

M&O Scrutiny Group Report to LHC Resources Review Boards

12 – 14 October 2009

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DESY

Composition of the Scrutiny Group for 2009:

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Christinel Diaconu	(Marseille)
George Ginther	(FNAL, Rochester University)
Bernd Löhner	(DESY, Chair)
Gerhard Mallot	(CERN)
Emmanuel Tsesmelis	(CERN)
Michał Turała	(INP PAN Cracow)
Scientific Secretary: Sascha Schmeling (CERN)	

Task of the Scrutiny group:

The RRB shall be assisted by a Scrutiny Group that will analyze critically the Collaboration's M&O reports and estimates, refine the Category A estimates in consultation with the Collaboration and advise the RRB on the course of action to take.

Activities of the SG in 2009:

Meetings held:

- 8 face-to-face and 2 telephone conference meetings between scrutiny group members and the LHC experiments;
- 2 meetings of the scrutiny group .

Documents to be worked on:

- > 60 documents produced by the LHC experiments;
- minutes of the 10 meetings with several versions each;
- enormous amount of e-mail exchanges with proposed changes to the minutes.

Many thanks to my colleagues in the scrutiny group for their hard work and to all resource coordinators for their cooperation.

Some Introductory Remarks

The LHC experiments have now essentially **completed** their **commissioning**.

Longer time periods with **stable operation** of the experiment, although without beams.



Discovery of 'weak points' and **necessary improvements**.

No real beam operation yet.



Some quoted **costs**, e.g. gas consumptions, are still **initial estimates** which will have to be reviewed after experience with beam operation.

Projects which were planned already earlier, but have been **deferred until after the completion** of the experiment's construction, are being **started now**.

Due to the changed **LHC schedule** some **changes of the costs** in certain areas have to be **expected for 2009** w.r.t. agreed budget.

ALICE

ALICE closing Report 2008:

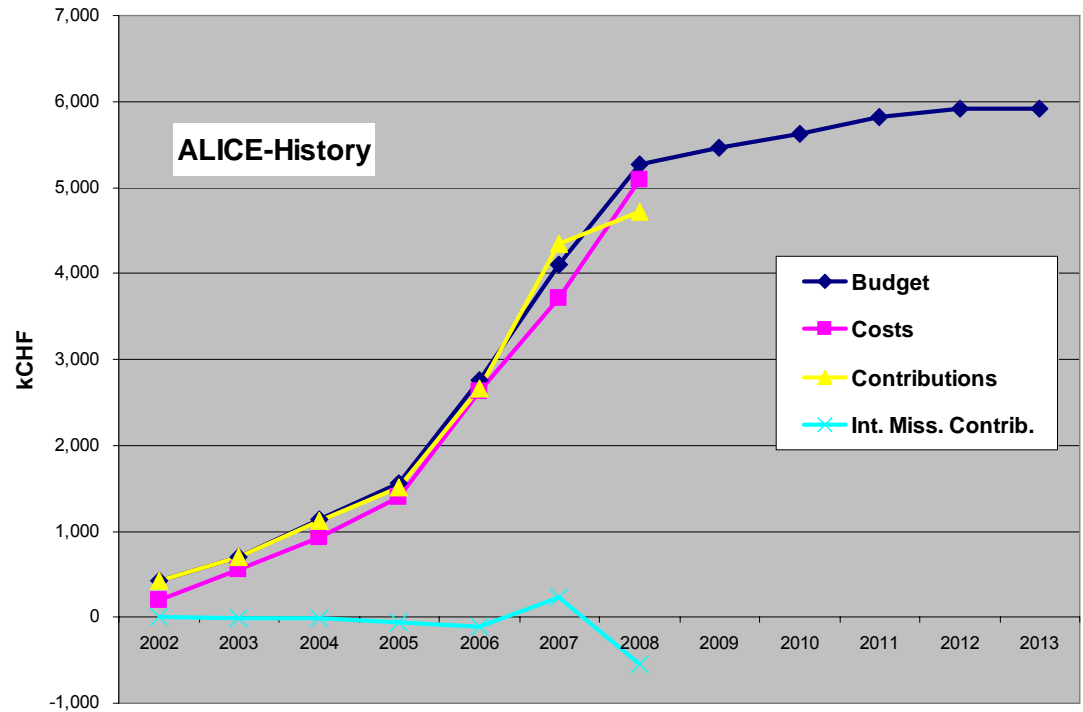
Actual costs 5088 kCHF
Budget 5266 kCHF

Including power costs for
Non-member states

ALICE request for 2010 M&O A and projections to 2013:

Including full power costs

Year	2010	2011	2012	2013
Budget [kCHF]	7,209	7,400	7,500	7,500



Most costly level-2 items:

- on-line computer replacement
- shutdown activities : MiniFrame support, floor rail repair, temporary support of ID.

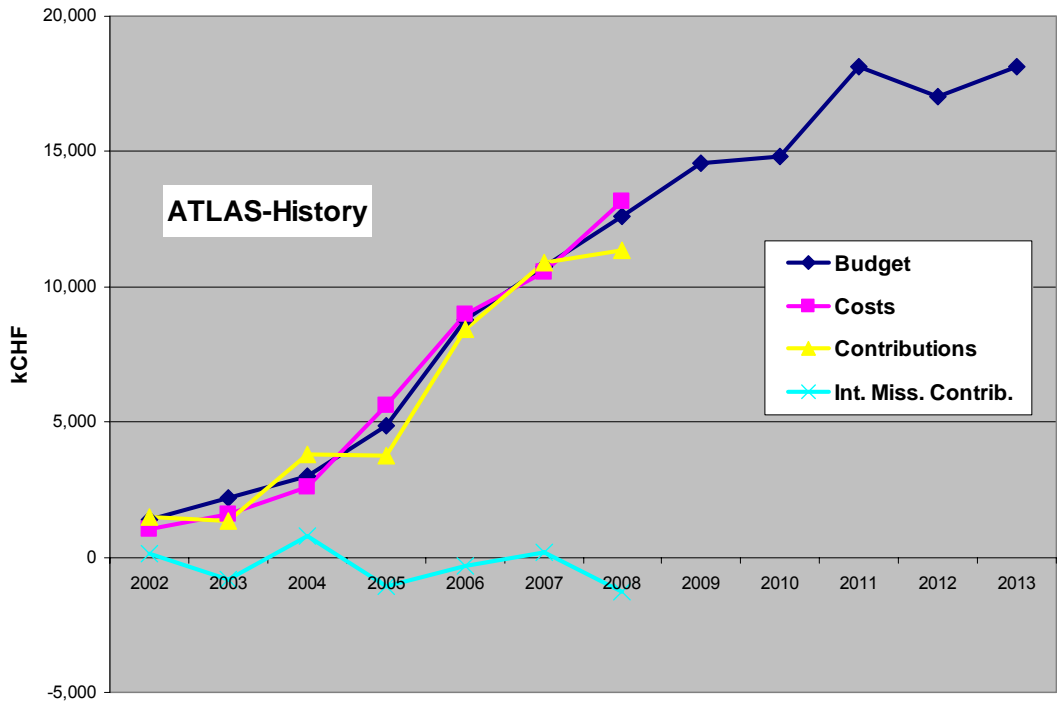
ATLAS

ATLAS closing Report 2008:

Actual costs **13,166 kCHF**
 Budget **12,628 kCHF**

Including power costs for Non-member states

ATLAS request for 2010 M&O A and projections to 2014:



Including full power costs

Year	2010	2011	2012	2013	2014
Budget [kCHF]	16,661	19,976	18,866	19,971	19,006

Major points of discussions in the scrutiny process:

- Insertable B-Layer in the budget proposals
- Inner Detector Cooling : compressors in the budget proposals
- Inner Detector Cooling : distribution racks not yet in the budget proposals
- Magnet cooling : compressors in the budget proposals but cost neutral

ATLAS (cont. 1)

Insertable B-Layer (IBL):

Initially replacement of radiation damaged pixel detector layer, now partly an upgrade; includes modifications of beam pipe, partly new Beryllium pipe, and new tooling for removal and re-installation.

