

# EP-DT

## Group Meeting 1/11/16

M.Capeans, A.Catinaccio, M.Moll

<https://indico.cern.ch/event/569467/>

# EP-DT Detector Technologies

## Contact Persons for Experiments and Projects

### Technology & Physics (DT-TP)

The TP section promotes and manages projects on detector construction, integration and operation.

Pool of project leaders that plans and coordinates projects - established in collaboration with the experiments- across different functional areas.

### Detector Development (DT-DD)

The DD section leads R&D projects in several detector technologies, and runs related detector R&D facilities open to all users.

Facilities: Gas detectors Lab, Silicon Lab, QART, BondLab, DSF, Irradiation Facilities.

### Fluidic Systems (DT-FS)

The FS section develops, maintain and operates gas and cooling systems for particle detectors.

The service is available to all experiments at CERN. It offers a coherent, ready-to-use deliverable, M&O support, advice and consultancy.

### Detector Interface (DT-DI)

The DI section develops and supports large and medium scale control and DAQ systems for the infrastructure of CERN experiments and laboratory control systems.

### Engineering Facilities (DT-EF)

The EF section develops and maintains technology expertise and facilities for particle detector prototyping and contributes to small scale parts productions for CERN experiments.

Facilities/shops are used to develop parts, prototypes, and conduct validation experiments in support of the group and projects.

### Engineering Office (DT-EO)

The EO section is in charge of mechanical design activities for CERN detector-related projects.

Designers and engineers cover a wide range of disciplines in mechanical engineering, construction, and numerical simulation fields.

### Detector Construction & Operations (DT-CO)

The CO section expertise is mechanics for particle detectors, including know-how in detector design, prototyping, production, detector assembly, integration and testing.

It represents the technical backbone of the group intervening and supporting through various detector projects the construction and operation of CERN experiments.

Projects

Services



# Meeting's Goal

1 year running with current DT structure and of continuous and very successful LHC operation.

It's time to review EP-DT in 2016

- Team and Modus Operandi
- Overview of commitments

Discuss challenges ahead

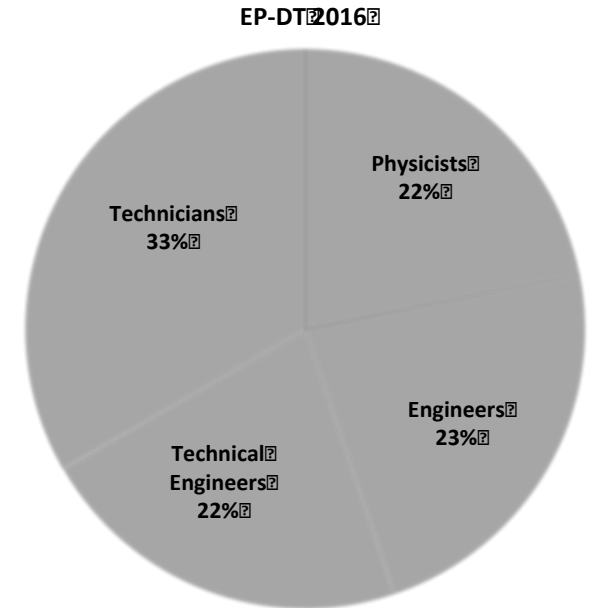
- Resources
- Investments: expertise & infrastructure

Enjoy achievements

- Sections Reports

# EP-DT Mandate & Team

- DT is the largest, most diversified group in the EP Department. It is a result of an optimisation of EP resources needed to design, build and operate experiments at CERN
- DT has also in its mission a vision into the future: the research and development of technologies for the experiments beyond today's upgrades



