Detector Technology Group

PH-DT

Steering Board Meeting

(short version of PH Retreat Talk)

- Structure and organization of DT
- Resources and Infrastructure
- Snapshot of activities and resource attribution
- Expected evolution
- Services (few topics)
- AOB

cern.ch/ph-dep-dt

See also ‘Annual Report 2009’ under ‘Documents’

Mandate of DT group (spring 2008)

The mandate of the PH/DT group comprises development, construction, operation and maintenance of particle detectors for the experiments at CERN. The group clusters common services and infrastructure which are at the benefice of all experiments at CERN.

The group's activities are concentrated in four areas:

1. Completion and consolidation of the ongoing LHC projects;
2. Maintenance and operation: piquet services, shutdown and preventive maintenance, repairs and infrastructure support;
3. New detector projects: participation in new developments (LHC upgrade);
4. R&D: participation in common R&D activities in strategic fields;

The two main bodies to steer and manage the group are the **Steering Board** (SB) and the **Coordination Panel** (CP)

Meets 1x / year

Steering Board
PH DDL (chair), TCs (LHC exp.), GL, DGLs

→ Monitor and define main directions, global resource sharing.

Meets every 3 weeks

Coordination Panel
GL, DGLs, SLs, ECPs + invited

→ Exchange information, monitor progress, adjust resources.

Structure and organization of DT

http://cern.ch/ph-dep-dt/

DT = 78 staff

(HRT snap shot, Feb 2010. More details later)

Group Leader : C.Joram
Deputies F. Hahn (Resource Coordinator)
A. Onnela (Safety, workshops)

Secretariat: V. Wedlake (shared with NA48/NA62/CLOUD/RD50/RD51)

The group comprises 5 sections.

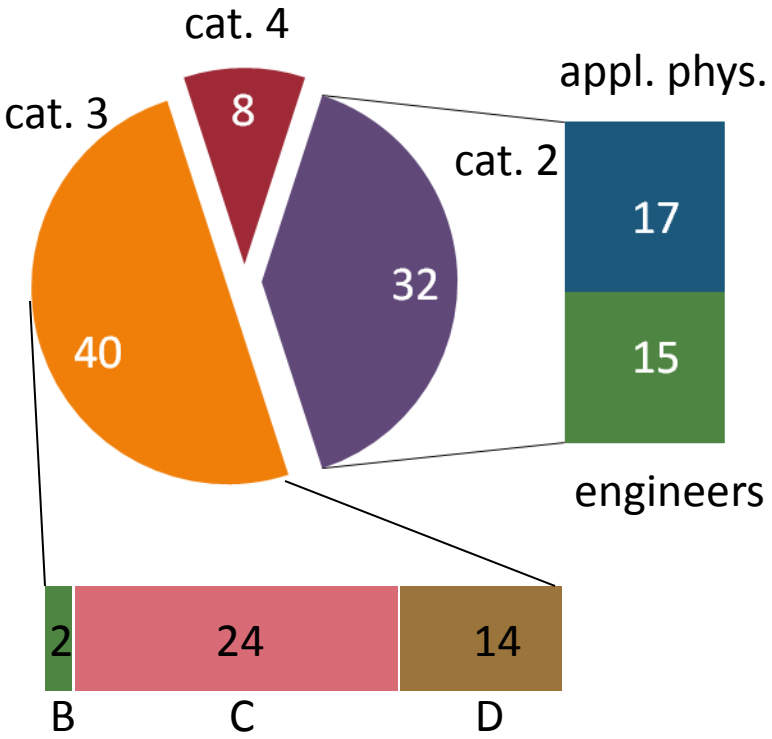
Section	Description	Staff	Leader
PH-DT-PO	Projects Office	13	A. Catinaccio
PH-DT-DI	Detector Infrastructure	26	F.Hahn
PH-DT-TP	Technology and Physics	12	C.Joram
PH-DT-EM1	Engineering & Mechanics 1	14	D.Perini
PH-DT-EM2	Engineering & Mechanics 2	13	H.Danielsson

Two staff members are on leave (ITER). They are not counted.

For each of the LHC experiments, we appointed a DT experiment contact person (**ECP**): Paolo Martinengo (ALICE), Mar Capeans (ATLAS), Paolo Petagna (CMS), Burkhard Schmidt (LHCb), Joachim Bächler (TOTEM).

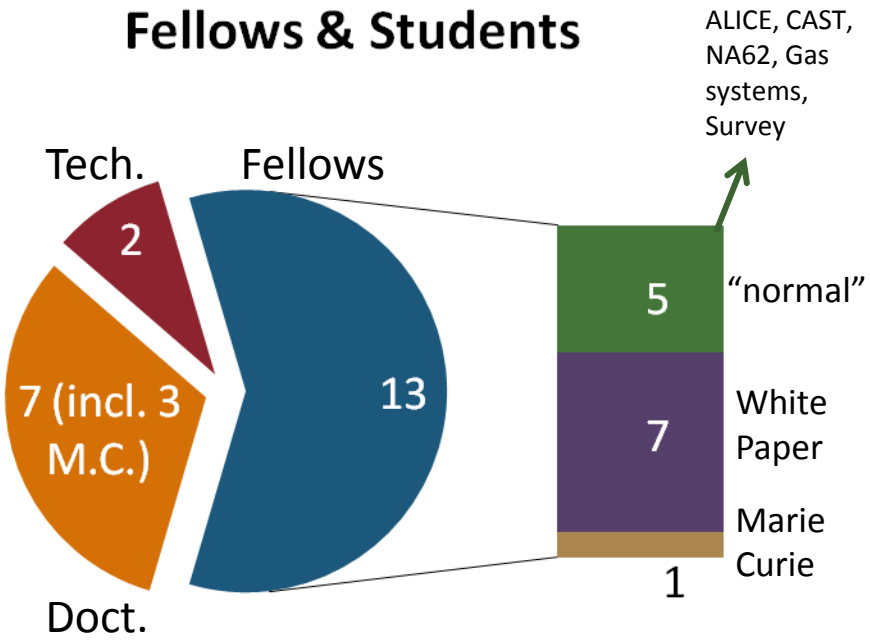
Staff composition

Staff categories



Σ = 80 (incl. 2 engineers at ITER)

Fellows & Students



Σ = 21

In addition 2 FSU teams (not counted in the following):
PH01 – pipe work, mech. supp., welding (4 FTE)
PH-02 – cabling work, electro-mech. support, (5+2 FTE)

Available manpower in 2010: 88.4 FTE (accounts for retirements, end of contracts)

The activities of DT are organized in

- 14 projects
- 12 services
- 6 R&D activities

Most of the projects extend over more than 1 section
→ Matrix organization.

