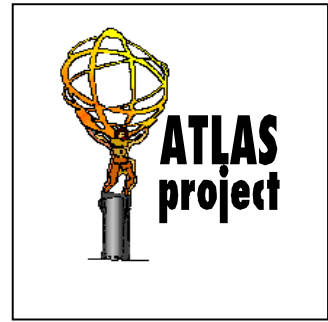


CERN-RRB-2008-035

ATLAS Resources Review Board, April 15, 2008



2007 and 2009 ATLAS M&O Budgets



CERN-RRB-2008-035

ATLAS Resources Review Board, April 15, 2008

For RRB approval




Part 1

Closing Report for 2007 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 2007.

The RRB approved the year 2007 Maintenance and Operation (M&O) budget in October 2006 (CERN-RRB-2006-072) for 11 722 kCHF (Category-A), including cost of energy of 1 470 kCHF, and 6 980 kCHF (Category-B), respectively.

<hr/>	1. M&O Budgets for 2007
M & O B U D G E T	
<hr/>	
REPORT ELEMENTS	
<hr/>	
 Payment Summary	The final M&O payments in 2007 amounted to 10 522 kCHF in Category-A (including energy) and 6 662 kCHF in Category-B. The remaining open commitments amounted to 855 kCHF in total (A+B). The total payments were 523 kCHF less than the budgeted income (i.e. invoices sent out) due to delayed payments in both categories for technical services.
<hr/>	
 Activity Description	
<hr/>	
 Table References	
<hr/>	

In 2007, 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 (5.1 MCHF) as well as operating the cryogenic plants at Point 1 (2.4 MCHF) and operating the TDAQ system (1.5 MCHF). Core computing infrastructure services were also provided for and this amounted to 1.5 MCHF.

The CERN member state share of the energy cost for 2007 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 2007 amounted to 0.5 MCHF (non-member state part).

In Category B, the main costs were related to operation of the gas and electronics systems as well as carrying out repairs in-situ in the ATLAS cavern. The Inner Detector (ID) started operations of all of its sub-systems in the cavern. The Liquid Argon (LAr) system continued operating the barrel and end cap detectors in the ATLAS cavern. The Tile Calorimeter continued operating its electronic systems and the Muons system started operating its chambers. The above activities included the use of gases and coolants and related mechanics (1.9 MCHF), electronics

replacements and pool rentals (0.9 MCHF) and area operation and purchasing of store items (0.6 MCHF). Sub-detector spares were purchased worth 0.4 MCHF. The hired technical manpower supported all these activities (2.9 MCHF).

The value of in-kind contributions in Category-A amounted to 1.1 MCHF and to 0.1 MCHF in Category-B.

As a consequence of the 2007 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 - 0.3 MCHF in Category-A and +0.1 MCHF for Category-B. Due contributions amounted to 1.2 MCHF in Category-A and 0.8 MCHF in Category-B.

For Category-A, the status of contributions (sent invoices less received contributions) are shown in the document "Financial Report", page 6 (CERN-RRB-2008-002).

Table 1 summarizes the 2007 M&O payments per system. The participating institutes provided, as part of their deliverable obligations, 56 man-years for detector-related activities and 87 man-years in core computing tasks.

Table 2 shows the 2007 M&O contributions made for 2007 by the Funding Agencies for each system.

