



**Magnet Chamber Workshop
Krakow 26/09/2022**

Ressources and structure at P8

TC team

- Safety
- Infrastructure
- Coordinate with CERN support groups



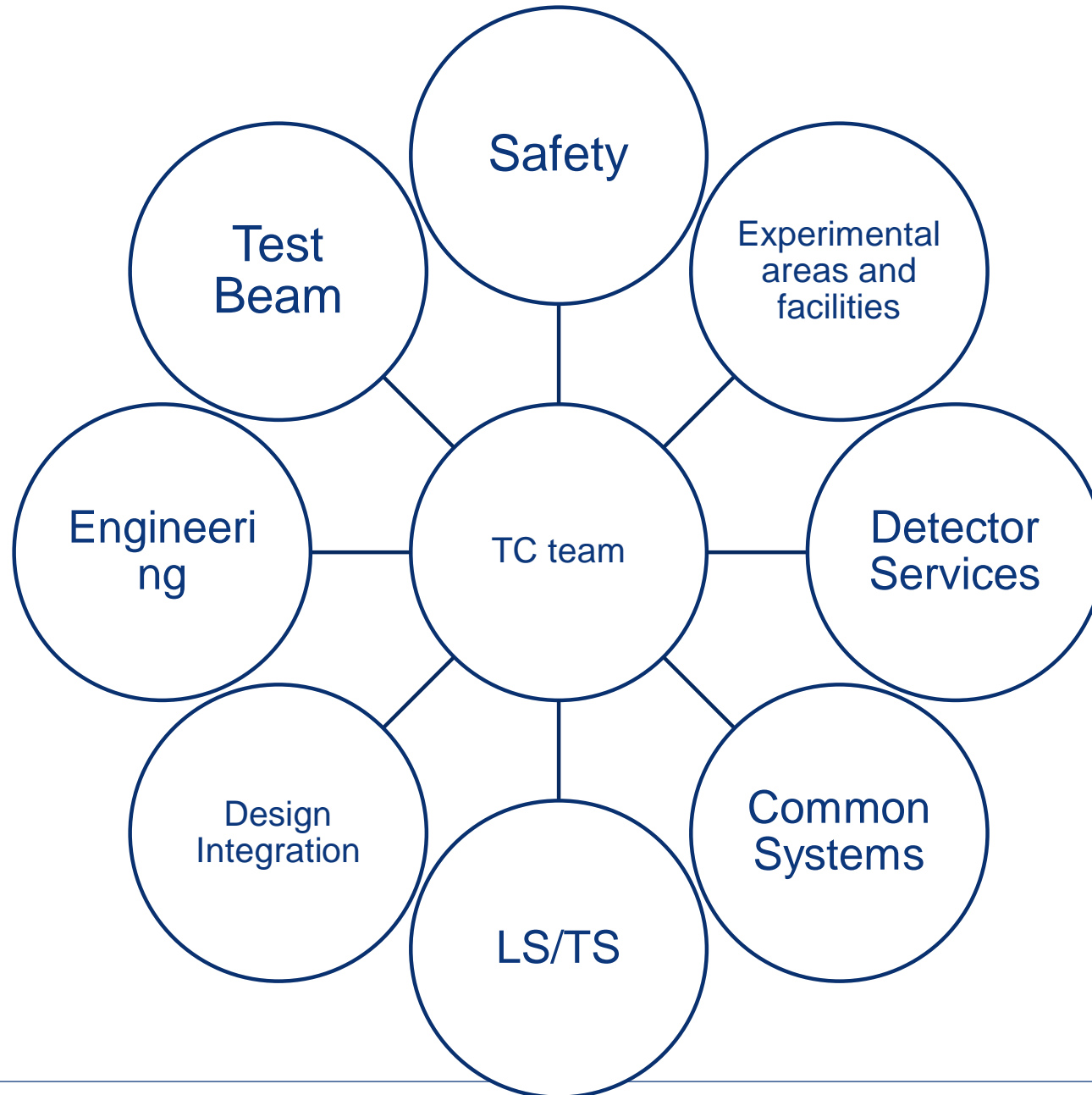
Host Lab duties

- Detector services
- Engineering support
- Detector Integration & CAD model
- Shieldings
- Planning
- LHCb operation during Shutdown and TS