+ 8 mechanical workshops (see below)

Projects

- AEGIS
- ALICE Operation
- ATLAS ALFA
- ATLAS Operation
- ATLAS Tracker Upgrade
- CAST M&O
- CLIC Det. Studies
- Cloud
- CMS Operation
- CMS Pre-shower
- LHCb Operation
- NA48/62
- TOTEM Operation
- TOTEM RP

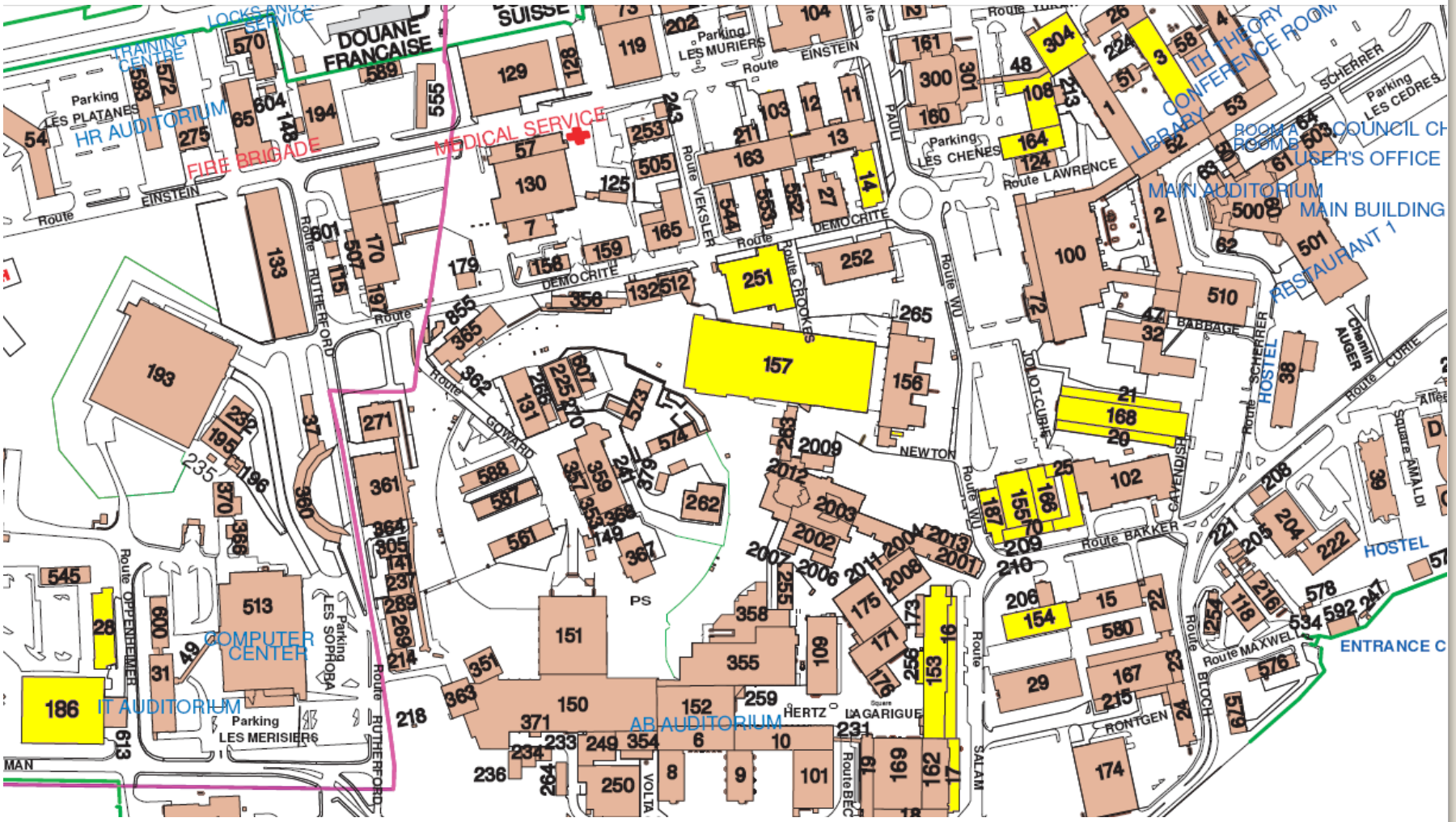
Services

- B-Field Measurements
- Bond. Lab. / DSF
- Gas Support
- Glueing Techniques
- Irrad. Facilities
- Magnet M&O
- Magnet Support
- Optical Lab.
- Rad. Mon.
- Scintillators
- Thin Film
- WP11/Cooling

