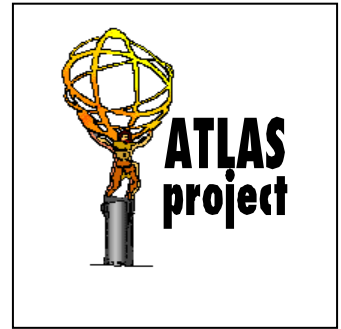


CERN-RRB-2010-014

ATLAS Resources Review Board, April 20, 2010



2009 and 2011 ATLAS M&O Budgets



CERN-RRB-2009-014

ATLAS Resources Review Board, April 20, 2010

For RRB approval




Part 1

Closing Report for 2009 ATLAS M&O Budgets

Introduction

The ATLAS management, supported by the ATLAS Executive and Collaboration Boards, kindly invites the RRB to approve the final M&O payments for 2009.

The RRB approved the year 2009 Maintenance and Operation (M&O) budget in November 2008 (CERN-RRB-2008-085) for 16 430 kCHF (Category-A), including cost of energy of 2 820 kCHF, and 6 976 kCHF (Category-B), respectively.

M & O B U D G E T
REPORT ELEMENTS
 Payment Summary
 Activity Description
 Table References

1. M&O Budgets for 2009

The final M&O payments in 2009 amounted to 14 408 kCHF in Category-A (including energy for the CERN NMS-part) and 6 246 kCHF in Category-B. The remaining open commitments amounted to 2 184 kCHF in total (A+B). The total payments were 668 kCHF below the budgeted total income (i.e. invoices sent out) due to reorganization of work in M&O-A to absorb reported over-costs carried over from 2008 and due to the shift in planned Insertable b-layer (IBL) payments.

In 2009, the Category-A costs covered various technical services invoiced by CERN such as access and cranes operation, site management, providing gases and coolants, running the cooling and ventilation plants (6.7 MCHF) as well as operating the cryogenic plants at Point 1 (2.1 MCHF) and operating the TDAQ system (3.7 MCHF). Core computing infrastructure services were also provided for and this amounted to 1.9 MCHF.

The CERN member state share of the energy cost for 2008 was paid by CERN in full and partially for those non-member states contributing to the machine construction outside the M&O budget. The cost of energy consumption for 2009 amounted to 0.9 MCHF (non-member state part).

In Category B, the main costs were related to operation of the electronics systems as well as carrying out repairs in-situ in the ATLAS cavern. The above activities included related mechanics (1.0 MCHF), electronics replacements and pool rentals (2.3 MCHF) and area operation and purchasing of store items (0.7 MCHF). Sub-

detector spares were purchased worth 0.4 MCHF. The hired technical manpower supported all these activities (1.7 MCHF).

The value of in-kind contributions in Category-A amounted to 1.2 MCHF. There were no in-kind contributions made in Category-B in 2009.

As a consequence of the 2009 payments and amortization of the remaining open commitments from the past, the cumulative budget balance (i.e. the approved budgets less executed payments and remaining open commitments) amounts to + 60 kCHF in Category-A and + 218 kCHF for Category-B. Due contributions in 2009 amounted to 1.0 MCHF in Category-A and 0.1 MCHF in Category-B.

For Category-A, the status of contributions (sent invoices less received contributions) are shown in the document “Financial Report” (CERN-RRB-2010-017).

Table 1 summarizes the 2009 M&O payments per system. The participating institutes provided, as part of their detector operation tasks (OTP) obligations, 470 man-years for expert-related activities (excluding shift work), of which 117 man-years in core computing tasks.

Table 2 shows the M&O contributions made for 2009 or earlier by the Funding Agencies for each system.

It should be noted that in order for ATLAS to pay for the 2009 expenses as well as for the past open commitments, permission was given by the CERN Management at the very end of the year to exceptionally overdraft on the M&O-A accounts while waiting for due contributions.

