DT Group Meeting

Welcome/Bienvenue!

June 22, 2017

Burkhard Schmidt for the DT coordination team

Goal of the Meeting

- **Change of group leader took place on April 2017:**
  - Many thanks to Mar for all she did for the group in the past years! She left the group in an excellent condition!

- **We want to review today the activities of the group**
  - Try to cover all areas. Since many things are being done, the meeting will be rather long – apologies – but there will be a BBQ at the end ...

- **Contents of the introduction:**
  - Reminder of the group's mandate
  - Overview of group status and changes
  - Involvement in the LHC experiment upgrades
  - Overview of service provided by the group
  - Ongoing R&D activities and future vision

Mandate of the Group

- **From our webpage**: https://ep-dep.web.cern.ch/organisation/dt

  The DT group participates in the development, construction and operation of particle detectors for experiments at CERN. This comprises detector consolidation and upgrade projects as well as infrastructure for experiments.

- **Key assets:**

  We have vast range of expertise and facilities in many different domains that are crucial for advanced detector-systems. Among these are detector research development and system support, fine mechanics, engineering, thin film coatings, optics, silicon detectors facility with wire-bonding lab, irradiation facilities, magnet support, B-field mapping, instrumentation and controls, gas and cooling systems for particle detectors.

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.

7 staff
1 Fell +1 Tech

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.

11+1 staff
5 fell + 6 Doct
1 Tech + 5 Trne

Fluidic Systems (DT-FS)

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

Service available to all experiments. It offers a coherent, ready-to-use deliverable, M&O support, advice and consultancy.

13 +1 staff
6 Fell + 1 Doct
2 Tech + 5 Trne
5 FSU

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.

6+1 staff
2 Fell + 1 Doct
4 FSU

Engineering Facilities (DT-EF)

The EF section develops, maintains technology expertise and facilities for detector prototyping and small scale productions.

22+1 staff
2 Fell + 1 Tech
13 FSU

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.

11+1 staff
1 Fell + 2 Tech
1 FTEC

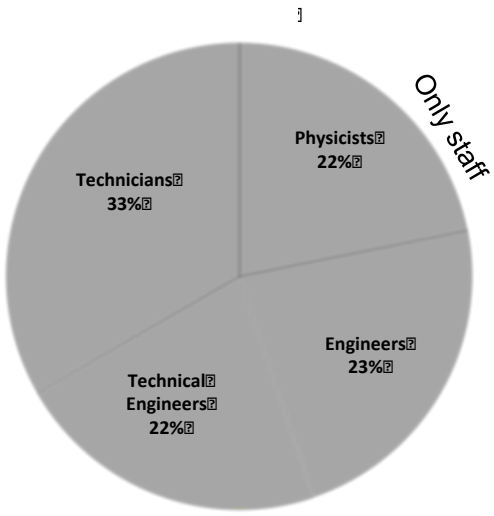
Detector Construction & Operations (DT-CO)

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.

16 staff
2 Fell + 1 Tech

PERSONNEL	Nov 2016
Staff	90
Fellows / TTE	19
Tech Students	8
Doct Students	8
Trainees /FTEC	11
FSU	22
Active Honorary M	2
	160



Projects

Services

Resources Allocation

DT-hosted Generic R&D

- Clusters of expertise (R&D Projects), equipment and infrastructure for all experiments (Services), often launch pads for Upgrade projects.
- No WPs are established.