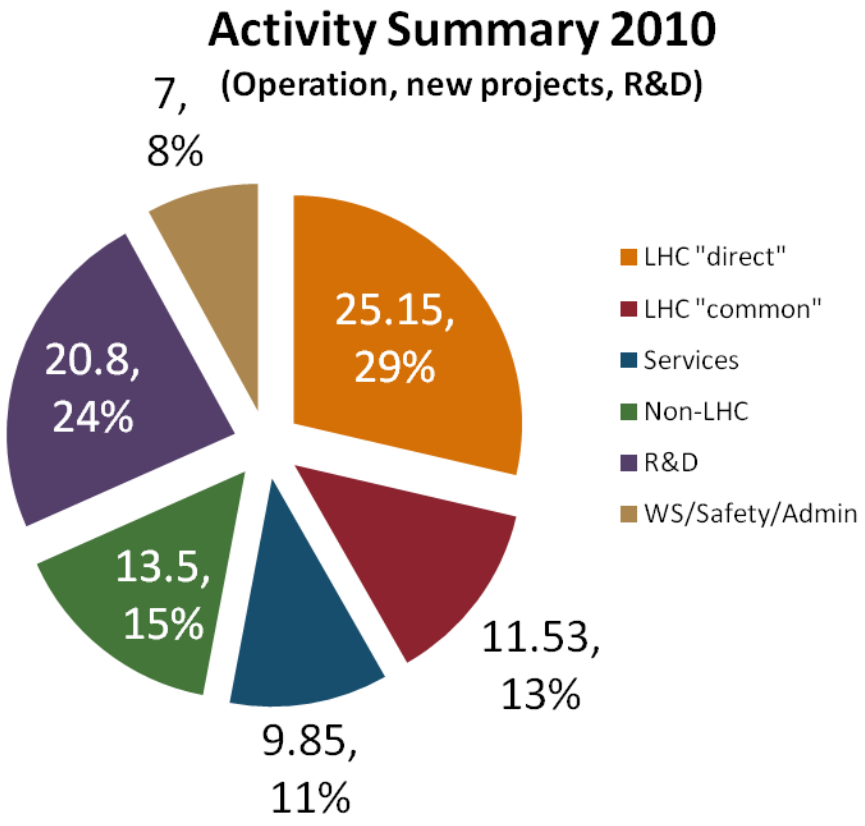
R&D

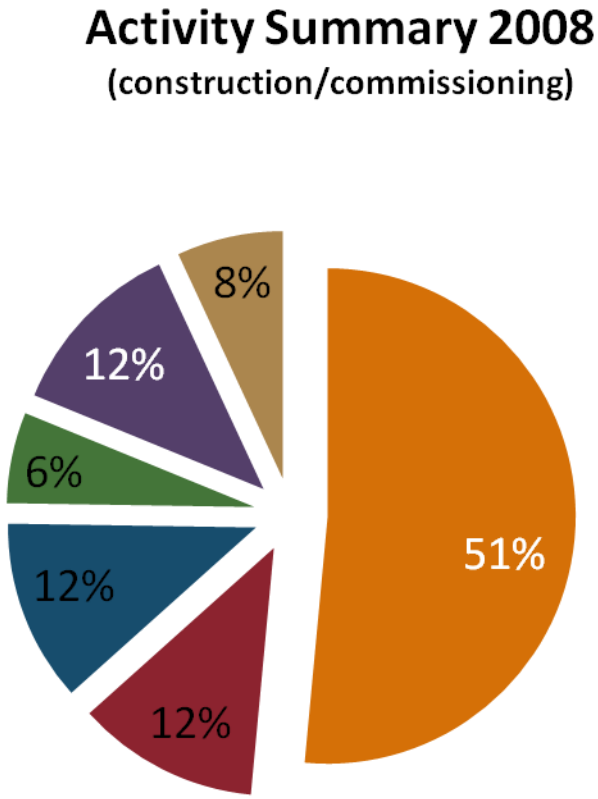
- WP4 / RD50
- WP5 / RD51
- WP6 / QC
- WP7 / New Irrad Fac / Mat. Studies
- WP11/Cooling
- Reverse Engineering/3D survey
- AX-PET

DT people are spread over 7 clusters of buildings. A possible regrouping will be subject of next SPOB meeting.