Proposed funding via: M&O A (4,065 kCHF), M&O B (5,480 kCHF), and new project money from newly joining institutions (1,200 kCHF).

M&O A contribution to IBL	2010	2011	2012	2013	2014
[kCHF]	180	940	1,050	995	900

M&O A contribution in 2010 is for beam-pipe tooling

Inner Detector (ID) cooling compressors:

The existing compressors do not guarantee a reliable operation; uninterrupted cooling of ID is necessary once radiation damage has reached a certain level (about 3 years of operation with beams).

A new technical solution is being worked out.

M&O A contribution to compressors for ID	2010	2011	2012	2013	2014
[kCHF]	420	380	410	370	20

Inner Detector (ID) cooling distribution racks:

The present arrangement of the distribution of cooling fluid does not enable cooling to sufficiently low temperatures; heaters of the evaporative cooling system have to be replaced and integrated in the distribution racks.

Plans for technical solutions are under discussion → costs not yet included in budget proposal but are likely to appear in the future

ATLAS (cont. 2)

Magnet cooling compressors:

Compressor for magnet cooling are single point of failure. They will be upgraded to higher performance and one spare compressor will be installed. Total costs of 1,200 kCHF will be covered by redirecting initially foreseen 320 kCHF per year for additional LN2 of magnet to this project. The additional LN2 cooling is not necessary.

Additional manpower:

Two additional FTEs are requested for

- replacement of one person who will leave the IT department. His task for ATLAS will have to taken over by the Collaboration;
- one person for the support of “Production and Distributed Analysis (PanDA) “ servers which have been moved from BNL to CERN.

One FTE for On-line Database support requested by the IT department.

Indexing

ATLAS proposes a onetime indexing of 3% for support persons paid via M&O A through CERN.

ATLAS (cont. 3)

ATLAS M&O B

Closing report for 2008: spent (excl. FTEs) 6821 kCHF to be compare to budgeted 6866 kCHF.

Request for 2010 and projections 2011-2014:

ATLAS M&O B	2010	2011	2012	2013	2014
Totals (excl. FTEs) [kCHF]	5,501	5,766	5,716	5,311	4,511

The SG's recommendation concerning ATLAS:

The SG recommends the approval of the ATLAS closing reports for M&O A and M&O B of 2008.

The SG recommends the approval of the M&O A budget request for 2010 under the following conditions:

- the IBL is not yet a formal project; it should be reviewed by the LHCC and a written report should be presented to the RRB prior to approval;
- the technical solution of the new compressor system for the Inner Detector cooling has not yet been worked out; once a new concept will exist, it should be reviewed by the LHCC and a written report should be presented to the RRB.

The SG recommends the approval of the M&O B budget request for 2010.

Additional remark: should the ATLAS Collaboration decide to upgrade the Inner Detector cooling rack system, the SG recommends a review of the solution by the LHCC prior to approval by the RRB.

