

## MEMORANDUM

Date: 7 April 2012

To: Members of the LHCb RRB  
From: C. D'Ambrosio  
Subject: Status of M&O Category A.

---

**Budget Closing Report for 2011**

2011 is second-time full data-taking year for LHCb. As already noted in CERN-RRB-2011-040, the 2010 exercise, which represented a first-time full data-taking year, had shown an under-spending in Detector Related and General Services. This trend is confirmed with the 2011 results and has been anticipated for the 2012 year, by decreasing both lines (see CERN-RRB-2011-088 and Table 3). Core Computing shows a stabilization around the budgeted value (in 2010 it had overspent). Finally, the Communications line shows an overspending, due to EVO, which was budgeted at 50% on SG request (see CERN-RRB-2010-116). The closing result for 2011 is given in Table 1.

The main deviation is on detector related line. The detector related line shows an under-spending of 168 kCHF, thanks to a smooth year of data-taking, resources optimization and consolidation work done in 2010. This was already anticipated, as discussed with the Scrutiny Group, although some spending did come at the end-of-year (which is charged in year 2012), due to the important shut-down activities that took place between December 2011 and March 2012. Due to the fact that LHCb is running to optimize physics throughput and owing to the principle of keeping our budget as constant as possible over the years, this surplus should serve in covering the coming long shutdown years, when important consolidation, replacement of ageing components and maintenance on the detector general infrastructure is foreseen, whilst keeping the related lines essentially constant (see also CERN-RRB-2011-076, CERN-RRB-2011-088 and CERN-RRB-2011-90).

Core Computing is in line with the expected expenditures, thanks to a successful re-organization of resources.

Due to the LHC activity and the demanding LHCb running conditions for 2011-12 and beyond, we anticipated the completion of the Farm for 2010. However, more consolidation had been deemed necessary for the general network infrastructure and the farm itself, which was achieved thanks to two extra-contributions (see CERN-RRB-2011-040). Both belonged to DAQ-NONCORE contributions and were of the order of 300 kCHF each. However, we plan to further consolidate by adding a ~10% more CPU power, through again a CERN contribution (50%, ~100 kCHF) and part of the foreseen CPU replacement policy for 2012 (50%, ~100 kCHF). This acquisition has already been finalized and is being put in place. As agreed at the last RRB (CERN-RRB-2011-090), we have transferred 400 kCHF on the special "Online Account" and will ask RRB to transfer another 300 KCHF for the year 2011, after consultation with the SG. These transfers constitute the base of our "CPU replacement strategy", consisting in annual equivalent transfers of 300 kCHF in order to satisfy the Farm need until year 2018 (see CERN-RRB-2011-076).

2011	Budget	Used	Difference
detector related	920	752	168
secretariat	185	172	13
communication	30	36	-6
core comp	150	151	-1
on line (see text)	810	825 (525+300)	-15
test beams	30	9	21
laboratory	60	21	39
general services	360	283	77
Totals	2545	2249	296
Special online account		400	

Table 1: M&O Cat.A in kCHF at book closing for 2011. To be noted, the 300 kCHF reserved for the special online account, and the 400 kCHF already moved in there in 2011.

In Table 2, details on the 2011 main expenditure lines are given. Seen the coming long shutdown and the important maintenance and consolidation operations to be achieved to insure a smooth 2014 – 2018 running period before the (possible) LHCb upgrade, we propose that the overall under spending of 296 kCHF is kept as buffer in the M&O Cat.A budget. We also propose to secure 300 kCHF in the Online special account, as foreseen and discussed with the SG last year. We will report back to RRB in October.