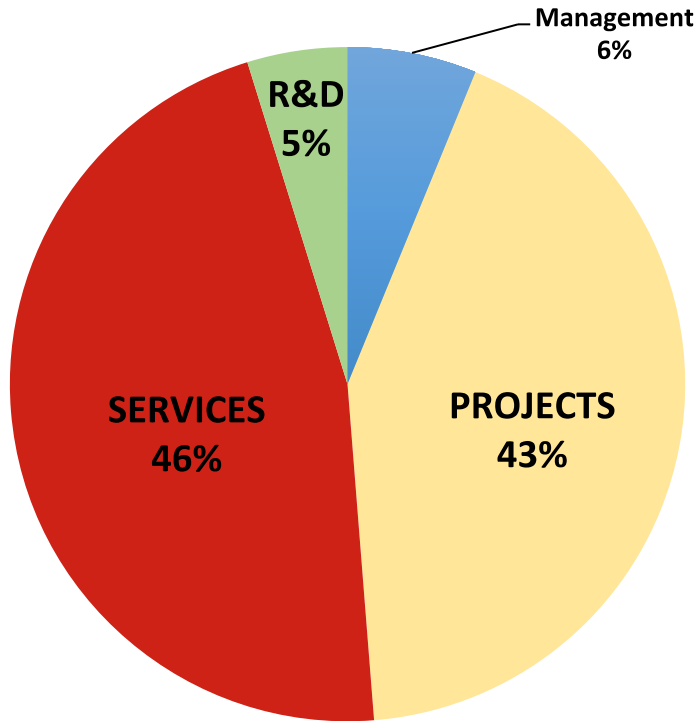
PERSONNEL	2012	Nov 2016
Staff	70	87
Fellows	12	15
Tech Students	~ 10	9
Doct Students		7
Trainees		10
FSU	~ 10	25
Active Honorary M		2
	<b>102</b>	<b>155</b>

## 30% increase in young members

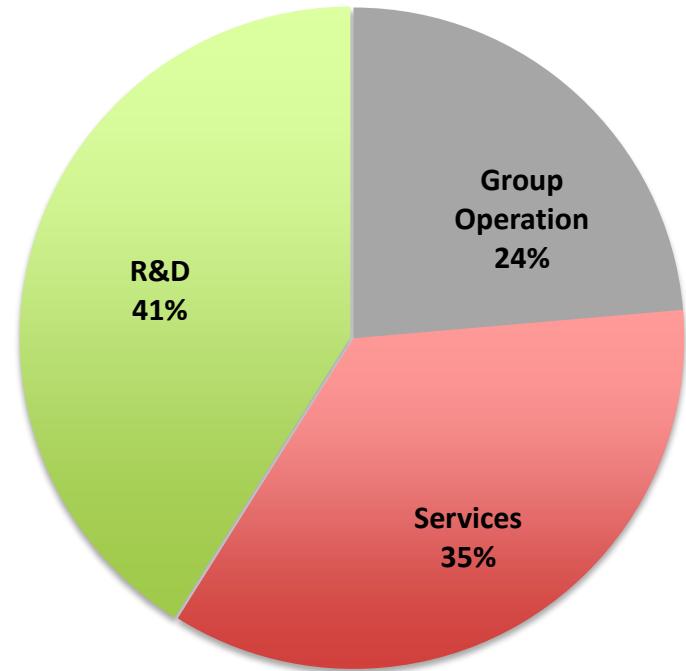
- 30% on DT quota and 70% are co-funded with experiments, studies (FCC, Nplat, LCD) and EU projects
- Regular intake of Trainees (Agreement with CUT, Poland – thanks Lukasz!)