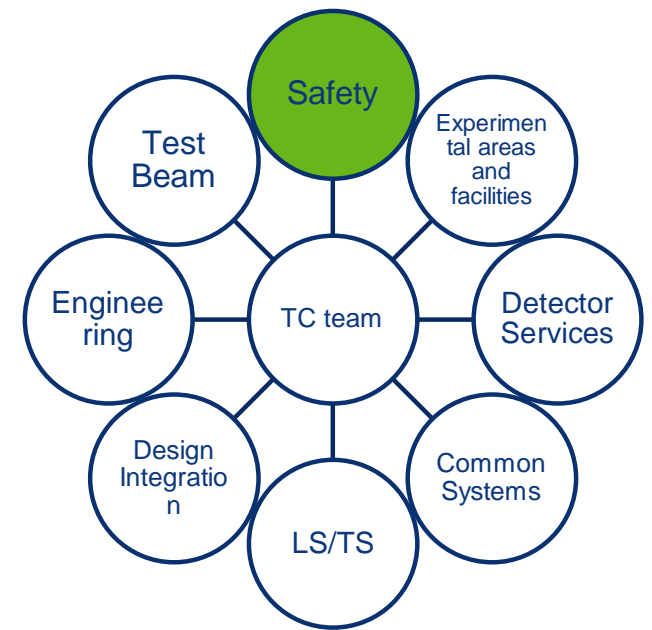
Support to the
Collaboration

TC team



TC: Safety

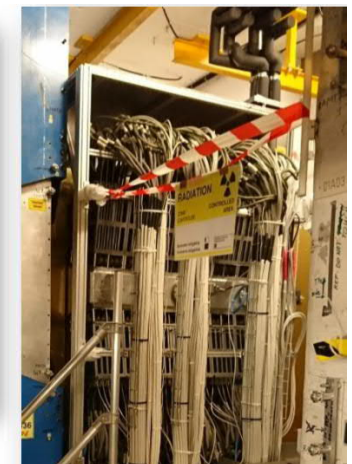
- Safe operation of experiment
- Ensure compliance with CERN safety rules
 - Materials and equipments
 - Work practices
- Advice to users, institutes, project leaders
- Radiation Safety
 - Traceability
 - Radiation monitoring
 - Fluence and activation simulation
- Filling Safety Roles: LEXGLIMOS, RSO, RPE, RPA, TSO, FGSO ...



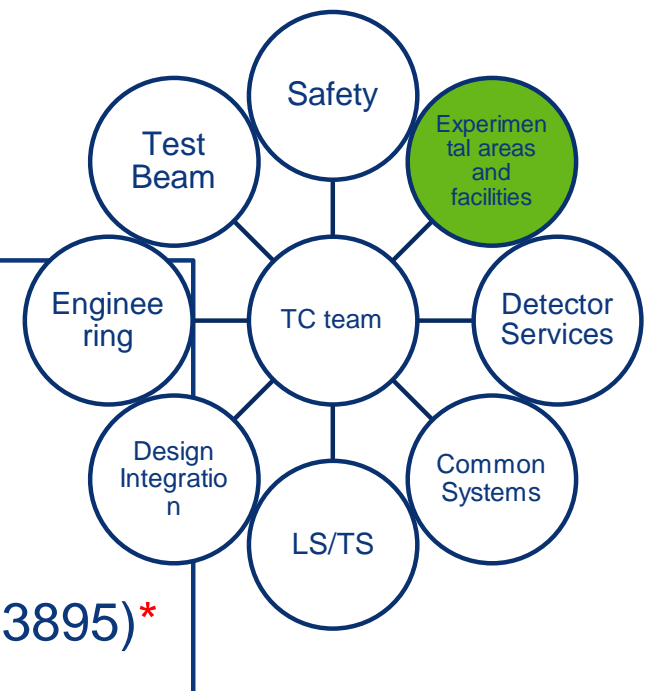
CERN Area Classification
<http://cern.ch/raisin>

| Area | Dose limit [year] | Ambient dose equivalent rate | | Sign |
|----------------|-------------------|------------------------------|---------------|------|
| | | Work place | Low occupancy | |
| Non-designated | 1 mSv | 0.5 µSv/h | 2.5 µSv/h | |
| Supervised | 6 mSv | 3 µSv/h | 15 µSv/h | |
| Radiation Area | Simple | 20 mSv | 50 µSv/h | |
| | Limited Stay | 20 mSv | 2 mSv/h | |
| | High Radiation | 20 mSv | 100 mSv/h | |
| Prohibited | 20 mSv | > 100 mSv/h | | |

