PROJECT: SPIRE	**MINUTES OF MEETING**	**Doc. No:** SPIRE-RAL-MOM-000729 **Date: 8-June-2001** **No. of Sheets: 11**

Subject: SPIRE AIV – Kick Off Meeting with AS Scientific

Meeting Place: RAL Date/Time: 8-June-2001, 09:00 Agenda Dated:		Chairman: M.R. Harman Secretary: D.L. Smith Close of Meeting: 16:15
PARTICIPANTS		**ADDITIONAL DISTRIBUTION**
D.L.Smith (RAL) M.Harman (RAL) Eric Clark (RAL) Marc Ferlet (RAL - PT) Eric Sawyer (RAL – PT) Colin Hilier (AS Scientific) Beth Evans (AS Scientific)	Kevin Ayres (Stainless Metalcraft – Part Time)	S.Heys (RAL)

Agenda:

1. Introductions
2. Aims of Meeting
3. Actions from previous meetings

Attachments:

Action / Comment Number	Short Title	Action (A), Recommendation (R), Decision (D), Observation (O)	Action / Ref. with:	Action Deadline
	Introduction	D.L.Smith presented objectives of meeting		
	Actions from previous meetings	A-619-01 – closed PDF files sent to AS. Optical interfaces have been revised further issue required.		
		A-619-02 – closed		
		A-619-03 – cooldown rate not more than 20Khr, could have cost implications if AS to propose method. RAL to consider. There will be heaters at the end of the level-0 stage, but may not be sufficient for boil		
		A-619-04 – closed – requiement is 1.7K		
		A-619-05 – closed		
	Interfaces	Mark Harman presented an overview of the interface drawings A change request was issued for the services Ports for optical filters need to be large to allow optical alignment to be done. Current size of outer windows are ok. N2 shield will move.		
A-01		Marc Harman and Marc Ferlet to finalise window sizes.	MH/MF	15-June-2001

Action / Comment Number	Short Title	Action (A), Recommendation (R), Decision (D), Observation (O)	Action / Ref. with:	Action Deadline
		Optical window on SPIRE was never formally defined. Telescope simulator beams did not line up with instrument beams. As a result there is possibly a small movement in the window position.		
A-02		Marc Harman to update interface drawings with revised window postions.	MH	15-June-2001
	Thermal Design	Beth presented results of thermal analysis – see appendix		
		1.7K pot, many design issues still to be finalised		
		Assume 20mW total heat load. Need to confirm with Sam Peak load of 0.4W/hr		
		5L He required, but larger pot required for losses.		
		10L required for two cycles.		
		Need 120m3/hr pump!		
A-03		Review the heat loads on 9K shield from filters – if thermal cut-off at 77K and 10K, heat load is ~10mW	DS	29-June-2001

Action / Comment Number	Short Title	Action (A), Recommendation (R), Decision (D), Observation (O)	Action / Ref. with:	Action Deadline
A-04		Concern was raised over whether '9K' shield will reach 9K. Sam Heys to specify temperature range for 9K shield.	SH	29-June-2001
A-05	**MECHANICAL DESIGN** **Vacuum Vessel**	Low conductivity supports based on original design concept. Design to expect 25Kg load with safety margin of 3. Mark would like evidence that structure will withstand lateral forces, particularly when rail is cooled. Beth presented calculations to Mark Mark Harman to review calculations. Width of cryostat with doors shut 1894mm. Because of need to design to PD5500 material thickness results in smaller inner diameters. For ISO250 flanges, inner diameter = 254.6mm, for ISO100, inner diameter = 102.3mm. Pumping port will be ISO250, position still to be determined.	MH	29-June-2001
A-06		RAL to fix position of pump port.	MH	15-June-2001