# Resources Allocation

%FTE (Staff) in DT Activities



2016 Budget Request (2.2M)

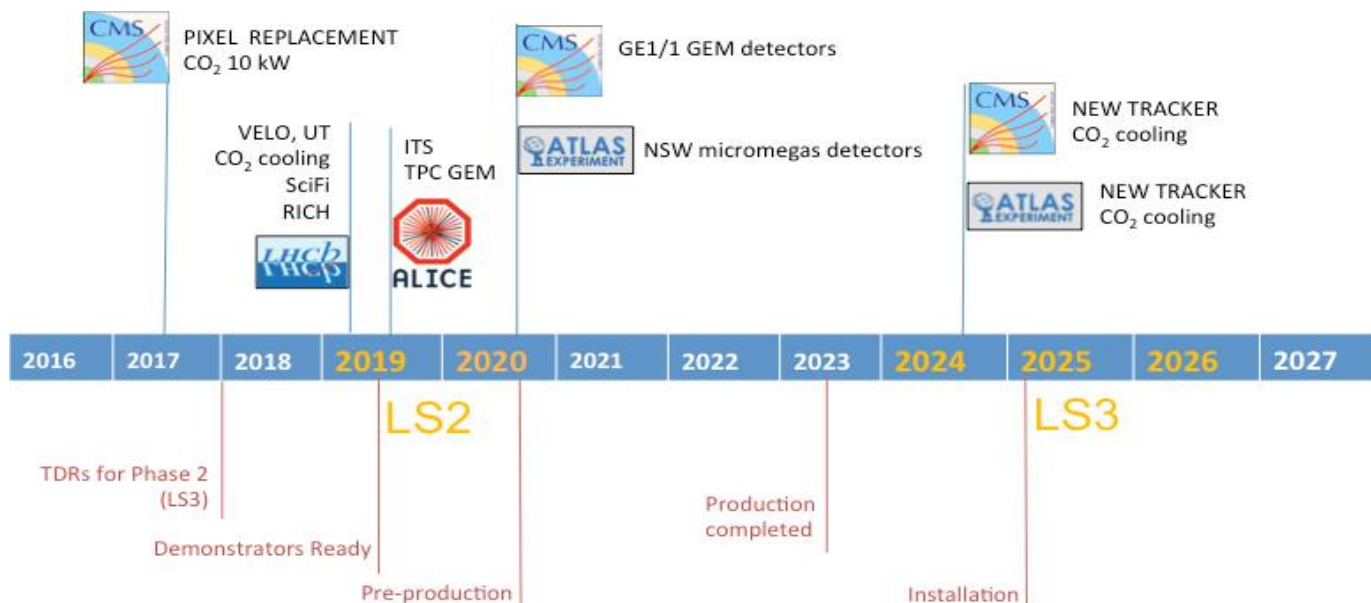


- *R&D activities supported by Fellows and Students*
- *Services are fully supported by central EP-funds and/or LHC M&O via work packages with the experiments*
- *No funding is allocated to projects (DT commits resources to projects)*

