1. SPIRE PROJECT

1.1 General

- This report covers December 2001.
- Project team has focussed on
  - Support and assistance of subsystem DDRs
  - Cryo-harness definition
  - IID-B update, change requests issued.
  - Preparation for IBDR

1.2 Instrument performance

The latest information on micro vibration from Alcatel indicates that we do not have a problem with the SMEC (TBC). However the levels may still be a problem for the detectors. This is being analysed by the system team and a technical note will be issued shortly.

The rotation required for the spectrometer detectors in order to use the chop axis for step and look mode has been analysed. This showed that the use of corner cubes in the moving mirror caused the field to rotate such that it was no longer possible to align the detectors along the chop direction. Using roof top mirrors does not lead to this field rotation although it leaves the spectrometer vulnerable to tilt errors in the mechanism. An analysis of the mechanism specification shows that this should not be a problem. Roof top mirrors have therefore been baselined with the proviso that should any problems manifest themselves during development and test of the mechanism we will revert to corner cubes and suffer the loss in observing efficiency associated with cross axis chopping.

1.3 Problem Areas

- Definition of cryo harness connectors (awaiting confirmation)
- Requested CQM delivery date remains incompatible with the SPIRE schedule.
- Electrical isolation of cold straps
- Mass of DRCU (a mass breakdown has been produced and is more than allocation)
- Lack of cryostat dynamic thermal model from industry is holding up FPU thermal analysis.
- Undefined/unconfirmed spacecraft interfaces (IID-B) will soon cause problems.

1.4 Project-Level Meetings

- DPU DDR at IFSI 6 and 7/12/01
- DRCU Initial phase DDR 13 and 14/12/01
- Several project team meetings
- Several 300mK strap team meetings

1.5 Documents Issued

- IBDR plan
- Subsystem DDR data packs.
- ECRs on IRD
- Draft SMEC DDR report.

2. INSTRUMENT MANAGEMENT

2.1 Personnel

No Change

2.2 Work packages

No changes.

2.3 Schedule

No changes to major milestone list since April 2001

2.4 Funding

- The UK funding envelope is still inadequate fore the hardware plus ICC development programme. Pressure still exists to descope hardware (BSM or Flight Spare).
- High cost of DRCU electronic components poses potentially serious funding problem in France.
- Funding within JPL is a problem and is considered likely to have an impact on deliverables and/or schedule.

3. INSTRUMENT ENGINEERING

3.1 Instrument Design Changes

- Change from corner cube to roof top mirrors in FTS mirror mechanism

3.2 PA/QA

- On going

3.3 Budgets

- Mass of warm electronics over budget, action TBD

4. INSTRUMENT SUBSYSTEMS

Subsystem	Responsible	Status	Schedule status
BSM	ATC	Detailed 2 axis prototype testing continues - linearity of chop and jiggle sensor confirmed, indicating look up tables not required. Infineon position sensors received. Purchase Order for sub-con of random response FEA placed. Magnetic modelling underway at MPIA. Options identified for cryo-harness connectors; pursuing details.	Currently 1 month late
Calibrators	Cardiff	Updating ICD HB7 source design for PCAL nearing completion (with Jeff Beeman). New drawings for prototype SCAL components submitted for manufacture	OK
Cooler	SBT	- First Electron Beam welding phase on cooler heart and heat switches successfully performed - All structures have also been successfully EB weld. Will be transported to subcontractor this week for final machining (for EB welding purpose, some sections were left thicker) - Brazing phase on cooler heart and heat switches in progress - ITT for clean room issued on December 21st . ITT closing date : Week 4 January 2002 - Kevlar characterisation campaign : fatigue test set up being modified to speed up tests – so far, after over a month Kevlar 34 (breaking at 12 DaN) has been sollicited over 800 000	OK

