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**Summary of UK COBRAS/SAMBA Meeting**  
**10th October 1996**

IN ATTENDANCE:

Peter Ade	QMW
Bernard Carr	QMW
Mike Cruise	Birmingham
Rod Davies	NRAL, Manchester
George Efstathiou	Oxford
Roger Emery	RAL
Matt Griffin	QMW
Mike Hobson	MRAO, Cambridge
Anthony Lasenby	MRAO, Cambridge
Neil Turok	DAMTP, Cambridge
Alan Wells	Leicester

**1. Background:** Matt Griffin described the present status of the mission. The next critical date is the SPC meeting on 26/27th November, when it is hoped that COBRAS/SAMBA will be reconfirmed as M3. There remains a significant uncertainty over the timescale of COBRAS/SAMBA caused by possibility of ESA funding a replacement to the failed Cluster mission. Various participants agreed to argue strongly where appropriate that a Cluster reflight should not lead to a significant delay of COBRAS/SAMBA.

**2. Current status of the payload:** Matt Griffin described the current state of the payload. For the high frequency instrument (HFI), the main new developments are the possibilities of extending the frequency range to 90GHz and of including polarisers at the 143GHz and 217GHz channels. The 50-80K cooler may not now be needed if the low frequency instrument power dissipation is reduced. For the low frequency instrument (LFI) an extensive investigation is underway to improve the performance figures over those quoted in the red book. This can be accomplished by splitting the gain stages of the receivers, so reducing the power dissipation at the focal plane by an order of magnitude to 0.5W. This alone would lead to a reduction in the passively cooled temperature at the focal plane from 100K listed in the red book to about 50K. Detailed thermal models have been constructed by Birmingham. In addition, the possibility of including a cooler to reduce the temperature of the radiometers to 20K is under consideration. Two possible cooling systems have been proposed for the LFI. mechanical Stirling coolers (as for the HFI) and adsorption coolers.

The consortium development for both instruments has been good, but is more advanced in the case of the HFI. Significant UK involvement is envisaged for both instruments, as described below.

### 3. Envisaged UK participation

#### 3.1 HFI Involvement

Focal Plane Optical	QMW/Caltech/Maynooth
Filters	QMW
Feed Optics	QMW
Test-bed	IAS/QMW/Caltech
4-K Cooler	RAL/MMS
Thermal Integration	IAS/RAL
Cryogenic systems engineering	ROE
EGSE hardware/ software	Leicester

#### 3.2 LFI Involvement

Thermal/Structural Design	Birmingham
Data Processing Unit	Birmingham
Receiver Development	Jodrell Bank

#### 3.3 Data Processing

The detailed nature of data processing for the COBRAS/SAMBA mission was still under discussion and a meeting of both the HFI and LFI consortia was scheduled in Munich on 25th October to discuss this issue. In outline, however, it was envisaged that data processing would take place on three distinct levels: Level 1 – converting telemetric data to data stream from both HFI and LFI; Level 2 – calibrating data from each instrument and processing the data streams to produce maps at each frequency; Level 3 – producing well defined data products *e.g.* point source catalogues, foreground maps, and core science projects *e.g.* estimation of cosmological parameters.

It was likely that MPA in Munich would bid for a significant data processing role spanning all of these activities. Within the UK, RAL expressed an interest in Level 1

activity. It was envisaged that Level 2 reduction would be done by each instrument team. For the HFI, much of the Level 2 reduction would be done by IC and QMW, with some contributions in specific areas from Cambridge. Cambridge and IC expressed strong interest in Level 3 reduction. It was clearly too early to construct a detailed plan of data reduction activities by UK groups, but it was evident that the UK intended to figure prominently at least in Level 2 and Level 3 data analysis.

#### 4. Implications for UK funding

A first assessment of the costs of UK participation in COBRAS/SAMBA was attempted as follows:

QMW HFI	£1.75m
RAL HFI coolers	£0.58m
RAL LFI	£0.18m
Coolers (MMS) <sup>†</sup>	£0.5m
Birmingham DPU	£1.5m
Birmingham Thermal/structural design	£1.1m
Jodrell LFI receivers	£2.0m
ROE LFI	£0.3m
Leicester	xxx
Software/data centre (50My)	£1.7m
Science Analysis (64My)*	£1.3m
<hr/>	
Total	£10.9m

<sup>†</sup> UK share of £1.5m for MMS coolers.

\* Costs assuming 24My of estimated 64My provided via grants line.

No estimate for the Leicester involvement has yet been received. In summary, the UK involvement in COBRAS/SAMBA is expected to be significant and in line with the suggested figure of a £20m UK involvement in COBRAS/SAMBA and FIRST.

#### 5. Date of next meeting

It was agreed to hold a second meeting at QMW on 5th December.

GPE 5/12/96