# EP-DT Modus Operandi

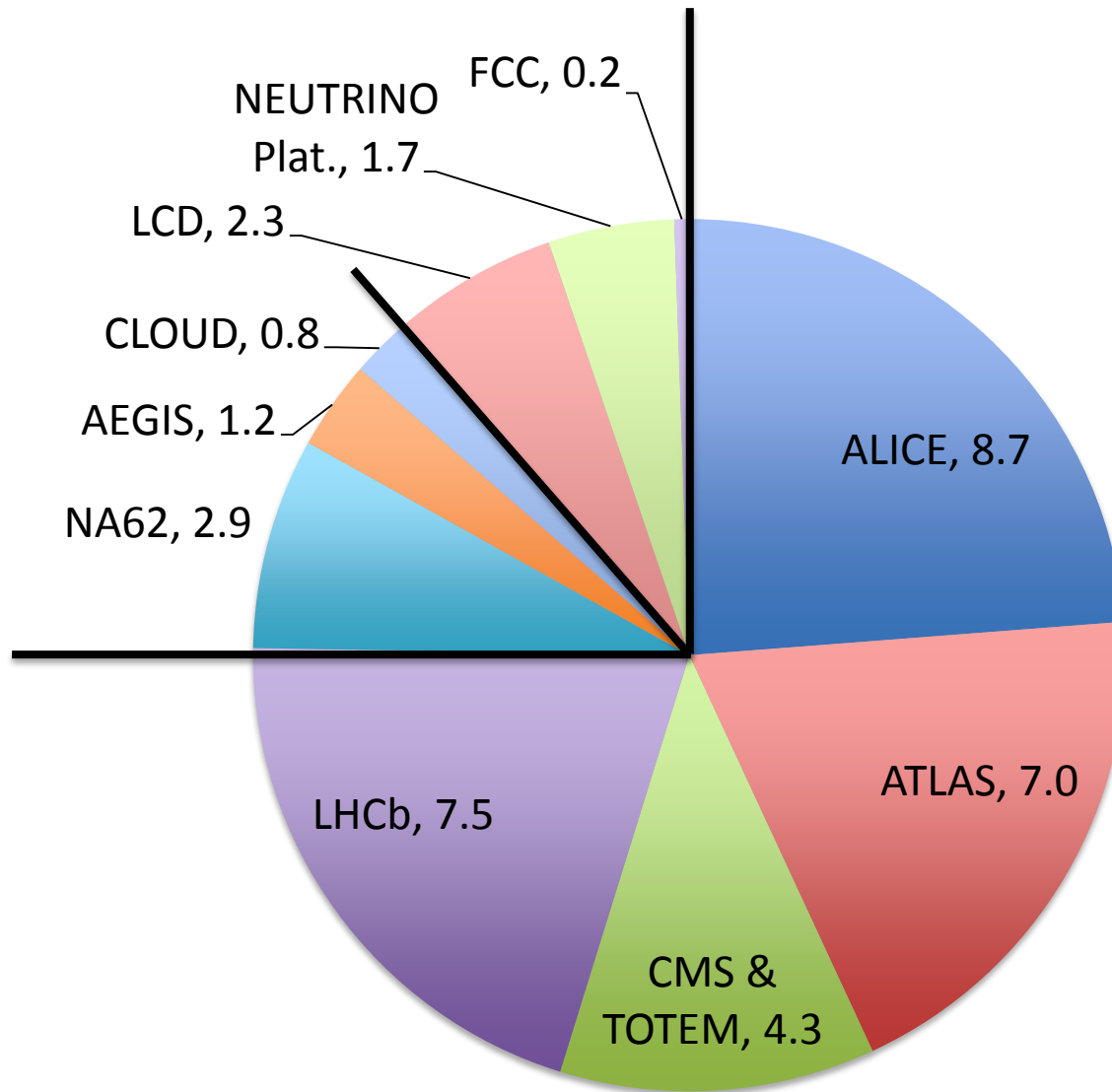
## Projects & Services

- **Projects** = collaborations with CERN teams in experiments to build detectors, usually covering the full project cycle (R&D, prototyping, construction, commissioning, M&O)
- A WP document describes the project, DT deliverables and resources. The WP is signed by the EP DH, experiment Project leader and Team leader, and DT mgt.
- DT resources allocated to projects are assigned for a given period of time to the experiment's personnel budget code in APT.
- All WPs are being reviewed now:
  - For LHC experiments covering the period Jan 2017 – Feb 2021: ATLAS, CMS&TOTEM, LHCb, ALICE
  - NA62, CAST, CLOUD, AEGIS, LCD, Neutrino Platform



# FTE (staff) in Projects

(data 2017)

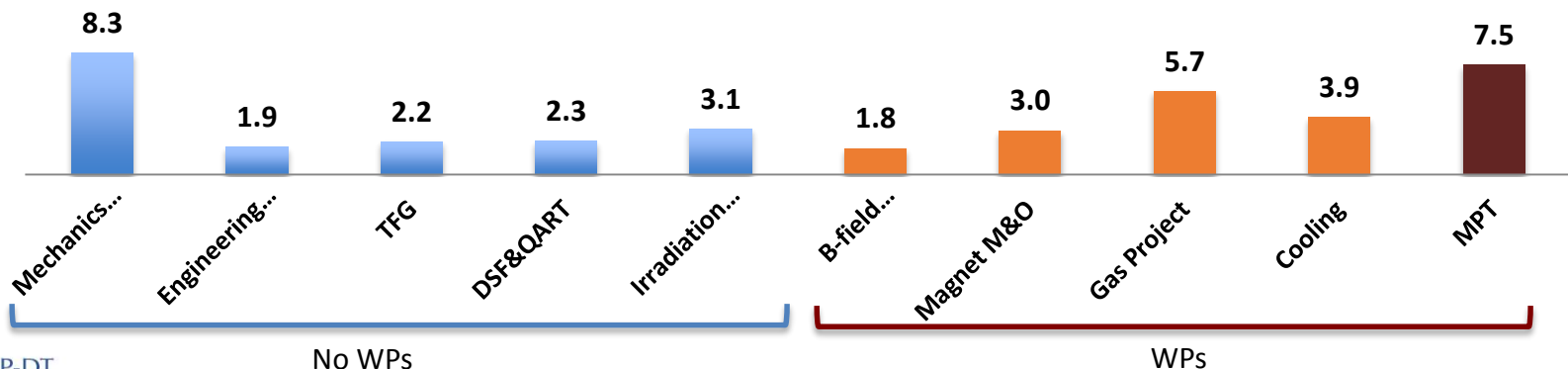


# EP-DT Modus Operandi

## Projects & Services

- **Services** for developing and operating infrastructures for experiments and detector R&D. They are client-driven and available for all experiments at CERN. They offer a coherent, ready-to-use deliverable (e.g. gas system, cooling system, control system, B-field measurement, thin film coating), M&O support, consultancy.
- A WP document describes the DT deliverables, cost of materials and FSU, and lists DT resources. DT resources are not accounted against a given experiment because they are considered common EP services. The WP is signed by the EP DH, experiment's Project leader, Team Leader, Resource Coordinator, and DT mgt.
  - Recurrent WPs for LHC M&O: Gas M&O, Cooling M&O and R&D, Magnet M&O
  - Recurrent WPs for non-LHC: CLOUD and NA62 gas M&O
  - Punctual WPs: Magnetic measurements, Safety systems non-LHC magnets, Roman pots controls,...
- **DT-hosted Generic R&D:** Clusters of expertise (R&D Projects), equipment and infrastructure for all experiments (Services), often launch pads for Upgrade projects. WPs documents not established

