SPS Software Test Cases

PFS-SPS-PRU300005-01

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1 Version and Changelog

The version of this document is **0.1** .

Version	Date	Author	Description
0.1	2019-07-10	H Siddiqui	First version

2 Introduction

This document describes the test cases used for demonstrating the validity of the ICS software used for SPS commanding, prior to delivery of the SM1 module to Subaru at the end of 2019.

The intention is for these test cases to be run at LAM during the summer of 2019. A report of the outcome would then be provided to the PFS Project Office, who would then decide whether the software is of an adequate level for use at Subaru.

3 Test Case SPS-ALERT-THIGH-010: Test Temperature Exceeds Limit Alarm

3.1 Description

Checks that expected alarm is raised when temperature exceeds a given limit.

3.2 Pass/Fail Condition(s)

Pass Expected alert seen on GUI and written to log when temperature exceeded X Kelvin

Fail Any result otherwise. For example:

1. Unexpected alert raised when temperature exceeded X Kelvin
2. No alert raised when temp exceeded X Kelvin
3. Any alert raised when temperature lower than X Kelvin

3.3 Hardware constraints

Cryostat is cooled?

3.4 Initial conditions

SM module and temperature board deactivated. AlertsActor deactivated.

3.5 Procedure

Step	Description	Pass/FAIL	Comment
1	Configure alerts actor to raise alarm with temp X Kelvin		
2	Start alerts actor and SM module with temperature board activated		
3	Start temperature at a value lower than X-10 K		
4	Raise temperature to temp X+10 K, in steps of 5 K		
5	Monitor alerts		

3.6 Additional Notes

None.

4 Test Case SPS-ALERT-TLOW-020: Test Temperature Drops Below Limit Alarm

4.1 Description

Checks that expected alarm is raised when temperature drops below a given limit.

4.2 Pass/Fail Condition(s)

Pass Expected alert seen on GUI and written to log when temperature drops below X Kelvin

Fail Any result otherwise. For example:

1. Unexpected alert raised when temperature drops below X Kelvin
2. No alert raised when temp drops below X Kelvin
3. Any alert raised when temperature higher than X Kelvin

4.3 Hardware constraints

Cryostat is cooled?

4.4 Initial conditions

SM module and temperature board deactivated. AlertsActor deactivated.

4.5 Procedure

Step	Description	Pass/FAIL	Comment
1	Configure alerts actor to raise alarm with temp X Kelvin		
2	Start alerts actor and SM module with temperature board activated		
3	Start temperature at a value greater than X-10 K		
4	Drop temperature to temp X-10 K, in steps of 5 K		
5	Monitor alerts		

4.6 Additional Notes

None.

5 Test Case SPS-ALERT-PHIGH-030: Test Pressure Exceeds Limit Alarm

5.1 Description

Checks that expected alarm is raised when the cryostat pressure exceeds a given limit.

5.2 Pass/Fail Condition(s)

Pass Expected alert seen on GUI and written to log when pressure exceeded X Bar

Fail Any result otherwise. For example:

1. Unexpected alert raised when pressure exceeded X Bar
2. No alert raised when pressure exceeded X Bar
3. Any alert raised when pressure is lower than X Bar

5.3 Hardware constraints

Cryostat is cooled?

5.4 Initial conditions

SM module and temperature board deactivated. AlertsActor deactivated.

5.5 Procedure

Step	Description	Pass/FAIL	Comment
1	Configure alerts actor to raise alarm when pressure is above X Bar		
2	Start alerts actor and SM module with roughing pump activated		
3	Start pressure at a value lower than X-0.05 Bar		
4	Raise pressure to X+0.05 Bar, in steps of 0.01 Bar		
5	Monitor alerts		

5.6 Additional Notes

None.

6 Test Case SPS-ALERT-PLOW-040: Test Pressure Drops Below Limit Alarm

6.1 Description

Checks that expected alarm is raised when the cryostat pressure drops below a given limit.

