Summary of Expenditure for CMS Construction for the Period from 1995 to 2006

INTRODUCTION

From 1995 to 1997, the CMS Collaboration worked on R&D, design, prototyping and pre-industrialization as required to accomplish the set "Milestones" and to submit the Technical Design Reports; this period was covered by the Interim Memorandum of Understanding.

In 1998, once the CMS Memorandum of Understanding for the Construction (MoU) had been signed by most of the CMS Funding Agencies, the detector construction started, apart from Tracker and Trigger/DAQ.

An amendment to the MoU was presented to the October 2000 RRB for the Tracker, and approved. By the end of 2000, the Tracker construction started. The Technical Design Report (TDR) for the Trigger was submitted in December 2000 and its construction started soon after.

The TDR for the Data Acquisition was submitted in December 2002 and its construction started as soon as the TDR was approved by the LHCC (May 2003).

The Cost to Complete of CMS has evolved since October 2000 and the RRB has been kept informed of the changes. The cost estimates used in the following tables are the ones presented to this board in April 2005. The funding figures used in the following tables are based on the latest available information for the MoU, CtC and CtC2 with Steps 1, 2 and 3 being kept separate, as presented in the CMS Status Report (cf. CERN-RRB-2007-023).

By the end of 2006, the total commitments reported reach 95% of the current cost estimate while payments total to 89%.

This document only contains expenditure for items listed in the CMS Cost Estimate Version 9 breakdown, that is the reference for the CMS MoU. The cost estimate figures are presented at **current prices**. For ease of comparison with the values of deliverables shown in the MoU, payments and commitments in expenditure statements are detailed to the same level as for the MoU (Level 3 of Cost Estimate). Note that all expenditure in the present report, as for past reports, is shown at **current prices**.

The expenditure compiled in this document has been gathered from a large number of participating institutes, which manage their budgets according to their own policy of making commitments. In this report “commitment” is understood as the total amount for which commercial contracts or any other legally binding documents were signed. Some institutes prefer to report payments only, in which case “commitments” are assumed to be equal to the reported “payments”. This implies that whilst all payments figures are precise in this report, the total level of financial commitments is likely to be larger than that shown herein.

1. COMMITMENTS

A detailed overview of all the financial commitments (expenditure) for items or activities covered by the CMS Memorandum of Understanding is compiled in **Annex 1.**

Annex 1.A gives the summary of the commitments by Funding Agency to each subdetector.

Annex 1.B further shows the individual commitments made by the different Funding Agencies/institutes for procurements through their institutes ("payments to contracts") or for "in-kind contributions", as well as their total commitments (including payments to the Common Funds).

1.1 Magnet, Offline Computing and Commissioning & Integration (Common Funds)

Magnet: The remaining open commitments in 2006 mainly concerned the re-installation of the cold box in the USC after the magnet test (contract with Air Liquide, France) and for the rental of the 2000 t crane for the lowering of CMS (so called "heavy lifting" contract with VSL, Switzerland).

Smaller amounts remain committed in relation with the re-installation of the Coil and its services (control, power supply and racks in particular) in the USC and UX.

Offline: Offline Computing provides a central service servers and software for the entire CMS Collaboration.

C&I: The year 2006 was the fifth and the last one for Commissioning and Integration (C&I). The work has concentrated on completion on items covered by C&I: surface commissioning facilities, detector access and specific installation, and only payments for carried over commitments will be executed in 2007.

1.2 Sub-detectors and Infrastructure

Tracker: For the Strip Tracker, essentially all procurements have been completed in 2006, together with the corresponding commitments; with the exception of those concerning cables and power supply systems, which will be completed during 2007. Additional commitments were created for the Barrel and Forward Pixel sub-detectors, which have now entered the full production phase.

Electromagnetic Calorimeter (ECAL): After the important commitments from 2005, the year 2006 has seen much lower new commitments. These included the Low Voltage Power Supplies, for Barrel and Endcaps (2.7 MCHF) and the Endcaps Optolinks (1MCHF).

The remaining commitments concern the Endcaps: namely an order for 5500 crystals, Off-detector Electronics and Mechanical parts.

Hadron Calorimeter (HCAL): total commitments for HCAL by the end of 2006 include essentially all mechanics, optics, photodetector, front-end and readout electronics costs. Only some small installation and cabling costs remain uncommitted.

Muon Detector: the total commitments are now 99% of the funding available. Major 2006 commitments cover:

- Drift Tubes procurements and mass production of the electronics,
- readjustment of HV and LV commitments, and cabling expenses,

- Barrel Resistive Plate Chamber procurements electronics and installation,
- Muon system alignment.

Trigger and Data Acquisition: The CMS Trigger/DAQ project is proceeding on schedule according to the CMS planning.

In 2006, the final construction of trigger hardware was undertaken. Expenditure relative to RPC Trigger components was pursued.

The production of all the components for the DAQ readout system (FRL, FMM) and the purchase of all underground control PCs were done in 2006

Infrastructure: Open commitments are still connected with fire protection system, the cooling plant, the vacuum chamber, with the electrical distribution system. In particular, the low voltage system has been fully committed. Other two contracts, which have still open commitments, are for the Cooling plant in the USC and for the Gas piping distribution.

2. PAYMENTS

A detailed overview of all payments for items or activities covered by the CMS MoU is given in **Annex 2**.

Annex 2.A gives the summary of the payments by Funding Agency to each subdetector.

In addition to the origin of payments to the Common Funds, **Annex 2.B** also shows the payments made by the Funding Agencies/Institutes for procurements through their institutes to Common Projects as well as their total payments (including the payments to the Common Funds).

2.1 Magnet, Offline Computing and Commissioning & Integration (Common Funds)

Magnet: the final payments mostly concerned the payments for the "heavy lifting crane" contract as well as the payments related to the Protocol of collaboration with CEA Saclay.

Smaller payments were related to the assembly and testing of the coil at SX5.

Offline: the major payments made in 2006 were in the areas indicated in the commitments section above.

C&I: the major payments made in 2006 were in the areas indicated in the commitments section above.

2.2 Sub-detectors and Infrastructure

Tracker: For the Strip Tracker, essentially all procurements have been completed in 2006, together with the corresponding payments; with the exception of those concerning cables and power supply systems, which will be completed during 2007. Substantial payments have been made for the Barrel and Forward Pixel sub-detectors, which have now entered the full production.phase.

Electromagnetic Calorimeter (ECAL): In 2006, the Barrel Electromagnetic Calorimeter has been the object of an intense construction activity. The payments for ECAL construction amount to 24.2 MCHF.

Half of this sum went towards the procurement of Barrel crystals (12 MCHF). The year 2007 should see the last and much lower payment for the Barrel crystals.

The other noticeable payments concern:

- the Barrel Electronics (5.1 MCHF), including High Voltage power supplies and Off detector Electronics.
- the Barrel Mechanics (1.8 MCHF), with the new cooling elements of the Barrel modules.
- the Preshower (1.8 MCHF), particularly for Sensors and Electronics.

Hadron Calorimeter (HCAL): In 2006 the largest payments were for fiber optic cable, readout electronics, power supplies, and detector control and safety systems.

Muon Detector: the major payments made in 2006 were in the areas indicated in the commitments section above.

For ME1/1, commissioning of all chambers on the positive endcaps has been completed, and for negative it is in the progress. A 60 degree sector of endcap chambers successfully participated in MTCC. Positive endcap has been lowered into underground cavern.

For the Forward RPC's, a major payment was for the LV/HV power supplies paid by Pakistan.

The Barrel RPC has been completed and is now in the integration phase.

Trigger/Data Acquisition: the 2006 payments arose from works initiated during the same year and detailed in the Commitments section above.

Infrastructure: payments for infrastructure have followed the installation of CMS and some delays in payments are related with the slippage of installation activities. The payments have also been related to the completion of the installation of services underground. In particular, the installation of racks and the electrical distribution in the USC. These expenses will be carried over in 2007 to complete the installation.

3. SUMMARY AND COMPARISON WITH THE COST ESTIMATES

A detailed overview of the expenditure (commitments and payments) is compared with the current cost estimate in **Annex 3.** This shows that some *xx%* of the latest cost estimate has been committed.

We can also observe that the level of commitments for the various CMS subprojects is a fair reflection of the state of progress.

4. PLURI-ANNUAL COMMITMENTS AND PAYMENTS

Annex 4 and **Annex 5** show the pluri-annual evolution of Commitments and Payments, respectively. The bars (left axis) depict annual data and the curves show cumulative data. Note that the figure given for the year 2007 is the budget as approved by the October 2006 RRB (cf. CERN-RRB-2006-088).

The figure given for the year 2008 is the one from the document Preliminary Draft Budget for 2008 (cf. CERN-RRB-2007-025).

Annex 4 indicates that the present level of commitments is very much in line with what was planned early in 2006 (520 MCHF committed vs. 526 MCHF forecast, cf. CERN-RRB-2006-032).

Annex 5 is also in fairly good agreement with last year forecast, most of the difference being due to the acceleration of the construction schedule.

ANNEXES

The structure of the Annexes is the same as last year.

The summary tables give an overview of the total expenditures by Funding Agency (Annexes 1.A and 2.A) as well as an overview of payments to all Common Funds.

Full details by Sub-detector and Funding Agency are available in Annexes 1.B and 2.B.

Annex 1 : Tables - Total Accrued Commitments by Item and Funding Agency.

