

CERN-RRB-2005-029

ATLAS Resources Review Board, April 25, 2006



2005 and 2007 ATLAS M&O Budgets



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For RRB approval




Part 1

Closing Report for 2005 ATLAS M&O Budgets

Introduction

The ATLAS management kindly invites the RRB to approve the final M&O payments for 2005.

The RRB approved the year 2005 Maintenance and Operation (M&O) budget in October 2004 (CERN-RRB-2004-123) for 5509 kCHF (Category-A), including cost of energy of 1030 kCHF, and 1970 kCHF (Category-B), respectively.

M & O B U D G E T	
R E P O R T E L E M E N T S	
 Payment Summary	1. M&O Budgets for 2005
 Activity Description	The final M&O payments in 2005 amounted to 5627 kCHF in Category-A (including energy) and 2191 kCHF in Category-B. The remaining open commitments amounted to 340 kCHF in total (A+B). The total payments were 1.0 MCHF higher than the budgeted income (i.e. invoices sent out). This is due to paying all open commitments from the past (dating back to 2003 and 2004). These comprised technical services provided by CERN, mostly in Category-A, including mainly storage costs, heavy handling, energy (distribution), cooling and ventilation, system management, electronics replacements and rentals.
 Table References	

The CERN member state share of the energy cost for 2005 is paid by CERN in full outside the M&O budget and partially for those non-member states contributing to the machine construction. In 2005, the Category-A costs covered the operation of the cryogenic plants at B180 and at Point 1 (1.8 MCHF), operating the TDAQ system set up for the detector systems (0.6 MCHF), and various technical services invoiced by CERN (e.g. cranes operation; site management at Point 1 for e.g. gases, coolants, cooling and ventilation, racks management, ca. 2.5 MCHF). The cost of energy consumption for 2004 and 2005 amounted to 0.7 MCHF.

The Category-A payments include also a supplementary cost of 0.5 MCHF related to an urgent need for additional crane operators and operating the racks at Point 1. This additional cost was offset by savings made elsewhere and it was endorsed by the Chairperson of the RRB and by the M&O Scrutiny Group.

In Category B, the costs were driven by beam-test activities in all ATLAS detector systems. The main costs included the use of gases and coolants and related mechanics (0.5 MCHF), hired technical manpower (0.5 MCHF), store items (0.4 MCHF), electronics replacements and pool rentals (0.3 MCHF), system tests and

laboratory operations (0.2 MCHF),. The Inner Detector focused on its operations of the SR1-building, the Liquid Argon (LAr) system started operating the barrel detectors in the ATLAS cavern. The Tile Calorimeter continued commissioning its electronic systems and the Muons system its system tests for the chambers. Within the Inner Detector, due to re-organization of work, a provision of 53 kCHF was needed for a work package in SCT, initially planned for 2006. The provision will be adjusted within the M&O 2006 budget.

The value of in-kind contributions in Category-A amounted to 285 kCHF and to 30 kCHF in Category-B.

As a consequence of the 2005 payments and amortization of the remaining open commitments from 2003 and 2004, the cumulative budget balance (i.e. difference between the approved budgets and executed payments and open commitments from 2005) amounts to -165 kCHF in Category-A (excluding energy) and +5 kCHF for Category-B. The negative budget position for Category-A is balanced by savings made in energy costs.

For Category-A, the status of contributions (sent invoices less received contributions) are shown in the document "Financial Report", page 10 (CERN-RRB-2006-024).

Table 1 summarizes the 2005 M&O payments per system. The systems utilized hired manpower at 0.5 MCHF and 31 man-years were provided by the participating institutes as part of their deliverable obligations.

Table 2 shows the 2005 M&O contributions made for 2005 by the Funding Agencies for each system.

In October 2001, the RRB agreed to the need for payment advances for certain critical spares which needed to be purchased before 2005 because of availability and cost. The cost of the spares will be amortised between 2007 - 2010. In 2005, no new contribution advancements were made.

It should be noted that in order for ATLAS to pay for the 2005 expenses as well as for the past open commitments dating back to 2003 and 2004, permission was given by the CERN Management at the very end of the year to exceptionally overdraw on the M&O-A accounts while waiting for due contributions.