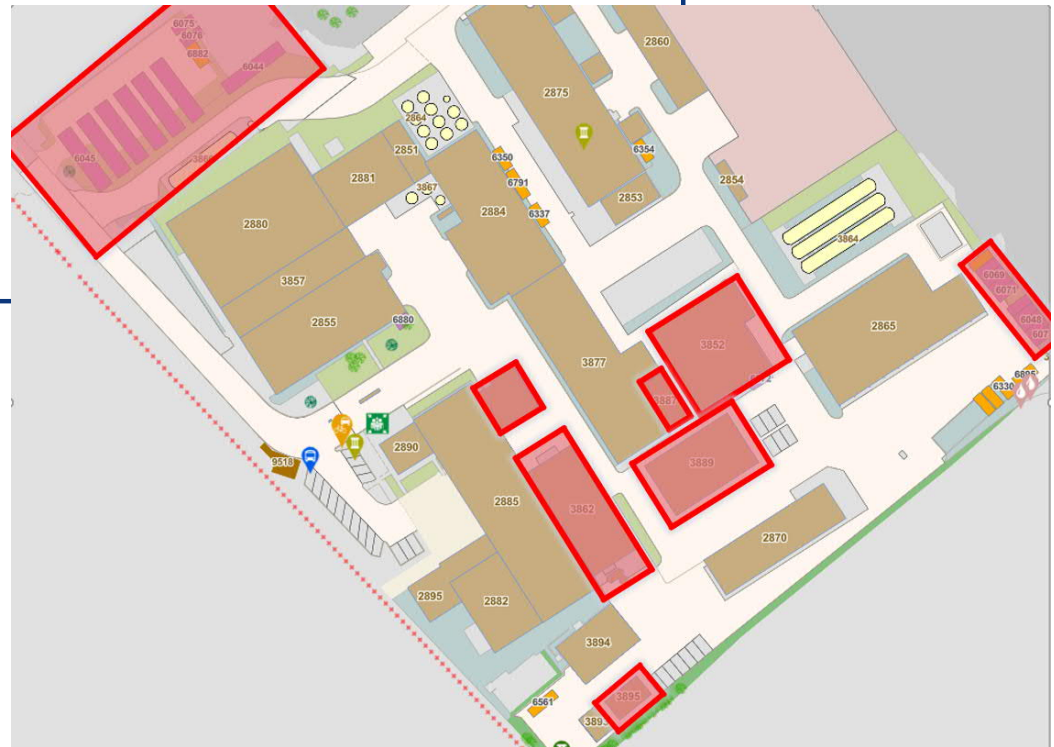
Controlled Area



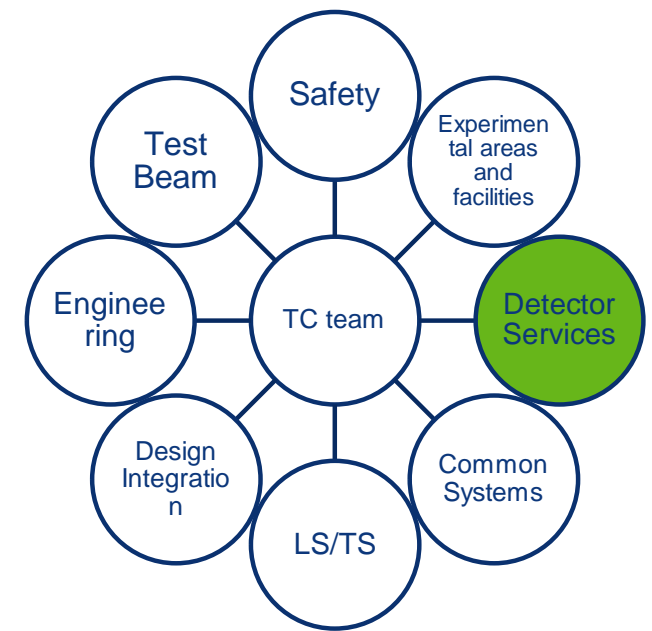
TC: Experimental Area



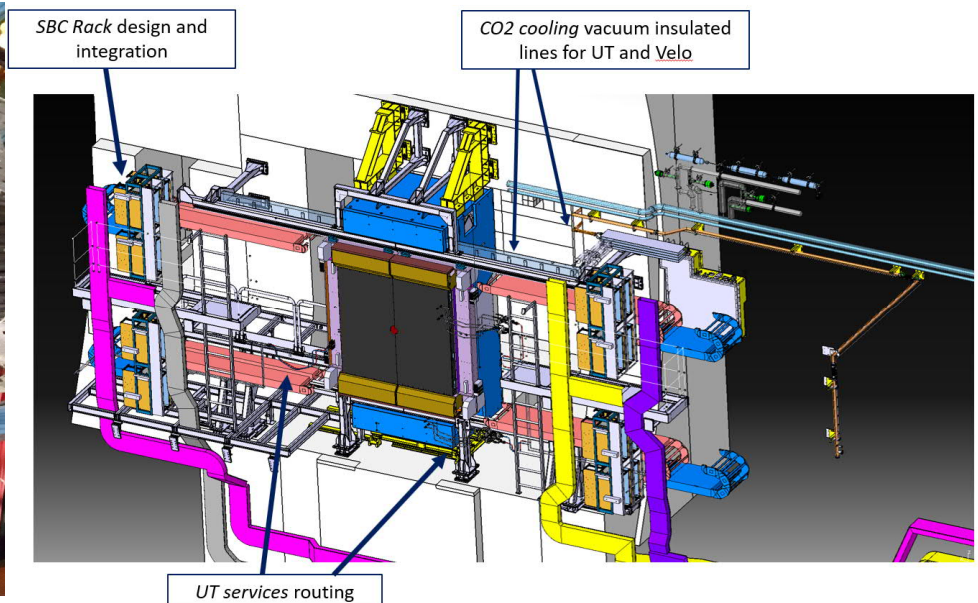
- Provide experimental Area / facilities
 - UX85
 - SG8
 - Workshop*
 - Assembly Hall SXL8* SX8
 - Storage Tent (3889) *, Cable (3887) *, Electronics (3895)*
 - Data Centre*
 - Control room*
 - * New since 2010**
- Follow-up inspections
- Operation and maintenance