- **Annex 1.**A: Summary of CMS Commitments
- **Annex 1.**B: Detailed CMS Subdetectors Commitments

Annex 2 : Tables - Total Accrued Payments by Item and Funding Agency

- **Annex 2.**A: Summary of CMS Payments
- **Annex 2.**B: Detailed CMS Subdetectors Payments

Annex 3 : Table - Summary and Comparison with Cost Estimates

Annex 4 : Plot - Annual and Pluri-Annual Commitments

Annex 5 : Plot - Annual and Pluri-Annual Payment

ANNEX 1.A

Summary Commitments vs. Funding 1995-2006 (in kCHF)

Year	2006

Commitments		Contributing / Funding Agency																																				
Type	System	Austria	Belgium	Bulgaria	CERN	China	Croatia	Cyprus	Estonia	Finland	France-CEA	France-IN2P3	Germany	Greece	Hungary	India	Iran	Italy	Korea	Pakistan	Poland	Portugal	RDMS-DMS	RDMS-Russia	Serbia	Spain	Switzerland-ETHZ	Switzerland-PSI	Switzerland-Universities	Taipei	Turkey	United Kingdom	USA-DOE	USA-NSF	Grand Total
Expense	1. Magnet	1,241	1,645		16,908	1,215	104	226	112	1,770	3,447	6,300	5,441	1,480	368	1,098		17,300	815	625	940	730				2,140	24,782	2,610		866	368	2,857	26,527	2,852	124,767
	2. Tracker	1,714	4,388		18,187					3,130		7,859	8,803					20,991										2,743	2,559			3,150	2,135	1,023	76,682
	3. ECAL				35,378		200	276			2,713	6,983		1,122		1,113		4,987				1,080	80	3,290	56		43,922	1,720		1,175		4,328	6,201	4,257	118,881
	4. HCAL														500	2,500	510						5,715	5,701							690		27,066	7,383	50,064
	5. Muon Detector	43		600	2,229	3,340							6,193		55			20,584	400	1,186			1,000	3,810		5,519							24,395	2,112	71,466
	6. Trigger-DAQ	948			3,656					989	483			25							741	309				33						1,252	9,748		18,183
	7. Offline Computing	100	100		200					100		200	200	100				500								100	600	70				200		1,130	3,600
	8. Infrastructure				25,312												700							1,476											27,487
	9. Commissioning & Integration		40		12,267	500							543												400								2,080		15,830
Expense Total		4,046	6,173	600	114,136	5,055	304	502	112	5,989	6,642	21,342	21,181	2,728	923	4,711	1,210	64,362	1,215	1,811	1,681	2,118	6,795	14,277	456	7,792	69,305	7,143	2,559	2,041	1,058	11,787	98,152	18,756	506,961
Funding		4,775	6,170	600	103,500	5,115	349	706	112	6,170	7,732	23,700	20,809	5,000	1,058	5,200	1,210	67,927	1,962	2,824	3,000	2,440	6,815	15,928	450	7,800	75,500	8,500	2,700	2,740	1,058	13,018	100,435	18,554	523,856

ANNEX 1.B

Total Commitments 1995-2006 (in kCHF)

System	1. Magnet

Commitments			CF	Funding Agency: Contributing																										Contributing Total
Type	Subsystem	Item		Austria	Belgium	CERN	China	Croatia	Cyprus	Estonia	Finland	France-CEA	France-IN2P3	Germany	Greece	Hungary	India	Italy	Korea	Pakistan	Poland	Portugal	Spain	Switzerland-ETHZ	Switzerland-PSI	Taipei	Turkey	United Kingdom	USA-DOE	USA-NSF	
Expense	1.0. Magnet Common Fund	1.0.1 MoU		1,100	1,500	15,760		80	26	90	1,480	1,760	6,000	1,886	1,480	310	900			940	423	1,790		500	730	310	2,650				39,715
		1.0.2 CtC		141	145	1,006		24		16	290		300	290		58	198				100	350			136	58	207				3,319
		1.0.3 CtC2005								6																					6
	1.0. Magnet Common Fund Total			1,241	1,645	16,766		104	26	112	1,770	1,760	6,300	2,176	1,480	368	1,098			940	523	2,140		500	866	368	2,857				43,040
	1.1. Barrel Yoke and Vacuum Tank	1.1.01 Barrel Rings and Vacuum Tank	5,505						200					2,163										8,081	2,110				7,615	2,852	23,020
		1.1.02 High Tension Bolts	241																												
		1.1.03 Hydraulic Tensioners	28																												
		1.1.04.A Support Feet - Outer - Material (Plates)																						338							338
		1.1.04.B Support Feet - Outer - Material (Welding)	100																												
		1.1.05 Support Feet - Outer - Transport to Karachi	30																												
		1.1.06 Support Feet - Outer - Manufacture																		625											625
		1.1.07 Support Feet - Outer - Transport to CERN	62																												
		1.1.08.A Manufacture Follow-up	461			2																									2
		1.1.08.B Photogrammetry and Survey	40																												
		1.1.09 Moving Beams	379																												
		1.1.10 Jacks and Air Pad System	262											1,103																	1,103
		1.1.11 Grease Pad Systems	140																			207									207
		1.1.12 Hydraulic Rotator	275																												
		1.1.13 Drilling Machine	822																												
		1.1.14 Rails	19																												
		1.1.15 Assembly on Surface	2,208																												
		1.1.16 Rigs and Scaffolds	147																												
		1.1.17 Ancillaries and Coupling Devices	111																												
		1.1.18 Design and Follow-up	171																												
	1.1. Barrel Yoke and Vacuum Tank Total		10,999			2			200					3,265						625	207			8,419	2,110				7,615	2,852	25,295
	1.2. Endcap Yokes	1.2.01.A KHI Contract (6 disks, 2 noses and ancillaries)	625																										8,209		8,209
		1.2.01.B FCI Contract (assembly of disks on surface)																											803		803
		1.2.02 Superbolts																											868		868
		1.2.03 HE Supports	126																												
		1.2.04 Design and Follow-up																											932		932
		1.2.05.A Carts Weldments (In-kind from China)					1,215																								1,215
		1.2.05.B Carts Weldments (payment from Common Fund)	170																												
		1.2.07 Ancillaries and Coupling Devices	153																										142		142
		1.2.09 Engineering, Supervision, Quality Control	35																										829		829
		1.2.10 Manufacture Follow-up	8																										12		12
		1.2.11 Support System	275																												
	1.2. Endcap Yokes Total		1,391			1,215																							11,795		13,010

Commitments				Funding Agency																												
			CF	Contributing																												Contributing Total
Type	Subsystem	Item		Austria	Belgium	CERN	China	Croatia	Cyprus	Estonia	Finland	France-CEA	France-IN2P3	Germany	Greece	Hungary	India	Italy	Korea	Pakistan	Poland	Portugal	Spain	Switzerland-ETHZ	Switzerland-PSI	Taipei	Turkey	United Kingdom	USA-DOE	USA-NSF	
	1.3. Coil	1.3.01.A Superconducting Strands	6																									4,036		4,036
		1.3.01.C Cabling Strands into Rutherford Cable	1																				978							978
		1.3.01.D Pure Aluminium (99.998 %)	11																									1,255		1,255
		1.3.01.E Co-extrusion of Insert	42																				3,474							3,474
		1.3.01.F Strands for Tests and Prototypes																					322							322
		1.3.02.A Alloy for Reinforcement	198			19																						1,072		1,091
		1.3.02.B EB Welding Reinforcement	123			17																	7,657							7,674
		1.3.03 Conductor - Quality Assurance	432			2																	3,932							3,934
		1.3.04 Module Assembly, Swiveling Tooling	383														17,300	815												18,115
		1.3.05 Process Qualification and QA Winding	320			97																								97
		1.3.06 Thermal Shields	812																											
		1.3.07 Cold Supports	838																											
		1.3.08 He Circuits	871																											
		1.3.09 Cold Mass Instrumentation	223																											
		1.3.10 Vacuum System	241																											
		1.3.11 Power Supply and Bus Bar	1,620																											
		1.3.12 Dump Resistor	660																											
		1.3.13 Magnet Safety System	376																											
		1.3.14 Magnet Control System	111																											
		1.3.15 He Refrigeration External Plant	8,973																											
		1.3.16 Components Testing	545			5																								5
		1.3.17 Coil Assembly	961																											
		1.3.18 Coil Surface Tests	340																											
		1.3.19 Studies and Supervision	12,069									1,687																		1,687
		1.3.20 Consumables	246																											
		1.3.21 Coil Transfer into Underground Cavern	866																											
		1.3.22 Implantation and Integration	206																											
	1.3. Coil Total		31,474			139						1,687					17,300	815					16,363					6,363		42,668
	1.4. Magnet Installation	1.4.01 2'200 t Crane Rental	1,991																											
		1.4.02 Rigging Equipment	341																											
		1.4.03 SX Infrastructure	357																											
		1.4.05 Field Mapping	15																									755		755
	1.4. Magnet Installation Total		2,705																									755		755
Expense Total			46,570	1,241	1,645	16,908	1,215	104	226	112	1,770	3,447	6,300	5,441	1,480	368	1,098	17,300	815	625	940	730	2,140	24,782	2,610	866	368	2,857	26,527	2,852	124,767
Funding				1,240	1,645	16,908	1,215	129	235	112	1,770	3,447	6,300	5,440	1,480	368	1,000	17,300	815	625	940	730	2,140	25,000	2,610	866	368	2,857	26,527	2,852	124,919