Detector related costs	Magnet	62
	Gas	253
	Cooling	82
	Safety	24
	Tech. support	171
	Beam pipe	66
Secretariat	Secretarial aid	160
Communication	EVO	33
On-line computing	System Manag.	356
	Hardware	169
Test beams, calibration	Operation	9
Laboratory operations	Operation	21
General services	Cool., vent. etc	126
	Transport and cranes	137
	Survey	0

Table 2: Partial list of the main items paid from 2011 M&O Category A

### Current status of the 2012 M&O Category A budget

In October 2011 the RRB approved the M&O Category A budget for 2012 for a total of 2,801 kCHF, including a power cost of 970 kCHF and a VELO Spare contribution of 100 kCHF. As in previous years, there are only minor expenditures on the M&O Category A budget by the end of March. However, we are confident that the expenditure will follow closely the budget forecast.

### Forecast for the 2013 M&O Category A budget

The estimated budget for 2013 will be examined with the Scrutiny Group in the coming months and presented for ratification to the RRB in fall 2012. There are minor changes from 2012 to 2013, which reflect the discussions from last year, agreed upon with the SG, and which are described in CERN-RRB-2011-088 and CERN-RRB-2011-076, mainly due to the coming long shutdown. In line with the principle of keeping the budget as constant as possible over the years and owing to the surplus from 2011 to be kept as buffer for the LS1 years, any revisions are unlikely to make significant changes to the overall budget. The total budget currently stands at 2,851 kCHF including the power cost at 970 kCHF and the VELO Spare contribution of 100 kCHF (see Table 3). Table 3 also shows past and future proposed budgets.

The sharing between the different Funding Authorities is based on the number of PhD equivalent members at each institute. This number is normally agreed for the next year in September of the previous year. As usual, the power is shared by all Funding Authorities, but only charged to Non Member States. Provisionally, with the same numbers of PhD equivalents as for 2012, the sharing is given in Table 4.

Item List	2009	2010	2011	2012	2013	2014	2015
Detector related cost	914	920	920	880	920	920	880
Secretariat	192	192	185	185	185	185	185
Communications	12	50	30	50	50	50	50
Core computing	100	150	150	150	150	150	150
Online computing	850	750	810	900	900	900	900
Test Beam and calibration	20	30	30	30	40	40	30
Laboratory operation	60	60	60	50	50	50	50
General services	360	360	360	330	330	330	330
Power	300	600	970	970	970	300	600
VELO Spare	100	100	100	100	100	0	0

Table 3: Running and proposed M&O Cat.A budgets for 2012 and 2013 respectively and their evolution for 2014 - 2015 in kCHF. The VELO spare funding profile starts in 2009 and ends in 2013. Note also the fact that we charge the power on the subsequent operation year.

2012	PhD eq. total/ funding auth.		M&O A	VELO	Power	
			kCHF	kCHF	kCHF	
			2625	100	970	Total
		%	CHF	CHF	CHF	CHF
BRAZIL	18	4.9	128,747	4,905	47,575	181,226
FRANCE	43	11.7	307,561	11,717	0	319,278
BMBF GERMANY	14	3.8	100,136	3,815	0	103,951
MPI, MPG, GERMANY	7	1.9	50,068	1,907	0	51,975
IRELAND	2	0.5	14,305	545	5,286	20,136
INFN ITALY	56	15.3	400,545	15,259	0	415,804
NETHERLANDS	13	3.5	92,984	3,542	0	96,526
P. R. CHINA	3	0.8	21,458	817	7,929	30,204
POLAND	8	2.2	57,221	2,180	0	59,401
HHNIPNE ROMANIA	3	0.8	21,458	817	0	22,275
RUSSIA	31	8.4	221,730	8,447	34,716	264,893
SPAIN	17	4.6	121,594	4,632	0	126,226
SWITZERLAND	24	6.5	171,662	6,540	0	178,202
UKRAINE	3	0.8	21,458	817	7,929	30,204
UK	66	18.0	472,071	17,984	0	490,054
USA	9	2.5	64,373	2,452	22,527	89,352
CERN	50	13.6	357,629	13,624	0	371,253
TOTAL	367	100.0	2,625,000	100,000	125,962	2,850,962

Table 4: Sharing of the estimated 2013 budget in CHF for M&O Category A.

### M&O Category B

There are no major changes since the October 2011 RRB (see CERN-RRB-2011-090).