FTE (Staff) in SERVICES





# Resources

## STAFF

Till end of 2015, DT planned activities at short- and long-term under the agreement that resources were constant (~87 FTE): natural replacement of retirements and ending LDs.

Since January 2016 Staff planning is done differently.

EP management is very responsive and helpful to discuss the most critical activities.

- New posts, LD extensions and LD2IC conversions have been agreed where most urgently needed.
- The key argument for DT is the need of consolidating and renewing teams, adding new expertise, and guaranteeing teams with enough critical mass to cope LHC M&O, R&D, services and contribution to detector projects.

## FELLOWS & STUDENTS

DT operates with small (given the large group size), EP-given budgets and quotas:

- Tech and Doct students: 40 PM/y
- Fellows: increased recently from 46 to 54 PM/y
- Currently, about 2/3 students are co- or fully-funded by external sources.

Currently DT has no real budget capacity to access other programmes (e.g. TTE, VIA, FTEC and Portuguese Trainees) in a significant way.

# Innovation

**Detector R&D, expertise in new technologies, prototyping and detector/component productions are vital to maintain knowhow, to provide expert services, and to ensure successful careers of DT staff**

- There is quite some innovation driven by experiment's needs: gas, cooling, controls, coatings, sensors...
- EP KT Innovation Day on Oct 14<sup>th</sup>
  - DT R&D projects well represented: microScint by A.Mapelli, Tools for silicon detector R&D by M.Fernandez, Optical RO for MPGD by F.Resnati
  - Technology: C-composite activities by F.Boyer
- **Need to push new manufacturing technologies - DT core expertise!**
  - Would like to invest on new high-tech manufacturing equipment and corresponding staff training, and involve young trainees
  - Work ahead: identification of fields of interest (unique competencies), priorities and achievable goals, identification of staff members
- **Continue renovating DT infrastructures**
  - Done
    - Mechanical WSs: CNC 5-axis, conformity, TRAKA, 3D printing, painting (B108, 162, 166)
    - Composite Lab: tensile machine (B153)
    - DSF: bonding machine, stereo-microscope, access, meeting room (B186)
  - Imminent
    - Rationalization of Gas&Cooling Workshop (B155)
    - Cooling R&D space (B153)
    - New area for MPT (B107, as planned long time ago!)

# Key points

- DT has unique expertise in several domains.
- DT contributions continue to be crucial for LHC operation and upcoming upgrades, and SME experiments. Agreed small contributions to Neutrino Platform on 'new' domains.
  - Listen to the next talks!
- Road ahead for projects and services evolution is well known.
- >75% DT resources are dedicated to LHC projects (M&O, LS2 and LS3 projects).
- We do not have much contingency available (see WPs). New requests mean prioritization.
- The M&O responsibilities in the Group are very heavy. It is and it will be a challenge to allow all of you 'creative' activities and personal development aligned with the Organization's needs:
  - Every section has been built to share M&O and services responsibilities with exploratory/RD/fun activities
  - Teams renewal and addition of youngsters being planned and implemented across all sections and projects
  - Expertise modernization being planned: access to high-tech technologies and infrastructure for DT-core activities
- Resources limitations:
  - We need growth to renovate and be able to question 'old' activities
  - We need to be inventive with a constant budget
  - We need to exploit further external funding: collaborations, EU projects, KT
  - Connections between sections are very important