System	2. Tracker

Commitments			Funding Agency														
			CF	Contributing													Contributing Total
Type	Subsystem	Item		Austria	Belgium	CERN	Finland	France-IN2P3	Germany	Italy	Switzerland-PSI	Switzerland-Universities	United Kingdom	USA-DOE	USA-NSF	
Expense	2.1. Pixel Detectors	2.1.01 Detectors (incl. Pre-series)									92	775		215	100	1,182
		2.1.02 Electronics (include. Engineering)		75							1,526	1,064		1,235	135	4,035
		2.1.03 Module Mechanics									912			190		1,102
		2.1.04 Support Structures & Assembly									32			230		262
		2.1.05 Monitoring									19			50		69
		2.1.06 Service Systems									162	160		215		537
	2.1. Pixel Detectors Total			75							2,743	1,999		2,135	235	7,187
	2.2. Silicon Detectors	2.2.01 Procurement of Sensors		1,047	1,205	5,361	534	3,174	3,313	6,504						21,138
		2.2.02 Capton				194			326	87						607
		2.2.03 Frames			1,563				225							1,788
		2.2.04 Pitch Adapters			776	686		26								1,488
		2.2.05 FE Hybrid				506		1,535	10						49	2,100
		2.2.07 Tooling and Box			41			55		211						307
		2.2.08 Interconnect Board				451			475	511					100	1,538
		2.2.09 Module Preseries		49	304			75	349	205						982
	2.2. Silicon Detectors Total			1,096	3,888	7,199	534	4,865	4,698	7,518					149	29,947
	2.3. Electronics for Si Detectors	2.3.01 Module Electronics				342	32			1,204			1,101			2,678
		2.3.02 Analogue Link				4,193		1,424	1,165	4,718			500			12,000
		2.3.03 Digital Link				0			130							130
		2.3.04 Analogue Optohybrid		543						277						820
		2.3.05 Digital Optohybrid				80										80
		2.3.06 FED			233	1,504	754	816	110	55		500	1,549		639	6,160
		2.3.08 FEC				135										135
	2.3. Electronics for Si Detectors Total			543	233	6,254	786	2,240	1,405	6,254		500	3,150		639	22,004
	2.4. Power Supplies for Si Detectors	2.4.01 Power Supplies				493				3,689						4,182
		2.4.02 Cables (installed)				286	118		34	914		60				1,411
	2.4. Power Supplies for Si Detectors Total					778	118		34	4,603		60				5,593
	2.5. Mech. Struct. & Cooling for Si Detectors	2.5.01 Inner Barrel								1,033						1,033
		2.5.02 Inner Endcap								358						358
		2.5.03 Outer Barrel				195	472									667
		2.5.04 Outer Barrel Rods					1,220									1,220
		2.5.05 Endcaps						520	709							1,229
		2.5.06 Endcaps Petals			167				848							1,014
		2.5.07 General Cooling				1,593				400						1,993
		2.5.08 Integration (st, ts, etc.)				1,314			138							1,453
	2.5. Mech. Struct. & Cooling for Si Detectors Total				167	3,102	1,692	520	1,695	1,791						8,967
	2.6. Monitoring for Si Detectors	2.6.01 Position Monitoring Systems				23			413							436
		2.6.02 Temperature Control				362										362
	2.6. Monitoring for Si Detectors Total					385			413							798
	2.7. Data Acquisition for Si Detectors	2.7.01 Test Stands			100			234	558	421						1,314
	2.7. Data Acquisition for Si Detectors Total				100			234	558	421						1,314
	2.8. Installation of Si Detectors	2.8.01 Installation Manpower				468				404						872
	2.8. Installation of Si Detectors Total					468				404						872
	2.9. Integration Facilities	2.9.01 Clean Room	1,395													
		2.9.02 Integration Manpower	873													
	2.9. Integration Facilities Total		2,268													
Expense Total			2,268	1,714	4,388	18,187	3,130	7,859	8,803	20,991	2,743	2,559	3,150	2,135	1,023	76,682
Funding				1,810	4,385	17,700	3,280	7,950	8,820	24,300	3,600	2,500	2,700	4,018	990	82,053

System	3. ECAL

Commitments

Type	Subsystem	Item	Contributing / Funding Agency	CERN	Croatia	Cyprus	France-CEA	France-IN2P3	Greece	India	Italy	Portugal	RDMS-DMS	RDMS-Russia	Serbia	Switzerland-ETHZ	Switzerland-PSI	Taipei	United Kingdom	USA-DOE	USA-NSF	Contributing Total
Expense	3.1. Barrel	3.1.1 Crystals		28,919		5		250			872					24,350			1,304			55,700
		3.1.2 Electronics		467	200	231	397	3,151			1,874	812			44	4,392	1,720			4,407	4,202	21,897
		3.1.3 Mechanics		1,404				3,162			2,241					3,057						9,865
		3.1.4 Assembly and Installation		1,425			121									1,612						3,158
		3.1.5 Monitoring					1,700													837		2,537
	3.1. Barrel Total			32,216	200	236	2,218	6,563			4,987	812			44	33,411	1,720		1,304	5,244	4,202	93,158
	3.2. Endcaps	3.2.1 Crystals		844						500				27		9,100			72			10,542
		3.2.2 Electronics		124		40		420				268		19	12	1,150			1,046	958	54	4,091
		3.2.3 Mechanics												2,331					1,906			4,237
		3.2.4 Assembly and Installation														261						261
		3.2.5 Monitoring					494							13								507
		3.2.6 Preshower		2,194					1,122	613			80	900				1,175				6,084
	3.2. Endcaps Total			3,162		40	494	420	1,122	1,113		268	80	3,290	12	10,511		1,175	3,024	958	54	25,723
Expense Total				35,378	200	276	2,713	6,983	1,122	1,113	4,987	1,080	80	3,290	56	43,922	1,720	1,175	4,328	6,201	4,257	118,881
Funding				22,700	200	471	3,121	9,250	1,360	1,500	5,100	1,315	100	4,791	50	47,900	1,720	1,874	4,711	6,201	4,090	116,454

System	4. HCAL

Commitments

			Funding Agency								
			Contributing								Contributing Total
Type	Subsystem	Item	Hungary	India	Iran	RDMS-DMS	RDMS-Russia	Turkey	USA-DOE	USA-NSF	
Expense	4.1. Barrel	4.1.01 Mechanics							12,162		12,162
		4.1.02 Optics							2,417	194	2,611
		4.1.03 Read-out Boxes							445	121	565
		4.1.04 Photodetectors							475	1,690	2,165
		4.1.05 Front-end Electronics							1,590	571	2,161
		4.1.06 Calibration Systems							362	11	373
		4.1.07 Trigger/DAQ Electronics							1,087	799	1,886
		4.1.08 Voltage Supply Systems							238	208	445
		4.1.09 Detector Control Systems							250	51	301
		4.1.10 Pre-production Prototypes							2,144	63	2,207
	4.1. Barrel Total								21,170	3,707	24,877
	4.2. Outer Barrel	4.2.01 Mechanics		481							481
		4.2.02 Optics		1,761					34	14	1,809
		4.2.03 Read-out Boxes							138	139	277
		4.2.04 Photodetectors		98					156		254
		4.2.05 Front-end Electronics							24	220	244
		4.2.06 Calibration Systems							49		49
		4.2.07 Trigger/DAQ Electronics							241	271	512
		4.2.08 Voltage Supply Systems							28	104	132
		4.2.09 Detector Control Systems							2	31	32
		4.2.10 Pre-production Prototypes		160					8	5	173
	4.2. Outer Barrel Total			2,500					680	785	3,964
	4.3. Endcap	4.3.01 Mechanics				5,240	2,732		27	1,289	9,289
		4.3.02 Optics				150	624		406	170	1,349
		4.3.03 Read-out Boxes							125	96	221
		4.3.04 Photodetectors							77		77
		4.3.05 Front-end Electronics							12	216	228
		4.3.06 Calibration Systems							261		261
		4.3.07 Trigger/DAQ Electronics							152	454	606
		4.3.08 Voltage Supply Systems							30	130	160
		4.3.09 Detector Control Systems								31	31
		4.3.10 Pre-production Prototypes				325	200		35	4	564
	4.3. Endcap Total					5,715	3,556		1,125	2,390	12,786
	4.5. Forward	4.5.01 Mechanics	9		510		1,856	677	8		3,060
		4.5.02 Optics	477						2,048		2,525
		4.5.03 Read-out Boxes							91		91
		4.5.04 Photodetectors							791		791
		4.5.05 Front-end Electronics							104	238	342
		4.5.06 Calibration Systems					59		313		372
		4.5.07 Trigger/DAQ Electronics							110	232	342
		4.5.08 Voltage Supply Systems							125		125
		4.5.09 Detector Control Systems							32	31	63
		4.5.10 Pre-production Prototypes	14				230	13	469		726
	4.5. Forward Total		500		510		2,145	690	4,091	501	8,437
Expense Total			500	2,500	510	5,715	5,701	690	27,066	7,383	50,064
Funding			500	2,500	510	5,715	5,701	690	26,698	7,380	49,694

