1. INTRODUCTION

This document reports the results of the execution of several instantiated AOTs during the PFM4 test campaign.

AOTs define the way in which the different types of SPIRE observations are implemented. They are defined using the Herschel Common Uplink System (CUS), which converts user input into a sequence of satellite and instrument commands with appropriate timing. These command sequences use both simple DRCU commands and Command Lists defined specifically for SPIRE observations. One purpose of these tests was to execute as many different AOT types as possible in order to determine if the command sequence and timing was correct, and to exercise the Command Lists used.

For each AOT tested the user inputs were taken from the relevant section of RD01 and the command sequence generated was executed by the instrument.

1.1 Scope

The purpose of this test was

- To execute as many different instantiated AOT types as possible in order to confirm correct command sequencing and timing, and correct execution of command lists. (*This was limited by both the number of AOTs defined at the time and the instrument operational modes previously verified*)
- To generate data for testing the latest version of the SPIRE pipeline (version 0.5).

1.2 Reference Documents

Ref	Document	Name	Version/Issue No.
RD01		SPIRE AOT Test Plan (SPIRE-RAL-DOC_002720)	Issue 1.0
RD02		SPIRE Instrument User Manual (SPIRE-RAL-PRJ-002395)	Issue 1.0

1.3 Change Record

Document	Change date	Changes
Issue 1.0	**01/03/07**	First Version

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2. SUMMARY OF AOT TESTS

2.1 Instrument Configuration

- All tests start with the instrument in the appropriate standby mode (PHOT_STBY or SPEC_STBY) see RD02.

- All observations have a PCAL flash at the beginning and end (some also have PCAL flashes within the operations)

2.2 AOT Tests Summary

This table lists the AOTs carried out during POF4.
Highlighted tests have severe problems identified with them and should not be used for pipeline testing.

OBSID	Test Case	Description
30011547	ILT-OPS-POF2-Ca	Data for the 'on' part of the third PCAL flash in each cycle is missing.
3001154A	ILT-OPS-POF3-Aa	COLLECT_GARBAGE cmd failed at start and all subsequent cmds failed
300115AB	ILT-OPS-POF2-Ca	Only half a PCAL flash performed at each end of the test. At the end of the test, the BSM was seen to be along way from the nominal position in the chop direction.
300115AC	ILT-OPS-POF2-Ca	Only half a PCAL flash performed at each end of the test. At the end of the test, the BSM was seen to be along way from the nominal position in the chop direction.
300115B1	ILT-OPS-POF2-Ca	At the end of the test, the BSM was seen to be along way from the nominal position in the chop direction.
300115B5	ILT-OPS-POF2-Ca	At the end of the test, the BSM was seen to be along way from the nominal position in the chop direction. Source was being moved during the observation
30011626	ILT-OPS-POF2-Ca	Jiggle Map with source on central pixel
30011627	ILT-OPS-POF3-Aa	Didn't go to correct position s for 64 pnt map
30011628	ILT-OPS-POF5-Aa	Large Scan Map (7mins)
30011647	ILT-OPS-POF5-Aa	Large Scan Map (7mins)
30011648	ILT-OPS-POF5-Ab	Large Scan Map (21mins)
30011649	ILT-OPS-POF5-Ac	Large Scan Map (53mins)
3001164A	ILT-OPS-POF5-Ad	Large Scan Map (255mins) – not known if successful – unable to read data into DP
300116DC	ILT-OPS-SOF1-Aa	Wrong scan speed (0.0525mm/s instead of 0.525)
300116DD	ILT-OPS-SOF1-Aa	Wrong scan speed (0.0525mm/s instead of 0.525). Scan end out of limit at 42.1 mm
30011701	ILT-OPS-POF2-Ca	Manual 'nod' of telescope position carried out at wrong time External chopper was on
30011702	ILT-OPS-POF2-Ca	Jiggle Map with source on central pixel
300117FD	ILT-OPS-SOF1-Aa	Possibly no source
300117FE	ILT-OPS-SOF1-Aa	Sparse High Res Spectrum, Laser on SSWD3, SCAL @ 67.90K
300117FF	ILT-OPS-SOF1-Aa	Sparse High Res Spectrum, Laser on SSWD2, SCAL @ 67.90K
30011800	ILT-OPS-SOF1-Ad	Sparse Medium Res Spectrum No Source (HotBB warming up), SCAL @ 67.90K
30011801	ILT-OPS-SOF1-Ae	Sparse Low Res Spectrum No Source (HotBB warming up), SCAL @

