIA60446 = 0 PIA60447 = 0 PIA60448 = 0x0ZIA58832, PIA60218 = 0ZIA58757, PIA60773 = 0 PIA60774 = 0 PIA60775 = 0ZIA58805, PIA60773 = 0 PIA60774 = 0 PIA60775 = 0ZIA58756ZIA8804ZIA58051, PIA58050 = EAS1\_SENS\_HKZIA58051, PIA58050 = EAS2\_SENS\_HKIA-FCP-002 | 19:20:3019:21:0019:21:3019:22:0019:23:0019:24:0019:25:0019:25:3019:26:0019:26:0119:27:00 |

# 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-017ZIA58913, PIA60001 = 9 |  |
|  | Wait 1 hour 22 mins | Wait 01:22:00 (4920 seconds) |  |
|  | Power up & configure PAS in No scienceEnable HKDisable FDIRPower OnMaster Control RegisterEnable Monitor parameterEnable Monitor parameterEnable Monitor parameterDisable Monitor parameterEnable Monitor parameterMaster Control RegisterPAS ConfigEnable Moniter parameterMaster Control RegisterMaster Control RegisterPAS HV Ramp upReport Config parametersModify Config parametersAcceptReport Config parametersEnable FDIR monitoringTurn Preamps onEnable FDIR monitoring | **PDOR\_SSWA\_PAS\_PowerUpConfig\_00002.SOL**ZIA58050, PIA58050 = PAS\_SENS\_HKZIA58064, 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 ZIA58858ZIA58863, PIA60343 = 0x0000001A ZIA58063, PIA60452 = 1 PIA60449 = PASSPWHB\_MI ZIA58063, PIA60452 = 1 PIA60449 = PASMISSACK\_MI= ZIA58063, PIA60452 = 1 PIA60449 = HK\_IP28V\_PRIMIZIA58064, PIA60452 = 1  PIA60449 = HK\_IP28V\_PRIMIZIA58063, PIA60452 = 1 PIA60449 = HK\_IP28V\_PRSCIZIA58863, PIA60343 = 0x0000001EZIA58853ZIA58063, 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 = 0x0000001FZIA58863, PIA60343 = 0x00000007ZIA58856, PIA60791 = 0  PIA60790 = **0x0NOM**  PIA60792 = 0x29  PIA60793 = 0x0014 Wait 00:20:00 (1200 seconds)ZIA58707, PIA60137 = 1 PIA60138 = 3004ZIA58706, PIA60133 = 1 PIA60136 = 3004 PIA60135 = 4 PIA60134 = **MSB of 0x0NOM** PIA60134 = **LSB of 0x0NOM** PIA60134 = 0 PIA60134 = 0x29ZIA58708ZIA58707, PIA60137 = 1 PIA60138 = 3004ZIA58063, PIA60452 = 4  PIA60449 = V\_MON\_C\_MI PIA60449 = V\_MON\_L\_MI  PIA60449 = I\_MON\_C\_MI PIA60449 = I\_MON\_L\_MIZIA58862, PIA58062 = ON PIA58063 = ONZIA58063, 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\_MIWait 00:30:00 (1800 seconds) |  |
|  | Puts HIS into NM | **PDOR\_SSWA\_HIS\_NORMSCI\_00001.SOL**ZIA58913, PIA60001 = 15 |  |
|  | Test the Suite in Normal ModePAS into NMHIS to HVSTBYEAS 1&2 into NM | **PDOR\_SSWA\_Suite\_Comm\_NM\_00001.SOL**IA-FCP-061, XF061A01 = 22Wait 00:10:00 (600 seconds)ZIA58917, PIA59011 = HVSTDBYIA-FCP-041IA-FCP-051Wait 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 PASStop Science on PASStart Calibration ModeAdjust the ThresholdsStart Science on PAS | **PDOR\_SSWA\_PAS\_Calibration\_00003.SOL**ZIA58944Wait 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 = 0x0000Wait 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 ModeAll sensors into BM for 5 mins5m = 300s / 8 = 2400PAS only into BM for 5 mins5m = 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 = 0Wait 00:20:00 (1200 seconds)ZIA58726, PIA60157 = 0 PIA60158 = 0 PIA60159 = 0 PIA60160 = 0 PIA60163 = 2400 PIA60164 = 0 PIA60170 = DYNAMIC PIA60161 = 0 PIA60162 = 0Wait 00:20:00 (1200 seconds) |  |

