Work Package: SPIRE Shutter 2001 November SPIRE-CSA-REP-001207

Reported by Don Peterson (CSA)

1. Subsystem Progress Since Project Inception (See also 2., below.)

* Contract placed with COM DEV Ltd, in Cambridge, Ontario, Canada for initial design and tradeoff studies.
* Support contract placed with University of Saskatchewan (USK).
* Shutter location changed from near the Herschel focal plane, to be on the top of the photometer top cover.
* Shutter PDR held July 17 at COM DEV Ltd
* Mechanical ICD agreed with MSSL.
* An analytic solid model file was supplied to MSSL where it was incorporated into the SPIRE Structural model.
* Mass of 592 g, including 117 g margin, allocated to the shutter by the SPIRE Project. This assumes cryoharness extends to the shutter frame.
* A Reduced Thermal Model was supplied to RAL for incorporation into the SPIRE thermal model suite.
* Successfully tested cable flexures and a stepper motor at ~ 12 K.
* EGSE (first version) used, under Labview, to control the stepper motor during cable flexure tests.
* The SPIRE Project has approved, with slight modifications, an ECR to the SPIRE IRD (Section 3.5.3) to update all shutter requirements, including replacing a requirement to 'fail out of the beam' by a requirement for 'highly reliable operation'.

2. Subsystem Progress Since Last Report

* A Shutter Design Report meeting was held at COM DEV on Oct 26.
* Adhesive between heater and vane failed in tests at ~ 12 K. Alternate design considered, but not yet tested.
* Cryotemperature test chamber for functional and thermal balance tests of the Shutter - USK has prepared for CSA a report of the requirements and general design concepts.
* USK has updated the Anticipated Shutter Usage document re EGSE accessibility timelines at test sites.
* Shutter test procedures have been prepared for Dave Smith re Shutter tests at RAL.

3. Technical Problem Areas and Remedial Action

* Alcatel wants the Herschel Services Module (the RTU of the HCDMU) to be able to monitor a switch closure for the status of the Shutter vane's (un)latch solenoid, but the Shutter PDR design baselines only an EGSE-readable analog status of the solenoid's armature position.
  >> * Don Peterson will submit a Request For Deviation (RFD) in December to the IID-B requirement re monitoring the launch latch of deployable mechanisms, as there is no possibility of commanding the shutter to move into the beam after the final disconnection of the Shutter EGSE and the end of Thermal-Vacuum testing during the AIT at Alcatel.
* The SPIRE Harness Definition Document (0.8) is not in line with the Shutter PDR design.
  >> * Joe Taylor is preparing an ECR which Don Peterson will submit to the SPIRE Project in December.

4. Engineering Activities

* ECR and RFD are in progress (See # 3 above.)
* The Shutter content for the SPIRE Design Description Document is being updated.
* Documentation is being compiled re the Cardiff/QMW Black coating. Shutter requirements and applications will be supplied to Peter Hargrave re qualification tests for the coating.
* The work plan is being updated.

5. Design Changes

* The SPIRE Project has allocated one more wire to the Shutter in the cryoharness. The Shutter design will be changed to provide separate power Return lines for the stepper motor and the thermistors. resistor resister

6. PA/QA Activities

* Nothing new to report

7. Subsystem Management Issues

* Placement of a contract for development and manufacturing is proceeding slowly, subject to ESA-CSA negotiations re contributions to the Herschel-Planck Program..
* Some Shutter DDR documents may not be final before the SPIRE IBDR in 2002 March.

8. Actions Requiring Immediate Attention by the SPIRE Project

* Astrium's proposed temperature and emissivity of the lid of the Herschel cryostat could warm up the SPIRE photometer cover, and the shutter, enough to make it not possible for the shutter to reach its lowest operating temperature.

9. Status of Previous Actions

* Shutter SubSystem Specification Document (SSSD) requires updating - currently working to the requirements in the ECR submitted to the SPIRE IRD, Section 3.5.3.

10. Activities Yet to be Achieved

* Shutter DDR now anticipated for 2002 Feb.

11. Shutter Milestones

2001 Jul 17	Design Review at COM DEV	Complete
2001 Nov 28-29	SPIRE Structure DDR	Complete
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2002 Feb	Shutter DDR	Schedule Tight
2002 Feb 28 (tbc)	Conclude Tests on Shutter Breadboard	Schedule Tight
2002 Mar 5/6	SPIRE IBDR	-
2002 Aug 1	Shutter STM - deliver to RAL	On schedule
2003 Jan 11	Conclude Tests on Shutter QM	On schedule
2003 Jan 11	Shutter CQM - deliver to RAL	On schedule
2003 June 27	SPIRE CDR	-
2003 Oct 1	Shutter PFM - deliver to RAL	On schedule
TBD	Shutter Flight Spare (TBD)	TBD

12. Changes to the Shutter Schedule

* Shutter delivery dates now match SPIRE need dates, per Major Milestone List, dated 2001 April 12.