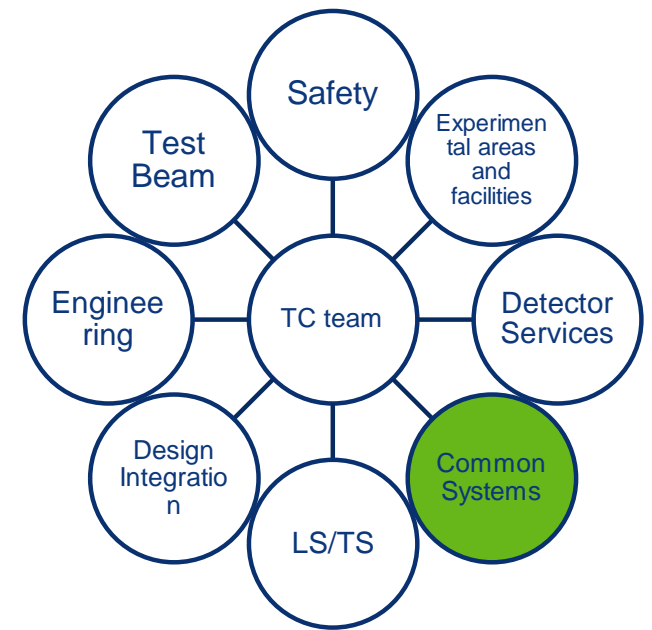
TC: Detector Services



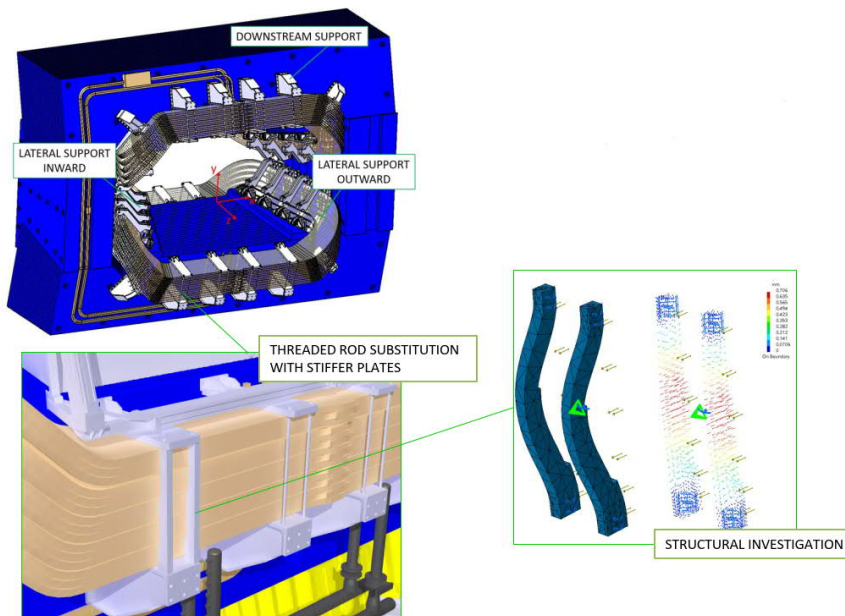
- Supply, maintain, and Operate detector services
 - Gas
 - Power
 - Cabling
 - Cooling
 - Compressed air
 - Survey
- Liaise with CERN support groups (EN, EP-DT)



TC: Common Systems



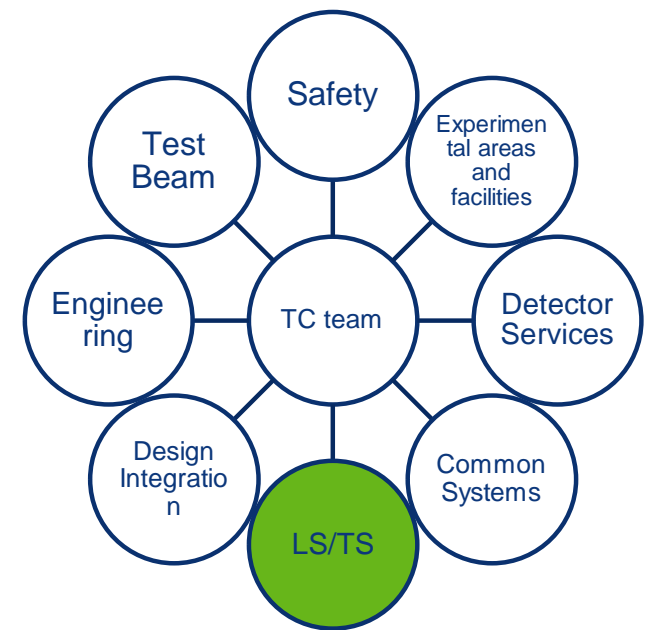
- Magnet: operation/maintenance/Safety (with EP-DT)
- DSS: Implementation & operation, interface with detectors
- LHC-EXP PIQUET Service (Magnet and DSS)
- Liaise with CERN support groups (EN, EP-DT, EP-ESE)
- Management of Common Spare parts




TC: LS and TS

Provide:

- Worksite organization
 - Planning
 - Logistics
 - QA, documents
- Infrastructure (incl. services)
- Sub detector support



| | |
|--|--|
|  UPGRADE LS2 The Large Hadron Collider beauty (LHCb) experiment | Version : 1 Date : 22/11/18 EDMS : 2053830 |
| | Subsystem: Technical Coordination Category: Safety-Installation |


Work Package Procedure (WPP)

Removal of cooling stations from UXA85

Abstract

The C2 and C3 platforms in UX85A currently house the cooling stations for VELO, IT, TT, OT, and RICH. The VELO and IT/TT cooling stations will not be needed after the LHCb LS2 upgrade and so can be removed. The purpose of this document is to describe the procedure for the removal of the VELO and IT/TT cooling stations.

| | | |
|--------------------------------------|--|---|
| Distribution: Cedric Fournier EP/LBO | | |
| Prepared by : Mark Hatch EP/DT | Checked by : Heinrich Schindler EP/LBO Augusto Sciuccati EP/LBO Bernard Chadaj EP/LBO Gloria Corti (RSO) Wouter Hulsbergen (Nikhef) Bart Verlaet (EP/DT) Florian Corbaz (EN/CV) Patrick Vallet (Transport) | Approved by : Eric Thomas (LS2 PL) Rolf Linder (TC) |

| | |
|---|--|
|  UPGRADE LS2 The Large Hadron Collider beauty (LHCb) experiment | Version : 1 Date : 22/11/18 EDMS : 2050855 |
| | Subsystem: SPD/LEAD/PS Category: LS2 upgrade |

Work Package Safety Plan (WPSP)

Document 3 of 3.

Calorimeter dismantling

Abstract

The dismantling of the whole SPD/LEAD/PS system (detector elements, electronics, cables and infrastructure) and of ECAL and HCAL electronics with a fraction of cables used for them will take place during LS2. This safety document identifies potential risks and describes the proposed mitigation measures.