ATLAS M+O (A) and (B) Payments in 2009 (kCHF)

Item & Cost Driver (by RRB SG Headings)	Cat. A									Cat. B	Item & Cost Driver (by RRB SG Headings)
	M&O	Pixel	SCT	TRT	IDGen	LAr	TileC	Muon	Comp.	M&O	
Detector related costs Cryogenics operations Detector operations	5,641		100	100	400	27	4	428		1,059	Mechanics & Cooling & Cryogenics
Secretariat 2 FTE charged to ATLAS Publications, consumables	318	495	100	642	380	337	233	141		2,328	Standard electronics Crates, electronics pool rentals
Collaborative tools GSM phones Computer network connections Videoconferencing, archiving	314		17	25		29	2			73	Detector controls
Core computing (infrastr. & services) Software process service Central production & operation	1,901										
On-line computing Detector controls Software licences	3,386	100	109	100	120	27	19	24		499	Areas SR1-operations (ID), system tests, lab oper.
Test beams, facilities Testing equipment (DCS) Consolidation	496		5	2	17	10	7	5		46	Communications
Laboratory operations Assembly areas, workshops TDAQ laboratory equipment	100	10	6	24	115	4	9	42		210	Store items
General services Heavy handling Technical support, storage Survey Outreach Energy	2,252					350	29			379	Sub-detector spares (incl. b-layer replacement)
TOTAL	14,408	605	337	893	1,032	784	303	640	0	4,594	(Excluding hired manpower for Category B)
Hired manpower at CERN (in kCHF)	incl. above	300	250	40	400	200	154	308		1,652	
Institute manpower (in FTE), excl. shifts	0	33	33	31	40	67	40	109	117	470	Cat-2 expert tasks (OTP)
TOTAL M&O FOR A	14,408	905	587	933	1,432	984	457	948	0	6,246	TOTAL M&O FOR B

**M+O Contributions (cash and in-kind)
for ATLAS in 2009 by Funding Agency (kCHF)**

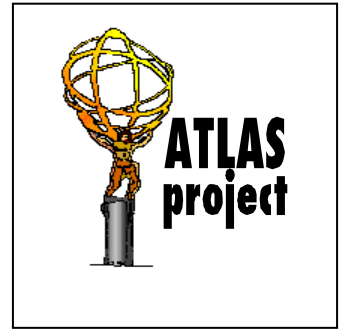
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Funding Agency	Cat.A items*	Category-B item contributions						Total Cat. B	Total A + B	Core comp. Categ.B (FTE)	
		Pixel	SCT	TRT	IDGen	LAr	TileC				Muon
Argentina	18						1	1	19	0	
Armenia	21							0	21		
Australia	110		19		18			37	147	0	
Austria	52			10		9	11	2	32	84	
Azerbaijan	27					1			1	28	
Belarus								0	0		
Brazil								0	0		
Canada	519					268			268	787	4
Chile	27							2	2	29	0
China NSFC+MSTC	186					5		4	9	195	
Colombia	9							1	1	10	
Czech Republic	270	4	4		9			2	19	289	1
Denmark	75			15	10				25	100	
France IN2P3	802	166			25	235	60		486	1288	8
France CEA	195					87		31	118	313	0
Georgia	45					1		1	2	47	
Germany BMBF	1041	395	47		103	51		36	632	1673	12
Germany DESY	225					68		69	137	362	5
Germany MPI	197		39		36	42		19	136	333	1
Greece	172							10	10	182	
Israel	185							9	9	194	0
Italy	1318	199			85	91	53	172	600	1918	8
Japan	645		113		106			113	332	977	2
Morocco	96					2			2	98	
Netherlands	202		28		30			65	123	325	2
Norway	127		38		40				78	205	1
Poland	124		1	4	2				7	131	1
Portugal	230						8		8	238	
Romania	96						5		5	101	
Russia	788		0	72	14	40	27	8	162	950	5
JINR	113				25	31	74	104	234	347	0
Serbia	54					3			3	57	
Slovak Republic	60					4			4	64	
Slovenia	63		2		2				4	67	1
Spain	307		24		23	49	45		141	448	1
Sweden	180		13	41	24	14	17		109	289	0
Switzerland	157		44		41	10			95	252	
Taipei	63		2		1				3	66	1
Turkey	145					4		3	7	152	
United Kingdom	1393		342		499				841	2234	14
US DOE + NSF	3503	599	2	443	54	261	276	134	1769	5272	36
CERN	959	22	19	230	101	110	82	18	582	1541	14
total contributions	14,798	1,387	735	815	1,248	1,387	660	802	7,034	21,832	117
total payments	14,408	905	587	933	1432	984	457	948	6,246	20,654	