Action / Comment Number	Short Title	Action (A), Recommendation (R), Decision (D), Observation (O)	Action / Ref. with:	Action Deadline
		ISO100 flange on each end of end cap, would be near flush to vessel wall.		
A-07 A-08 A-09	**Cryogen Tanks**	Will need to bolt to floor. Stainless metalcraft to specify securing requirements. Weight of inner vessels ~ 1 Tonne RAL to consider position of feedthrough ports. Kevin to send RAL nitrogen calculations Beth to send pdf files of drawings – metalcraft drawings, cryostat cross sections, optical interface drawings. AS can ensure that N2 vessel is leak-tight at 77K. 10K shroud, straps to instrument baseplate should be close to gas pipes to ensure optimum cooling. End flanges will have either helicoils or nut inserts. He Tanks – manostat to control pressure Current design assumes atmospheric pressure above 4.2K pot, and use boil off to	MH KA BE	15-June-2001 29-June-2001 15-June-2001

Action / Comment Number	Short Title	Action (A), Recommendation (R), Decision (D), Observation (O)	Action / Ref. with:	Action Deadline
		control 10K shield. If 3K is required then either lose control of the 10K shield, it would float, or to have separate 4.2K pot for Level-1 interface. To go above 4.2K is less of a problem since a heater can be used at the interface plate. Needle valve will be removable for servicing but room height will make it difficult to withdraw the valve. Control of valve is manual, temperature could be controlled using pump/manostat combination. Needle valve could be set to provide continuous feed to 2K pot. Alternative is to use pressure sensor to adjust needle valve to maintain temperature. If single shot used then the risk is that He will be used up within the 36hours. Pumping line uses ISO-63 flange, 2.5”bore. What is largest size of manostat? AS to investigate pressure control.		
A-10		Cleaning spec – external surface finish will be natural, will need to clean external surfaces. Copper shields will be left bare. Mark to investigate surface finish for 10 K shield.	CH	29-June-2001
A-11		AS will provide temperature sensors at extra cost.	MH	29-June-2001

Action / Comment Number	Short Title	Action (A), Recommendation (R), Decision (D), Observation (O)	Action / Ref. with:	Action Deadline
A-12	**Temperature Measurement and control**	RAL to specify calibration accuracy and decide appropriate calibration method/solution. Also to identify cryostat sensors and support frame/baseplate sensors. Heaters for level0 and level1 interfaces to boil-off pre-cool nitrogen and He can for boil off control. AS to provide details of heaters	DS	29-June-2001
A-13		Evacuation – 1400 Ls^{-1} pump should be adequate Cool-down – pre-cool with LN2, boil off nitrogen, fill with Helium. AS scientific to provide procedure. Cool down rate at 20K/hr down to 90K. AS were assuming filling with LN2 and cooling as quickly as possible.	CH	29-June-2001
	Operation	Operation – 1.7K use pressure to control, 10K shield use flow rate and heaters. AS to provide means to control, RAL to determine control procedure. Cooler recycling, heat discharged over 15 minutes, if single shot used the 2K He may be used up. 2K pot could be recharged at this point for following 36 hours. If continual drip feed then not a problem. Beth to meet with Sam Heys. AS to assume worst undefined case of 36hours plus some margin.		

Action / Comment Number	Short Title	Action (A), Recommendation (R), Decision (D), Observation (O)	Action / Ref. with:	Action Deadline
	QUALIFICATION AND TESTING	Warm-up 1. switch-on instrument heaters 2. heat up interfaces – use controller 3. heat up N2 shield – use controller RAL could provide a black aluminium plate to act as a heat load for cryostat. AS to test electrical connections (thermometers, heaters), checksheet and wiring diagram. Support frame thermometers and heaters to pass through test feedthrough. Vacuum qualification – AS to leak test all vessels before integrating into system. Evacuate 4.2 and 1.7K can, backfill with helium gas, test that there is no leak. Repeat for N2 vessel. Start global cold leak test, pre-cool with N2, fill with He. AS would use own vacuum system, doesn't use dry backing pump. RAL to review vacuum system for testing (i.e. cleanliness). Mild bake out at 80K.		