Management

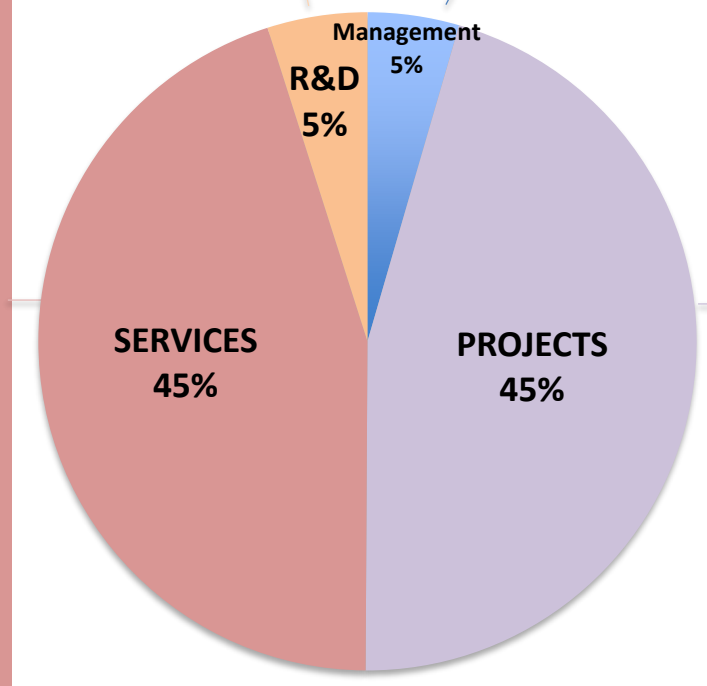
GL and SL

Safety roles

Services

- **Development and operation of infrastructures for experiments and detector R&D.**
- Client-driven and available for all experiments at CERN.
- For M&O, WPs describe the DT deliverables, cost of materials and FSU, and DT resources.
- DT resources are not accounted against a given experiment because they are considered common EP services.

Gas, Cooling, Magnets, DSF, TFG, MPT, Irrad, GIF++, Machining, Magnet support, Scintillator Lab, Composite Lab

