

MEMORANDUM

Date: 1 October 2011

To : Members of the LHCb RRB  
 From : C. D'Ambrosio  
 Subject : Category A M&O status for 2011 and request for 2012

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**Situation for 2011**

About 70% of the expected contributions for M&O in 2011 had been received by the end of August. That is a total of 1.9 MCHF. Together with the carry-over of funds from 2010 and a few late payments from 2010, these contributions have ensured that there has been no cash flow problem. The spending until second half of August is given in Table1. In the last month, another ~284 kCHF have been collected.

Item List	Spent	Budget
Detector related cost	399.7	920
Secretariat	106.3	185
Communications	35.0	30
Core computing	88.6	150
Online computing	508.8	810
Test Beam and calibration facilities	0.0	30
Laboratory operation	17.7	60
General services	117.2	360
Power		970

**Table 1.**

Status of Category A M&O at end of August in kCHF. To be noted that, strictly speaking, Online expenditures amount to 252.8 kCHF, if we consider in the sum also the reimbursed loan from 2010 (see text below).

We note that 2011 is the 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, has shown an under-spending in Detector Related and General Services, while showing an overspending in Core Computing. This trend seems to be confirmed with the first half-year 2011 results, although most of the fixed expenditure bills have not yet been received. Core Computing shows a stabilization around the budgeted value (in 2010 it had overspent). Finally, the Communications line shows

already an overspending, due to EVO, which was budgeted at 50% on SG request (see CERN-RRB-2010-116).

LHCb under-spent in chapter Online Computing in 2007 and 2008 mainly in manpower and for 2008, 2009 and 2010 in the sub-line Computers. Due to the foreseen LHC activity and the demanding LHCb running conditions for 2010 - 12 and beyond, we anticipated the completion of the Farm in 2010. Moreover, a consolidation has been deemed necessary for the general network infrastructure and the farm itself. To this end, two generous extra-contributions have been given from Switzerland and CERN: the first to reinforce our farm computing power and the second to strengthen our DAQ network Infrastructure. Both belong to DAQ-NONCORE contributions and are of the order of 300 kCHF each. This asked for a loan of 256 kCHF in 2010, which is now extinguished, see caption of Table 1 and also CERN-RRB-2011-040.

It has been the stated policy of LHCb to acquire the needed computing power on a "just-in-time" basis. This not only to have a top performing computing farm at the required time, but also to save money and to keep the flexibility to follow changing industrial computing standards. All this on top of an overall M&O Cat.A almost constant over the years. At the time, a rational replacement assessment, based on the LHC schedule and anticipated failure rates, was estimated to be in the range of 300 kCHF starting in 2009. With the new situation and in agreement with the Scrutiny Group (SG), we ask to take this number up to 370 kCHF as from 2012.

Together with the SG, we have agreed to set up a special account to "store" under-spent funds in the sub-line Computers/Processors/LAN (CPL), in order to keep budgets constant and have enough funds to provide the needed replacements in due time. We propose to start this account with a sum of 400 kCHF from the carry-over funds, which loosely reflects the under-spending in Online of the last few years, retaining a certain flexibility and insuring proper cash flow for the M&O Cat.A "standard" account. In the spring sessions of RRB, we will report on the Online sub-line CPL of the closing year and propose a sum to be stored in the special account (in case of under-spending). In contact with the SG and RRB, we will inform whenever expenditures are paid from this account.

Therefore, as already anticipated in CERN-RRB-2011-040 and in agreement with the SG, we propose that the overall under-spending of 19 kCHF plus the returned loan of 256 kCHF is kept as buffer in the M&O Cat.A budget.

## Situation for 2012

The budget for 2012, as discussed with the Scrutiny Group, is given in Table 2 and its flat evolution for the 2013 – 2015 years is given in Table 3, together with the presently running 2011 budget. The sharing between the different Funding Authorities, Table 4, is slightly modified due to changes in the number of PhD equivalent members at the different institutes. We also positively note the regular increase of the overall PhD number over the past years.

Item List	Budget 2012
Detector related cost	880
Secretariat	185
Communications	50
Core computing	150
Online computing	900
Test Beam and calibration facilities	30
Laboratory operation	50
General services	330
Power	970
VELO Spare (500 kCHF over 5 years)	100

**Table 2.**  
Proposed M&O Cat.A budget for 2012 in kCHF.

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

**Table 3.**  
Running and proposed M&O Cat.A budgets for 2011 and 2012 respectively and their evolution for 2013 - 2015 in kCHF. The VELO spare funding profile starts in 2009 and ends in 2013.