ATLAS M+O (A) and (B) Payments in 2005(kCHF)

Item & Cost Driver (by RRB SG Headings)	Cat. A	Pixel	SCT	TRT	IDGen	LAr	TileC	Muon	Cat. B	Item & Cost Driver (by RRB SG Headings)
	M&O								M&O	
Detector related costs Cooling systems, power supplies	2,310	77	27	3	144	14	1	200	466	Mechanics & Gas & Cooling & Cryogenics Gases (ID, Tiles, Muons)
Secretariat 0.7 FTE charged to ATLAS Publications, consumables	181	4	18	46	5	45	87	100	305	Standard electronics Crates, electronics pool rentals
Communications GSM phones Computer network connections	20				48				48	Detector controls
On-line computing Detector controls Software licences	528	12	20	22	100		4		158	Areas Test-beam activities, system tests (ID)
Test beams Magnet Cryo Op. in B180 On-line computing support TDAQ common electronics	434						3		3	Communications
Laboratory operations Assembly areas, workshops TDAQ laboratory equipment	93	33	6	42	39	118	32	81	351	Store items
General services Heavy handling Technical support, storage Survey Outreach Energy	2,061					364			364	Sub-detector spares (amortization of critical spares)
TOTAL	5,627	126	71	113	336	541	127	381	1,695	(Excluding hired manpower for Category B)
Hired manpower at CERN (in kCHF)	incl. above		34		353	79	30		496	
Institute manpower (in FTE)	0	6			5	15	1	4	31	
TOTAL M&O FOR A	5,627	126	105	113	689	620	157	381	2,191	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.

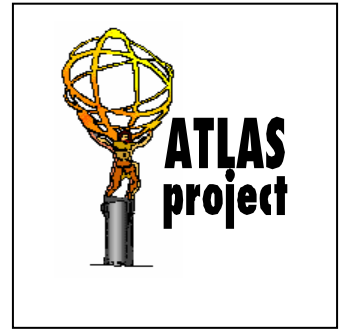
**M+O Contributions (cash and in-kind)
for ATLAS in 2005 by Funding Agency (kCHF)**

3/29/2006

Funding Agency	Cat. A items*	Category B item contributions						Total Cat. B	Total A+B	Critical spares+	
		Pixel	SCT	TRT	IDGen	LAr	TileC				Muon
Armenia							0	0			
Australia		2		13			15	15			
Austria	24						0	24			
Azerbaijan							0	0			
Belarus							0	0			
Brazil	21						0	21			
Canada	143				61		61	204			
China NSFC+MSTC	58				2		2	4	62		
Czech Republic	114	2		5		3	10	124			
Denmark	27		6	9			15	42			
France IN2P3	250	19		20	131	12	182	432			
France CEA	71				42		54	125			
Georgia	25						0	25			
Germany BMBF	260	41	4	75	23		157	417			
Germany MPI	67	2		16	13		36	103			
Greece							0	0			
Israel	60					14	14	74			
Italy	506	45		48	27	7	178	684			
Japan	220		8	65			111	331			
Morocco					2		2	2			
Netherlands	61	2		15			34	95			
Norway	30	2		22			24	54			
Poland							0	0			
Portugal	37						0	37			
Romania	46						0	46			
Russia						15	15	15			
JINR	153						0	153			
Serbia	25						0	25			
Slovak Republic	27				2		2	29			
Slovenia	25	1		8			9	34			
Spain	115	1		11	17	11	40	155			
Sweden	71						0	71			
Switzerland	54	6		47	8		61	115			
Taipei	37	5	1	9	5		20	57			
Turkey	37						0	37			
United Kingdom	381	15		125			140	521			
US DOE + NSF	995	29	6	25	114	123	20	366	1361		
CERN	438	2	45	86	63	17	8	221	659		
total contributions	4,378	141	52	76	688	519	70	225	1,771	6,149	0
total payments	5,627	126	105	113	689	620	157	381	2,191	7,818	

Notes:

- *Following invoices sent to FAs; includes energy cost adjustments
- +Contributions to critical spares approved by the RRB (LAr FEBs)



CERN-RRB-2006-029

ATLAS Resources Review Board, April 25, 2006

For RRB to take note




Part 2

Preliminary 2007 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 2007.

The first M&O budget estimates for the ATLAS detector in 2007 amount to 19.1 MCHF in payments. Before the end of 2007, the entire ATLAS detector will have entered into 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 2007

The preliminary 2007 M&O payments for Category-A items are 11.6 MCHF (including energy) and 7.5 MCHF for Category-B items. The Category-A activities continue to increase in 2007. The main reasons for the increased payments in Category-A w.r.t. the 2006 figures are as follows:

- Operation of the cryogenics plant in Point 1 for the magnet system and LAr cryostat requires large operation teams and technical support;
- 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 5.6 MCHF). Another cost driver is the operation of the LAr and magnet system, including also an urgent repair of a transfer line and possibly of a refrigerator (2.5 MCHF).

Category-A also includes a specific core computing component, comprising infrastructure & services (central computing environment, user support, software process services) and central production & operations. Also for 2007, a constant level of total effort of 16 Full-time-equivalents (FTEs) are planned for the above-mentioned activities, some 10 FTEs of which is expected to be obtained as in-kind contributions. Applying an average cost of 88 kCHF/FTE/year, the activities are budgeted at 1.5 MCHF, also including server replacements.