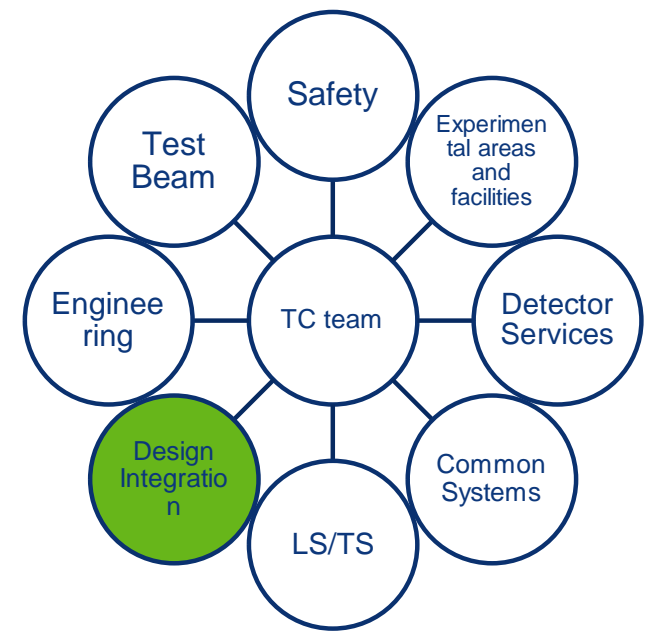
Note: At this stage (April 2017) the Work Package Leader (WPL) shall include the details for ALL activities. Later versions, in particular the one that is to be referred to in the IMPACT, must include the details as provided by the separate teams (Transport, LHCb TC, etc.). For example, it is for Transport to describe their activities including the identification of risks and safety measures.

Distribution list: Please add the relevant names, including all participants in the work package, including CERN E-Group

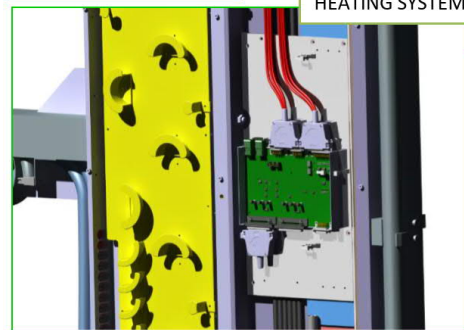
| Prepared by : | Checked by : | In agreement with : |
|----------------------------|--|---------------------|
| Pascal Perret EP/ULB (WPL) | Eric Thomas EP/LBO Gloria Corti EP/LBO Augusto Sciuccati EP/LBO Matthias Karacson EP/LBO Cedric Fournier EP/LBO Bernard Chadaj EP/LBO Mark Hatch EP/DT Kevin Boonroy HSE/SEE Jacques Campagna EN/ACE Yun Guiz EP/LBO (PL) Frédéric Machefer EP/ULB | R. Lindner EP/LBO |

TC : Design Integration

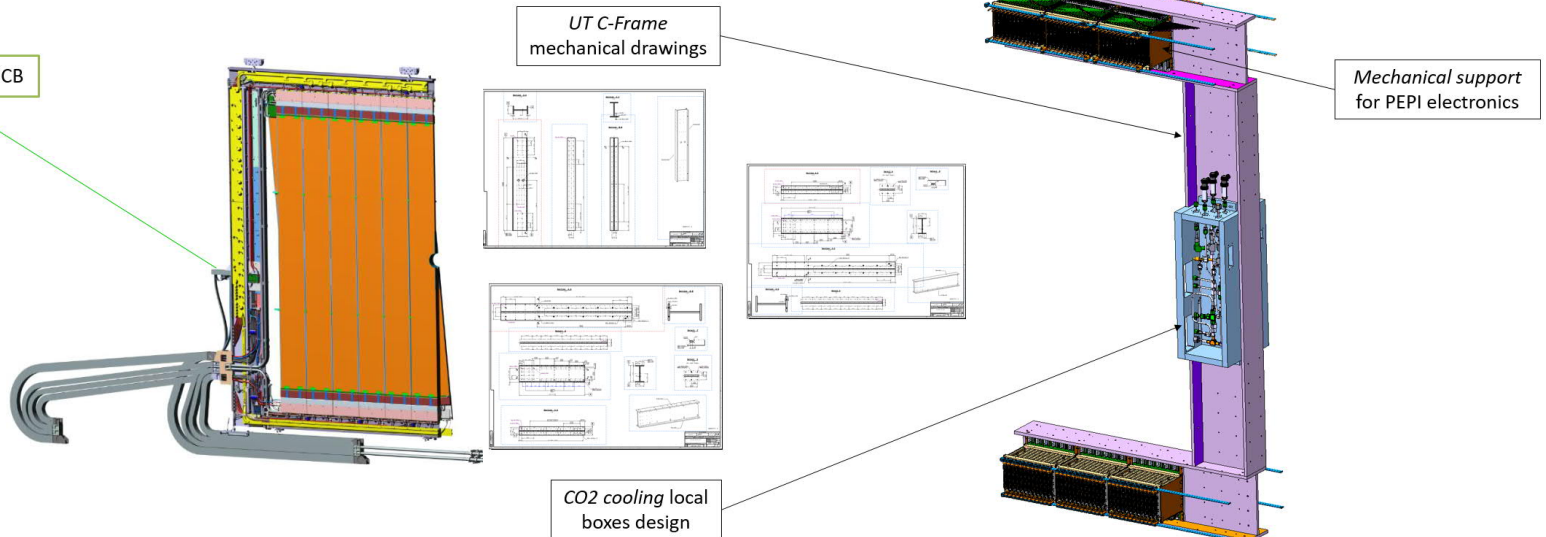
- Provide, maintain, upgrade CAD model for LHCb and its environment
- Integration of detectors and services
- Engineering & design support for
 - Detectors
 - Installation
 - Dismantling
 - Tooling