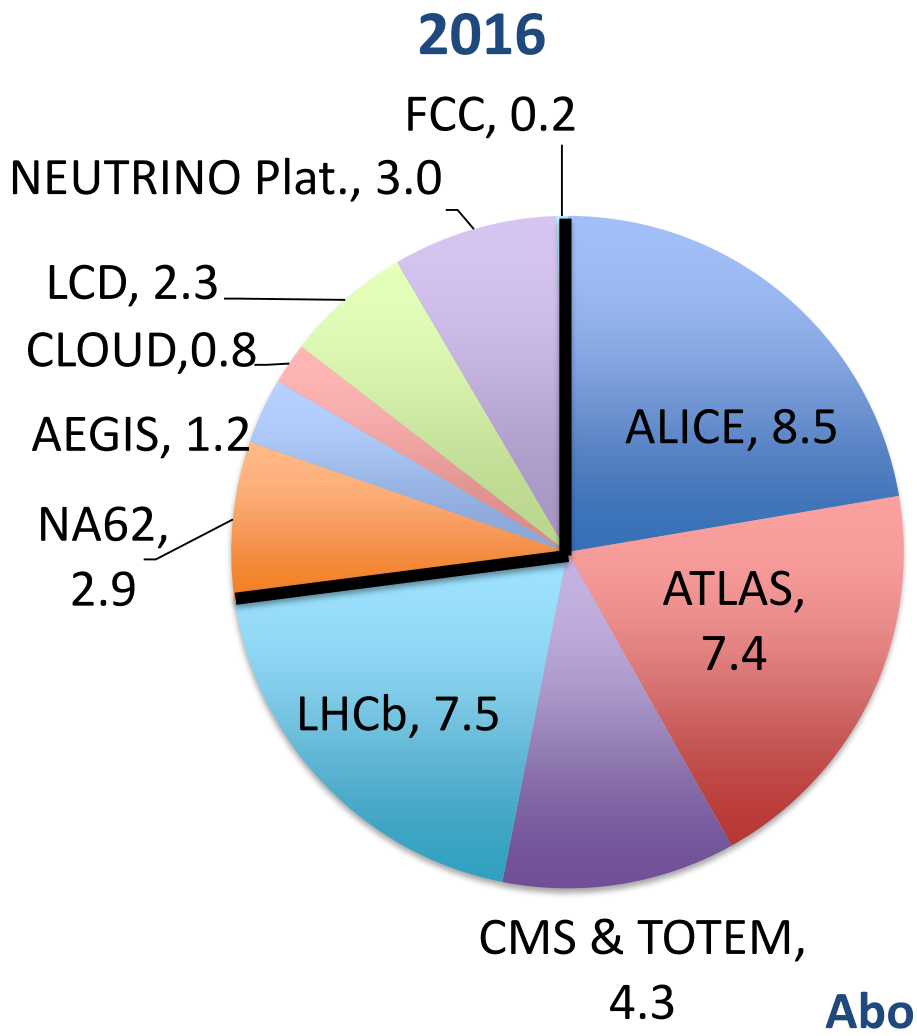


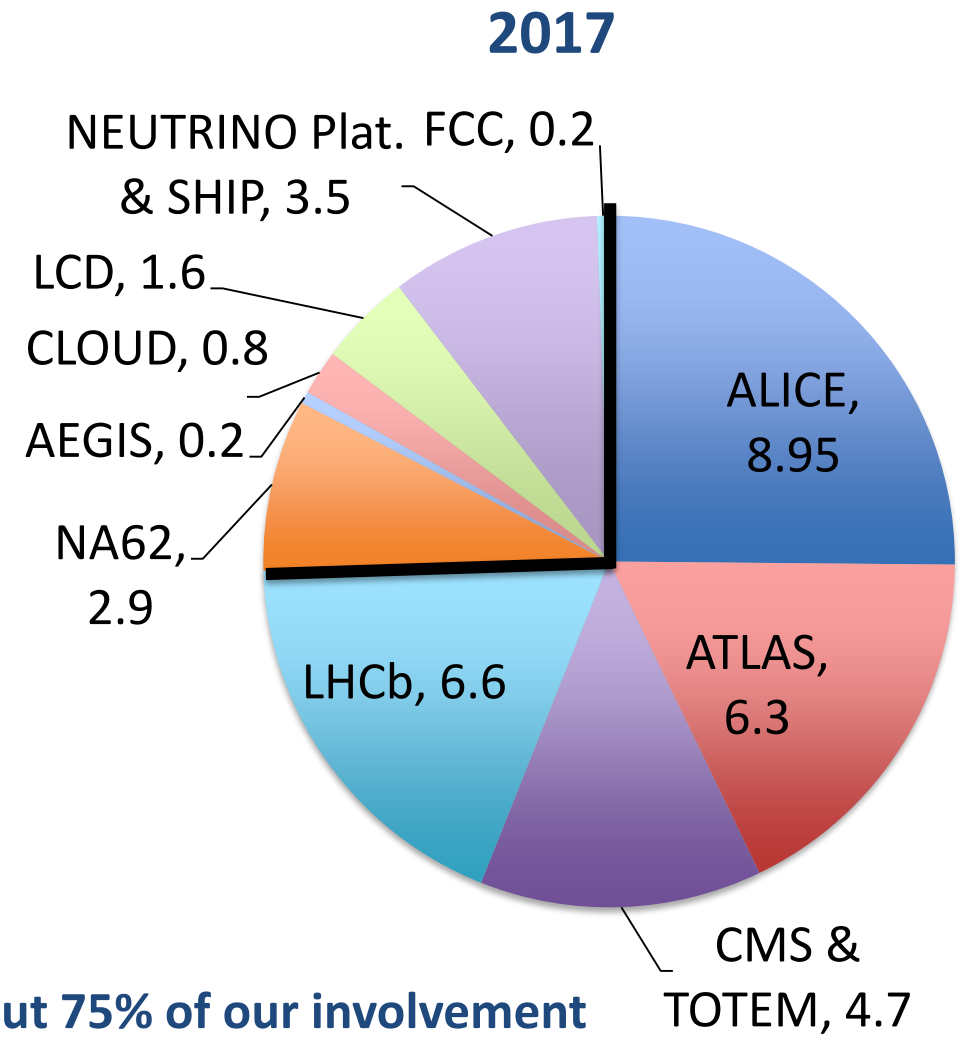
Activities DT- Staff (2017)

Projects

- **Collaborations with CERN teams in experiments to build detectors,** usually covering the full project cycle (R&D, prototyping, construction, commissioning, M&O).
- WPs document describes the project, DT deliverables and resources.
- DT resources allocated to projects are assigned for a given period of time to the experiment's personnel budget code in APT.