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

The main Category-B the cost driver is the related to running the detector modules and related electronics (replacements, repairs, charges for the electronic pool rentals) as well as amortization of spare modules and electronics for all the systems (2.7 MCHF). In addition to LAr, critical spares are also obtained by the Inner Detector (TRT) for which a payment advancement has been arranged internally within ATLAS up to 1.1 MCHF (in line with CERN-RRB-2002-023). The amortization of spares will extend to 2010. The cooling, gas and cryogenics operations are planned at 1.3 MCHF. The operation of the Inner Detector SR1-building is planned at 1.0 MCHF. The cost of hired technical manpower to run the facilities is estimated at 2.0 MCHF.

Category-B also includes core computing tasks such as core computing management, software project management, data management and computer operations (Grid, DC). An estimated manpower effort of 63 FTEs is planned to be provided in full as in-kind contributions, details yet to be confirmed.

Table 3 gives the breakdown of the M&O (Categories A and B) budget estimates for 2007.

Table 4 shows the expected contributions for 2007 for each Funding Agency and system (Categories A and B). The Category-A contributions 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 provides a summary of actual payments up to end of 2005 and a forward look to M&O budget estimates up to 2010. The breakdown between Categories A and B are provided in **Table 5**. The Category-B costs include also the replacement of the Pixel b-layer, currently planned to be installed in 2012.

Figure 1. Evolution of M&O Budget up to 2010 (MCHF)

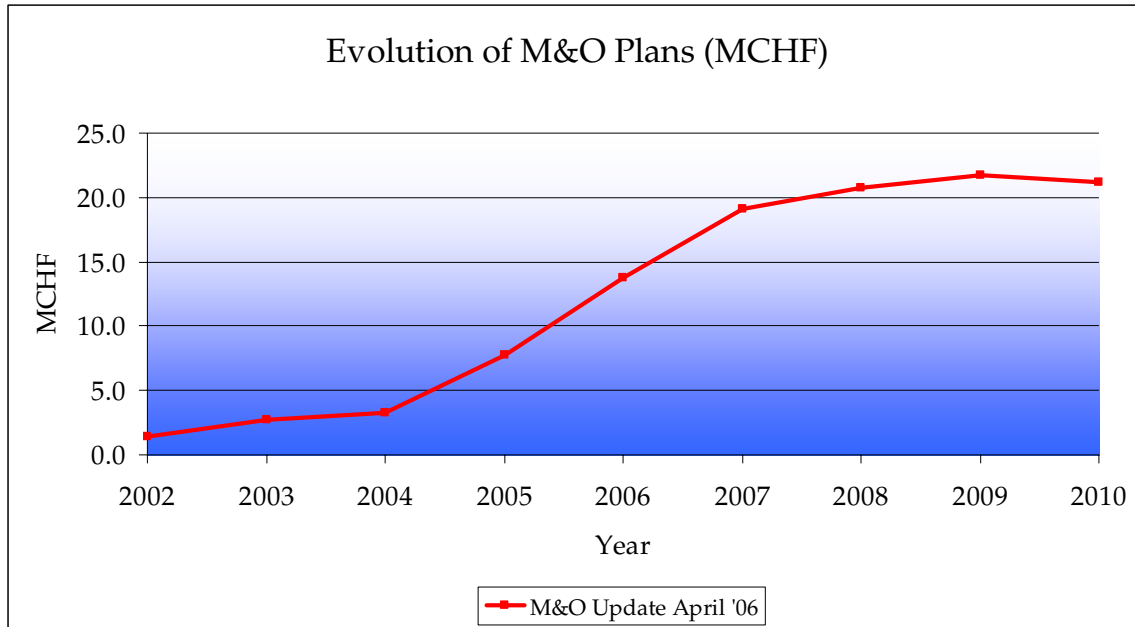


Table 5. Evolution of M&O Budget up to 2010 (MCHF)

	2002	2003	2004	2005	2006	2007	2008	2009	2010	Total
Category A	1.0	1.6	2.6	5.6	9.4	11.6	12.9	13.9	13.9	72.5
Category B	0.4	1.1	0.7	2.2	4.4	7.5	7.8	7.8	7.3	39.2
Total (A+B)	1.4	2.7	3.3	7.8	13.8	19.1	20.7	21.7	21.2	111.7

The status (February 28, 2006) of the signatures for the M&O MoU is given in **Table 6**. The Funding Agencies who have not yet signed the Agreement are: Brazil, Russia and Switzerland.