It should be noted that in order for ATLAS to pay for the 2007 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 2007 (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 Cooling systems, power supplies Magnet Cryo Operations	4,203	182	426	840	1	4	420				1,873	Mechanics & Gas & Cooling & Cryogenics Gases (ID, Tiles, Muons)
Secretariat 2 FTE charged to ATLAS Publications, consumables	310	23	11	19	611	117	114				895	Standard electronics Crates, electronics pool rentals
Collaborative tools GSM phones Computer network connections	115	5		3		1					9	Detector controls
Core computing Services	1,475	73	63	22	73	10	32				273	Areas Test-beam activities, system tests (ID)
On-line computing Detector controls Software licences	1,308	1	6	1	10	4	6	5			33	Communications
Test beams On-line computing support TDAQ common electronics	520	125	14	20	97	51	24				331	Store items
Laboratory operations Assembly areas, workshops TDAQ laboratory equipment	113		67	300							367	Sub-detector spares
General services Heavy handling Technical support, storage Survey Outreach Energy	2,478											
TOTAL	10,522	199	360	780	1,042	677	184	539	0	3,781	(Excluding hired manpower for Category B)	
Hired manpower at CERN (in kCHF)	incl. above	302	225	128	530	406	651	639			2,881	
Institute manpower (in FTE)	0	16	20	6	2	2	6	4	87		143	
TOTAL M&O FOR A	10,522	501	585	908	1,572	1,083	835	1,178	0	6,662	TOTAL M&O FOR B	

Notes:

1. Category A are common items charged based on the number of authors holding a PhD or equivalent. Category B is system-specific and is based on CORE sharing.

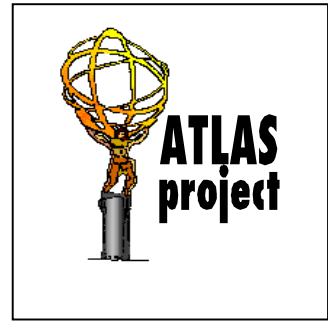
**M+O Contributions (cash and in-kind)
for ATLAS in 2007 by Funding Agency (kCHF)**

12/03/2008

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	8							0	8		
Armenia								0	0		
Australia	79	22		30				52	131	0	
Austria	48							0	48		
Azerbaijan	8							0	8		
Belarus								0	0		
Brazil	47					4		4	51		
Canada	333				128			128	461	3	
China NSFC+MSTC								0	0		
Czech Republic	242	8	5	11		24		47	289	1	
Denmark	69		54	19				73	142		
France IN2P3	545	82		45	191	102		419	964	7	
France CEA	166				87		59	146	313	1	
Georgia	39							0	39		
Germany BMBF	669	172	54	167	42		70	506	1175	3	
Germany DESY	55							0	55	1	
Germany MPI	172	27		36	18		23	103	276	1	
Greece	283						27	27	310		
Israel	124						69	69	194	0	
Italy	1069	189		107	57	63	252	668	1738	6	
Japan	427	109		145			185	439	866	0	
Morocco								0	0		
Netherlands	145	21		32			82	135	281	2	
Norway	69	33		49				82	151	2	
Poland	117	3	12	9				24	141	1	
Portugal								0	0		
Romania								0	0		
Russia	438	3	124	71	63	53	74	388	826	1	
JINR	223		16		15			31	254		
Serbia	32							0	32		
Slovak Republic	69				3			3	72		
Slovenia	47	13		18				31	78		
Spain	269	19		26	25	95		164	434	2	
Sweden	152	24	94	65	16	43		243	395		
Switzerland	152	79		105	11			195	347		
Taipei	63	19	8	21	8			56	119	2	
Turkey	71							0	71		
United Kingdom	925	199		279				478	1403	10	
US DOE + NSF	2228	125	81	223	255	257	173	1351	3580	30	
CERN	904	25	402	191	131	143	41	933	1837	15	
total contributions	10,294	595	725	925	1,679	1,053	700	1,119	6,796	17,090	87
total payments	10,522	501	585	908	1572	1083	835	1178	6,662	17,184	

Notes:

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



CERN-RRB-2007-035

ATLAS Resources Review Board, April 15, 2008

For RRB to take note




Part 2

Preliminary 2009 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 2009.

The first M&O budget estimates for the ATLAS detector in 2009 amount to 23.6 MCHF in payments. In 2009, the ATLAS detector will be in full operation mode at Point 1, its performance being closely monitored and its functionalities constantly checked and maintained. The supporting technical infrastructure will also be fully operational (e.g. cryogenics, gases, coolants, access operations, cooling and ventilation plant).