Staff involvement in Projects



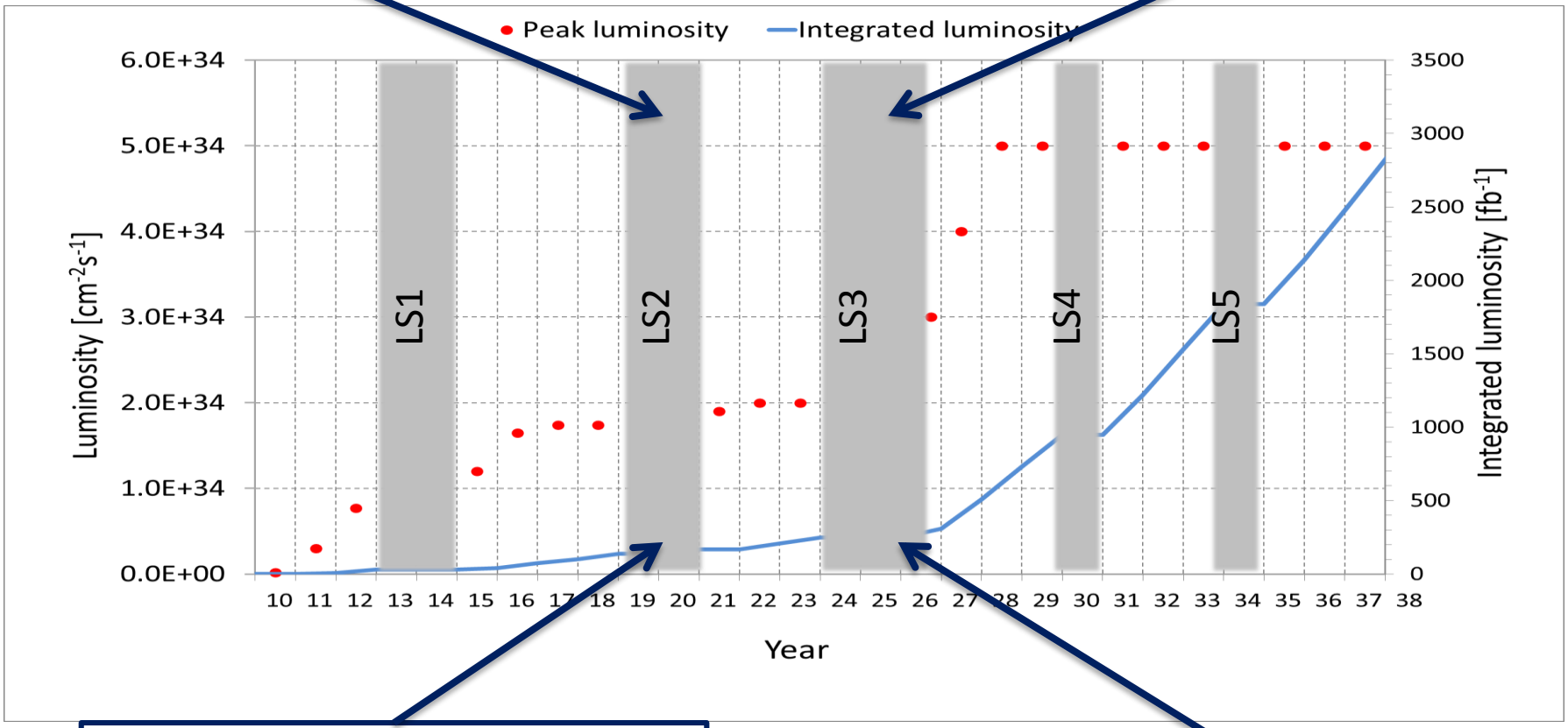


About 75% of our involvement In projects is LHC related

Long Term LHC Schedule

- LHC Injector Upgrade

HL-LHC, pp luminosity increase to 5 x 10^{34} (levelled)