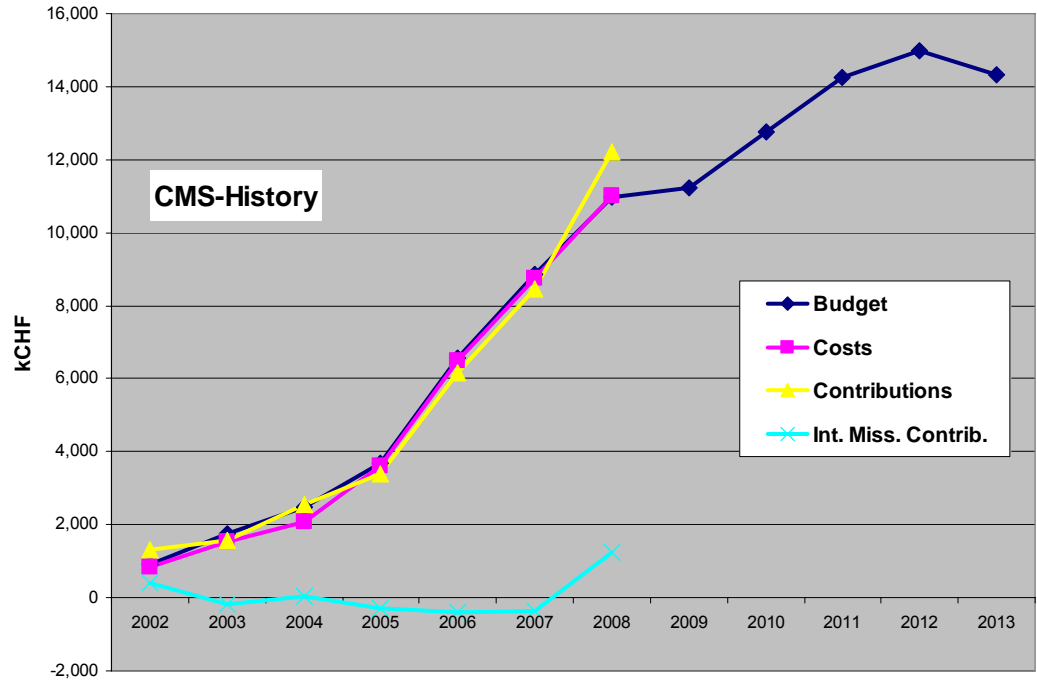
CMS

CMS closing Report 2008:

Actual costs 10,982 kCHF
 Budget 11,011 kCHF

Including power costs for
 Non-member states

CMS request for 2010 M&O A and projections to 2013:



Including full power costs

Year	2010	2011	2012	2013
Budget [kCHF]	13,711	15,261	15,945	15,309

Increase in 2010 and following years mostly due to hardware for on-line computing, assembly area, engineering integration center, and electronics and electrical integration center.

Major points of discussions in the scrutiny process:

CMS Operational Support Centre (OSC)
 Engineering Integration Centre (ENIC)
 Electronic and Electrical Integration Centre (ELIC)

CMS (cont. 1)

CMS Operational Support Centre:

OSC to be installed in SX5 building and surrounding barracks. It will contain
Swiss Class C radiation laboratories,
buffer zone for temporary storage during shutdowns,
semi-clean room for gas-ionization chambers,
logistics areas for CMS and TOTEM.

To be built in 4 phases. First phase is needed for the first shutdown after start of beam operation.

Engineering Integration Centre:

Already existing, funded so far from Cost to Completion. Planned to be M&O A funded in the future.

It provides

assistance for maintenance, consolidation and upgrade projects,
coherence with Electronic and Electrical Integration,
maintenance of the as-built model of CMS and CAD translations,
Equipment Management Database, in particular for beam exposed equipment.

Costs are planned to be shared between CERN, collaborating institutes, M&O A and upgrade funds.

Electronic and Electrical integration Centre:

To be established in building 904. The purpose is
test bed for burn-in of equipment to be installed or reinstalled,
validate Trigger and DAQ chain modifications.

CMS (cont. 2)

Proposed M&O A contributions to OSC, ENIC and ELIC and anticipated spending profile

Year	2010	2011	2012	2013	SUM
OSC	499	390	155	120	1164
ENIC	317	237	237	217	1008
ELIC	445	167.5	167.5	167.5	947.5
SUM	1261	794.5	559.5	504.5	3119.5

The M&O A costs for these projects are, however, evenly distributed over the years 2010-2013. They appear under the headings “Assembly Areas, clean rooms” (A.6.01) with 580 kCHF/year and “Reviewing and Engineering” (A.7.11) with 200 kCHF/year.

The SG received information on these projects as detailed as level-2 item but only on 1 September. Therefore the proposed M&O A contributions to the OSC, ENIC and ELIC could not be scrutinized.

The SG’s recommendation concerning CMS:

The SG recommends the approval of the CMS closing report for M&O A of 2008.