6.2 Pass/Fail Condition(s)

Pass Expected alert seen on GUI and written to log when pressure exceeded X Bar

Fail Any result otherwise. For example:

1. Unexpected alert raised when pressure exceeded X Bar
2. No alert raised when pressure exceeded X Bar
3. Any alert raised when pressure is higher than X Bar

6.3 Hardware constraints

Cryostat is cooled?

6.4 Initial conditions

SM module and temperature board deactivated. AlertsActor deactivated.

6.5 Procedure

Step	Description	Pass/FAIL	Comment
1	Configure alerts actor to raise alarm when pressure is below X Bar		
2	Start alerts actor and SM module with roughing pump activated		
3	Start pressure at a value higher than X+0.05 Bar		
4	Drop pressure to X-0.05 Bar, in steps of 0.01 Bar		
5	Monitor alerts		

6.6 Additional Notes

None.

7 Test Case SPS-ALERT-VHIGH-050: Test Voltage Exceeds Limit Alarm

7.1 Description

Checks that expected alarm is raised when the cryostat voltage exceeds a given limit.

7.2 Pass/Fail Condition(s)

Pass Expected alert seen on GUI and written to log when voltage exceeded X Volts

Fail Any result otherwise. For example:

1. Unexpected alert raised when voltage exceeded X Volts
2. No alert raised when voltage exceeded X Volts
3. Any alert raised when voltage is lower than X Volts

7.3 Hardware constraints

Cryostat is cooled?

7.4 Initial conditions

SM module and voltage board deactivated. AlertsActor deactivated.

7.5 Procedure

Step	Description	Pass/FAIL	Comment
1	Configure alerts actor to raise alarm when voltage is above X Volts		
2	Start alerts actor and SM module with roughing pump activated		
3	Start voltage at a value lower than X-0.05 Volts		
4	Raise voltage to X+0.05 Volts, in steps of 0.01 Volts		
5	Monitor alerts		

7.6 Additional Notes

None.

8 Test Case SPS-ALERT-VLOW-060: Test Voltage Drops Below Limit Alarm

8.1 Description

Checks that expected alarm is raised when the cryostat voltage drops below a given limit.

8.2 Pass/Fail Condition(s)

Pass Expected alert seen on GUI and written to log when voltage drops below X Volts

Fail Any result otherwise. For example:

1. Unexpected alert raised when voltage is higher than X Volts
2. No alert raised when voltage drops below X Volts
3. Any alert raised when voltage is higher than X Volts

8.3 Hardware constraints

Cryostat is cooled?

8.4 Initial conditions

SM module and voltage board deactivated. AlertsActor deactivated.

8.5 Procedure

Step	Description	Pass/FAIL	Comment
1	Configure alerts actor to raise alarm when voltage is above X Volts		
2	Start alerts actor and SM module with roughing pump activated		
3	Start voltage at a value higher than X+0.05 Volts		
4	Drop voltage to X-0.05 Volts, in steps of 0.01 Volts		
5	Monitor alerts		

8.6 Additional Notes

None.

9 Test Case SPS-LOG-070: Process logging

9.1 Description

Checks that logging is active for a typical process.

9.2 Pass/Fail Condition(s)

Pass Logging of INFO, FAIL and WARN messages are correctly written to the expected log file

Fail Any result otherwise.

9.3 Hardware constraints

None.

9.4 Initial conditions

`/data` and `/software` volumes are created.

9.5 Procedure

None..

Step	Description	Pass/FAIL	Comment
1	TBW		

9.6 Additional Notes

A test script installed in the `/software` folder would address this test effectively.

10 Test Case SPS-IO-080: Test File I/O

10.1 Description

Checks that data can be read and written from the input and output directories.

10.2 Pass/Fail Condition(s)

Pass Data can be written to and read from the /data volume, and software can be written to and read from the /software volume.

Fail Any result otherwise.

10.3 Hardware constraints

None.

10.4 Initial conditions

/data and /software volumes are created.