***Coming together is a beginning. Keeping together is progress. Working together is success.***

***Thanks for you trust and commitment***



**EP-DT Detector Technologies**

**Group leader:** Mar CAPEANS  
**Deputies:** Andrea CATINACCIO & Michael MOLL

*Secretariat:* Veronique WEDLAKE  
*Safety Linkperson:* Isabelle MARDIROSIAN

**Technology & Physics (DT-TP)**  
 Burkhard SCHMIDT

**Detector Development (DT-DD)**  
 Petra RIEDLER

**Fluidic Systems (DT-FS)**  
 Paola TROPEA

**Detector Interface (DT-DI)**  
 Giovanna LEHMANN

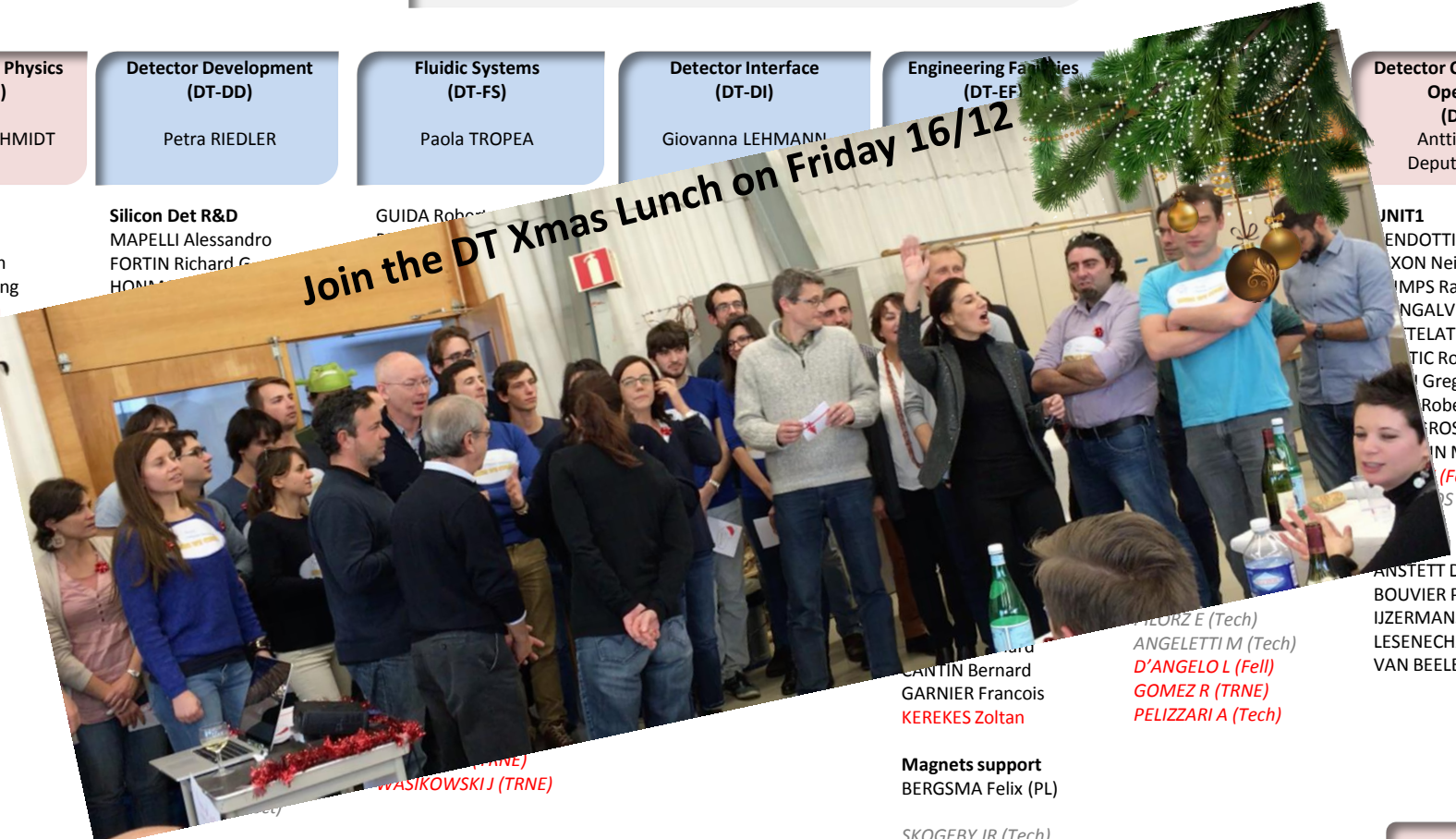
**Engineering Families (DT-EF)**

**Detector Construction & Operations (DT-CO)**  
 Antti ONNELA  
 Deputy: F.PEREZ

GYS Thierry  
 HAIDER Stefan  
 JORAM Christian  
 KLEMPF Wolfgang  
 PACIFICO Nicola  
 MARTINENG  
 SICKING Eva  
 GALKAMA (Tech)  
 SROKAS (Fell)