		67.90K
30011802	ILT-OPS-SOF1-Ab	Sparse H+L Res Spectrum No Source (HotBB warming up), SCAL @ 67.90K
30011803	ILT-OPS- SOF2-Ac	BSM did not move during observation
30011804	ILT-OPS- SOF2-Bb	BSM did not move during observation
3001180D	ILT-OPS-POF3-Aa	Map positions not correct
300118E3	ILT-OPS-POF2-Ca	Jiggle Map viewing ColdBB at 6.7k
300118E5	ILT-OPS-POF2-Ca	Viewing lab (HotBB switched on part way through test)
300118E6	ILT-OPS-POF2-Ca	Jiggle Map with source (HotBB) on central pixel
300118E7	ILT-OPS-POF2-Da	Jiggle Map with source (HotBB) offset from central pixel (~4" +y, +z)
300118E8	ILT-OPS-POF3-Aa	Small Map with central source (HotBB) (1' beam)
300118E9	ILT-OPS-POF3-Ba	Small Map with offset source (HotBB) (1' beam)
300118EA	ILT-OPS-POF3-Ca	Small Map, viewing chopper, No source
300118EB	ILT-OPS-POF3-Ab	Small Map with HotBB central source (0.4' beam)
300118FE	ILT-OPS-SOF1-Aa	Sparse High Res Spectrum, Signal saturated as SCAL not on
30011900	ILT-OPS-SOF1-Aa	Sparse High Res Spectrum, SCAL @80K
30011901,	ILT-OPS- SOF2-Ac	Done with Sparse sampling
30011902	ILT-OPS- SOF2-Ac	BSM did not move
30011904	ILT-OPS- SOF2-Ac	Intermediate Medium Res Spectral Map
30011905	ILT-OPS- SOF2-Bb	Full Low Res Spectral Map

2.3 AOT Results

Test Case	Result	SPRs Raised
ILT-OPS-POF2-Ca	Completed Successfully	
ILT-OPS-POF2-Da	Completed Successfully	
ILT-OPS-POF3-Aa	Completed Successfully	
ILT-OPS-POF3-Ab	Completed Successfully	
ILT-OPS-POF3-Ba	Completed Successfully	
ILT-OPS-POF3-Ca	Completed Successfully	
ILT-OPS-POF5-Aa	Completed Successfully	
ILT-OPS-POF5-Ab	Completed Successfully	
ILT-OPS-POF5-Ac	Completed Successfully	
ILT-OPS-SOF1-Aa	Completed Successfully	
ILT-OPS-SOF1-Ab	Completed Successfully	
ILT-OPS-SOF1-Ad	Completed Successfully	
ILT-OPS-SOF1-Ae	Completed Successfully	
LT-OPS- SOF2-Ac ILT-OPS- SOF2-Bb	No BSM data sampled during the AOTs.	SPR-0582

3. DETAILED TEST RESULTS

3.1 7-pnt Jiggle Mapping

3.1.1 Configuration

- The instrument was placed into the PHOT_STBY mode before execution of the AOT
- In order to be able to simulate nodding of the Herschel telescope the movement time between on-source and nodding positions was increased to 3 mins to allow time for the operator to 'move' the input beam. This should have no affect on the data.
- For on-source BBs (Nod position A) the beam was centred on pixel PSWE8 and chopped between PSWE6 and PSWE10. For off-source BBs (Nod position B) the beam was centred on pixel PSWE12 and chopped between PSWE10 and PSWE14

3.1.2 Test Case: ILT-OPS-POF2-Ca

OBSID: 30011626, 30011702, 300118E3, 300118E6
Description: 7-pnt jiggle with one complete jiggle cycle on-source and one at the nod position (i.e AB nodding)
Source (Hot BB) is at the centre of the beam
Results:
- Completed successfully