10.5 Procedure

For each volume:

Step	Description	Pass/FAIL	Comment
1	Create small files		
2	Read those files		
3	Copy those files to new locations within same volume and check that they are readable.		

10.6 Additional Notes

A test script installed in the /software folder would address this test effectively.

11 Test Case SPS-TPROBE-090: Check temperature probes

11.1 Description

Checks that the temperature probes for the CCD, cryostat and OBA are functioning.

11.2 Pass/Fail Condition(s)

Pass Temperature values read from the probes are in the expected range (1-100 K)

Fail If the temperature reads `NaN` or zero.

11.3 Hardware constraints

None.

11.4 Initial conditions

TBW.

11.5 Procedure

For each probe:

Step	Description	Pass/FAIL	Comment
1	On GUI check temperature value.		

11.6 Additional Notes

None.

12 Test Case SPS-SHUTTER-110: Shutter control

12.1 Description

Checks the SpS shutter movement

12.2 Pass/Fail Condition(s)

Pass Shutters open/close as expected

Fail Any result otherwise.

12.3 Hardware constraints

None.

12.4 Initial conditions

All shutter are in the closed position.

12.5 Procedure

For each shutter:

Step	Description	Pass/FAIL	Comment
1	Open Shutter		
2	Check that monitor shows that the shutter door is open		
3	Close shutter		
4	Check that the monitor confirms that the shutter door is closed		

12.6 Additional Notes

None..

13 Test Case SPS-SLIT-120: Slit movement

13.1 Description

Check the slit movement such that the expected positions are reached.

13.2 Pass/Fail Condition(s)

Pass The slit position is as intended, within the given tolerance.

Fail Any result otherwise.

13.3 Hardware constraints

None?

13.4 Initial conditions

None.

13.5 Procedure

1. for each position A, B, C, D, E:
   (a) command slit to be moved to that position
   (b) check whether the expected position is reached within tolerance 1 micron
   (c) monitor slit movement throughout.

Step	Description	Pass/FAIL	Comment
1	Position A		
2	Position B		
3	Position C		
4	Position D		
5	Position E		

13.6 Additional Notes

None..

14 Test Case SPS-REXM-130: Red exchange mechanism movement

14.1 Description

Checks that the red exchange mechanism moves as expected.

14.2 Pass/Fail Condition(s)

Pass The REXM switches to the expected mode.

Fail Any result otherwise.

14.3 Hardware constraints

None?

14.4 Initial conditions

None.

14.5 Procedure

Step	Description	Pass/FAIL	Comment
1	Move REXM to low resolution mode		
2	Check position		
3	Move REXM to high resolution mode		
4	Check position		

14.6 Additional Notes

None..

15 Test Case SPS-BIA-140: Check Back Illumination Assembly Photoresistance

15.1 Description

Check photoresistance of BIA.

15.2 Pass/Fail Condition(s)

Pass The photoresistance is measured as expected.

Fail Any result otherwise.

15.3 Hardware constraints

None?

15.4 Initial conditions

None.

15.5 Procedure

Step	Description	Pass/FAIL	Comment
1	Check from the monitors that the protoresistance is 'saturated'.		

15.6 Additional Notes

None..

16 Test Case SPS-CCD-150: Check CCD bias/darks

16.1 Description

None.

16.2 Pass/Fail Condition(s)

Pass The CCD bias and darks are processed correctly.

Fail Processing fails.

16.3 Hardware constraints

None?

16.4 Initial conditions

None.

16.5 Procedure

Step	Description	Pass/FAIL	Comment
1	Take the bias and dark exposures.		
2	Check the FITS headers of the bias and dark files for any non-conformance.		
3	Process the CCD bias and darks against the 2D DRP pipeline.		

16.6 Additional Notes

None..

Acronyms

ICS Instrument Control Software.

LAM Laboratoire d'Astrophysique de Marseille, France.

PFS Prime Focus Spectrograph.

SPS Spectrograph System.

Glossary