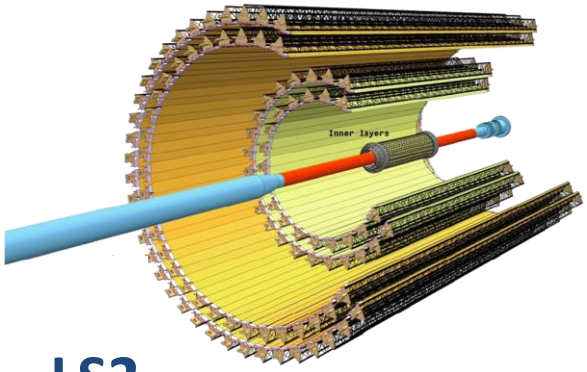


ALICE & LHCb major upgrades
ATLAS & CMS Phase I upgrades

ATLAS & CMS Phase II upgrades

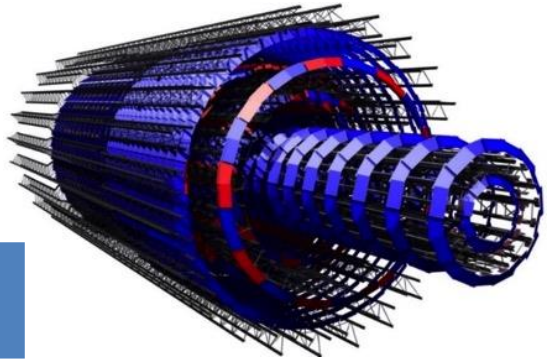
LHC Projects with DT involvement

ALICE ITS upgrade



LS2

ATLAS Phase 2 Pixel Upgrade

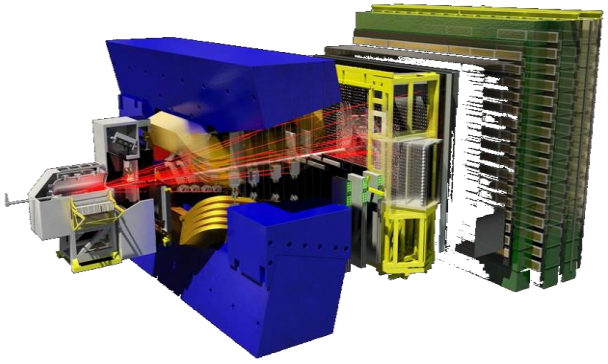


LS3

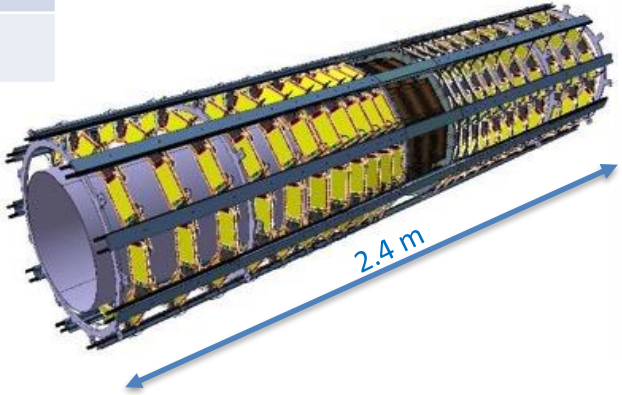
DT contribution defined in Workpackages

Experiment	Workpackage EDMS number
ALICE	1735468
ATLAS	1735463
CMS	1735465
LHCb	1735466