System	5. Muon Detector

Commitments

Type	Subsystem	Item	CF	Contributing	Austria	Bulgaria	CERN	China	Germany	Hungary	Italy	Korea	Pakistan	RDMS-DMS	RDMS-Russia	Spain	USA-DOE	USA-NSF	Contributing Total
				Funding Agency															
Expense	5.1. Barrel Drifttubes	5.1.1 Detectors and Components							2,576		5,909					1,972			10,457
		5.1.2 Electronics					853	800	2,773		7,846					1,989			14,261
		5.1.3 Mechanical Structure and Supports						350	191		521					152			1,214
		5.1.4 Assembly and Installation							94		287					108			489
		5.1.6 Service Systems					315		560		299					105			1,279
	5.1. Barrel Drifttubes Total						1,168	1,150	6,193		14,862					4,326			27,699
	5.2. Forward ME 1/1	5.2.1 Detectors and Components												80	1,685				1,765
		5.2.2 Electronics												700	160		1,781	600	3,241
		5.2.3 Mechanical Structure, Supports													210				210
		5.2.4 Assembly and Installation												170	155				325
		5.2.5 Monitoring												50					50
		5.2.6 Service Systems													100				100
	5.2. Forward ME 1/1 Total													1,000	2,310		1,781	600	5,691
	5.3. Endcap CSC	5.3.1 Detectors and Components						1,500							1,500	8,855			11,855
		5.3.2 Electronics															11,361	674	12,034
		5.3.3 Mechanical Structure and Supports															430		430
		5.3.4 Assembly and Installation															260		260
		5.3.5 Monitoring															323		323
		5.3.6 Service Systems															1,183		1,183
	5.3. Endcap CSC Total							1,500							1,500	22,411		674	26,085
	5.4. Barrel RPC	5.4.1 Detectors and Components				600		320			2,911								3,831
		5.4.2 Electronics									1,968								1,968
		5.4.3 Mechanical Structure and Supports									100								100
		5.4.4 Assembly and Installation						20			40								60
		5.4.5 Monitoring									130								130
		5.4.6 Service Systems	410								573								573
	5.4. Barrel RPC Total		410			600		340			5,722								6,662
	5.5. Forward RPC	5.5.1 Detectors and Components	613					350				400	190						940
		5.5.2 Electronics	10									0	876						876
		5.5.3 Mechanical Structure and Supports										0							0
		5.5.4 Assembly and Installation	261										120						120
		5.5.6 Service Systems	535																
	5.5. Forward RPC Total		1,419					350				400	1,186						1,936
	5.6. Alignment	5.6.1 Barrel			43		1,060			55									1,158
		5.6.2 Forward														78	203	838	1,119
		5.6.3 Link														1,115			1,115
	5.6. Alignment Total				43		1,060			55						1,193	203	838	3,393
Expense Total			1,829		43	600	2,229	3,340	6,193	55	20,584	400	1,186	1,000	3,810	5,519	24,395	2,112	71,466
Funding			1,485		50	600	2,300	3,100	5,806	100	19,827	500	1,820	1,000	3,810	5,560	24,395	2,112	70,980

System	6. Trigger-DAQ

Commitments

			Funding Agency	CF	Contributing														Contributing Total	Grand Total
Type	Subsystem	Item			Austria	CERN	Finland	France-CEA	Greece	Hungary	Italy	Korea	Poland	Portugal	Spain	Switzerland-ETHZ	Switzerland-PSI	United Kingdom	USA-DOE	
Expense	6.1. Trigger	6.1.1 Calorimeter Trigger												309				802	4,382	5,492	5,492
		6.1.2 CSC Trigger																	1,683	1,683	1,683
		6.1.3 DT Trigger			603										33					636	636
		6.1.4 RPC Trigger					989						741							1,729	1,729
		6.1.5 Global Trigger			345															345	345
	6.1. Trigger Total				948		989						741	309	33			802	6,065	9,886	9,886
	6.2. Data Acquisition	6.2.1 Event Filter		2,000				483												483	2,483
		6.2.2 Readout Builder				905													510	1,415	1,415
		6.2.3 Data to Surface				1,417												450	2,573	4,440	4,440
		6.2.4 Detector Controls				259														259	259
		6.2.5 Preseries				403			25										600	1,028	1,028
		6.2.6 DAQ Integration				672														672	672
	6.2. Data Acquisition Total			2,000		3,656		483	25									450	3,683	8,297	10,297
Expense Total				2,000	948	3,656	989	483	25				741	309	33			1,252	9,748	18,183	20,183
Funding					1,300	7,470	1,020	840	2,060	90	100	500	2,060	255		2,000	500	2,050	10,515	30,760	30,760

System	7. Offline Computing

Commitments

			Funding Agency														
			CF	**Contributing**													**Contributing Tot**
Type	Subsystem	Item			**Austria**	**Belgium**	**CERN**	**Finland**	**France-IN2P3**	**Germany**	**Greece**	**Italy**	**Spain**	**Switzerland-ETHZ**	**Switzerland-PSI**	**United Kingdom**	**USA-NSF**	
Expense	7.0. Offline Common Fund	7.0.1 MoU			100	100	200	100	200	200	100	500	100	496		200	1,130	3,426
	7.0. Offline Common Fund Total				100	100	200	100	200	200	100	500	100	496		200	1,130	3,426
	7.1. Offline Infrastructure	7.1.1 File Servers	743												35			35
		7.1.2 Information Servers	127															
		7.1.3 Computing Power	191											104	35			139
		7.1.4 Spares	21															
		7.1.5 System Assembly	109															
		7.1.6 Software Licenses	83															
		7.1.7 System Management	856															
	7.1. Offline Infrastructure Total		2,130											104	70			174
Expense Total			2,130		100	100	200	100	200	200	100	500	100	600	70	200	1,130	3,600
Funding					100	100	200	100	200	200	100	500	100	600	70	200	1,130	3,600

System	8. Infrastructure

Commitments

Type	Subsystem	Item	Contributing CERN	Funding Agency Iran	Funding Agency RDMS-Russia	Contributing Total
Expense	8.1. Access and Survey	8.1.1 Gangways, Stairs	1,788			1,788
		8.1.2 Structures on Yoke	1,363			1,363
		8.1.3 Personnel Access Equipment	1,327			1,327
		8.1.4 General Survey	606			606
	8.1. Access and Survey Total		5,085			5,085
	8.2. General Installation	8.2.1 Counting Room Structures	631			631
		8.2.2 Racks with Cooling	836			836
		8.2.3 Electrical Distribution from Outlets	2,790			2,790
		8.2.4 Gas Systems and Primary Distribution Racks	1,863			1,863
		8.2.5 Beam Pipe	624			624
		8.2.6 Cable Trays to Counting Rooms	412			412
		8.2.7 Control Room and Cabling to Surface	93			93
		8.2.8 General Piping	914			914
	8.2. General Installation Total		8,164			8,164
	8.3. Cooling and Ventilation	8.3.1 Detector Cooling Plant	3,892			3,892
		8.3.2 Detector Specific Ventilation	205			205
		8.3.3 Detector Primary Cooling System	884			884
	8.3. Cooling and Ventilation Total		4,982			4,982
	8.4. Safety	8.4.1 Safety Installations	847			847
		8.4.2 Safety Equipment Control	371			371
		8.4.3 Hard-wired Safety System	98			98
		8.4.4 Inertion System	354			354
	8.4. Safety Total		1,669			1,669
	8.5. Fixed Cranes	8.5.1 80 ton /100 m	857			857
		8.5.2 80 ton /100 m Double Beam System	1,706			1,706
		8.5.3 20 ton Crane	219			219
		8.5.4 3 ton Lift	271			271
	8.5. Fixed Cranes Total		3,054			3,054
	8.6. Shielding Systems	8.6.1 Rotating Shielding	646		1,476	2,121
		8.6.2 Vertical 400 ton Lifting System	604			604
		8.6.3 Mechanics and Shielding for Forward HCAL	1,109	700		1,809
	8.6. Shielding Systems Total		2,359	700	1,476	4,534
Expense Total			25,312	700	1,476	27,487
Funding			23,955	700	1,476	26,131

System	9. Commissioning & Integration

Commitments

				Funding Agency												
				CF	**Contributing**											**Contributing Tota**
Type	Subsystem	Item			**Belgium**	**CERN**	**China**	**France-CEA**	**Germany**	**Korea**	**Portugal**	**RDMS-Russia**	**Serbia**	**Switzerland-Universities**	**USA-DOE**	
Expense	9.0. C&I Common Fund	9.0.1 CtC			40	12,267			543							12,850
	9.0. C&I Common Fund Total				40	12,267			543							12,850
	9.1. Additional facilities for Commissioning on surface	9.1.01 Mixed Water Cooling		1,959												
		9.1.02 Gas Distribution		352												
		9.1.03 Control Room		161												
		9.1.04 Smoke Detection		442												
		9.1.05 LV System (1 generator)		340											780	780
		9.1.06 20t lifting equipment		253												
		9.1.07 Extra Electric & Optical Cabling		1,239												
		9.1.08 Common Electronics		435												
		9.1.09 Pre-cabling, pre-testing & related facilities		2,037												
		9.1.10 Basic DSS for Equipment Protection		233												
		9.1.11 Semi-clean areas		159												
	9.1. Additional facilities for Commissioning on surface Total			7,611											780	780
	9.2. Detector Installation, Opening and Access Facilities	9.2.01 Installation and access tooling		860												
		9.2.02 Dummy End Flanges (EB, EE, SE)		246												
		9.2.03 Magnet Closing System		850									400			400
		9.2.04 Control for Magnet and Magnet Power Supply		123												
		9.2.05 Beampipe Vacuum Tooling & Support Structure		129												
		9.2.06 Floor Plates for UXC		94			500									500
		9.2.07 Cherry Pickers & Access Platforms		352												
	9.2. Detector Installation, Opening and Access Facilities Total			2,653			500						400			900
	9.3. General Services	9.3.01 Workshops		576												
		9.3.02 Heavy Transport		1,039												
		9.3.03 Survey		212												
		9.3.04 Storage Infrastructure		675												
		9.3.05 Extra Engineering for Integration of Magnet & Detectors		1,489												
		9.3.06 Technical Support Team		3,621											1,300	1,300
	9.3. General Services Total			7,612											1,300	1,300
Expense Total				17,876	40	12,267	500		543				400		2,080	15,830
Funding					40	12,267	800	324	543	147	140	150	400	200	2,080	17,091

ANNEX 2.A

Summary Payments vs Funding 1995-2006 (kCHF)