M & O B U D G E T
REPORT ELEMENTS
 Budget summary
 Activity Description
 Table References

1. Preliminary M&O Budget Estimate for 2009

The preliminary 2009 M&O payments for Category-A items are 16.3 MCHF (including energy) and 7.3 MCHF for Category-B items. The Category-A activities continue to increase in 2008. The main reasons for the increased payments in Category-A w.r.t. the 2008 figures are as follows:

- Increasing use of detector gases, coolants, fluids and other related consumables (moved from M&O-B in 2008) ;
- Operation of the TDAQ system and replacement of installed components (networking equipment, processors).

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 7.8 MCHF). Another cost driver is the operation of the LAr and magnet system at an annual level of 2.5 MCHF. The general support for running the TDAQ system and replacement of equipment is 4.2 MCHF. Core computing (infrastructure) services are planned at 1.8 MCHF. Work is in progress to verify the above cost estimates. Only minor changes are nevertheless expected before submitting the final 2009 budget in October.

In Category-B, an increase in maintenance activities is planned as the detector systems reach full operation status.

The main Category-B cost driver is related to running the detector modules and related electronics (1.6 MCHF), as well as cooling and cryogenics (1.2 MCHF). Sub-detector spares amortization are planned at 1.2 MCHF, including payment advancements arranged internally within ATLAS. The cost of hired technical manpower to run the facilities is estimated at 2.2 MCHF.

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 98 FTEs is planned to be provided in full as in-kind contributions, details yet to be confirmed.

Figure 1 provides a summary of actual payments up to end of 2007 and a forward look to M&O budget estimates up to 2010. The breakdown between Categories A and B is provided in **Table 3**. The Category-B costs include also the replacement of the Pixel b-layer, currently planned to be installed in 2012.

Table 4 gives the breakdown of the M&O (Categories A and B) budget estimates for 2009.

Table 5 shows the expected contributions for 2009 for each Funding Agency and system (Categories A and B). The Category-A contributions are based on authors 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 2010 (MCHF)

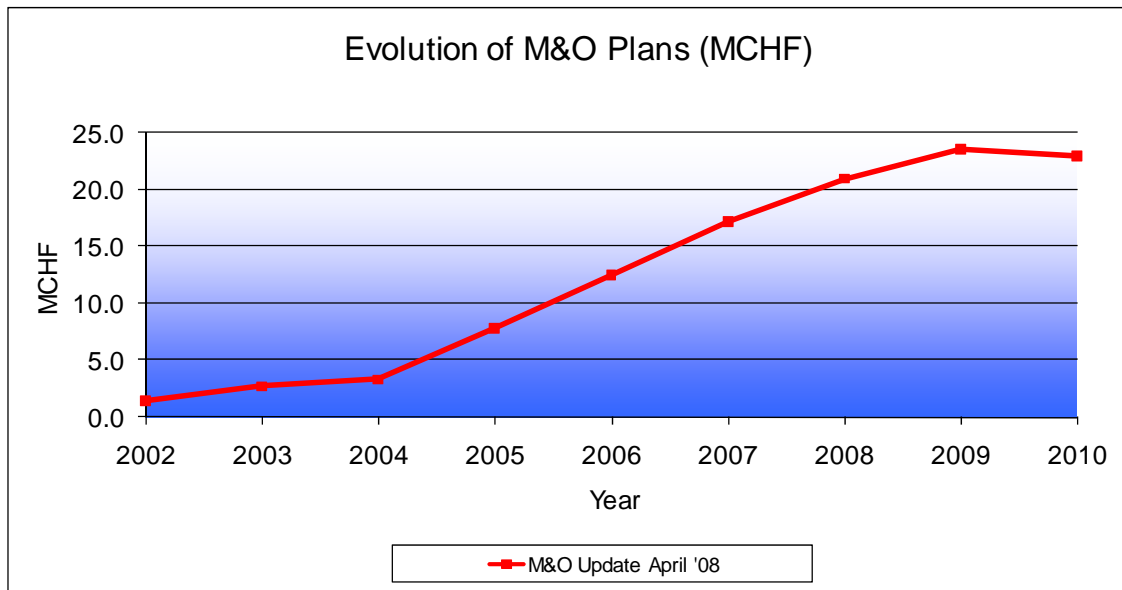


Table 3. Evolution of M&O Budget up to 2010 (MCHF)