## SWA Cadence test

|  |  |  |  |
| --- | --- | --- | --- |
| **Step N°** | **Commanding Flow** | **FCP ID or PDOR title & contents** | **Comments** |
|  | Test SWA CadencesDecrease All SWA cadenceIncrease EAS cadence All SWA at nominal cadence | **PDOR\_SSWA\_Suite\_Comm\_Cadence\_00002.SOL**ZIA58728, PIA60096 = 2 PIA60097 = 2 PIA60099 = 2 PIA60098 = 2Wait 00:10:00 (600 seconds)ZIA58728, PIA60096 = 0 PIA60097 = 0 PIA60099 = 1 PIA60098 = 1Wait 00:10:00 (600 seconds)ZIA58728, PIA60096 = 1 PIA60097 = 1 PIA60099 = 1 PIA60098 = 1Wait 00:10:00 (600 seconds) |  |
|  | Enter Low Cadence ModeSelect Product Configuration Table 3 for Max Res VDFSelect "SWA\_HIS\_LOW\_1TENTH" PHASelect "SWA\_HIS\_LOW\_1TENTH" VDFSelect "SWA\_HIS\_LOW\_QUARTER" PHASelect "SWA\_HIS\_LOW\_QUARTER" VDFSelect "SWA\_HIS\_LOW\_HALF" PHASelect "SWA\_HIS\_LOW\_HALF" VDFSelect "SWA\_HIS\_LOW\_2THIRDS" PHASelect "SWA\_HIS\_LOW\_2THIRDS" VDFEnter Normal Cadence ModeSelect "SWA\_HIS\_NORMAL\_5X" PHASelect "SWA\_HIS\_NORMAL\_5X" VDFSelect "SWA\_HIS\_NORMAL\_3X" PHASelect "SWA\_HIS\_NORMAL\_3X" VDFSelect "SWA\_HIS\_NORMAL\_2X" PHASelect "SWA\_HIS\_NORMAL\_2X" VDFSelect Product Configuration Table 0 for Half Res VDFSelect "SWA\_HIS\_NORMAL" PHASelect "SWA\_HIS\_NORMAL" VDFSelect Burst PHASelect Burst PHASelect Burst VDFSelect Burst VDFSetup DPU for 5-minute HIS core burstSetup DPU for 5-minute HIS optional burstCommand NOP to hold wait time | **PDOR\_SSWA\_HIS\_DATA\_RATE\_CADENCES\_00002.SOL**Wait 0:00:01 (1 seconds)ZIA58913, PIA60001 = 8Wait 0:01:00 (60 seconds)ZIA58919, PIA60356 = PR\_CONF\_TAB\_NO  PIA60352 = 3Wait 0:00:01 (1 seconds)ZIA58919, PIA60356 = PHA\_MAX\_NORMAL PIA60352 = 5654Wait 0:00:01 (1 seconds)ZIA58919, PIA60356 = VDF\_EN\_NORM PIA60352 = 0Wait 0:22:00 (1320 seconds)ZIA58919, PIA60356 = PHA\_MAX\_NORMAL PIA60352 = 8928Wait 0:00:01 (1 seconds)ZIA58919, PIA60356 = VDF\_EN\_NORM PIA60352 = 1Wait 0:22:00 (1320 seconds)ZIA58919, PIA60356 = PHA\_MAX\_NORMAL PIA60352 = 11904Wait 0:00:01 (1 seconds)ZIA58919, PIA60356 = VDF\_EN\_NORM PIA60352 = 1Wait 0:22:00 (1320 seconds)ZIA58919, PIA60356 = PHA\_MAX\_NORMAL PIA60352 = 23808Wait 0:00:01 (1 seconds)ZIA58919, PIA60356 = VDF\_EN\_NORM PIA60352 = 7Wait 0:22:00 (1320 seconds)ZIA58913, PIA60001 = 15Wait 0:00:10 (10 seconds)ZIA58919, PIA60356 = PHA\_MAX\_NORMAL PIA60352 = 11904Wait 0:00:01 (1 seconds)ZIA58919, PIA60356 = VDF\_EN\_NORM PIA60352 = 7Wait 0:17:00 (1020 seconds)ZIA58919, PIA60356 = PHA\_MAX\_NORMAL PIA60352 = 13094Wait 0:00:01 (1 seconds)ZIA58919, PIA60356 = VDF\_EN\_NORM PIA60352 = 1Wait 0:12:00 (720 seconds)ZIA58919, PIA60356 = PHA\_MAX\_NORMAL PIA60352 = 5654Wait 0:00:01 (1 seconds)ZIA58919, PIA60356 = VDF\_EN\_NORM PIA60352 = 1Wait 0:12:00 (720 seconds)ZIA58919, PIA60356 = PR\_CONF\_TAB\_NO  PIA60352 = 0Wait 0:00:01 (1 seconds)ZIA58919, PIA60356 = PHA\_MAX\_NORMAL PIA60352 = 5357Wait 0:00:01 (1 seconds)ZIA58919, PIA60356 = VDF\_EN\_NORM PIA60352 = 1Wait 0:12:00 (720 seconds)ZIA58919, PIA60356 = PHA\_MAX\_BURST\_1 PIA60352 = 4000Wait 0:00:01 (1 seconds)ZIA58919, PIA60356 = PHA\_TLM\_MAX\_B2 PIA60352 = 4000Wait 0:00:01 (1 seconds)ZIA58919, PIA60356 = VDF\_EN\_BURST\_1 PIA60352 = 0x3FWait 0:00:01 (1 seconds)ZIA58919, PIA60356 = VDF\_EN\_B2 PIA60352 = 0x3FWait 0:00:01 (1 seconds)ZIA58726, PIA60157 = 0 PIA60158 = 0 PIA60159 = 0 PIA60160 = 0 PIA60163 = 0 PIA60164 = 0 PIA60170 = DYNAMIC PIA60161 = 2400 PIA60162 = 0Wait 0:10:00 (600 seconds)ZIA58726, PIA60157 = 0 PIA60158 = 0 PIA60159 = 0 PIA60160 = 0 PIA60163 = 0 PIA60164 = 0 PIA60170 = DYNAMIC PIA60161 = 0 PIA60162 = 2400Wait 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.