Notes:

*Following invoices sent to Funding Agencies; including energy cost adjustments

Final Pixel 2009 budget corrected at 1390 kCHF, following INFN request to treat their IBL share separately



CERN-RRB-2010-014

ATLAS Resources Review Board, April 20, 2010

For RRB to take note




Part 2

Preliminary 2011 ATLAS M&O Budget Estimates

Introduction

The ATLAS management, supported by the ATLAS Executive and Collaboration Boards, kindly invites the RRB to take note of the preliminary M&O budget estimates for 2011.

The first M&O budget estimates for the ATLAS detector in 2011 amount to 24.8 MCHF in payments. In accordance with the machine schedule, the ATLAS detector will be running a full long year in 2011 at Point 1 in data-taking mode. Its performance is being closely monitored and its functionalities constantly checked and maintained. The supporting technical infrastructure remain to be fully operational (e.g. cryogenics, gases, coolants, access operations, cooling and ventilation plant).

<hr/>	
M & O B U D G E T	1. Preliminary M&O Budget Estimate for 2011
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REPORT ELEMENTS	The preliminary 2011 M&O payments for Category-A items are 20.0 MCHF (including energy) and 4.8 MCHF for Category-B items.
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 Budget summary	
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 Activity Description	
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 Table References	The dominant part of the cost in Category-A is providing the required technical services (e.g. detector access, gas systems, heavy handling, crane operations, cooling and ventilation maintenance services, electricity; amounting to 9.6 MCHF). Another cost driver is the operation of the LAr and magnet system at an annual level of 2.2 MCHF. The general support for running the TDAQ system and replacement of equipment is 5.9 MCHF, half of which is foreseen for high-level trigger processor replacements, following three full years of operation. Core computing (infrastructure) services are planned at 2.1 MCHF.
	In the light of the recent changes in the machine schedule calling for a longer shutdown in 2012, and while needing to update some of the information requested by the Scrutiny Group (CERN-RRB-2009-078), the preliminary budget estimates are expected to change before submitting the final 2011 budget in October. These changes are expected to be within 15%, most likely reducing the expenditures.
	In Category-B, the maintenance activities continue at a nominal level, as the detector systems now reach full operation status and become more stable.

The main Category-B cost driver is related to running the detector modules and related electronics (1.4 MCHF). Sub-detector spares amortization are planned at 0.6 MCHF, including previous payment advancements that were arranged internally within ATLAS. Scheduled maintenance work of detector structures and mechanics, including the use of store items, amounts to 0.4 MCHF. The cost of hired technical manpower to run the facilities is estimated at 2.1 MCHF.

The manpower required from institutes for operation expert tasks (OTP), excluding shifts, amounts to 343 man-years. Category-B also includes core computing tasks such as core computing management, software project management, data management and computer operations. An estimated manpower effort of 157 man-years is planned to be provided in full as in-kind contributions.

Figure 1 provides a summary of actual payments up to end of 2009 and a forward look to M&O budget estimates up to 2014. The breakdown between Categories A and B is provided in **Table 3**. It should be noted that the Category-B costs now include only a part of the Insertable b-layer effort (1.5 MCHF), as some Funding Agencies wish their share to be treated separately as project funding.

Table 4 gives the breakdown of the M&O (Categories A and B) budget estimates for 2011.

Table 5 shows the expected contributions for 2011 for each Funding Agency and system (Categories A and B). The Category-A contributions are based on authors holding a PhD or equivalent and are split into two columns; the second column “budgeted” shows the cost sharing including electricity costs and the first column “invoiced” shows the amount to be invoiced to the Funding Agencies, taking into account the energy cost adjustments.