	2002	2003	2004	2005	2006	2007	2008	2009	2010	Total
Category A	1.0	1.6	2.6	5.6	9.0	10.5	14.1	16.3	15.5	76.2
Category B	0.4	1.1	0.7	2.2	3.5	6.7	6.9	7.3	7.5	36.3
Total (A+B)	1.4	2.7	3.3	7.8	12.5	17.2	21.0	23.6	23.0	112.5

The status (February 29, 2008) of the signatures for the M&O MoU is given in **Table 6**. The only remaining Funding Agency who has not yet signed the Agreement is Brazil.

Planned 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	5,778		360	364	240	25	24	175			1,188	Mechanics & Cooling & Cryogenics
Secretariat 2 FTE charged to ATLAS Publications, consumables	300	420	100	100	100	605	155	160			1,640	Standard electronics Crates, electronics pool rentals
Collaborative tools GSM phones Computer network connections Videoconferencing, archiving	120		20	25		40	44	30			159	Detector controls
Core computing (infrastr. & services) Software process service Central production & operation	1,824											
On-line computing Detector controls Software licences	4,055	150	100	118	232	15	111				726	Areas SR1-operations (ID), system tests, lab oper.
Test beams, facilities Magnet Cryo Operations On-line computing support TDAQ common electronics	90				5	5	5	5			20	Communications
Laboratory operations Assembly areas, workshops TDAQ laboratory equipment	75	50	37	68		15	30				200	Store items
General services Heavy handling Technical support, storage Survey Outreach Energy	4,052	770				350	76				1,196	Sub-detector spares (incl. b-layer replacement)
TOTAL	16,294	1,390	617	675	577	1,055	445	370	0	5,129	(Excluding hired manpower for Category B)	
Hired manpower at CERN (in kCHF)	incl. above	300	250	100	630	400	192	330			2,202	
Institute manpower (in FTE)	0					2	5	8	98		113	
TOTAL M&O FOR A	16,294	1,690	867	775	1,207	1,455	637	700	0	7,331	TOTAL M&O FOR B	

Proposed Sharing of M+O Contributions for ATLAS in 2009 by Funding Agency (kCHF)

12/03/2008

Funding Agency	Category-A items		Category-B items budgeted							Budget Total	Core comp. Categ.B (FTE)
	Invoiced*	Budgeted	Pixel	SCT	TRT	IDGen	LAr	TileC	Muon		
Argentina	20	20	0	0	0	0	0	0	1	21	0
Armenia	10	10	0	0	0	0		1	0	11	
Australia	100	100	0	30	0	24	0	0	0	154	1
Austria	50	60	0	0	10	0	9	11	2	92	1
Azerbaijan	10	10	0	0	0	0	1	0	0	11	
Belarus	60	60	0	0	0	0	0	0	3	63	
Brazil	60	60	0	0	0	0	0	3	0	63	0
Canada	595	611	0	0	0	0	328	0	0	939	3
Chile	30	30	0	0	0	0	0	0	2	32	
China NSFC+MSTC	100	100	0	0	0	0	2	0	3	105	1
Colombia	10	10	0	0	0	0	0	0	1	11	
Czech Republic	265	320	6	2	0	2	0	6	0	336	2
Denmark	83	100	0	0	41	12	0	0	0	154	1
France IN2P3	761	921	183	0	0	26	222	64	0	1416	6
France CEA	207	250	0	0	0	0	103	0	31	385	2
Georgia	40	40	0	0	0	0	1	0	1	42	
Germany BMBF	853	1031	400	46	0	85	42	0	30	1635	3
Germany DESY	174	210	0	0	0	0	56	0	57	323	1
Germany MPI	232	280	0	49	0	39	41	0	21	431	1
Greece	240	290	0	0	0	0	0	0	15	305	0
Israel	185	190	0	0	0	0	0	0	10	200	0
Italy	1448	1752	553	0	0	85	83	55	166	2693	8
Japan	606	621	0	127	0	100	0	0	107	954	3
Morocco	80	80	0	0	0	0	4	0	0	84	
Netherlands	174	210	0	29	0	27	0	0	57	323	2
Norway	99	120	0	44	0	40	0	0	0	205	2
Poland	124	150	0	1	4	2	0	0	0	158	0
Portugal	116	140	0	0	0	0	0	7	0	147	0
Romania	110	110	0	0	0	0	0	6	0	116	0
Russia	466	591	0	0	9	5	23	4	4	635	2
JINR	320	320	0	0	2	1	5	4	4	337	0
Serbia	40	40	0	0	0	0	2	0	0	42	
Slovak Republic	75	90	0	0	0	0	5	0	0	95	
Slovenia	70	70	0	2	0	2	0	0	0	74	1
Spain	397	480	0	39	0	31	61	127	0	739	3
Sweden	182	220	0	16	44	26	13	19	0	338	0
Switzerland	182	220	0	60	0	48	11	0	0	338	0
Taipei	80	80	2	0	0	1	0	0	0	84	3
Turkey	110	110	0	0	0	0	3	0	3	116	
United Kingdom	1299	1571	0	381	0	463	0	0	0	2416	10
US DOE + NSF	3259	3323	545	13	398	73	290	236	163	5042	30
CERN	1068	1291	0	26	266	115	148	96	21	1964	15
total	14,390	16,294	1690	867	775	1207	1455	637	700	23,626	98
										System-specific items	7,332

