

## MEMORANDUM

Date : 28-03-06

To : Members of the LHCb RRB  
 From : A. Smith  
 Subject : Category A M&O Status

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**Closing Report for the 2005 budget**

LHCb announced at the last RRB that it was expected that the Category A M&O budget would be underspent by about 50 kCHF by the end of the year. Although, as shown in table 1 below, the budget was underspent by about 100 kCHF, there were commitments of 67 kCHF at the end of the year and part of the services bill had not been received. That bill was settled early this year so that the complete 2005 budget was spent. There was more spending on test beams than had been expected because, although the CERN accelerators were not operating, some test beam work was done in Italy and GIF continued to operate. The spending in 2005 is summarized in table 1. The power will be billed this year.

**Table 1 : Outcome of Category A M&O spending for 2005**

Item list	Outcome of 2005 Spending	Budget kCHF
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Detector related costs	81	120
Secretariat	150	180
Communications	13	5
On-line computing	115	180
Test beams, calibration facilities	72	20
Laboratory operations	38	45
General services	280	320
<b>Total</b>	<b>749</b>	<b>870</b>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Power	0	60

## Current Status 2006 budget

During the RRB of October 2005, the budget for Category A M&O for this year was approved at the level of 1,478 kCHF excluding the power cost that was estimated to be 100 kCHF. However, it was proposed that only 1,326 kCHF would be billed to reduce the carry over. At the end of February, spending on the M&O budget stood at 73 kCHF with 63 kCHF of commitments. This is in line with previous experience as the major items to be covered are for services whose invoices are only expected to arrive later in the year. We believe that this year's spending will be closely aligned to the budget.

## Preliminary Category A Budget for 2007

Although the estimated budget for 2007 was re-examined to take into account trends in the spending of previous years it requires some more revision before being presented to the Scrutiny Group later this year. This revision should not greatly affect the total as some expenses foreseen will be delayed while some others may increase due to changes in scheduling. The budget amounts to 2,312 kCHF for Category A not including the expected power bill of 600 kCHF. As only NMS contribute to the power costs these are listed separately in table 2 below which gives the estimated amount per item.

**Table 2 : Proposed Category A Budget for 2007**

Estimated Category A M&O Costs for LHCb	2007
Items	kCHF
<input type="checkbox"/>	<input type="checkbox"/>
<b>Detector related costs</b>	<b>978</b>
<b>Secretariat</b>	<b>189</b>
<b>On-Call communications</b>	<b>9</b>
<b>CORE Computing</b>	<b>0</b>
<b>On-line Computing</b>	<b>740</b>
<b>Test Beams</b>	<b>40</b>
<b>Laboratory Operations</b>	<b>35</b>
<b>General Services</b>	<b>321</b>
<b>Total</b>	<b>2312</b>
<input type="checkbox"/>	<input type="checkbox"/>
<b>Power</b>	<b>100</b>

The detector related line increase is mainly due to gas related costs, provision for beam-pipe related costs and maintenance beginning for most detectors. However, these are the main items to be revised. The on-line computing increase comes about through increased management requirements plus LAN and processor maintenance or replacement. The reduction in the general service costs reflects the reduced need for transport and cranes once the detectors have been installed.

The sharing is based on the names, and hence numbers, of PhD equivalent physicists and engineers that have been supplied by all LHCb institutes. This list is continuously

updated but will be fixed for the 2007 sharing late this summer. The current numbers are given in table 3 along with the resulting sharing of the contributions to the proposed 2007 budget.

**Table 3 : Sharing of the proposed budgets.**

<b>FUNDING AGENCY</b> □	<b>PhD</b> <b>Equivs</b>	<b>% PhD</b> <b>Equivs.</b>	<b>2007</b> <b>Share</b>	<b>Power</b> <b>Share</b>	<b>Total Cat A</b> <b>plus Power</b>
BRAZIL	14	4.01%	92,745	24,069	116,814
CERN	52	14.90%	344,481	□	
CHINA	3	0.86%	19,874	5,158	25,032
FRANCE IN2P3	47	13.47%	311,358	□	□
GERMANY BMBF	13	3.72%	86,120	□	□
GERMANY MPG	7	2.01%	46,372	□	□
ITALY INFN	49	14.04%	324,607	□	□
NETHERLANDS	15	4.30%	99,370	□	□
POLAND	13	3.72%	86,120	□	□
ROMANIA	4	1.15%	26,499	6,877	33,375
RUSSIA	32	9.17%	211,989	23,310	235,298
SPAIN	15	4.30%	99,370	□	□
SWITZ Lausanne	11	3.15%	72,871	□	□
SWITZ Zurich	6	1.72%	39,748	□	□
UK	58	16.62%	384,229	□	□
UKRAINE	4	1.15%	26,499	6,877	33,375
USA NSF	6	1.72%	39,748	9,768	49,516
<b>TOTAL</b>	<b>349</b>	<b>100.00%</b>	<b>2,312,000</b>	<b>76,058</b>	□

## CORE Software Manpower

The CORE computing software manpower needs have been estimated for 2007, and it is expected that the required support will be found as voluntary contributions from collaborating institutes that can be likened to Category B M&O. The needs are summarised in table 5 below in terms of Full Time Equivalent persons.

**Table 5 CORE computing Requirements in 2007**

CORE Software Manpower 2007	FTE's
Project Management	2.7
Software Framework	2.8
Alignment & Conditions DB	2
Software Infrastructure	3
Applications	4.7
Distributed Production	10.2
Production	5
Global Applications	6.5
Total CORE Computing	36.9

## Forecast for later years

The forecast budgets for the years 2008 till 2010 are given below in table 4, As LHCb expects to be in stable operation during 2008 and 2009 their forecast budgets are essentially identical.

**Table 4 : Budget forecasts for 2008-10**

Estimated Category A M&O Costs for LHCb	2008	2009	2010
Item	kCHF	kCHF	kCHF
Detector related costs	978	978	978
Secretariat	192	195	200
On-Call communications	9	9	9
CORE Computing	0	0	0
On-line Computing	740	740	740
Test Beams	25	25	25
Laboratory Operations	35	35	35
General Services	318	328	328
<b>Total</b>	<b>2297</b>	<b>2310</b>	<b>2315</b>
Power	903	903	903
<b>Grand Total</b>	<b>3200</b>	<b>3213</b>	<b>3218</b>

## **Category B Status**

As stated at previous meetings, LHCb will mainly start to need Cat B funds from 2008 onwards. However two detectors have already indicated that they will be requesting funds for 2006 and 2007. These are the Silicon Tracker and the Muon detectors. The STR foresees 89.5 kCHF this year and 179 kCHF in 2007, and the Muon foresees similarly 225 kCHF and 291 kCHF.

All detector groups have been asked to produce their preferred method of sharing Category B costs, and so far the replies received have all announced sharing based on one of two algorithms. Most are based around the percentage of the original investment as defined in the MoU and the others are based on numbers on publications.

In LHCb we regard it as the responsibility of each detector collaboration to arrive at their own agreed and preferred method of sharing.