Figure 1. Evolution of M&O Budget up to 2014 (MCHF)

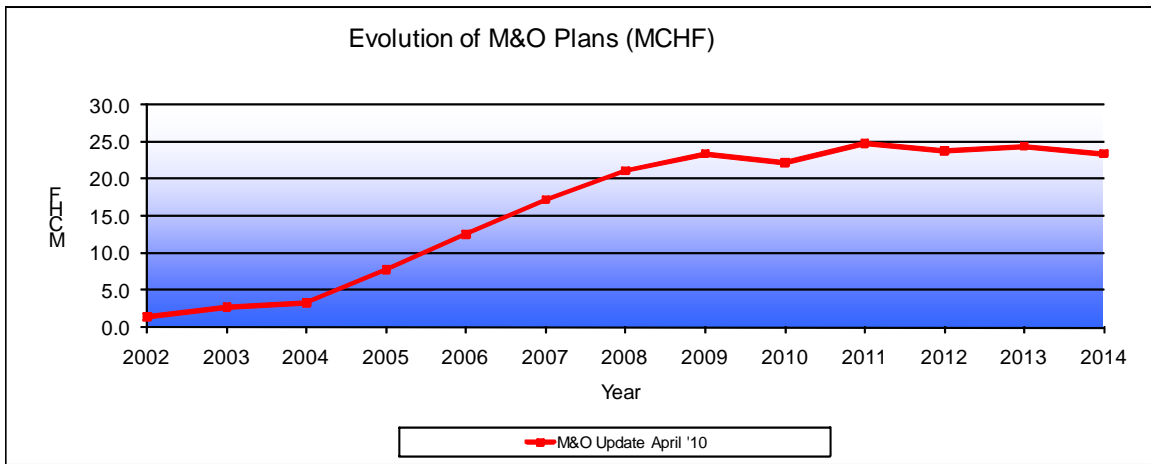


Table 3. Evolution of M&O Budget up to 2014 (MCHF)

M&O BUDGET EVOLUTION (Categories A and B), in MCHF														
	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	Total
Category A	1.0	1.6	2.6	5.6	9.0	10.5	14.3	16.4	16.7	20.0	18.9	20.0	19.0	155.6
Category B	0.4	1.1	0.7	2.2	3.5	6.7	6.8	7.0	5.5	4.8	4.9	4.4	4.4	52.4
Total (A+B)	1.4	2.7	3.3	7.8	12.5	17.2	21.1	23.4	22.2	24.8	23.8	24.4	23.4	208.0

Planned ATLAS M+O (A) and (B) Payments in 2011 (kCHF)

Item & Cost Driver (by RRB SG Headings)	Cat. A									Cat. B	Item & Cost Driver (by RRB SG Headings)	
	M&O	Pixel	SCT	TRT	IDGen	LAr	TileC	Muon	Comp.	M&O		
Detector related costs Cryogenics operations Detector operations	6,503					26	23	100			149	Mechanics, structures, cooling
Secretariat 2 FTE charged to ATLAS Publications, consumables	305	220	305	200	50	240	142	235			1,392	Standard electronics Crates, electronics pool rentals
Collaborative tools GSM phones Computer network connections Videoconferencing, archiving	320					40	16	30			86	Detector controls
Core computing (infrastr. & services) Software process service Central production & operation	2,128											
On-line computing System administration HLT hardware repl., networking	5,600	45	20	30	120	10	61				286	Areas SR1-operations (ID), system tests, lab oper.
Test beams, facilities Evaporative cooling On-line computing support Common electronics	885	1	5		8	5	7	5			31	Communications
Laboratory operations Assembly areas, workshops TDAQ laboratory equipment	125	24	30	30	80	10	23				197	Store items
General services Heavy handling Technical support, storage Survey Outreach Energy	4,110	149				350	116				615	Sub-detector spares (incl. Insertable b-layer)
TOTAL	19,976	439	360	260	258	681	388	370	0	2,756	(Excluding hired manpower for Category B)	
Hired manpower at CERN (in kCHF)	incl. above	199	277	265	315	455	217	330			2,058	
Institute manpower (in FTE)	0	25	22	27	38	67	42	122	157		500	(Excluding shift work)
TOTAL M&O FOR A	19,976	638	637	525	573	1,136	605	700	0	4,814	TOTAL M&O FOR B	