Year	2006

Payments		Contributing / Funding Agency																																				
Type	System	Austria	Belgium	Bulgaria	CERN	China	Croatia	Cyprus	Estonia	Finland	France-CEA	France-IN2P3	Germany	Greece	Hungary	India	Iran	Italy	Korea	Pakistan	Poland	Portugal	RDMS-DMS	RDMS-Russia	Serbia	Spain	Switzerland-ETHZ	Switzerland-PSI	Switzerland-Universities	Taipei	Turkey	United Kingdom	USA-DOE	USA-NSF	Grand Total
Expense	1. Magnet	1,241	1,608		16,908	1,215	96	226	112	1,480	2,590	6,300	5,441	1,480	368	1,098		17,300	815	625	940	730				2,140	23,997	2,610		866	368	2,857	26,527	2,852	122,790
	2. Tracker	1,714	4,371		17,923					2,956		7,859	8,803					18,199										2,743	2,559			3,150	2,135	874	73,285
	3. ECAL				35,378		200	276			2,713	6,983		807		613		4,987				1,080	80	3,290	56		25,661	1,720		1,175		4,328	6,201	4,257	99,805
	4. HCAL														500	2,500	510						5,715	5,701							690		27,066	7,383	50,064
	5. Muon Detector	43		600	2,229	3,340							6,193		55			20,584	400	1,186			1,000	3,810		5,519							24,395	2,112	71,466
	6. Trigger-DAQ	948			3,499					989				25							741	309				33						1,252	9,748		17,543
	7. Offline Computing	100	100		200					100		200	200	100				500								100	475	70				200		1,130	3,475
	8. Infrastructure				22,449												700							1,476											24,624
	9. Commissioning & Integration		40		12,267	500							543												400								780		14,530
Expense Total		4,046	6,119	600	110,852	5,055	296	502	112	5,525	5,302	21,342	21,181	2,413	923	4,211	1,210	61,570	1,215	1,811	1,681	2,118	6,795	14,277	456	7,792	50,133	7,143	2,559	2,041	1,058	11,787	96,852	18,607	477,584
Funding		4,775	6,170	600	103,500	5,115	349	706	112	6,170	7,732	23,700	20,809	5,000	1,058	5,200	1,210	67,927	1,962	2,824	3,000	2,440	6,815	15,928	450	7,800	75,500	8,500	2,700	2,740	1,058	13,018	100,435	18,554	523,856

ANNEX 2.A

Summary of Payments to Common Funds 1995-2006 (kCHF)

Year	2006
System	(Show All)
Subsystem Ref.	0.

Payments

			Contributing	Funding Agency																												Contributing Total	DAQ Staging
Type	Subsystem	Item	Austria	Belgium	CERN	Croatia	Cyprus	Estonia	Finland	France-CEA	France-IN2P3	Germany	Greece	Hungary	India	Italy	Poland	Portugal	Spain	Switzerland-ETHZ	Switzerland-PSI	Taipei	Turkey	United Kingdom	USA-NSF								
Expense	0.0. Other Common Funds Income	0.0. Other Common Funds Income																															
	0.0. Other Common Funds Income Total																																
	1.0. Magnet Common Fund	1.0.1 MoU	1,100	1,500	15,760	80	26	90	1,480	1,760	6,000	1,886	1,480	310	900		940	423	1,790		500	730	310	2,650									39,715	
		1.0.2 CtC	141	108	1,006	16		16			300	290		58	198			100	350			136	58	207									2,984	
		1.0.3 CtC2005						6																									6	
	1.0. Magnet Common Fund Total		1,241	1,608	16,766	96	26	112	1,480	1,760	6,300	2,176	1,480	368	1,098		940	523	2,140		500	866	368	2,857									42,705	
	6.0. DAQ Common Fund	6.0.1 DAQ Staging																																2,000
	6.0. DAQ Common Fund Total																																	2,000
	7.0. Offline Common Fund	7.0.1 MoU	100	100	200				100		200	200	100			500			100	371				200	1,130								3,301	
	7.0. Offline Common Fund Total		100	100	200				100		200	200	100			500			100	371				200	1,130								3,301	
	9.0. C&I Common Fund	9.0.1 CtC		40	12,267							543																					12,850	
	9.0. C&I Common Fund Total			40	12,267							543																					12,850	
Expense Total			1,341	1,748	29,233	96	26	112	1,580	1,760	6,500	2,919	1,580	368	1,098	500	940	523	2,240	371	500	866	368	3,057	1,130								58,856	2,000

ANNEX 2.B

Total Payments 1995-2006 (kCHF)

System	1. Magnet

Payments

Type	Subsystem	Item	CF	Contributing Funding Agency	Austria	Belgium	CERN	China	Croatia	Cyprus	Estonia	Finland	France-CEA	France-IN2P3	Germany	Greece	Hungary	India	Italy	Korea	Pakistan	Poland	Portugal	Spain	Switzerland-ETHZ	Switzerland-PSI	Taipei	Turkey	United Kingdom	USA-DOE	USA-NSF	Contributing Total
Expense	1.0. Magnet Common Fund	1.0.1 MoU			1,100	1,500	15,760		80	26	90	1,480	1,760	6,000	1,886	1,480	310	900			940	423	1,790		500	730	310	2,650			39,715
		1.0.2 CtC			141	108	1,006		16		16			300	290		58	198				100	350			136	58	207			2,984
		1.0.3 CtC2005									6																				6
	1.0. Magnet Common Fund Total				1,241	1,608	16,766		96	26	112	1,480	1,760	6,300	2,176	1,480	368	1,098			940	523	2,140		500	866	368	2,857			42,705
	1.1. Barrel Yoke and Vacuum Tank	1.1.01 Barrel Rings and Vacuum Tank	5,505							200					2,163									7,581	2,110				7,615	2,852	22,520
		1.1.02 High Tension Bolts	241																												
		1.1.03 Hydraulic Tensioners	28																												
		1.1.04.A Support Feet - Outer - Material (Plates)																						338							338
		1.1.04.B Support Feet - Outer - Material (Welding)	100																												
		1.1.05 Support Feet - Outer - Transport to Karachi	30																												
		1.1.06 Support Feet - Outer - Manufacture																		625											625
		1.1.07 Support Feet - Outer - Transport to CERN	62																												
		1.1.08.A Manufacture Follow-up	461				2																								2
		1.1.08.B Photogrammetry and Survey	40																												
		1.1.09 Moving Beams	379																												
		1.1.10 Jacks and Air Pad System	262												1,103																1,103
		1.1.11 Grease Pad Systems	140																			207									207
		1.1.12 Hydraulic Rotator	275																												
		1.1.13 Drilling Machine	822																												
		1.1.14 Rails	19																												
		1.1.15 Assembly on Surface	2,208																												
		1.1.16 Rigs and Scaffolds	147																												
		1.1.17 Ancillaries and Coupling Devices	111																												
		1.1.18 Design and Follow-up	171																												
	1.1. Barrel Yoke and Vacuum Tank Total		10,999				2			200					3,265					625		207		7,919	2,110				7,615	2,852	24,795
	1.2. Endcap Yokes	1.2.01.A KHI Contract (6 disks, 2 noses and ancillaries)	625																										8,209		8,209
		1.2.01.B FCI Contract (assembly of disks on surface)																											803		803
		1.2.02 Superbolts																											868		868
		1.2.03 HE Supports	101																												
		1.2.04 Design and Follow-up																											932		932
		1.2.05.A Carts Weldments (In-kind from China)						1,215																							1,215
		1.2.05.B Carts Weldments (payment from Common Fund)	170																												
		1.2.07 Ancillaries and Coupling Devices	153																										142		142
		1.2.09 Engineering, Supervision, Quality Control	35																										829		829
		1.2.10 Manufacture Follow-up	8																										12		12
		1.2.11 Support System	275																												
	1.2. Endcap Yokes Total		1,366					1,215																					11,795		13,010

Payments

Type	Subsystem	Item	CF	Contributing Funding Agency	Austria	Belgium	CERN	China	Croatia	Cyprus	Estonia	Finland	France-CEA	France-IN2P3	Germany	Greece	Hungary	India	Italy	Korea	Pakistan	Poland	Portugal	Spain	Switzerland-ETHZ	Switzerland-PSI	Taipei	Turkey	United Kingdom	USA-DOE	USA-NSF	Contributing Total
	1.3. Coil	1.3.01.A Superconducting Strands	6																										4,036			4,036
		1.3.01.C Cabling Strands into Rutherford Cable	1																					978								978
		1.3.01.D Pure Aluminium (99.998 %)	11																										1,255			1,255
		1.3.01.E Co-extrusion of Insert	42																					3,474								3,474
		1.3.01.F Strands for Tests and Prototypes																						322								322
		1.3.02.A Alloy for Reinforcement	198				19																						1,072			1,091
		1.3.02.B EB Welding Reinforcement	123				17																	7,372								7,389
		1.3.03 Conductor - Quality Assurance	432				2																	3,932								3,934
		1.3.04 Module Assembly, Swiveling Tooling	383																17,300	815												18,115
		1.3.05 Process Qualification and QA Winding	320				97																									97
		1.3.06 Thermal Shields	737																													
		1.3.07 Cold Supports	838																													
		1.3.08 He Circuits	871																													
		1.3.09 Cold Mass Instrumentation	223																													
		1.3.10 Vacuum System	241																													
		1.3.11 Power Supply and Bus Bar	1,584																													
		1.3.12 Dump Resistor	660																													
		1.3.13 Magnet Safety System	376																													
		1.3.14 Magnet Control System	111																													
		1.3.15 He Refrigeration External Plant	7,813																													
		1.3.16 Components Testing	545				5																									5
		1.3.17 Coil Assembly	961																													
		1.3.18 Coil Surface Tests	340																													
		1.3.19 Studies and Supervision	11,239										830																			830
		1.3.20 Consumables	246																													
		1.3.21 Coil Transfer into Underground Cavern	758																													
		1.3.22 Implantation and Integration	206																													
	1.3. Coil Total		29,265				139						830						17,300	815				16,078					6,363			41,525
	1.4. Magnet Installation	1.4.01 2'200 t Crane Rental	1,021																													
		1.4.02 Rigging Equipment	341																													
		1.4.03 SX Infrastructure	357																													
		1.4.05 Field Mapping	15																										755			755
	1.4. Magnet Installation Total		1,734																										755			755
Expense Total			43,365		1,241	1,608	16,908	1,215	96	226	112	1,480	2,590	6,300	5,441	1,480	368	1,098	17,300	815	625	940	730	2,140	23,997	2,610	866	368	2,857	26,527	2,852	122,790
Funding					1,240	1,645	16,908	1,215	129	235	112	1,770	3,447	6,300	5,440	1,480	368	1,000	17,300	815	625	940	730	2,140	25,000	2,610	866	368	2,857	26,527	2,852	124,919