LHCb upgrade



CMS Tracker Upgrade

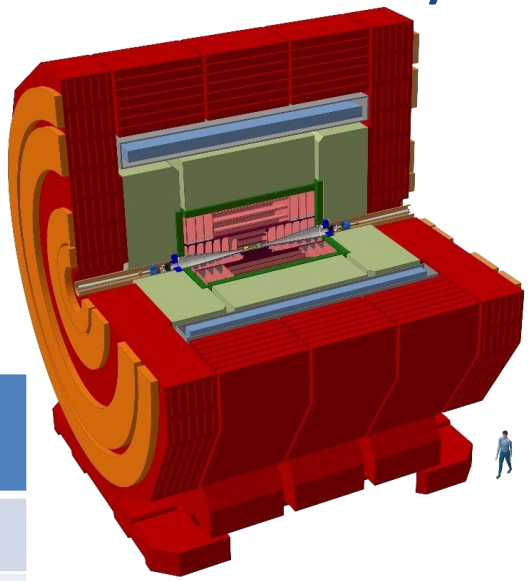


Non-LHC Projects

NA62

CLOUD

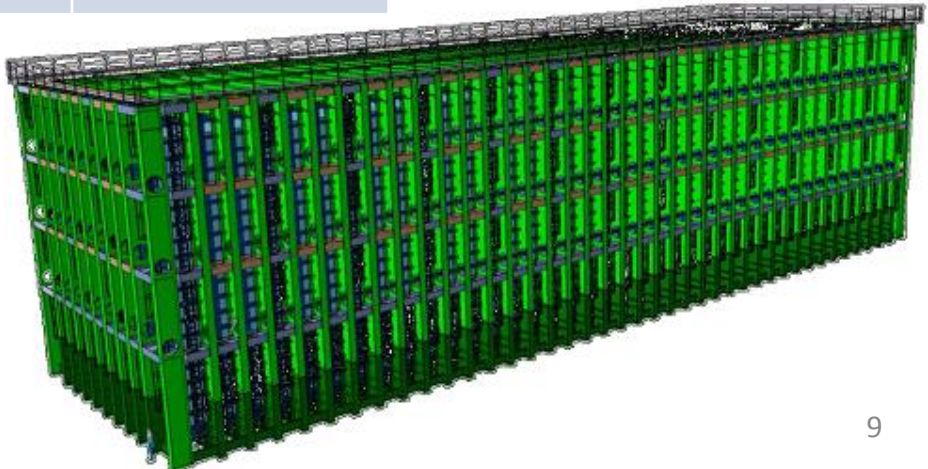
CLIC Detector Study



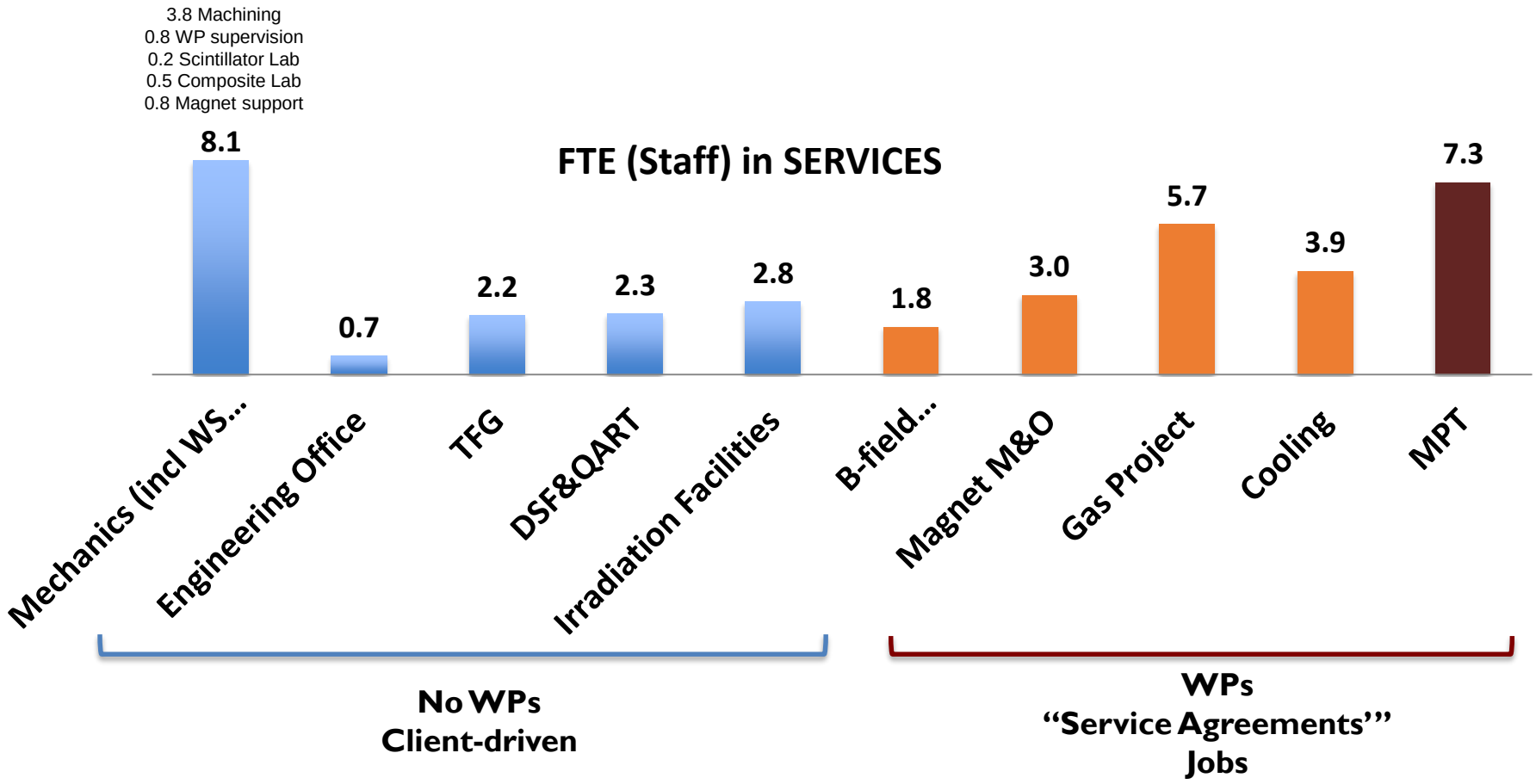
DT contribution defined in Workpackages

Experiment / Detector Study	Workpackage EDMS number
NA62	1738693
LCD (CLIC)	1735469
Neutrino	1735471

LBNF



Staff involvement in Services



R&D within DT

Silicon Detectors

- Rad-hard Sensor Development
  → RD50
- Pixel R&D
- Bonding and Quality Assurance

- µ-channel cooling (µ-fabrication)
- CO_2 cooling

- IRRAD and radiation monitoring

Gas Detectors

- Gaseous Detector Development
  → RD 51
- Micro Pattern Technology workshop
- Thin Film Lab (coatings)

- Gas System Development
- Environmental friendly Gas Mixtures

- GIF++

- **Engineering Office**
- **Detector Interface section**

Concluding remarks

- The resources of the group are well shared between projects and services.
- We are committed to support the CERN experiments with the resources available, in particular the LHC detector upgrades.
- It is important to maintain the expertise and facilities of EP-DT and the various services, including e.g. TFG and B-field mapping.
- Only little DT resources are involved in generic R&D, which is however a crucial aspect of our activities and important for the HEP community.
- There is a strong need to define the R&D roadmap (of CERN and EP-DT) beyond 2020 and to secure the required resources.