The SG recommends the approval of the M&O A budget request for 2010 but it points out that the SG was not able to scrutinize the request of 780 kCHF for the OSC, ENIC and ELIC projects. The SG recommends further that the OSC, ENIC and ELIC projects be reviewed by the LHCC.

LHCb

LHCb closing report 2008:

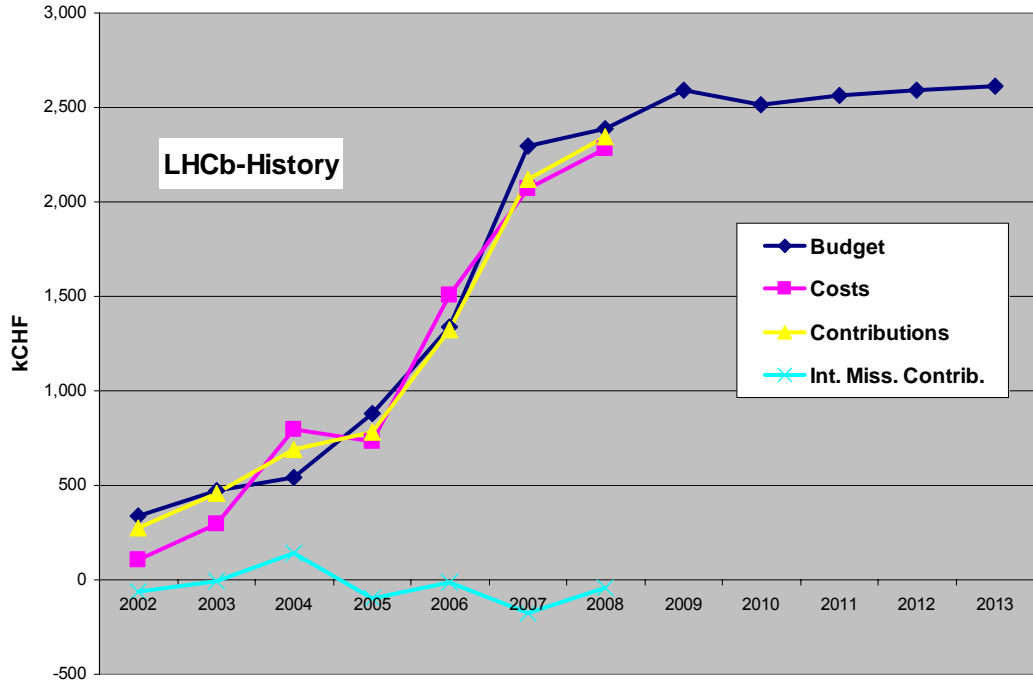
Actual costs 2,281 kCHF
 Budget 2,386 kCHF

Including power costs for
 Non-Member States

LHCb requests for 2010 M&O A
 and projections to 2013:

Including full power costs

Year	2010	2011	2012	2013
Budget[kCHF]	3,112	3,530	3,560	3,585



LHCb Operational Model foresees to buy on-line processors “just in time”.
 Nevertheless, the budget projections are kept almost flat.

The LHCb Collaboration asks the RRB to keep an eventual underspend for later purchase of on-line processors.

SG recommendations concerning LHCb:

The SG recommends the approval of the LHCb closing report for 2008 and the M&O A budget request for 2010.

TOTEM

TOTEM closing report 2008:

Actual costs 381 kCHF
Budget 463 kCHF

No power costs arise for
the TOTEM experiment

Underspend mainly because of
late arrival of money in 2008.
Foreseen items are being purchased in 2009

TOTEM requests for 2010 M&O A and projections to 2012:

YEAR	2010	2011	2012
[kCHF]	448	440	440

TOTEM provided the SG with an Operational Model:

- power costs are included in the CMS budget;
- operation and consumables for cooling are handled via contracts with EN-CV;
- operations and consumables for the gas system are managed via contracts with DT;
- necessary resources for computing are provided through the IT department.

SG recommendations concerning TOTEM:

The SG recommends the approval of the TOTEM closing report for 2008 and the M&O A budget request for 2010.

