LCFI R&D PROJECT COMPONENT SPECIFICATION

Date: 13-4-99
A.Nichols, R66, CLRC, RAL

General Description: Optical survey cryostat

1. Detailed Hardware description.

1.0 'Nil-Flam' Foam insulated test cryostat of anti-static, light tight black acrylic sheet construction. Will be of suitable size to accommodate both the omega beam (2-TB-0046-135) and the vee beam (2-TB-0046-136) test substrates. A double glazed vacuum insulated lid will be provided which comprises one sheet of resistive coated and one sheet of conventional glass with a vacuum space between them, surrounded by an acrylic frame. This frame also includes mounting screws and a suitable seal. The whole window design is based exactly on that for VXD2. At each end of the cryostat body a small piece of the body has to be removed to allow the substrate support tube to be added, but this feature has also been proved with VXD experience.
The whole assembly will be capable of operating at all temperatures required by the survey process.

1.1 A rigid stainless steel support tube, which includes suitable welded blocks and low stress sprung clamps for holding the substrate. Surrounding this area will be the inner test box of two-piece acrylic construction to allow assembly to the support tube. This inner box will have a thin mylar window and push-on rubber tubes for gas delivery. The outer ends of the central support tube will be connected rigidly to a baseplate made from dimensionally stable cast aluminium plate via removable cone-vee-flat type mountings. A flexible gas seal, which allows sufficient mechanical decoupling between the support tube and the cryostat will be provided, made from rubber sleeve bonded to aluminium alloy mounting rings. Relative movement of approximately 5mm will be allowed for.
The whole cryostat assembly will be compatible with the 'Smartscope' co-ordinate measuring machine (CMM) at RAL, which has a working height of 195mm

1.1 Cooled nitrogen gas will be delivered by the rig already extant at RAL; suitable holes for the inlet and outlet tubes will be provided in the cryostat body wall.

2. Cost estimates

Item 1.0, Optical cryostat and window

Detail drawings.....£1000 (see note 1)
Material cost.....£350
Manufacture cost.....£3000

Item 1.1, Central support tube and base

Detail drawings.....£500 (see note 1)
Material cost.....£200
Manufacture cost.....£1000

Notes:

1. Detail drawing costs are based on very provisional budget estimates obtained from one contract design company. If effort can be found at RAL or elsewhere, these costs can be avoided.
2. Manufacturing and material costs are not based on firm quotations; they are estimates based on normal manufacturing techniques.
3. Costs are based on 'one off' quantities only.

3. Help needed/expected.

The first task will be detail design and drawing work and if the cost cannot be met (see note 1 above), about 2 man months of design effort will be required.
When the parts are delivered, some assembly and commissioning work will be inevitable and approximately 3 man months of PPD effort will be required, possibly spread over some period.

4. Provisional Schedule.

Optical survey cryostat and support tube/baseplate

Finalise overall design layout.....mid Feb 99
Complete detail drawings.....mid Mar 99
Manufacture.....mid July 99
Assembly, test, commissioning.....end Aug 99

The electrical test cryostat will follow sometime later in 1999.
The main expenditure will be around May/June 1999 (manufacture of cryostat)

5. Notes

1. See layout lcfi003 (A.Nichols, RAL)