System	2. Tracker

Payments				Funding Agency													
			CF	Contributing													Contributing Total
Type	Subsystem	Item		Austria	Belgium	CERN	Finland	France-IN2P3	Germany	Italy	Switzerland-PSI	Switzerland-Universities	United Kingdom	USA-DOE	USA-NSF	
Expense	2.1. Pixel Detectors	2.1.01 Detectors (incl. Pre-series)									92	775		215	100	1,182
		2.1.02 Electronics (include. Engineering)		75							1,526	1,064		1,235	135	4,035
		2.1.03 Module Mechanics									912			190		1,102
		2.1.04 Support Structures & Assembly									32			230		262
		2.1.05 Monitoring									19			50		69
		2.1.06 Service Systems									162	160		215		537
	2.1. Pixel Detectors Total			75							2,743	1,999		2,135	235	7,187
	2.2. Silicon Detectors	2.2.01 Procurement of Sensors		1,047	1,205	5,361	534	3,174	3,313	5,462						20,096
		2.2.02 Capton				194			326	87						607
		2.2.03 Frames			1,563				225							1,788
		2.2.04 Pitch Adapters			776	686		26								1,488
		2.2.05 FE Hybrid				506		1,535	10							2,051
		2.2.07 Tooling and Box			41			55		211						307
		2.2.08 Interconnect Board				451			475	511						1,438
		2.2.09 Module Preseries		49	304			75	349	205						982
	2.2. Silicon Detectors Total			1,096	3,888	7,199	534	4,865	4,698	6,475						28,756
	2.3. Electronics for Si Detectors	2.3.01 Module Electronics				342	32			1,204			1,101			2,678
		2.3.02 Analogue Link				4,134		1,424	1,165	4,718			500			11,941
		2.3.03 Digital Link				0			130							130
		2.3.04 Analogue Optohybrid		543						277						820
		2.3.05 Digital Optohybrid				80										80
		2.3.06 FED			216	1,478	614	816	110	55		500	1,549		639	5,977
		2.3.08 FEC				135										135
	2.3. Electronics for Si Detectors Total			543	216	6,168	646	2,240	1,405	6,254		500	3,150		639	21,761
	2.4. Power Supplies for Si Detectors	2.4.01 Power Supplies				493				2,467						2,960
		2.4.02 Cables (installed)				286	118		34	412		60				909
	2.4. Power Supplies for Si Detectors Total					778	118		34	2,879		60				3,869
	2.5. Mech. Struct. & Cooling for Si Detectors	2.5.01 Inner Barrel								1,033						1,033
		2.5.02 Inner Endcap								358						358
		2.5.03 Outer Barrel				178	438									616
		2.5.04 Outer Barrel Rods					1,220									1,220
		2.5.05 Endcaps						520	709							1,229
		2.5.06 Endcaps Petals			167				848							1,014
		2.5.07 General Cooling				1,593				400						1,993
		2.5.08 Integration (st, ts, etc.)				1,184			138							1,322
	2.5. Mech. Struct. & Cooling for Si Detectors Total				167	2,955	1,658	520	1,695	1,791						8,786
	2.6. Monitoring for Si Detectors	2.6.01 Position Monitoring Systems							413							413
		2.6.02 Temperature Control				362										362
	2.6. Monitoring for Si Detectors Total					362			413							775
	2.7. Data Acquisition for Si Detectors	2.7.01 Test Stands			100			234	558	396						1,288
	2.7. Data Acquisition for Si Detectors Total				100			234	558	396						1,288
	2.8. Installation of Si Detectors	2.8.01 Installation Manpower				459				404						863
	2.8. Installation of Si Detectors Total					459				404						863
	2.9. Integration Facilities	2.9.01 Clean Room	1,395													
		2.9.02 Integration Manpower	522													
	2.9. Integration Facilities Total		1,917													
Expense Total			1,917	1,714	4,371	17,923	2,956	7,859	8,803	18,199	2,743	2,559	3,150	2,135	874	73,285
Funding				1,810	4,385	17,700	3,280	7,950	8,820	24,300	3,600	2,500	2,700	4,018	990	82,053

System	3. ECAL

Payments

Type	Subsystem	Item	Contributing / Funding Agency	CERN	Croatia	Cyprus	France-CEA	France-IN2P3	Greece	India	Italy	Portugal	RDMS-DMS	RDMS-Russia	Serbia	Switzerland-ETHZ	Switzerland-PSI	Taipei	United Kingdom	USA-DOE	USA-NSF	Contributing Total
Expense	3.1. Barrel	3.1.1 Crystals		28,919		5		250			872					14,531			1,304			45,881
		3.1.2 Electronics		467	200	231	397	3,151			1,874	812			44	4,392	1,720			4,407	4,202	21,897
		3.1.3 Mechanics		1,404				3,162			2,241					3,057						9,865
		3.1.4 Assembly and Installation		1,425			121									1,612						3,158
		3.1.5 Monitoring					1,700													837		2,537
	3.1. Barrel Total			32,216	200	236	2,218	6,563			4,987	812			44	23,592	1,720		1,304	5,244	4,202	83,339
	3.2. Endcaps	3.2.1 Crystals		844										27		658			72			1,600
		3.2.2 Electronics		124		40		420				268		19	12	1,150			1,046	958	54	4,091
		3.2.3 Mechanics												2,331					1,906			4,237
		3.2.4 Assembly and Installation														261						261
		3.2.5 Monitoring					494							13								507
		3.2.6 Preshower		2,194					807	613			80	900				1,175				5,769
	3.2. Endcaps Total			3,162		40	494	420	807	613		268	80	3,290	12	2,069		1,175	3,024	958	54	16,466
Expense Total				35,378	200	276	2,713	6,983	807	613	4,987	1,080	80	3,290	56	25,661	1,720	1,175	4,328	6,201	4,257	99,805
Funding				22,700	200	471	3,121	9,250	1,360	1,500	5,100	1,315	100	4,791	50	47,900	1,720	1,874	4,711	6,201	4,090	116,454

System	4. HCAL

Payments

			Contributing								Contributing Total
			Funding Agency								
Type	Subsystem	Item	Hungary	India	Iran	RDMS-DMS	RDMS-Russia	Turkey	USA-DOE	USA-NSF	
Expense	4.1. Barrel	4.1.01 Mechanics							12,162		12,162
		4.1.02 Optics							2,417	194	2,611
		4.1.03 Read-out Boxes							445	121	565
		4.1.04 Photodetectors							475	1,690	2,165
		4.1.05 Front-end Electronics							1,590	571	2,161
		4.1.06 Calibration Systems							362	11	373
		4.1.07 Trigger/DAQ Electronics							1,087	799	1,886
		4.1.08 Voltage Supply Systems							238	208	445
		4.1.09 Detector Control Systems							250	51	301
		4.1.10 Pre-production Prototypes							2,144	63	2,207
	4.1. Barrel Total								21,170	3,707	24,877
	4.2. Outer Barrel	4.2.01 Mechanics		481							481
		4.2.02 Optics		1,761					34	14	1,809
		4.2.03 Read-out Boxes							138	139	277
		4.2.04 Photodetectors		98					156		254
		4.2.05 Front-end Electronics							24	220	244
		4.2.06 Calibration Systems							49		49
		4.2.07 Trigger/DAQ Electronics							241	271	512
		4.2.08 Voltage Supply Systems							28	104	132
		4.2.09 Detector Control Systems							2	31	32
		4.2.10 Pre-production Prototypes		160					8	5	173
	4.2. Outer Barrel Total			2,500					680	785	3,964
	4.3. Endcap	4.3.01 Mechanics				5,240	2,732		27	1,289	9,289
		4.3.02 Optics				150	624		406	170	1,349
		4.3.03 Read-out Boxes							125	96	221
		4.3.04 Photodetectors							77		77
		4.3.05 Front-end Electronics							12	216	228
		4.3.06 Calibration Systems							261		261
		4.3.07 Trigger/DAQ Electronics							152	454	606
		4.3.08 Voltage Supply Systems							30	130	160
		4.3.09 Detector Control Systems								31	31
		4.3.10 Pre-production Prototypes				325	200		35	4	564
	4.3. Endcap Total					5,715	3,556		1,125	2,390	12,786
	4.5. Forward	4.5.01 Mechanics	9		510		1,856	677	8		3,060
		4.5.02 Optics	477						2,048		2,525
		4.5.03 Read-out Boxes							91		91
		4.5.04 Photodetectors							791		791
		4.5.05 Front-end Electronics							104	238	342
		4.5.06 Calibration Systems					59		313		372
		4.5.07 Trigger/DAQ Electronics							110	232	342
		4.5.08 Voltage Supply Systems							125		125
		4.5.09 Detector Control Systems							32	31	63
		4.5.10 Pre-production Prototypes	14				230	13	469		726
	4.5. Forward Total		500		510		2,145	690	4,091	501	8,437
Expense Total			500	2,500	510	5,715	5,701	690	27,066	7,383	50,064
Funding			500	2,500	510	5,715	5,701	690	26,698	7,380	49,694