**Silicon Det R&D**  
 MAPELLI Alessandro  
 FORTIN Richard  
 HONN

GUIDA Robert



**Join the DT Xmas Lunch on Friday 16/12**

**UNIT1**  
 ENDOTTI Jerome  
 XON Neil  
 MPMPS Raphael  
 NGALVES Antonio  
 TELAT Luc-Joseph  
 TIC Robert  
 Gregory  
 Robert  
 ROSSI Didier  
 IN Maurice  
 (Fell)  
 SA (Tech)

ANSTETT Didier Henri  
 BOUVIER Philippe Jacques  
 IJZERMANS Pieter  
 LESENECHAL Yannick  
 VAN BEELEN Jacob Bastiaan

TEORZE (Tech)  
 ANGELETTI M (Tech)  
 D'ANGELO L (Fell)  
 GOMEZ R (TRNE)  
 PELIZZARI A (Tech)

**Magnets support**  
 BERGSMMA Felix (PL)

SKOGEBY JR (Tech)  
 UGIDOS Saray (Fell)

**Irradiation Facilities**  
 RAVOTTI Federico (PL)  
 GLASER Maurice  
 JAEKEL Martin  
 PEZZULO Giuseppe  
 GORINE G (Doct)  
 GOTKSE B (Doct)

WASIKOWSKI J (TRNE)

**FSU PH40:** A.Drozd, K.Baran, E.Budun, G.Button, P.Dubert, F.Fabregas, JC Gaubert, K.Jauregui, K.Kapusniak, B.Martins, P.Nguyen, J.Penedo, X.Thery  
**FSU PH02:** A.Kehrli, M.Carrichon, G.Crepet, B.Dinger, J.Dumollard, A.Laassiri, C.Landraud, H.Martinati