		times between 7.8 – 9.2 DaN (nominal tension in cooler : 5 DaN) – New motor can rotate at speed up to 10 Hz (against 0.2 Hz right now) - Large test cryostat : manufacturing in progress - Most project documents have been reviewed following SAp's comments.	
Detectors, JFETS and RF Filters	JPL	EM Load resistors fabricated with 80% yield. Contact engineering wafer shows robust results. SLW masks designed and fabricated. JFET & Load resistors designed and fabricated. Assembled 2 EM JFET membranes for Qual testing. Assembled 1 load resistor substrate for Qual testing. Started assembling 4 BDA suspension assemblies. Successfully tested pi-filter connectors in qualification run. Successfully tested load resitor modules in qualification program. Thermal cycle dewar mounting hardware fabricated. BoDAC BDA mount design completed and fabricated. DAS cable loom designed.	OK, but under review
DPU and OBS	IFSI	At the beginning of December the DPU-SPIRE DDR took place at IFSI, official report and RIDs not received yet. A 3 days test has been performed at Gavazzi premises in order to try to solve the HW problems discovered on the first set of boards during tests at IFSI. The 1553 problems have been solved (SW development/test in progress at IFSI), problems with slow/high I/F still under investigation. ASI project directive 3 and CGS ECP 3 (QM components quality level >= Mil-C) nearly completed.	OK
DRCU and WIH	SAp	Mechanical designs available for both DCU and MCU, but over mass budget. Optimisation of schedule and model philosophy is continuing with the aim of being consistent with the SPIRE planning.	Being optimised
DRCU simulator Inst simulator	Stockholm		OK
Filters, Dichroics	Cardiff	Prototyping of dichroics and beam dividers 300mK filter interface components in manufacture Copper evaporation problems solved	OK
Mirrors	LAM	Mirror sizes optimised.	OK
Shutter	USK	PDR complete	OK
Spectrometer Mechanism	LAM	DDR passed in October STM design finalised Synchronisation device material chosen Actuator specifications written Studies at BE System reinitiated with STM/flight design Test set up for sub components (LVDT and Actuator) in progress – preliminary tests done. Size of electronics board received from CEA Boards mechanical interfaces received from CEA Tests on MAC Board MAC QM1 Reading/Writing DSP-ADC/DAC test software OK Connector definition for Power supply OK Orcad layouts of Flight Model Electronics for DDR Detailed list of command review Definition of Harness pin out ACTEL FGA tools provided (Leonardo). CEA VHDL analysed with success MAC QM1 Board DSP : Arctangent calculations and optical	OK

		encoder signals acquisition OK	
Structure	MSSL	Continuing design of the photometer 2K box. Subsystem interfaces still open are thermal busbar, thermistors, RF filters and SMEC. Detailed design for MGSE nearly completed. DDR was held on 29 and 30 November. Minor changes to documentation needed. These changes implemented. Schedule stands at delivery of STM in Early September. Harness routing continuing. Production of second optical bench, mirror and dichroic mounts has started. Detail drawings of filter mounts completed.	OK but little margin
Thermal straps	MSSL, Cardiff	A small team has been formed to set up a design and test programme Design validation prototypes in manufacture for several suspension concepts. Vibration test of one concept successful.	OK
AIV/Calibration facility	RAL	**Cryolab:** Preparation continues **Cryostat:** The detailed engineering drawings for the outer vacuum vessel have been approved and manufacture has started. Detailed drawings for the cryogenic vessels have been produced and have been reviewed. A design of the HOB simulator and support frame has been produced and reviewed. A thermal analysis of the cryostat to carried out so that the design of the HOB simulator can be optimised. Drawings for the filter mounts have been produced and manufacturers are being approached. The cryostat vacuum system has been delivered. **Cryoharness:** On order **Telescope Simulator**: The telescope-imaging mirror has been delivered to RAL and is currently undergoing 3D metrology. **Laser:** Refurbishment continues **TFCS:** A draft version of the User Requirements Document has been produced. Thermometer monitoring units have been ordered.	OK

5. INSTRUMENT AIV

- A detailed AIT procedure is being developed

6. ACTIONS.

See action list attached to minutes HP-ASPII-MN-390