System	5. Muon Detector

Payments

			CF	Contributing														Contributing Total
			Funding Agency															
Type	Subsystem	Item		Austria	Bulgaria	CERN	China	Germany	Hungary	Italy	Korea	Pakistan	RDMS-DMS	RDMS-Russia	Spain	USA-DOE	USA-NSF	
Expense	5.1. Barrel Drifttubes	5.1.1 Detectors and Components						2,576		5,909					1,972			10,457
		5.1.2 Electronics				853	800	2,773		7,846					1,989			14,261
		5.1.3 Mechanical Structure and Supports					350	191		521					152			1,214
		5.1.4 Assembly and Installation						94		287					108			489
		5.1.6 Service Systems				315		560		299					105			1,279
	5.1. Barrel Drifttubes Total					1,168	1,150	6,193		14,862					4,326			27,699
	5.2. Forward ME 1/1	5.2.1 Detectors and Components											80	1,685				1,765
		5.2.2 Electronics											700	160		1,781	600	3,241
		5.2.3 Mechanical Structure, Supports												210				210
		5.2.4 Assembly and Installation											170	155				325
		5.2.5 Monitoring											50					50
		5.2.6 Service Systems												100				100
	5.2. Forward ME 1/1 Total												1,000	2,310		1,781	600	5,691
	5.3. Endcap CSC	5.3.1 Detectors and Components					1,500							1,500		8,855		11,855
		5.3.2 Electronics														11,361	674	12,034
		5.3.3 Mechanical Structure and Supports														430		430
		5.3.4 Assembly and Installation														260		260
		5.3.5 Monitoring														323		323
		5.3.6 Service Systems														1,183		1,183
	5.3. Endcap CSC Total						1,500							1,500		22,411	674	26,085
	5.4. Barrel RPC	5.4.1 Detectors and Components			600		320			2,911								3,831
		5.4.2 Electronics								1,968								1,968
		5.4.3 Mechanical Structure and Supports								100								100
		5.4.4 Assembly and Installation					20			40								60
		5.4.5 Monitoring								130								130
		5.4.6 Service Systems	406							573								573
	5.4. Barrel RPC Total		406		600		340			5,722								6,662
	5.5. Forward RPC	5.5.1 Detectors and Components	587				350				400	190						940
		5.5.2 Electronics	10								0	876						876
		5.5.3 Mechanical Structure and Supports									0							0
		5.5.4 Assembly and Installation	259									120						120
		5.5.6 Service Systems	535															
	5.5. Forward RPC Total		1,392				350				400	1,186						1,936
	5.6. Alignment	5.6.1 Barrel		43		1,060			55									1,158
		5.6.2 Forward													78	203	838	1,119
		5.6.3 Link													1,115			1,115
	5.6. Alignment Total			43		1,060			55						1,193	203	838	3,393
Expense Total			1,798	43	600	2,229	3,340	6,193	55	20,584	400	1,186	1,000	3,810	5,519	24,395	2,112	71,466
Funding			1,485	50	600	2,300	3,100	5,806	100	19,827	500	1,820	1,000	3,810	5,560	24,395	2,112	70,980

System	6. Trigger-DAQ

Payments

			Funding Agency																	
			CF	Contributing															Contributing	Grand Total
Type	Subsystem	Item		Austria	CERN	Finland	France-CEA	Greece	Hungary	Italy	Korea	Poland	Portugal	Spain	Switzerland-ETHZ	Switzerland-PSI	United Kingdom	USA-DOE		
Expense	6.1. Trigger	6.1.1 Calorimeter Trigger											309				802	4,382	5,492	5,492
		6.1.2 CSC Trigger																1,683	1,683	1,683
		6.1.3 DT Trigger		603										33					636	636
		6.1.4 RPC Trigger				989						741							1,729	1,729
		6.1.5 Global Trigger		345															345	345
	6.1. Trigger Total			948		989						741	309	33			802	6,065	9,886	9,886
	6.2. Data Acquisition	6.2.1 Event Filter	2,000																	2,000
		6.2.2 Readout Builder			905													510	1,415	1,415
		6.2.3 Data to Surface			1,417												450	2,573	4,440	4,440
		6.2.4 Detector Controls			259														259	259
		6.2.5 Preseries			246			25										600	872	872
		6.2.6 DAQ Integration			672														672	672
	6.2. Data Acquisition Total		2,000		3,499			25									450	3,683	7,658	9,658
Expense Total			2,000	948	3,499	989		25				741	309	33			1,252	9,748	17,543	19,543
Funding				1,300	7,470	1,020	840	2,060	90	100	500	2,060	255		2,000	500	2,050	10,515	30,760	30,760

System	7. Offline Computing

Payments

				Funding Agency														
			CF	**Contributing**														**Contributing Total**
Type	Subsystem	Item			**Austria**	**Belgium**	**CERN**	**Finland**	**France-IN2P3**	**Germany**	**Greece**	**Italy**	**Spain**	**Switzerland-ETHZ**	**Switzerland-PSI**	**United Kingdom**	**USA-NSF**	
Expense	7.0. Offline Common Fund	7.0.1 MoU			100	100	200	100	200	200	100	500	100	371		200	1,130	3,301
	7.0. Offline Common Fund Total				100	100	200	100	200	200	100	500	100	371		200	1,130	3,301
	7.1. Offline Infrastructure	7.1.1 File Servers	743												35			35
		7.1.2 Information Servers	107															
		7.1.3 Computing Power	187											104	35			139
		7.1.4 Spares	21															
		7.1.5 System Assembly	109															
		7.1.6 Software Licenses	83															
		7.1.7 System Management	856															
	7.1. Offline Infrastructure Total		2,105											104	70			174
Expense Total			2,105		100	100	200	100	200	200	100	500	100	475	70	200	1,130	3,475
Funding					100	100	200	100	200	200	100	500	100	600	70	200	1,130	3,600

System	8. Infrastructure

Payments

Type	Subsystem	Item	Contributing CERN	Contributing Funding Agency Iran	Contributing Funding Agency RDMS-Russia	Contributing Total
Expense	8.1. Access and Survey	8.1.1 Gangways, Stairs	1,788			1,788
		8.1.2 Structures on Yoke	1,363			1,363
		8.1.3 Personnel Access Equipment	1,242			1,242
		8.1.4 General Survey	606			606
	8.1. Access and Survey Total		5,000			5,000
	8.2. General Installation	8.2.1 Counting Room Structures	631			631
		8.2.2 Racks with Cooling	616			616
		8.2.3 Electrical Distribution from Outlets	2,790			2,790
		8.2.4 Gas Systems and Primary Distribution Racks	1,196			1,196
		8.2.5 Beam Pipe	624			624
		8.2.6 Cable Trays to Counting Rooms	287			287
		8.2.7 Control Room and Cabling to Surface	93			93
		8.2.8 General Piping	799			799
	8.2. General Installation Total		7,037			7,037
	8.3. Cooling and Ventilation	8.3.1 Detector Cooling Plant	2,486			2,486
		8.3.2 Detector Specific Ventilation	195			195
		8.3.3 Detector Primary Cooling System	884			884
	8.3. Cooling and Ventilation Total		3,565			3,565
	8.4. Safety	8.4.1 Safety Installations	847			847
		8.4.2 Safety Equipment Control	332			332
		8.4.3 Hard-wired Safety System	98			98
		8.4.4 Inertion System	186			186
	8.4. Safety Total		1,462			1,462
	8.5. Fixed Cranes	8.5.1 80 ton /100 m	857			857
		8.5.2 80 ton /100 m Double Beam System	1,706			1,706
		8.5.3 20 ton Crane	219			219
		8.5.4 3 ton Lift	271			271
	8.5. Fixed Cranes Total		3,054			3,054
	8.6. Shielding Systems	8.6.1 Rotating Shielding	646		1,476	2,121
		8.6.2 Vertical 400 ton Lifting System	604			604
		8.6.3 Mechanics and Shielding for Forward HCAL	1,082	700		1,782
	8.6. Shielding Systems Total		2,332	700	1,476	4,507
Expense Total			22,449	700	1,476	24,624
Funding			23,955	700	1,476	26,131

System	9. Commissioning & Integration

Payments

				Funding Agency													
				CF	**Contributing**												**Contributing Total**
Type	Subsystem	Item			**Belgium**	**CERN**	**China**	**France-CEA**	**Germany**	**Korea**	**Portugal**	**RDMS-Russia**	**Serbia**	**Switzerland-Universities**	**USA-DOE**	
Expense	9.0. C&I Common Fund	9.0.1 CtC			40	12,267			543								12,850
	9.0. C&I Common Fund Total				40	12,267			543								12,850
	9.1. Additional facilities for Commissioning on surface	9.1.01 Mixed Water Cooling	1,442														
		9.1.02 Gas Distribution	271														
		9.1.03 Control Room	113														
		9.1.04 Smoke Detection	251														
		9.1.05 LV System (1 generator)	266												780		780
		9.1.06 20t lifting equipment	253														
		9.1.07 Extra Electric & Optical Cabling	992														
		9.1.08 Common Electronics	421														
		9.1.09 Pre-cabling, pre-testing & related facilities	1,902														
		9.1.10 Basic DSS for Equipment Protection	129														
		9.1.11 Semi-clean areas	131														
	9.1. Additional facilities for Commissioning on surface Total		6,172												780		780
	9.2. Detector Installation, Opening and Access Facilities	9.2.01 Installation and access tooling	773														
		9.2.02 Dummy End Flanges (EB, EE, SE)	244														
		9.2.03 Magnet Closing System	822										400				400
		9.2.04 Control for Magnet and Magnet Power Supply	42														
		9.2.05 Beampipe Vacuum Tooling & Support Structure	122														
		9.2.06 Floor Plates for UXC	89				500										500
		9.2.07 Cherry Pickers & Access Platforms	262														
	9.2. Detector Installation, Opening and Access Facilities Total		2,353				500						400				900
	9.3. General Services	9.3.01 Workshops	445														
		9.3.02 Heavy Transport	1,018														
		9.3.03 Survey	212														
		9.3.04 Storage Infrastructure	605														
		9.3.05 Extra Engineering for Integration of Magnet & Detectors	1,412														
		9.3.06 Technical Support Team	3,380														
	9.3. General Services Total		7,072														
Expense Total			15,597		40	12,267	500		543				400		780		14,530
Funding					40	12,267	800	324	543	147	140	150	400	200	2,080		17,091