Action / Comment Number	Short Title	Action (A), Recommendation (R), Decision (D), Observation (O)	Action / Ref. with:	Action Deadline
A-14		Cryogenic qualification, AS to fill with He and measure boil, off. Any data logging requirements should be defined by RAL. Mark Harman to provide details of RGA flange. AS still reviewing locations of transit bungs.	DS	29-June-2001
A-15		Transit – AS need to make a support frame that will need to move around workshop. Cryostat will only go in final orientation. Need to consider how to wheel in and lower cryostat. AS to demonstrate how to manoeuvre into final resting place.	MH	15-June-2001
	Transit and Installation at RAL	Dependent on SPIRE schedule and closure of action items. Some concern over stainless metalcraft workload. D.S. to arrange meeting with JD, KK and BS to explore way to start work on cryostat vacuum vessel ahead of DDR.		
	Schedule	Eric clark circulated PA requirements list for review (See appendix A). Most of the elements will be within AS scientific's standard delivery pack.		
A-16			DS	22-June-2001

Action / Comment Number	Short Title	Action (A), Recommendation (R), Decision (D), Observation (O)	Action / Ref. with:	Action Deadline
	PA			

FOR INTERNAL USE ONLY

Object.
To produce a document that details the requirements and responsibilities for product or services supplied to RAL for Spire.

Please read and add any comment suggestions or any useful data as appropriate to the following table.
It attempts to lists all the sections normally required in a RAL ADP and additional sections that may be useful when deciding what a contractor should supply.
Please pass on to the next person on the distribution list when you have completed your contribution.

Distribution List

Eric Clark. . Additional comments in Pink
Dave Kelsh. Additional comments in BLUE
Mark Harman Additional comments in RED
Dave Smith. Comments in Green
Sam Hayes.

List of requirements and responsibilities.

SECT	CONTENTS	REQD.	Responsibile	COMMENTS
1	Shipping Documents	Yes	Contractor	
	Delivery Schedule (to Include reviews & inspection	Yes	Contractor/RAL	
2	Procedures for Transport Handling and Installation	Yes	Contractor	
	RAL Goods in inspection	YES	RAL	
3	C of C/Delivery Review Board AI-Lists	Yes	Contractor	RAL to hold DRB
4	Qualification Status List / Test Matrix	N/A		
5	Top Level Drawings	Yes	Contractor	
6	Interface Drawings	Yes	Contractor	
7	Functional Diagrams (Block Diagram)	N/A		
8	Electrical Circuit Diagrams	N/A		
9	As Built Configuration Status List	Yes	Contractor	List of configured drawings
	Configuration control of drawings.	YES	Contractor/RAL	
	DO to follow ISO9000 RAL Processes 1987	No		Provided a suitable “DO” control process is in place.
10	Serialised Components List	N/A		
11	List of Waivers	Yes	Contractor/ RAL	
12	Copies of Waivers	Yes	Contractor/ RAL	

SECT	CONTENTS	REQD.	Responsibile	COMMENTS
13	Operational Manual	Yes	Contractor	
14	Historical Record Traveller	N/A	Contractor	
15	Logbook / Diary of Events	Yes	Contractor	RAL will need full history of test vessel
16	Operating Time / Cycle Record	N/A		
17	Connector Mating Record	N/A		
18	Age Sensitive Items Record	N/A		
19	Pressure Vessel History / Test Record	Yes	Contractor	This would be part of the acceptance test
20	Calibration Data Record	Yes	TBD	All temperature sensors traceable to ITS90 Other instrumentation (e.g. level sensors) should also have calibration certificates.
21	Temporary Installation Record	N/A		
22	Open Work / Deferred Work / Open Tests		Contractor	As required
23	List of Non-Conformance Reports	Yes	Contractor	As required
24	Copies of Non-Conformance Reports	Yes	Contractor	As required
25	Test Reports	Yes	Contractor	Brief test report demonstrating that cryostat meets performance requirements
26	Proof Load Certificates	Yes	Contractor	
27	Reference List of Lower Level ADP's	N/A		
28	Mass Records/Power Budget	N/A		
29	Cleanliness Statement	Yes	Contractor	
30	Other Useful Information: *Compliance Matrix	Yes	RAL	

SECT	CONTENTS	REQD.	Responsibile	COMMENTS
31	REQUIREMENT SPEC	YES	RAL	
32				
33				
34				
35				
36				
37				
38				
39				
40				
41				
42				
43				
44				
45				