SCIFI HEATING SYSTEM



HEATING SYSTEM PCB



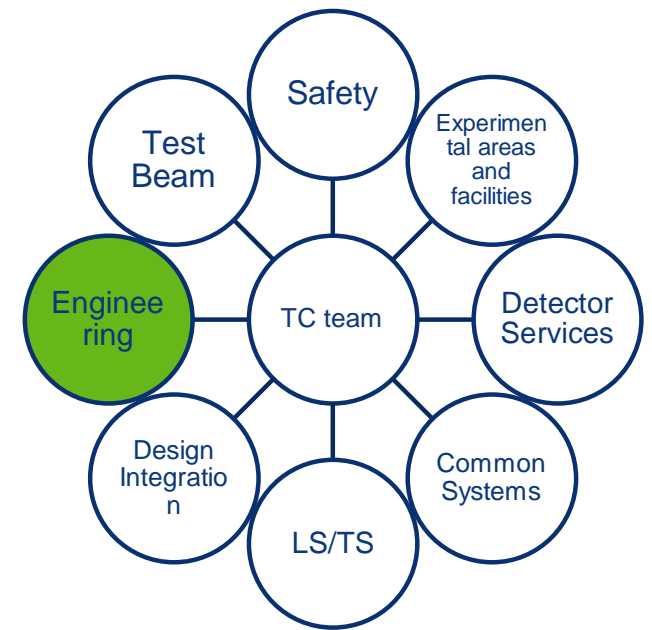
TC : Engineering

Provide expertise and support to sub-detector

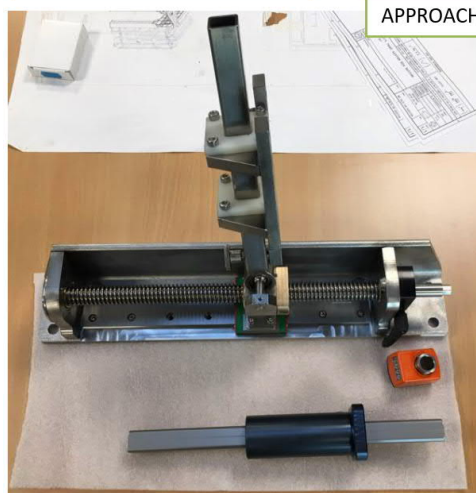
- Mechanical design and integration
- Mechanical conformity assessment
- Structural and Finite Element Analysis
- Assembly and Handling tools

Support for host lab duties

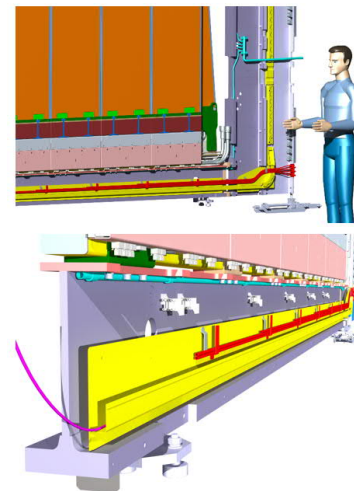
- Mechanical Safety
- Support and access structures
- Shielding wall



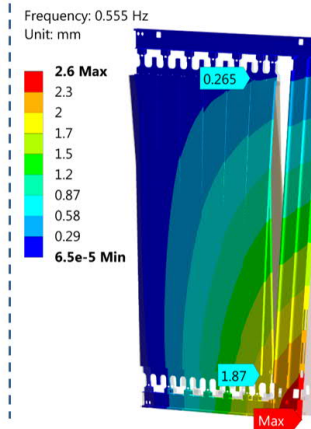
SCIFI APPROACHING SYSTEM



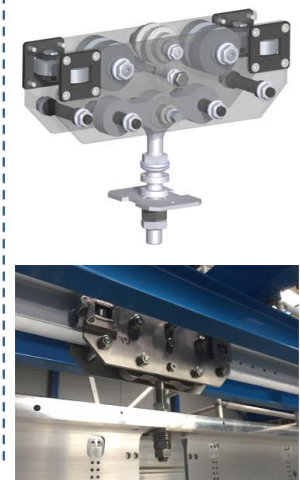
DRY GAS, FLOWMETER AND PIRANI SYSTEMS



SCIFI STRUCTURAL VERIFICATION

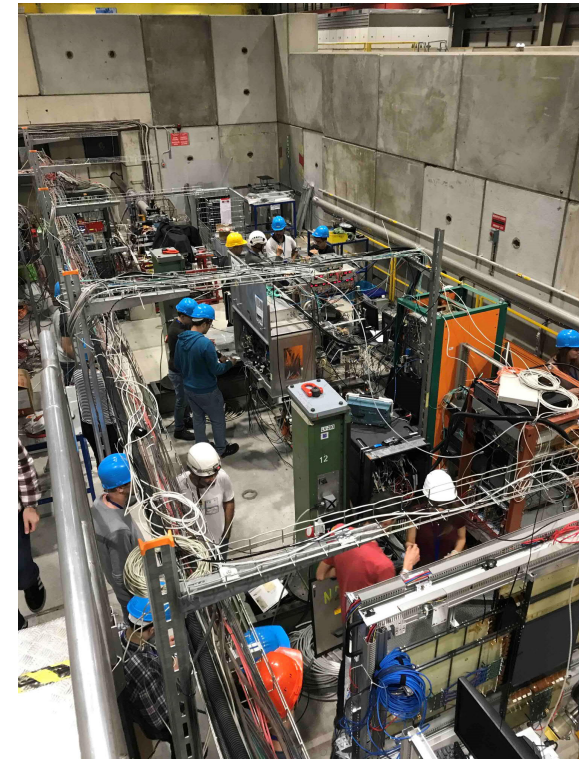
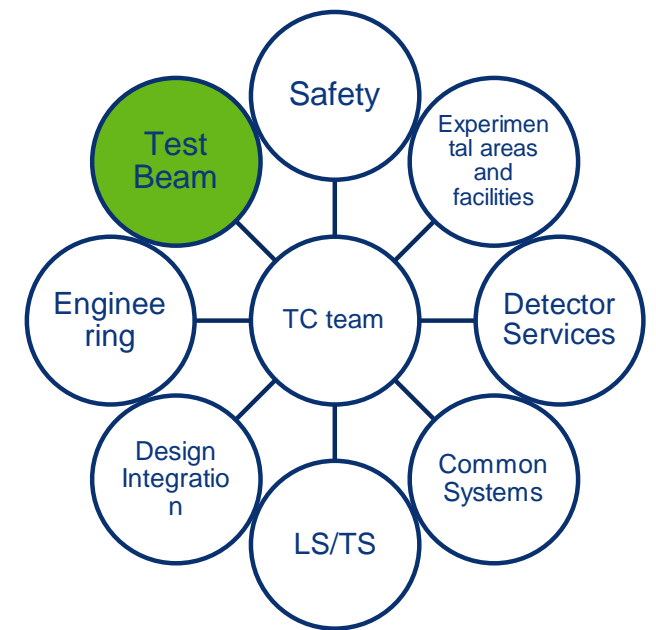