ANNEX 3

Summary and Comparison with Cost Estimates (kCHF)
Expenditure 1995-2006

Year	2006

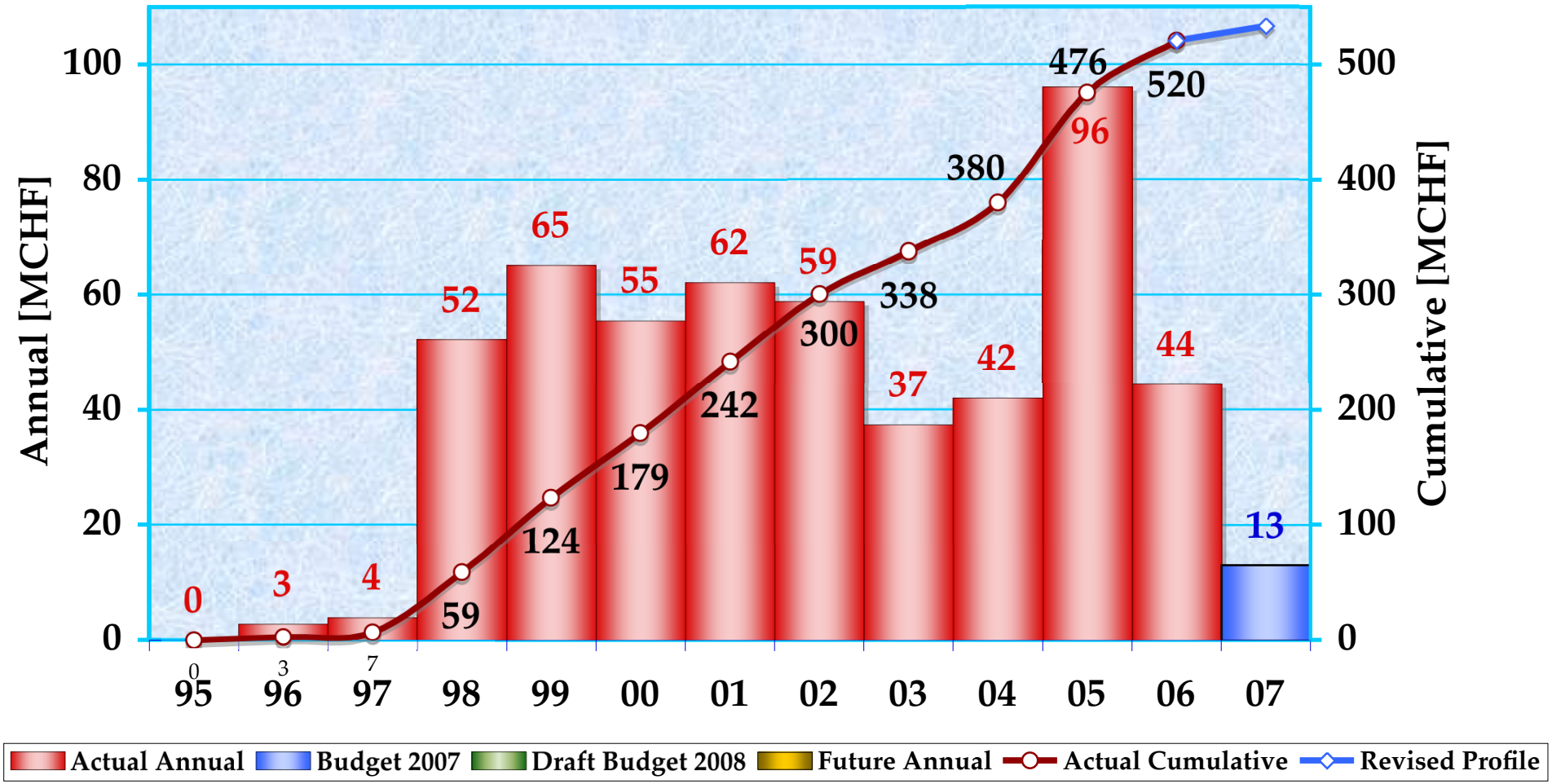
System	Subsystem	Cost Estimate	Payments	Payment %	Commitments	Commitment %
1. Magnet	1.1. Barrel Yoke and Vacuum Tank	34,433	35,795	104%	36,295	105%
	1.2. Endcap Yokes	14,615	14,376	98%	14,401	99%
	1.3. Coil	70,873	70,791	100%	74,142	105%
	1.4. Magnet Installation	6,820	2,489	36%	3,459	51%
1. Magnet Total		126,741	123,450	97%	128,297	101%
2. Tracker	2.1. Pixel Detectors	8,240	7,187	87%	7,187	87%
	2.2. Silicon Detectors	29,284	28,756	98%	29,947	102%
	2.3. Electronics for Si Detectors	21,578	21,761	101%	22,004	102%
	2.4. Power Supplies for Si Detectors	8,600	3,869	45%	5,593	65%
	2.5. Mech. Struct. & Cooling for Si Detectors	9,936	8,786	88%	8,967	90%
	2.6. Monitoring for Si Detectors	950	775	82%	798	84%
	2.7. Data Acquisition for Si Detectors	1,680	1,288	77%	1,314	78%
	2.8. Installation of Si Detectors	1,000	863	86%	872	87%
	2.9. Integration Facilities		1,917		2,268	
2. Tracker Total		81,268	75,202	93%	78,950	97%
3. ECAL	3.1. Barrel	91,962	83,339	91%	93,158	101%
	3.2. Endcaps	37,797	16,466	44%	25,723	68%
3. ECAL Total		129,759	99,805	77%	118,881	92%
4. HCAL	4.1. Barrel	24,166	24,877	103%	24,877	103%
	4.2. Outer Barrel	4,118	3,964	96%	3,964	96%
	4.3. Endcap	12,897	12,786	99%	12,786	99%
	4.5. Forward	8,514	8,437	99%	8,437	99%
4. HCAL Total		49,695	50,064	101%	50,064	101%
5. Muon Detector	5.1. Barrel Drifttubes	26,545	27,699	104%	27,699	104%
	5.2. Forward ME 1/1	5,691	5,691	100%	5,691	100%
	5.3. Endcap CSC	26,085	26,085	100%	26,085	100%
	5.4. Barrel RPC	6,910	7,068	102%	7,072	102%
	5.5. Forward RPC	3,995	3,329	83%	3,355	84%
	5.6. Alignment	3,729	3,393	91%	3,393	91%
5. Muon Detector Total		72,955	73,264	100%	73,295	100%
6. Trigger-DAQ	6.1. Trigger	11,847	9,886	83%	9,886	83%
	6.2. Data Acquisition	25,372	9,658	38%	10,297	41%
6. Trigger-DAQ Total		37,219	19,543	53%	20,183	54%
7. Offline Computing	7.1. Offline Infrastructure	3,600	2,279	63%	2,304	64%
7. Offline Computing Total		3,600	2,279	63%	2,304	64%
8. Infrastructure	8.1. Access and Survey	2,765	5,000	181%	5,085	184%
	8.2. General Installation	12,330	7,037	57%	8,164	66%
	8.3. Cooling and Ventilation	4,200	3,565	85%	4,982	119%
	8.4. Safety	1,700	1,462	86%	1,669	98%
	8.5. Fixed Cranes	3,180	3,054	96%	3,054	96%
	8.6. Shielding Systems	4,530	4,507	99%	4,534	100%
8. Infrastructure Total		28,705	24,624	86%	27,487	96%
9. Commissioning & Integration	9.1. Additional facilities for Commissioning on surface	4,940	6,952	141%	8,391	170%
	9.2. Detector Installation, Opening and Access Facilities	4,164	3,253	78%	3,553	85%
	9.3. General Services	6,900	7,072	102%	8,912	129%
9. Commissioning & Integration Total		16,004	17,277	108%	20,856	130%
Grand Total		545,946	485,509	89%	520,317	95%

Notes

1. Magnet, 7. Offline Computing, 9. Commissioning & Integration	Reflects Payments and Commitments from the Common Fund and thus differs from the total amounts paid by the Funding Agencies to the Common Fund
2. Tracker	Includes payments made from 1 staged DAQ slice
5. Muon Detector	Payments and Commitments include the Common Fund loan and thus differ from the total amounts paid by the Funding Agencies to the Muons detector
6. Trigger-DAQ	Includes payments for 1 staged DAQ slice
Cost Estimates	As reported to April 2005 RRB. Steps 1, 2 and 3 cost estimates are NOT included

ANNEX 4

Commitments for CMS Construction



ANNEX 5

Payments for CMS Construction