Proposed 2012	PhD eq. total/ funding auth.	%	M&O A	VELO	Power	Total
			kCHF	kCHF	kCHF	
			2,575	100	970	
			CHF	CHF	CHF	CHF
BRAZIL	18	4.9	126,294	4,905	47,575	178,774
FRANCE	43	11.7	301,703	11,717	0	313,420
BMBF GERMANY	14	3.8	98,229	3,815	0	102,044
MPI, MPG, GERMANY	7	1.9	49,114	1,907	0	51,022
IRELAND	2	0.5	14,033	545	5,286	19,864
INFN ITALY	55	15.0	385,899	14,986	0	400,886
NETHERLANDS	13	3.5	91,213	3,542	0	94,755
P. R. CHINA	3	0.8	21,049	817	7,929	29,796
POLAND	8	2.2	56,131	2,180	0	58,311
HHNIPNE ROMANIA	4	1.1	28,065	1,090	0	29,155
RUSSIA	31	8.4	217,507	8,447	34,716	260,669
SPAIN	17	4.6	119,278	4,632	0	123,910
SWITZERLAND	24	6.5	168,392	6,540	0	174,932
UKRAINE	3	0.8	21,049	817	7,929	29,796
UK	66	18.0	463,079	17,984	0	481,063
USA	9	2.5	63,147	2,452	22,527	88,126
CERN	50	13.6	350,817	13,624	0	364,441
TOTAL	367	100.0	2,575,000	100,000	125,962	2,800,962

**Table 4.**

Sharing of the proposed Category A M&O budget, power and VELO Spare for 2012.

### Changes from 2011

As already pointed out, main changes reflect the experience from the first (and partially the second) full data-taking year. Detector related costs have been reduced together with General services for 2012, while detector related line has increased slightly in the 2013 - 14 years due to the foreseen long shutdown. In agreement with the SG, an updated spending profile in the Online Computing due to the running conditions of LHC, to the demanding LHCb physics programme and to our policy of acquiring computing power on “just-in-time” basis has also been set. As also pointed out by the SG chairman report (CERN-RRB-2011-076) and stressed in the last two CBs, LHCb needs to assess in detail the expected M&O expenditures for the long shutdown inside a coherent framework. Work has started together with our technical coordination team and in parallel with the LHCb sub-detectors, for what will concern more specifically Cat. B.

Other changes in the proposed budgets are minor apart from a readjustment of the power costs for the years following the long shutdown (~1/3 and 2/3 of the full 970 kCHF power cost). As asked by the SG, EVO cost has been kept for 2012 and following years. However, due to the latest developments in this matter, LHCb has decided to keep EVO for 2012 in parallel with the new recently approved communication tool. We will further report on the spring session of RRB and eventually put to zero the related expenditures for the years 2013 - 2015.

Finally, it should be noted that in Table 4, Romania is not charged anymore with NMS power costs. In agreement with the LHCb CB, we would like to ask to apply the same also for the year 2011 (retroactively), therefore considering its 2011 power payment as funds "paid in advance" for M&O Cat.A. These funds amount to 13585 CHF for the year 2011.

### **2010 under spending**

As already announced at the RRB in April 2011, discussed with the SG and detailed above, we ask that the under spending from 2010, 19 kCHF plus 256 kCHF from the returned loan is kept as a buffer in M&O A.

## Category B M&O

Category B M&O budget for 2010 is given in Table 5. Only minor adjustments are anticipated for 2011. The total is ~1100 kCHF, a bit less than half of the M&O Cat.A total. Table 6 shows the funds per FA. Here we have not included contributions smaller than 10 kCHF.

CALO (CERN, ES, FR, RO, RU)	315
Level_0 (FR, IT)	60
Muons (CERN, IT, RU)	151
On Line (CERN)	80
Outer Tracker (GE, NL, PL, PRC)	120
RICH (CERN, IT, UK) (*includes contributions for the HPD-spare programme)	207*
Silicon Trackers (CH, ES, GE, UKR)	80
VELO (CERN, CH, EI, NL, RU, UK, USA)	135

**Table 5.**  
Category B M&O budget for 2010 in kCHF.

CERN (CA, MU, ON, RI, VE)	230
CH (STs, VE)	81
ES (CA, STs)	35
FR (CA, L0)	140
GE (OT, STs)	93
IT (L0, MU, RI)	140
NL (OT, VE)	90
RU (CA, MU, VE)	115
UK (RI, VE)	195

**Table 6.**  
Category B M&O budget for 2010 in kCHF and per FA (>10 kCHF).