CARRIAGES AND APPROACHING SYSTEM



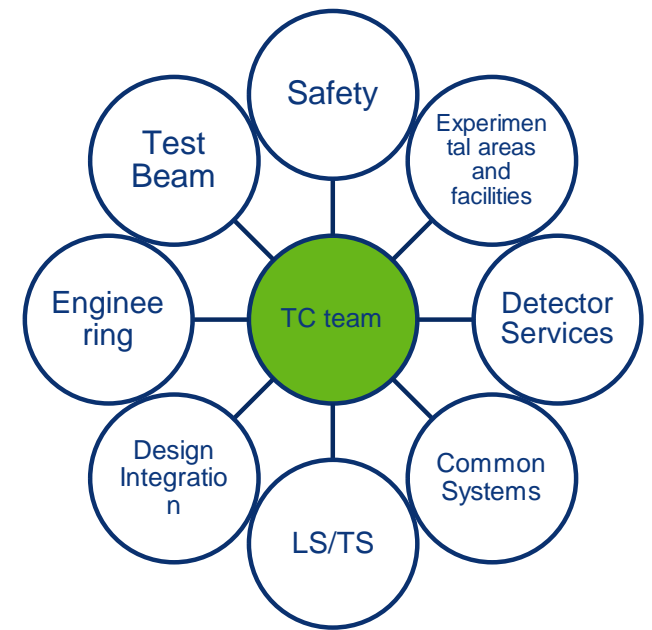
TC : Test beam

- Collect LHCb test beam request
- Organize beam time within LHCb
- Run coordinator for test beam, liaise with other users and BE
- Provide technical support
- ISIEC forms
- Organize safety clearance inspection and follow-up on non-conformities



TC : Detector Operation

- Ensure Daily operation of LHCb Infrastructure
- Provide On call services 16 8000
 - Infrastructure
 - DSS
 - RP
 - Patrol
- Organize and plan access during runs
- Planning and organization of TS, YETS, EYETS, LS



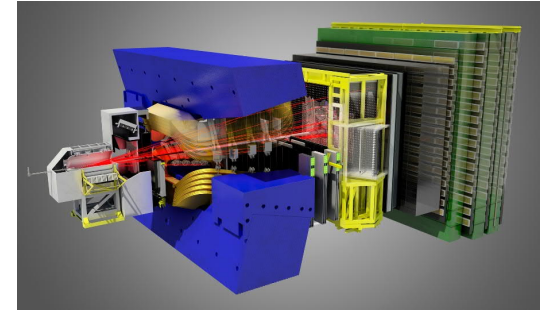
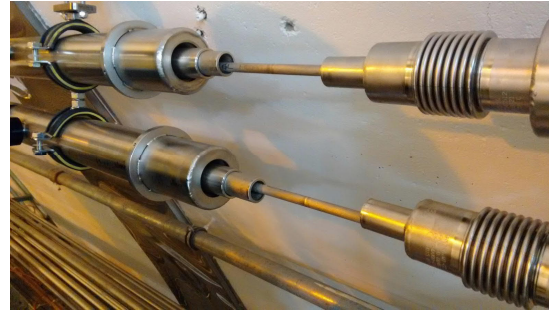
DSS ALARMS (red) - SENSOR ALARMS (orange) and WARNINGS (yellow)

| Short | Priority | PVSS Item | ALARMS (Click in this column to Acknowledge) | Alarm text | Dir | Value | Time |
|-------|----------|--|--|------------|------|---------------------|------|
| V | 15 | DI PS BARRACK UXA Intake Water Logging | Pre-warning | LAWC | TRUE | 2018/12/13 15:18:06 | |
| V | 15 | DI PS BARRACK Mixed Water DIA OPC State | Pre-warning | CAME | TRUE | 2018/12/13 15:18:09 | |
| W | 40 | DI PS BARRACK D3B Mixed Water Cooling | Triggered | CAME | TRUE | 2018/12/13 15:18:27 | |
| V | 15 | DI PS BARRACK Mixed Water D3B OPC State | Pre-warning | CAME | TRUE | 2018/12/13 15:18:32 | |
| V | 15 | DI PS CALO Mixed Water Cask | Pre-warning | CAME | TRUE | 2018/12/13 15:19:22 | |
| V | 15 | DI PS CALO Mixed Water Aside OPC State | Pre-warning | CAME | TRUE | 2018/12/13 15:19:33 | |
| V | 15 | DI PS UXA-B1 Mixed Water Cooling OPC State | Pre-warning | CAME | TRUE | 2018/12/13 15:19:33 | |
| V | 15 | DI PS VELO TT Mixed Water Cooling OPC State | Pre-warning | CAME | TRUE | 2018/12/13 15:19:55 | |
| V | 15 | DI PS TT Service Boxes Water Cooling OPC State | Pre-warning | CAME | TRUE | 2018/12/13 15:19:58 | |
| A | 99 | AL TT Mixed Water for Service Boxes Not Ok | Alarm | CAME | TRUE | 2018/12/13 15:20:02 | |
| W | 40 | DI FS TT Service Boxes Water Cooling | Triggered | CAME | TRUE | 2018/12/13 15:20:02 | |
| W | 40 | DI FS BALCONY Mixed Water Cooling | Triggered | CAME | TRUE | 2018/12/13 15:20:05 | |
| A | 99 | AL VELO Pumps Mixed Water Not Ok | Alarm | CAME | TRUE | 2018/12/13 15:20:05 | |
| W | 40 | DI PS VELO TT Mixed Water Cooling | Triggered | CAME | TRUE | 2018/12/13 15:20:05 | |
| W | 40 | DI PS BARRACK D3A Mixed Water Cooling | Triggered | CAME | TRUE | 2018/12/13 15:20:05 | |
| A | 99 | AL BALCONY Mixed Water Not Ok | Alarm | CAME | TRUE | 2018/12/13 15:20:05 | |