Notes:

*Invoiced to FAs; includes energy cost adjustments

List of qualified authors with PhD or equivalent (September 30, 2007) used for Category-A. Chile and Columbia added in March 1, 2008

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

ATLAS M+O MoU Signatures

(Status March 12, 2008)

Funding Agency	Signed Date	Signed by
Argentina	30.01.2008	L. Baraňao
Armenia	02.09.2002	H. Asatryan
Australia	17.10.2003	A. Williams
Austria	02.10.2002	R. Kneucker
Azerbaijan	20.03.2003	N.A.K. Guliyev
Belarus	25.03.2005	Y. Pleskachevsky
Brazil		
Canada	09.09.2002	I. Blain
Chile	10.01.2008	V. Heyl
China NSFC+MSTC	02.08.2002	Wang Naiyan
Colombia	24.01.2008	J.F. Miranda
Czech Republic	20.01.2003	J. Niederle
Denmark	18.08.2004	J.R. Hansen
France CEA	04.09.2002	F. Gounand
France IN2P3	25.09.2002	J.J. Aubert
Georgia	22.08.2002	A.N. Tavkhelidze
Germany BMBF	12.09.2002	R. Koepke
Germany DESY	01.11.2006	R.D. Heuer, C. Scherf
Germany MPI	28.06.2002	S. Bethke
Greece	18.10.2005	I. Tsoukalas
Israel	23.08.2002	D. Horn
Italy	25.11.2002	E. Iarocci
Japan	31.03.2003	H. Sugawara
Morocco	04.02.2004	S. Belcadi
Netherlands	14.11.2002	J. Engelen
Norway	04.09.2002	O.H. Ellestad
Poland	18.10.2004	J.K Frackowiak
Portugal	26.06.2002	A. Trigo de Abreu
Romania	21.04.2004	G. Popa
Russia	26.03.2006	A. Fursenko
JINR	07.08.2002	A.N. Sissakian
Serbia	12.08.2005	A. Popovic
Slovak Republic	26.11.2002	M. Fronc
Slovenia	22.04.2003	Z. Stančič
Spain	19.02.2003	P. Morenés
Sweden	25.11.2002	K. Bremer
Switzerland	02.04.2007	A. Clark
Taipei	12.07.2002	C.J. Chen
Turkey	12.03.2003	N.K. Pak
United Kingdom	24.09.2002	J.F. Down
US DOE + NSF	18.10.2002	T.B.W. Kirk
CERN	04.12.2002	D. Schlatter

Table 6 (Page10)