Planned 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 Cryogenics operations Detector operations	5,098		10	305	285	90	65	530		1,285	Mechanics & Gas & Cooling & Cryogenics Gases (ID, Tiles, Muons)
Secretariat 1.5 FTE charged to ATLAS Publications, consumables	245	315	340	180	45	600	160	310		1,950	Standard electronics Crates, electronics pool rentals
Communications GSM phones Computer network connections Collaborative tools	70	10	20	10	5	30	60			135	Detector controls
Core computing (infrastr. & services) Software process service Central production & operation	1,475										
On-line computing Detector controls Software licences	1,405	30	245	50	643	60	65			1,093	Areas SR1-operations (ID), system tests, lab oper.
Test beams, facilities Magnet Cryo Op. in B180 On-line computing support TDAQ common electronics	180				5	5	5	5		20	Communications
Laboratory operations Assembly areas, workshops TDAQ laboratory equipment	75	40	40	30	50	60	25			245	Store items
General services Heavy handling Technical support, storage Survey Outreach Energy	3,019	350	137	270			25			782	Sub-detector spares
TOTAL	11,567	745	792	845	1,033	845	405	845	0	5,510	(Excluding hired manpower for Category B)
Hired manpower at CERN (in kCHF)	incl. above	100	108	50	622	600	192	330		2,002	
Institute manpower (in FTE)	0						5	10	63	78	
TOTAL M&O FOR A	11,567	845	900	895	1,655	1,445	597	1,175	0	7,512	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.

Proposed Sharing of M+O Contributions for ATLAS in 2007 by Funding Agency (kCHF)

3/29/2006

Funding Agency	Category-A items		Category-B items budgeted							Budget	Core comp. Categ.B (FTE)
	Invoiced*	Budgeted	Pixel	SCT	TRT	IDGen	LAr	TileC	Muon	Total	
Armenia	18	18	0	0	0	0	0	3	0	21	
Australia	62	61	0	28	0	29	0	0	0	118	2
Austria	46	53	0	0	0	0	0	0	0	53	1
Azerbaijan	62	61	0	0	0	0	0	0	0	61	
Belarus	53	53	0	0	0	0	0	0	0	53	
Brazil	44	44	0	0	0	0	0	3	0	47	0
Canada	304	307	0	0	0	2	169	0	0	478	0
China NSFC+MSTC	123	123	0	0	0	0	5	0	8	136	
Czech Republic	237	272	11	6	0	10	0	18	0	317	0
Denmark	46	53	0	0	52	19	0	0	0	123	1
France IN2P3	575	657	116	0	0	44	279	75	0	1172	5
France CEA	145	166	0	0	0	0	115	0	59	341	1
Georgia	35	35	0	0	0	0	0	0	0	35	
Germany BMBF	567	648	245	67	0	164	55	0	70	1249	2
Germany MPI	161	184	0	34	0	35	27	0	23	302	
Greece	184	210	0	0	0	0	0	0	27	237	
Israel	129	131	0	0	0	0	0	0	69	201	1
Italy	1112	1271	269	0	0	105	75	46	252	2018	5
Japan	470	473	0	136	0	142	0	0	185	935	
Morocco	70	70	0	0	0	0	3	0	0	73	
Netherlands	130	149	0	26	0	32	0	0	82	289	1
Norway	76	88	0	41	0	48	0	0	0	176	1
Poland	76	88	0	4	12	8	0	0	0	112	
Portugal	99	114	0	0	0	0	0	36	0	150	1
Romania	105	105	0	0	0	0	0	11	0	116	
Russia	553	596	0	4	119	70	83	39	74	984	0
JINR	263	263	0	0	16	11	28	28	48	393	
Serbia	35	35	0	0	0	0	0	0	0	35	
Slovak Republic	61	70	0	0	0	0	5	0	0	75	
Slovenia	53	53	0	17	0	17	0	0	0	87	
Spain	291	333	0	24	0	25	36	70	0	488	1
Sweden	161	184	0	30	92	64	24	32	0	425	1
Switzerland	146	166	0	98	0	102	17	0	0	384	
Taipei	70	70	27	10	0	21	11	0	0	139	0
Turkey	70	70	0	0	0	0	0	0	0	70	
United Kingdom	928	1060	0	246	0	272	0	0	0	1579	5
US DOE + NSF	2128	2138	177	100	216	249	340	129	238	3587	24
CERN	959	1095	0	31	389	186	174	106	41	2022	12
total	10,647	11,567	845	900	895	1655	1445	597	1175	19,079	63
			System-specific items						7,512		

Notes:

*Invoiced to FAs; includes energy cost adjustments

Updated list of qualified authors with PhD or equivalent (September 26, 2005) used for Category-A

Category-B is based on 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 February 28, 2006)

Funding Agency	Signed Date	Signed by
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
China NSFC+MSTC	02.08.2002	Wang Naiyan
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 MPI	28.06.2002	S. Bethke
Greece	20.09.2005	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		
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		
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