Proposed Sharing of M+O Contributions for ATLAS in 2011 by Funding Agency (kCHF)

4/8/2010

Funding Agency	Category-A items		Category-B items budgeted						Budget	Core comp. Categ.B (FTE)	Authors M&O-A		
	Invoiced*	Budgeted	Pixel	SCT	TRT	IDGen	LAr	TileC	Muon			Total	
Argentina	33	33	0	0	0	0	0	0	2	35	0	3	
Armenia	11	11	0	0	0	0	1	1	0	12	0	1	
Australia	87	87	0	16	0	8	0	0	0	111	1	8	
Austria	47	54	0	4	5	0	3	0	3	69	0	5	
Azerbaijan	33	33	0	0	0	0	1	0	0	34	0	3	
Belarus	65	65	0	0	0	0	0	0	3	68	1	6	
Brazil	76	76	0	0	0	0	0	4	0	80	1	7	
Canada	702	718	0	0	0	0	194	0	0	913	6	66	
Chile	33	33	0	0	0	0	0	0	2	35	0	3	
China NSFC+MSTC	120	120	0	0	0	0	3	0	3	126	1	11	
Colombia	33	33	0	0	0	0	0	0	1	34	0	3	
Czech Republic	281	327	13	2	0	2	0	9	0	353	3	30	
Denmark	75	87	0	0	19	4	0	0	0	111	1	8	
France IN2P3	1038	1208	52	0	0	12	203	60	0	1535	9	111	
France CEA	224	261	0	0	0	0	50	0	21	332	2	24	
Georgia	54	54	0	0	0	0	1	0	1	56	0	5	
Germany BMBF	1468	1709	333	65	0	78	68	0	57	2310	13	157	
Germany DESY	215	250	0	0	0	0	34	0	34	318	2	23	
Germany MPI	280	327	0	28	0	14	30	0	16	415	3	30	
Greece	224	261	0	0	0	0	0	0	13	274	2	24	
Israel	223	229	0	0	0	0	0	0	11	240	2	21	
Italy	1561	1818	172	0	0	40	60	52	168	2310	14	167	
Japan	747	762	0	68	0	40	0	10	89	968	6	70	
Morocco	87	87	0	0	0	0	4	0	0	91	1	8	
Netherlands	280	327	0	21	0	12	0	0	55	415	3	30	
Norway	150	174	0	30	0	17	0	0	0	221	1	16	
Poland	178	207	0	2	6	2	0	0	0	217	2	19	
Portugal	131	152	0	0	0	0	0	8	0	160	1	14	
Romania	142	142	0	0	0	0	0	7	0	149	1	13	
Russia	583	697	0	0	12	3	8	5	6	732	5	64	
JINR	261	261	0	0	1	1	3	4	4	274	2	24	
Serbia	65	65	0	0	0	0	3	0	0	68	1	6	
Slovak Republic	93	109	0	0	0	0	5	0	0	114	1	10	
Slovenia	76	76	0	3	0	1	0	0	0	80	1	7	
Spain	430	501	0	18	0	9	35	74	0	636	4	46	
Sweden	243	283	0	11	26	11	11	17	0	360	2	26	
Switzerland	206	239	0	37	0	19	8	0	0	304	2	22	
Taipei	98	98	2	1	0	1	1	0	0	103	1	9	
Turkey	174	174	0	0	0	0	5	0	4	183	1	16	
United Kingdom	1776	2068	0	281	0	278	0	0	0	2628	16	190	
US DOE + NSF	4380	4452	35	51	310	12	324	287	185	5656	35	409	
CERN	1122	1306	31	0	146	8	80	68	21	1660	10	120	
total	18,105	19,976	638	637	525	573	1136	605	700	24,790	157	1,835	
			System-specific items						4,814				

Notes:

*Invoiced to FAs; includes energy cost adjustments

List of qualified authors with PhD or equivalent (September 30, 2009) used for Category-A

Category-B is based on authors, modulated by CORE contributions

Core computing in Category B expressed in Full-Time-Equivalents (FTE). Figure 0 refers to an effort smaller than 0.5 FTE