3.1.3 Test Case: ILT-OPS-POF2-Da

OBSID: 300118E7
Description: 7-pnt jiggle with one complete jiggle cycle on-source and one at the nod position (i.e AB nodding)
Source (Hot BB) is offset from the centre of the beam by approximately 0.5 of the PMW beam size
Results:
- Completed successfully

3.2 Small Map

3.2.1 Configuration

- The instrument was placed into the PHOT_STBY mode before execution of the AOT

3.2.2 Test Case: ILT-OPS-POF3-Aa

OBSID: 300118E8
Description: Small Map with 4 nod cycles. Source at centre of map

Results:
- Completed successfully

3.2.3 Test Case: ILT-OPS-POF3-Ab

OBSID: 300118EB
Description: Small Map with 4 nod cycles. Source at centre of map. Repeated 2 times

Results:
- Completed successfully

3.2.4 Test Case: ILT-OPS-POF3-Ba

OBSID: 300118E9
Description: Small Map with 4 nod cycles. Source offset from centre of map

Results:
- Completed successfully

3.2.5 Test Case: ILT-OPS-POF3-Ca

OBSID: 300118EA
Description: Small Map with 4 nod cycles. No source

Results:
- Completed successfully

3.3 Scan Mapping

3.3.1 Configuration

- The instrument was placed into the PHOT_STBY mode before execution of the AOT
- No movement of the telescope simulator was made so no source is expected to be seen in the map

3.3.2 Test Case: ILT-OPS-POF5-Aa

OBSID: 30011628, 30011647
Description: Scan Map: 10 arcmin x 10 arcmin, no source in beam
4 scan lines of length 10 armin
Results:
- Completed successfully

3.3.3 Test Case: ILT-OPS-POF5-Ab

OBSID: 30011648
Description: Scan Map: 30 arcmin x 30 arcmin, no source
9 scan lines of length 30 arcmin

Results:
- Completed successfully

3.3.4 Test Case: ILT-OPS-POF5-Ac

OBSID: 30011649
Description: Scan Map: 60 arcmin x 60 arcmin, no source
16 scan lines of length 60 arcmin
Results:
- Completed successfully

3.3.5 Test Case: ILT-OPS-POF5-Ad

OBSID: 3001164A
Description: Scan Map: 200 arcmin x 120 arcmin, no source
32 scan lines of length 200 arcmin
Results:
- Completed successfully???? This test was carried out overnight. I have been unable to read the data using DP as the memory used is too great.

3.4 Spectrometer Point Source

3.4.1 Configuration

- The instrument was placed into the SPEC_STBY mode before execution of the AOT

3.4.2 Test Case: ILT-OPS-SOF1-Aa

OBSID: 300117FE, 300117FF, 30011900
Description: 4 High Resolution FTS scans of Hot BB

Results:
- Completed successfully

3.4.3 Test Case: ILT-OPS-SOF1-Ab

OBSID: 30011802
Description: 4 High Resolution + 10 Low resolution FTS scans

Results:
- Completed successfully

3.4.4 Test Case: ILT-OPS-SOF1-Ad

OBSID: 30011800
Description: 10 Medium Resolution FTS scans

Results:
- Completed successfully

3.4.5 Test Case: ILT-OPS-SOF1-Ae

OBSID: 30011801
Description: 20 Low resolution FTS scans

Results:
- Completed successfully

3.5 Spectrometer Map

3.5.1 Configuration

- The instrument was placed into the SPEC_STBY mode before execution of the AOT

3.5.2 Test Case: ILT-OPS-SOF2-Ac

OBSID: 30011904
Description: 4 Medium Resolution FTS scans with Intermediate spatial sampling

Results:
- Completed successfully
- No BSM data sampled during the AOTs

3.5.3 Test Case: ILT-OPS-SOF2-Bb

OBSID: 30011905
Description: 4 Low Resolution FTS scans with Full spatial sampling

Results:
- Completed successfully
- No BSM data sampled during the AOTs