DSS ACTIONS (interlocks) - if this table is not empty, DSS is keeping part of your detector switched off

| Short | Priority | PVSS Item | ACTIONS (Click in this column to Reset) | Alarm text | Dir | Value | Time |
|-------|----------|-----------|---|------------------|------|-------|---------------------|
| S | 100 | X | O EA RICH1 Racks LSCA1=12 | Action Triggered | LAWC | TRUE | 2018/12/03 13:35:40 |
| S | 100 | | O EA RICH1 LAMS F14F5 | Action Triggered | CAME | TRUE | 2018/12/03 13:35:40 |
| S | 100 | X | O EA RICH1 MDMS P1A04 Platform | Action Triggered | CAME | TRUE | 2018/12/03 13:35:40 |
| S | 100 | | O EA RICH2 Racks D3C04=06 | Action Triggered | CAME | TRUE | 2018/12/03 13:36:67 |
| S | 100 | | O EA CALO Racks D3B04=06 | Action Triggered | CAME | TRUE | 2018/12/03 13:36:67 |
| S | 100 | | O EA CALO B1B01 Crate LV Aside | Action Triggered | CAME | TRUE | 2018/12/03 19:50:19 |
| S | 100 | | O EA CALO B1B01 Crate LV Aside | Action Triggered | CAME | TRUE | 2018/12/03 19:50:19 |
| S | 100 | X | O EA OT Rack P1C01 | Action Triggered | CAME | TRUE | 2018/12/03 19:50:20 |
| S | 100 | | O EA OT Rack P1C01 | Action Triggered | CAME | TRUE | 2018/12/03 19:50:20 |
| S | 100 | | O ZA VELO Chilled Water UXA-C Net Ok | Action Triggered | CAME | TRUE | 2018/12/04 18:50:48 |
| S | 100 | | O EV UXA-C Chilled Water Cooling | Action Triggered | CAME | TRUE | 2018/12/06 10:14:11 |
| S | 100 | | O ZA MUON HV CAEN Cask Stop | Action Triggered | CAME | TRUE | 2018/12/06 10:14:11 |
| S | 100 | | O EA MUON B1B01 Crate LV | Action Triggered | CAME | TRUE | 2018/12/06 10:14:22 |
| S | 100 | | O ZA MUON HV CAEN Aside Stop | Action Triggered | CAME | TRUE | 2018/12/06 10:14:22 |
| S | 100 | | O ZA MUON GEM HV Stop | Action Triggered | CAME | TRUE | 2018/12/06 10:14:22 |
| S | 100 | | O EV UXA-C Mixed Water Cooling | Action Triggered | CAME | TRUE | 2018/12/13 15:08:07 |
| S | 100 | | O ZA VELO Water Cooling Pumps Not Ok | Action Triggered | CAME | TRUE | 2018/12/13 15:20:05 |

Sharing between **CERN/TC** and **Participating Institutes (PI)**



Primary service → Customized equipment → Long Distance → Detector

- Cooling towers
- 18kV
- Compressed Air
- LN2, Ar, CO2

- Detector cooling plant
- Gas and power distribution racks
- ...

- Transfer lines
- HV/LV cable
- Opt Link
- ...

- Detector and svc **from nearest outlet or PP**



CERN/TC

Specs and purchase: **PI**
Installation: **CERN/TC**

- Everything from construction to operation: **PI**
-Support for integration/survey/
Handling: **CERN/TC**

Impact on other systems

- It is essential to initiate discussion with **ONLINE** and **RTA** from the beginning of the project
- **Common electronics** and spare needs shall be defined with the Electronics Coordinator.
- **Long distance** services shall be defined well in advance, may require CE works.
- **DSS I/O** shall be define with DSS coordinator
- **Dipole** is heavy, delicate and dynamic system. Discussion with experts shall be initiated at early stage. Integration of detector and services is not straightforward
- **RICH, Beam Pipe, SciFi** are fragile. Collaboration with neighbouring systems is essential to manage integration and co-activities.

SAFETY

Design Phase

- PI shall ensure compliance of equipment and installations w.r.t CERN safety rules(Electrical, material, fire, radiation ...).
- CERN/TC can advice, seek for expert support, arrange certification test, derogations.

Construction and Installation

- Work method statement shall be issued before starting the work at CERN (Work Package Procedure). It shall also include safety aspect (Safety Plan).

Operation

- Operational procedure and technical document shall be made available, for safe operation of the detector