Collaborative Tools

The discussions about Collaborative Tools concentrated around the EVO service.

EVO system is being operated by CALTECH. It was funded in the past by DOE and NSF, this support has been stopped.

The CERN community uses ~ 70% of the total EVO service provided by CALTECH.

Now CALTECH charges costs to CERN according to “real usage” and CERN IT department distributes costs to users.

$$\text{Real usage} = \# \text{ of meetings} * \text{duration of meeting} * \# \text{ of participants}$$

Requested contributions for 2009:

User community	Real Usage	Charge
CMS	51.617%	304540.3\$
ATLAS	31.165%	183873.5\$
ALICE	8.765%	51713.5\$
LHCb	5.843%	34473.7\$
WLCG	1.967%	11605.3\$
NA49	0.448%	2643.2\$
EGEE	0.195%	1150.5\$

CERN IT department has set up a pilot project to evaluate alternative solutions. Results are expected by end 2009.

A LHC Collaborative Environment Board (LCEB) has been installed and reached agreement between the LHC experiments and CERN/IT strategy, technical choices and service level.

The LHC experiments, except TOTEM, included contributions For EVO or an alternative in the 2010 budget request.

The SG endorsed these requests, although it is not clear from the MoUs that this is a pure M&O A item. The SG recommends that in the future necessary payments should be made on the basis of a clear funding model which has to be agreed upon between CERN and the funding agencies.

Service Level Agreements

New contracts have been signed for electrical distribution and cooling & ventilation. The Service Level Agreements date back to 2007 and have to be updated.

ALICE:

Maintenance costs for gas-sniffers will increase (see ATLAS below).
Service Level Agreement for on-line computing is under preparation.

ATLAS:

Costs for gas-sniffer maintenance increases in 2011 due to replacement of pumps.
In 2014, the smoke detector will have to be replaced.

A Service Level Agreement has been completed for WEB-casting.

CMS:

A service Level Agreement for the Access System has not yet been produced.

ATLAS gas-sniffer maintenance costs		
Annual Maintenance Costs		
	Description	ATLAS
2009	Consumables & components	€ 19,391
	Maintenance lump sum	€ 57,527
	TOTAL	€76,918
2010	Consumables & components	€ 40,792
	Maintenance lump sum	€ 59,842
	TOTAL	€100,634
2011	Consumables & components	€ 75,120
	Maintenance lump sum	€ 62,834
	TOTAL	€137,954

M&O CATEGORY C

The SG has been asked to look into M&O Cat C. The SG has no clear mandate for this. The SG understands that mainly as a discussion with the LHC experiments about their needs and expectations from M&O C.

Category C items: Defined in **Memoranda of Understanding**

Safety & Radiation Protection, INB Compliance, Radioactive Waste Removal, Access System, Elevators, Gerant de Site, Flood Control, Insurance (CERN standard), Cleaning, Office Space.

Points from discussion with LHC experiments:

- LHC experiments are concerned that they are increasingly being asked to pay for items which they believe to be the host laboratory responsibility;
- more detailed definitions of existing category C headings are needed;
- M&O C cost estimates need to be evaluated and projected over a 5 years period;
- funds for the M&O C services have to be provided in a Medium Term Plan;
- a procedure for updates of the agreements has to be established.

The LHC experiments expressed their opinions that an accord based on Service Level Agreements or MoUs between CERN and the LHC experiments should be developed.

It was agreed that ATLAS should serve as a test-case for a M&O C Memorandum of Understanding or Service Level Agreement.

Other Issues

The present model for hardware replacements in on-line computing foresees an exchange of processors every three years.

The DRC, Sergio Bertolucci, and the SG have questioned the validity of this model.

The DRC will convene a meeting with the experiments around summer 2010 to review the model after some experience has been gained with beam operation.

The SG pointed out that getting “in-kind contributions” from institutions for well defined collaboration tasks could be the right solution to get skilled people and save money.

Composition of the Scrutiny Group in 2010

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