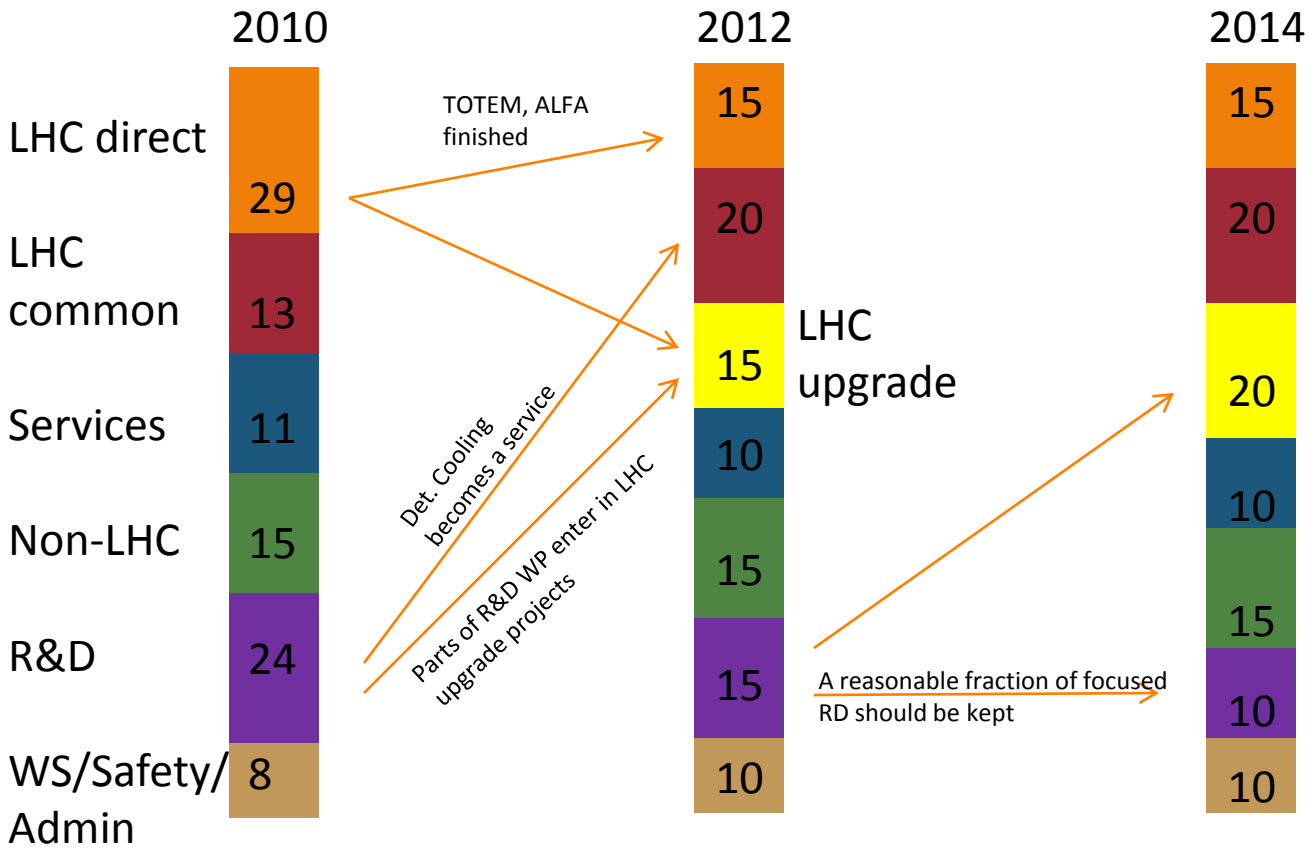


Comparison 2008 - 2010





‘Expected’ evolution of activities

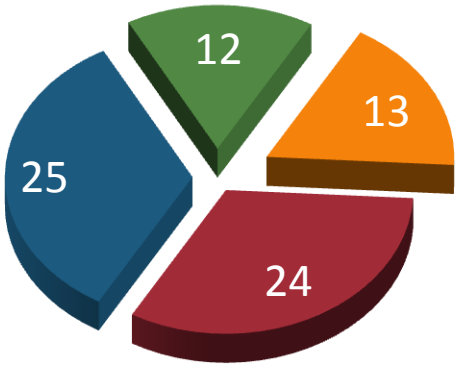


DT composition - 20% phys, 20% eng, 60% tech (incl. designers) - looks reasonable. Number of designers must be increased. Number of technicians must not drop!

Gas Piquet Interventions in 2009

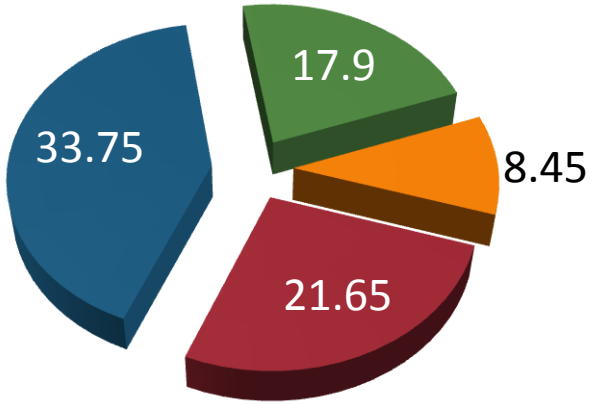
(S. Haider)

Number of interventions outside normal working hours (about 25% of all).



$\Sigma = 74$

Number of piquet hours outside normal working hours.



$\Sigma = 82$ h

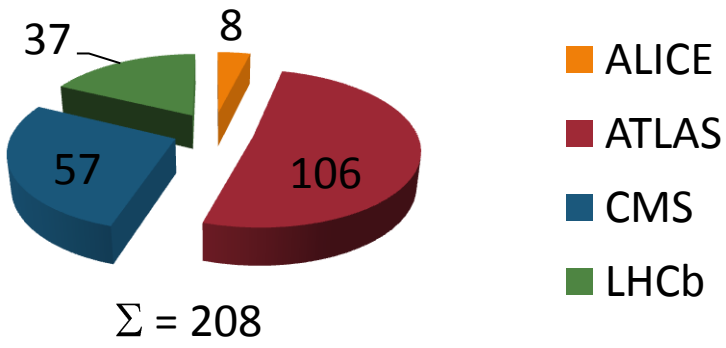
From 2010 on, All interventions will be recorded (in and outside normal working hours)

Magnet, DSS, RCS, Piquet Interventions in 2009

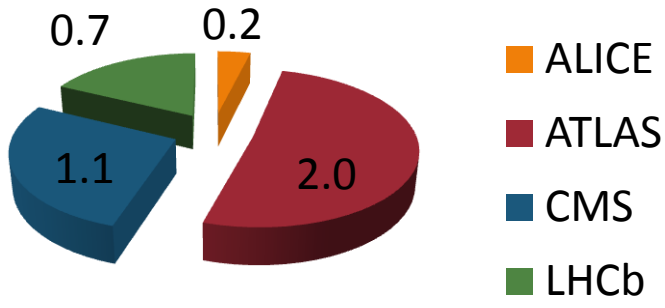
(G. Olesen)

Piquet is operational since 2006

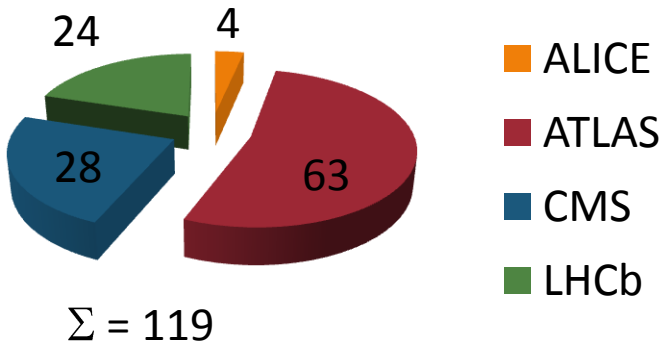
Interventions/Operation:



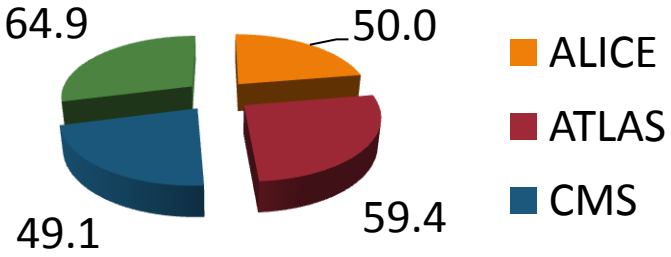
Interventions/week:



Outside working hours:



Outside normal hours (%):



M&O Budget Magnet Controls

(G. Olesen)

	Expected Yearly (WP)	2009 Paid	2010 Paid	2010 Outstanding
PH		440k	30k	0
ALICE	76k (16%)	76k	0	13k
ATLAS	243k (51%)	0	243k	38k
CMS	132k (28%)	0	0	155k
LHCb	25k (5%)	0	25k	3k
Total	**476k (100%)**	**516k**	**298k**	**209k**

Contributions

	2009 Spent	2010 Spent	2010 Outstanding
FSU	-195k	-95k	-180k
Spares	-126k	-23k	-28k
Consolidation	-106k	-81k	-50k (*)
Other	-88k	-49k	
Total	**-515k**	**248k**	**-258k**