Projects

Services

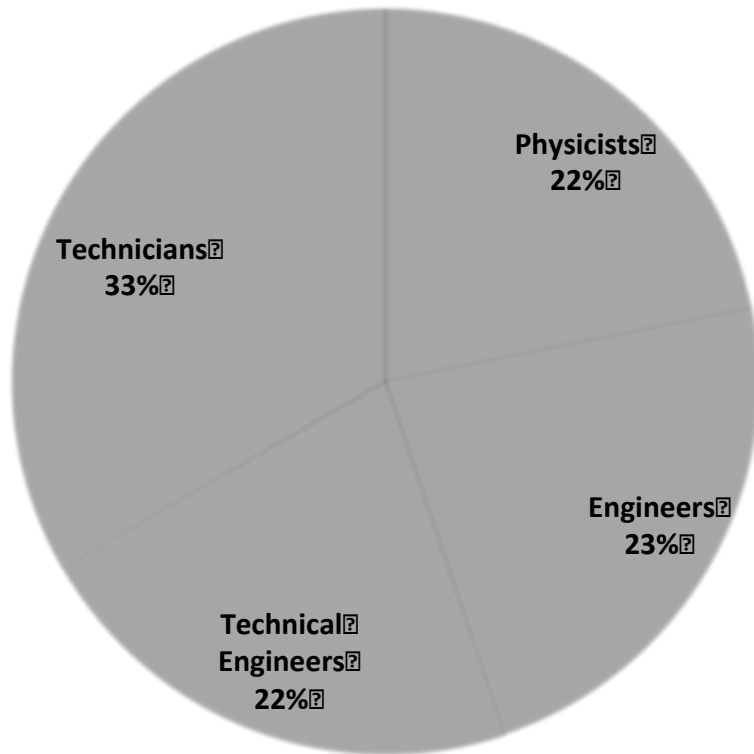
# Additional Material



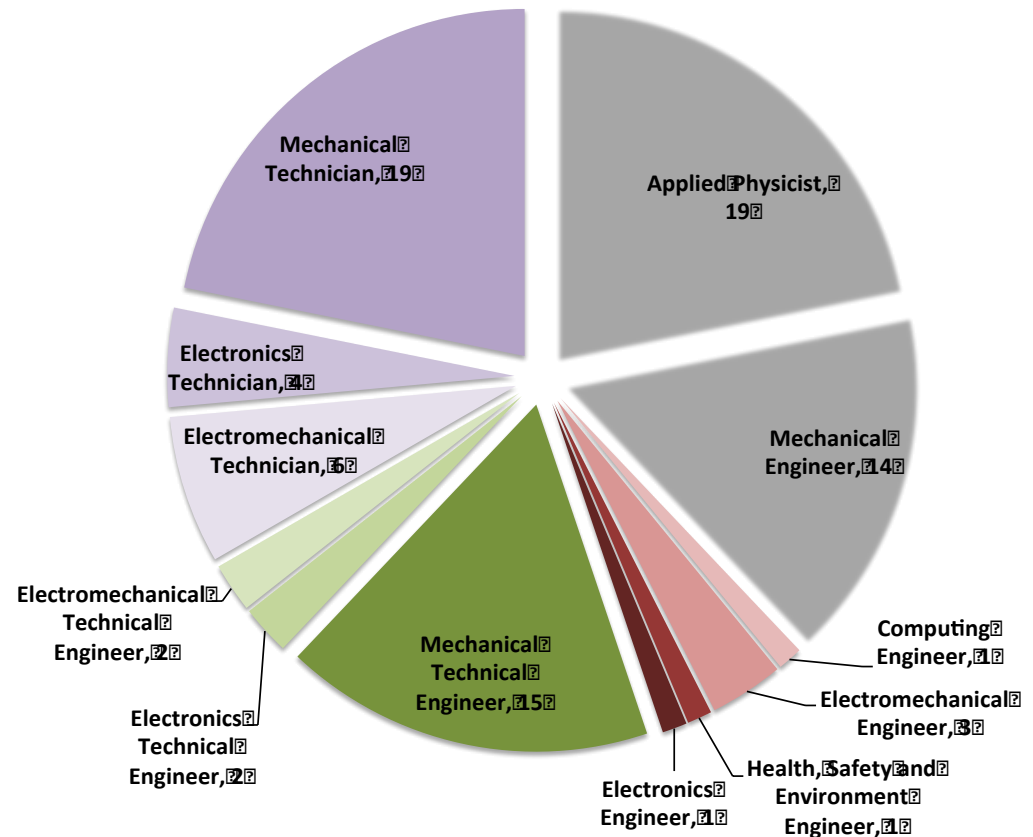
# EP-DT Team in 2016

87 staff members: 78% IC and 22% LD

EP-DT 2016



EP-DT 2016 Benchmark Jobs



# DT in LHC Upgrade Projects

- Support to **Operation**: mostly in technical stops, shutdowns
- **Detector Upgrades**: EP-DT partners with CERN teams in the experiments (WP agreements)

LHCb	ALICE	CMS	ATLAS
<ul style="list-style-type: none"><li>• <b>Up to LS2</b><ul style="list-style-type: none"><li>• Integration aspects</li><li>• SciFi (detector)</li><li>• Velo (mechanics)</li><li>• UT (integration)</li><li>• RICH/TORCH</li></ul></li><li>• CO<sub>2</sub> cooling</li></ul>	<ul style="list-style-type: none"><li>• <b>Up to LS2</b><ul style="list-style-type: none"><li>• Integration aspects</li><li>• ITS</li><li>• ALICE TPC (GEM prod.)</li></ul></li></ul>	<ul style="list-style-type: none"><li>• <b>Up to LS2</b><ul style="list-style-type: none"><li>• Pixel (integration)</li><li>• GE1/1 (GEM prod.)</li><li>• CO<sub>2</sub> for Pixel</li></ul></li><li>• <b>LS3</b><ul style="list-style-type: none"><li>• TK (modules, engineering)</li><li>• CO<sub>2</sub> cooling</li></ul></li></ul>	<ul style="list-style-type: none"><li>• <b>Up to LS2</b><ul style="list-style-type: none"><li>• NSW Module0</li><li>• ATLAS AFP (controls)</li></ul></li><li>• <b>LS3</b><ul style="list-style-type: none"><li>• ITK Pixel</li><li>• CO<sub>2</sub> cooling</li></ul></li></ul>

On top, continuous M&O responsibility for magnet controls & safety, all gas systems, cooling coordination and since LS1 CO<sub>2</sub> detector cooling M&O