Expenses

Balance	**0**	**Expected 0**

Balance

* Includes test set ups for upgrades of MSS and MDS

M&O Budget Gas Systems

(S.Haider)

	Expected Yearly (WP)	2009 Paid	2010 Paid	2010 Outstanding
PH		65k	35k	0
ALICE	130k (22%)	130k	0	130k
ATLAS	189k (32%)	189k	0	189k
CMS	157k (27%)	0	0	314k
LHCb	106k (18%)	106k	0	106k
TOTEM	8k (1.4%)	8k	0	8k
Total	**590k (100%)**	**498k**	**782k**	

Contributions

	2009 Spent	2010 Spent	2010 Outstanding
FSU	-411k		
Material	- 92k		
Spares	-135k		
Other	- 31k		
Total	**-669k**		

Expenses

Balance	**-171k**	**Expected 0**

Balance

Comments to M&O Work Packages

- WP Magnet control:
  - WP Term ends in 2010. Continuation should be defined this year.
  - Upgrade proposals for MDS and MSS will be made in the course 2010.
  - Replacement of ATLAS technician in piquet team. Important to have a competent person.

- WP Gas Systems:
  - WP Term 2008 – 2011.

Back-up

Bondlab / DSF

(A. Honma)

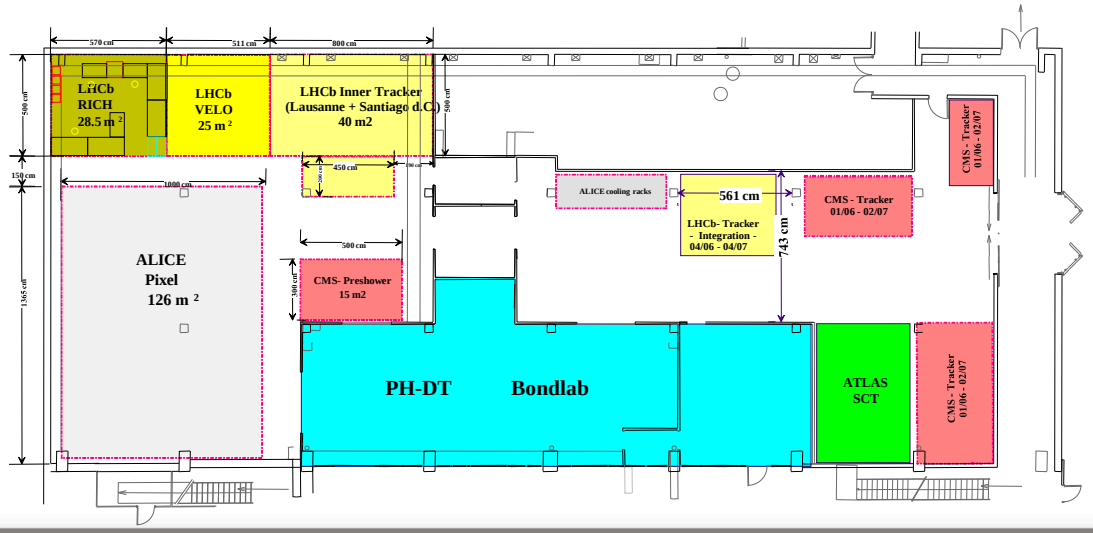
Bondlab activities performed in 2009

- Main effort: Totem (All Roman Pot modules), Atlas-ALFA (85 PMF PCBs), Medipix (Mpx2, Mpx3, Timepix), Axial Pet (gluing), CMS Opto.
- Other jobs: Atlas (LUCID,ABCN,FEC), PH/ESE (5+ different PCB jobs), RD50, NA62, Compass (silicon strip and RICH detector repairs), Isolde, Alice (Pixel, Upgrade / Phoenix), AMS, UA9-SPS, CMS Upgrade (sensor studies), numerous other small jobs. Bondlab remains very active.

Departmental Silicon Facility (DSF):

- Only Alice pixel, RD50 and occasionally Medipix still active in DSF clean room.
- Currently scheduling a meeting with all 4 main LHC experiments and other users to discuss usage of clean and non clean room for next 5 years.

DSF = 350m^2
high value
clean space.



p/n irradiations in 2009 (PS T7 area)

(M. Glaser/M. Moll)

Main users:

LHC Experiments (in particular innermost detector components – silicon tracking detectors)
most requests linked to R&D projects for LHC-upgrade (up to 2×10^{16} p/cm^2 ~ 5MGy requested)

Irradiations in 2009

110 sets of objects irradiated
155 dosimeters (Al) measured
126 days of beam time

Main users:

ATLAS Inner Detector upgrade, CMS Tracker Upgrade, CMS PLT
ATLAS LARG, LHCb RICH, CMS ECAL & Crystal Clear
RD50, RD42, PH Workpackages: WP2, WP4, …….

Main materials:

Silicon sensors (Pixel, Strip, Pad, 3D)
Electronics (CMOS devices, Front end and optoelectronic components, ….)
Scintillating crystals, ……

General tendency:

Irradiations become more complex (less objects but more time intensive set up & irradiations)

- Silicon sensors: under bias and in cold environment
- Electronics: readout during irradiation, tests in scattered proton field
- Crystals (heavy materials getting strongly activated)

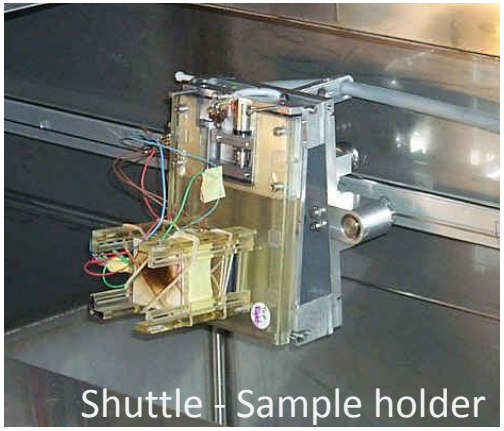
- **Problems**

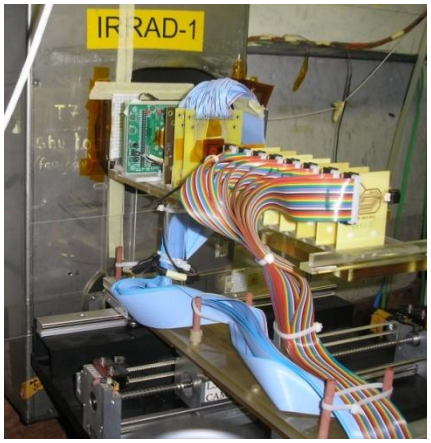
  We get a rather low proton flux (often only one spill of a supercycle) making irradiation for SLHC fluences a very long experiment

- **Future upgrades: PS2 abandoned (??) … new chances for EAST HALL ??**

  Up to the last Charonix Workshop the PS2 was planned to replace the PS in 'near' future. Making any major upgrade inside the East Hall impossible (not worth to invest in an infrastructure that anyway soon will disappear).

  In view of the latest discussions a long term operation of the PS (… for the next 25 years ??) seems to be a financially very attractive option. We assume this strategy will open up again the possibility to have a real upgrade in the EAST HALL as arguments regarding the limited lifetime of any investment for the facility are no longer valid.


Shuttle - Sample holder



New cold box inside facility

Gamma Irradiation Facility

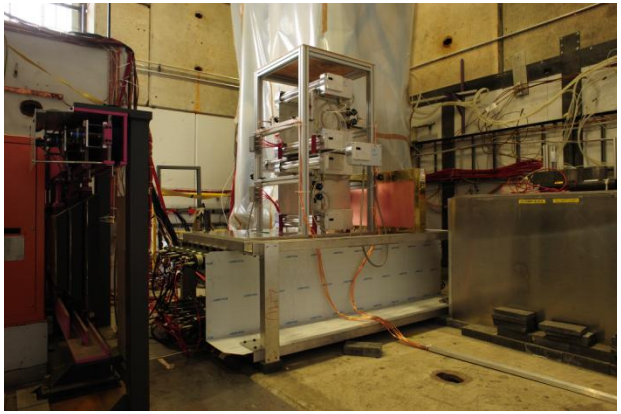
(R. Fortin)

ATLAS MDT Drift tube chambers (Ar + 7% CO2)
Two periods:
2009-05-01 - 2009-07-08. 924 h
2009-11-01 - 2009-11-31. 672 h

Gas filtering techniques for RPC (PH-DT, ATLAS and CMS)
(94% C2H2F4 + 5.5% + iC4H10 + 0.5% SF6)
2009-01-05 - 2009-12-17. 5036 h

LHC BLM (beam line monitors) (100 % N2)
- 2009-04-17 - 2009-04-20 1h
-2009-12-14 - 2009-12-14 1h

Radio-Protection (Test rad monitors):
2009-10-19 - 2009-10-19, 3 h



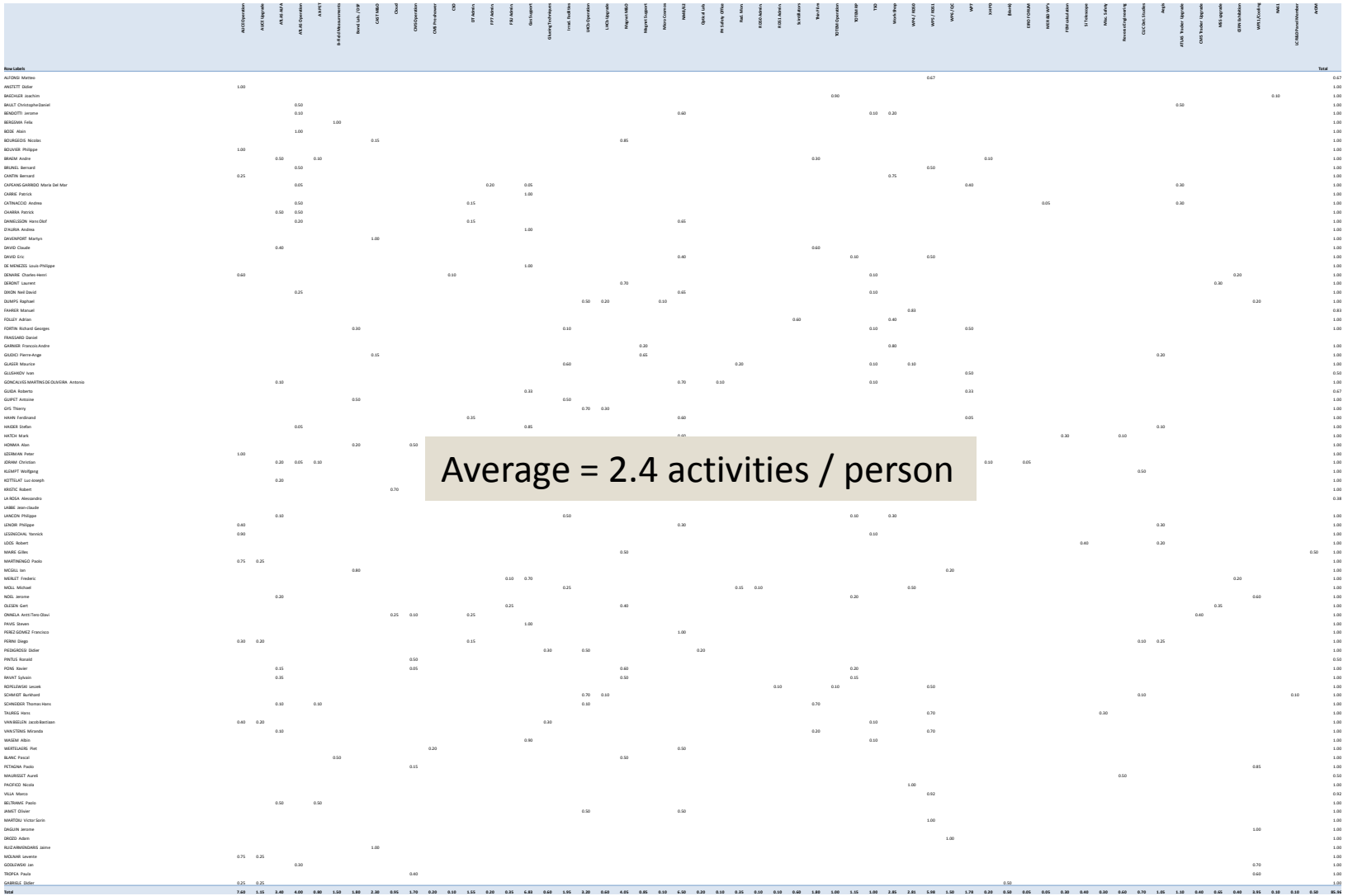
Proposal for GIF++ exists, but financial contributions of experiments are unclear.

M. Capeans et al., CERN-SPSC-2009-029 / SPSC-P-339

Example: Matrix of EM2 section

Row Labels	ATLAS ALFA	ATLAS Operation	CAST M&O	DT Admin.	Irrad. Facilities	Magnet Support	NA48/62	PH Safety Office	Scintillators	TOTEM RP	TSO	Work-Shop	WP5 / RD51	(blank)	Aegis	WP11/Cooling	Total
BENDOTTI Jerome		0.10					0.60				0.10	0.20					1.00
BODE Alain		1.00															1.00
BRUNEL Bernard		0.50											0.50				1.00
CHARRA Patrick	0.50	0.50															1.00
DANIELSSON Hans Olof		0.20		0.15			0.65										1.00
DIXON Neil David		0.25					0.65				0.10						1.00
FOLLEY Adrian									0.60			0.40					1.00
GARNIER Francois Andre						0.20						0.80					1.00
GIUDICI Pierre-Ange			0.15			0.65									0.20		1.00
GONCALVES MARTINS DE OLIVEIRA Antonio	0.10						0.70	0.10			0.10						1.00
LANCON Philippe	0.10				0.50					0.10		0.30					1.00
NOEL Jerome	0.20									0.20						0.60	1.00
PEREZ GOMEZ Francisco							1.00										1.00
Total	**0.90**	**2.55**	**0.15**	**0.15**	**0.50**	**0.85**	**3.60**	**0.10**	**0.60**	**0.30**	**0.30**	**1.70**	**0.50**		**0.20**	**0.60**	**13.00**

Group matrix



Row Labels	Total
ALFONSI Matteo	0.67
ANSTETT Didier	1.00
BAECHLER Joachim	1.00
BAULT Christophe/Daniel	1.00
BENDOTTI Jerome	1.00
BERGSMA Felix	1.00
BOSE Alain	1.00
BOURGEOIS Nicolas	1.00
BOUVIER Philippe	1.00
BRASM Andre	1.00
BRUNEL Bernard	1.00
CANTIN Bernard	1.00
CAPCANS-GARRIDO Maria Del Mar	1.00
CARRE Patrick	1.00
CATINACCIO Andrea	1.00
CHARRA Patrick	1.00
DANIELSSON Hans-Olof	1.00
D'AURIA Andrea	1.00
DAVENPORT Martyn	1.00
DAVID Claude	1.00
DAVID Eric	1.00
DE MENEZES Louis-Philippe	1.00
DENARIE Charles-Henri	1.00
DERONT Laurent	1.00
DIXON Neil David	1.00
DUNAYS Raphael	1.00
FAHRER Manuel	0.83
FOLLEY Adrian	1.00
FORTIN Richard Georges	1.00
FRASSARD Daniel	
GARNIER Francois Andre	1.00
GILDICI Pierre-Ange	1.00
GLASER Maurice	1.00
GLUSHKOV Ivan	0.50
GONCALVES MARTINS DE OLIVEIRA Antonio	1.00
GUIDA Roberto	0.67
GUIPET Antoine	1.00
GYS Thierry	1.00
HAHN Ferdinand	1.00
HAIDER Stefan	1.00
HATCH Mark	1.00
HONMA Alan	1.00
IZSIRKAN Peter	1.00
JORAM Christian	1.00
KLEMPT Wolfgang	1.00
KOTTSLAT Luc-Joseph	1.00
KRISTIC Robert	1.00
LA ROSA Alessandro	0.38
LABBE Jean-claude	
LANCON Philippe	1.00
LENOIR Philippe	1.00
LEUNG CHAN, Yannick	1.00
LOOS Robert	1.00
MARIE Gilles	1.00
MARTINENGO Paolo	1.00
MCGILL Ian	1.00
MERLET Frederic	1.00
MOLL Michael	1.00
NOEL Jerome	1.00
OLESEN Gert	1.00
ONNELA Antti Tero Olavi	1.00
PAVIS Steven	1.00
PEREZ GOMEZ Francisco	1.00
PERINI Diego	1.00
PIEDIGROSSI Didier	1.00
PINTUS Ronald	0.50
PONS Xavier	1.00
RAVAT Sylvain	1.00
ROPELEWSKI Leszek	1.00
SCHMIDT Burkhard	1.00
SCHNEIDER Thomas Hans	1.00
TAUBIG Hans	1.00
VAN BIGELEN Jacob-Bastiaan	1.00
VANSTENIS Miranda	1.00
WASEM Albin	1.00
WERTELAERS Piet	1.00
BLANC Pascal	1.00
PETAGNA Paolo	1.00
MAURISSET Aurelé	0.50
PACIFICO Nicola	1.00
VILLA Marco	0.92
BELTRAME Paolo	1.00
JAMET Olivier	1.00
MARTOIU Victor Sorin	1.00
DAGUIN Jerome	1.00
DRZEZI Adam	1.00
RUIZ-RAIMUNDARIS Jaime	1.00
MOLINAR Severine	1.00
GOOLEWSKI Ian	1.00
TROFKA Paula	1.00
GABRIELS Didier	1.00
Total	86.96

Average = 2.4 activities / person

8 workshops, with different roles / different locations

- **3 workshops for 3 specific service activities in DT**

  Small park of dedicated machines and equipment. Located right next to other work areas and offices of the Service.

  - Thin films, glass and ceramics;
  - Gas systems;
  - Scintillators.

- **3 general purpose workshops + 2 small workshops**
  - Prototypes, very short series, complex pieces/assemblies, quick fixes during assembly phases.
  - Mostly conventional machine tools, but also some high-precision and numerically-controlled units.
  - Proximity to testing labs, assembly halls, experimental areas.
  - Proximity to detector project teams (designers, engineers, physicists) [Favored, but not always fully possible].
  - Work-space and tools also for project members of visiting teams, but only under agreed conditions.

3 workshops for specific services in DT

Building	Responsible	Main Use
3	M. Van Stenis	Small workshop specialized in Glass and Ceramic machining. CNC milling machine.
155	A. Wasem	Small workshop for Gas Lab. Pipe working tools and specialised welding equipment.
155	A. Folley	Small workshop for Scintillator production.

3 + 2 general purpose workshops

Building	Responsible	Main Use
108	F. Garnier	Large workshop. Welding. ATLAS Point 1 activities.
162	B. Cantin	Large workshop, conventional tools.
166	L. Kottelat / J.Bendotti	Conventional and CNC machines.
2252	D. Anstett	ALICE activities at Point 2.
20	R. Dumps	Small workshop, conventional tools.

Snapshot of activities and manpower attribution (~APT 2010)

LHC "direct" = Construction, M&O, Upgrade

ALICE Operation	7.60
ALICE Upgrade	1.15
ATLAS ALFA	3.40
ATLAS Operation	3.95
ATLAS Tracker Upgrade *	0.80
CMS Operation	1.70
CMS Pre-shower	0.20
CMS Tracker Upgrade	0.40
LHCb Operation	3.20
LHCb Upgrade	0.60
TOTEM Operation	1.00
TOTEM RP	1.15
SUM	**25.15**

* IBL project not yet included
WP draft exists.

4 approved M&O work packages

970155 v.1	Work Package for Maintenance and Operation of the ALICE experiment.	Released-Approved
Doc. page	WP_ALICE_4_4 docx (49 Kb) pdf (460 Kb)	
970156 v.2	Work Package for Maintenance and Operation of the LHCb experiment.	Released-Approved
Doc. page	WP_LHCb_v1r4 doc (137 Kb) pdf (150 Kb)	
975471 v.1	Work Package for Maintenance and Operation of the ATLAS experiment.	Released-Approved
Doc. page	WP_ATLAS_v1r2 doc (104 Kb) pdf (182 Kb)	
979739 v.2	Work Package for Maintenance and Operation of the CMS experiment.	Released-Approved
Doc. page	WP_CMS_MnO_v5_ doc (81 Kb)	

TOTEM M&O to be done in 2010 (RP still in construction).

1036495 v.1	Work package describing the involvement of PH-DT and PH-ADE in the ATLAS Insertable B-layer Project.	In Work
Doc. page	Draft_WP_IBL_v13 docx (463 Kb)	

Snapshot of activities and manpower attribution (~APT 2010)

LHC “Common”

Gas Support	6.83
Magnet M&O	4.05
MSS upgrade	0.65
Grand Total	**11.53**

2 approved M&O work packages (Gas Systems + Magnet Control)

931547 v.2	PH/DT1/GS - Operations Work Package M&O Agreement for the Experimental Gas Systems	Released-Approved
Doc. page		
931548 v.1	"M&O" work package for magnet control, DSS and RCS.	Released-Approved
Doc. page		

MSS upgrade work to be better defined in 2010 (S. Ravat, G. Olesen).

Snapshot of activities and manpower attribution (~APT 2010)

Services for all (CERN) experiments

B-Field Measurements	1.50
Bond. Lab. / DSF	1.80
Glueing Techniques	0.60
Irrad. Facilities	1.95
Magnet Support	0.85
Optical Lab.	0.20
Rad. Mon.	0.35
Scintillators	0.60
Thin Film	1.80
Grand Total	**9.85**

Non-LHC projects

Aegis	1.05
CAST M&O	3.30
CLIC Det. Studies	0.70
Cloud	0.95
NA48/62	7.50
Grand Total	**13.50**

The group provides the Technical Coordinators for

- CAST M. Davenport
- CLOUD A. Onnela
- NA62 F. Hahn

Snapshot of activities and manpower attribution (~APT 2010)

R&D

AX-PET	0.60
CLIC Det. Studies	0.70
LC R&D Panel Member	0.10
ME R&D WP's	0.05
WP11/Cooling	4.95
WP4 / RD50	2.81
WP5 / RD51	8.32
WP6 / QC	1.50
WP7	1.78
Grand Total	**20.81**

More than 50% are Fell/Doct/Tech

Staff breakdown in R&D WP

WP11/Cooling	**2.95**
DUMPS Raphael	0.20
GODLEWSKI Jan	0.70
NOEL Jerome	0.60
PETAGNA Paolo	0.85
TROPEA Paula	0.60
WP4 / RD50	**0.60**
GLASER Maurice	0.10
MOLL Michael	0.50
WP5 / RD51	**3.40**
BRUNEL Bernard	0.50
DAVID Eric	0.50
KLEMPT Wolfgang	0.50
ROPELEWSKI Leszek	0.50
TAUREG Hans	0.70
VAN STENIS Miranda	0.70
WP6 / QC	**0.50**
HONMA Alan	0.30
MCGILL Ian	0.20
WP7 / New Irrad + Material	**0.95**
CAPEANS GARRIDO Maria Del Mar	0.40
FORTIN Richard Georges	0.50
HAHN Ferdinand	0.05

Snapshot of activities and manpower attribution (~APT 2010)

Workshops + Admin + TSO, FP7 etc.

CERN Exhibition	0.40
CSO	0.10
DT Admin.	1.55
FEM calculation	0.30
FSU Admin.	0.35
Misc. Safety	0.30
RD50 Admin.	0.10
RD51 Admin.	0.10
TSO	0.90
Work-Shop	2.85
Grand Total	**6.95**

Currently not allocated :
~1 FTE (spread over 3 people)

M&O for LHC experiments

General approach

- DT contributes to the completion and consolidation of the (approved) detector
- DT participates in the operation and maintenance of the sub-detectors with DT (or CERN) involvement. This may also include participation in (central) shifts, RPA interventions, etc.
- DT prepares and executes shutdown work
- DT maintains lab infrastructure, equipment, documentation, etc. required for maintenance and repair.

- Scope and foreseen resources are agreed in M&O WPs, one for each LHC experiment.
- Upgrade work is in general not included in the M&O WP. (LHCb VELO replacement (~1:1) is included.)