

ENGINEERING
DEPARTMENT

Opportunities for future tenders in CERN Engineering Department (EN)

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15th June 2023

CERN: founded in 1954, 12 European States

“Science for Peace”

Today: 23 Member States

Employees: ~2 700 staff, 800 fellows

Associates: ~12 400 users, 1 300 others

Budget (2019) ~ 1 200 MCHF



The Missions of CERN

- **Push forward the frontiers of knowledge**

e.g. the secrets of the Big Bang ...
what was the matter like within
the first moments of the Universe's existence?

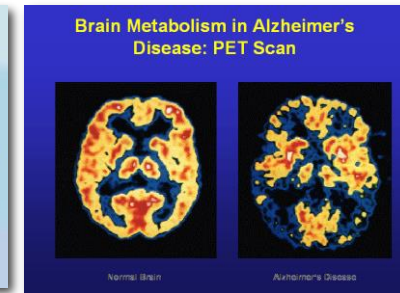
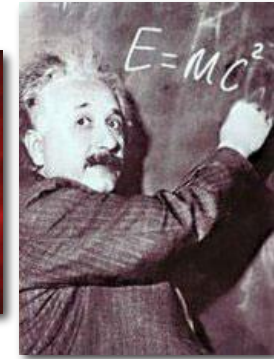
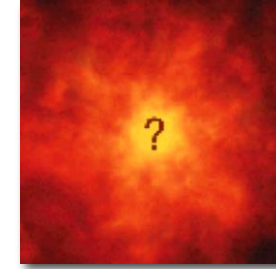
- **Develop new technologies for accelerators and detectors**

Information technology - the Web and the GRID

Medicine - diagnosis and therapy

- **Train the scientists and the engineers of tomorrow**

- **Unite people from different countries and cultures**



The instruments used

1. Particle accelerator

Boost particles to high energies and make them collide

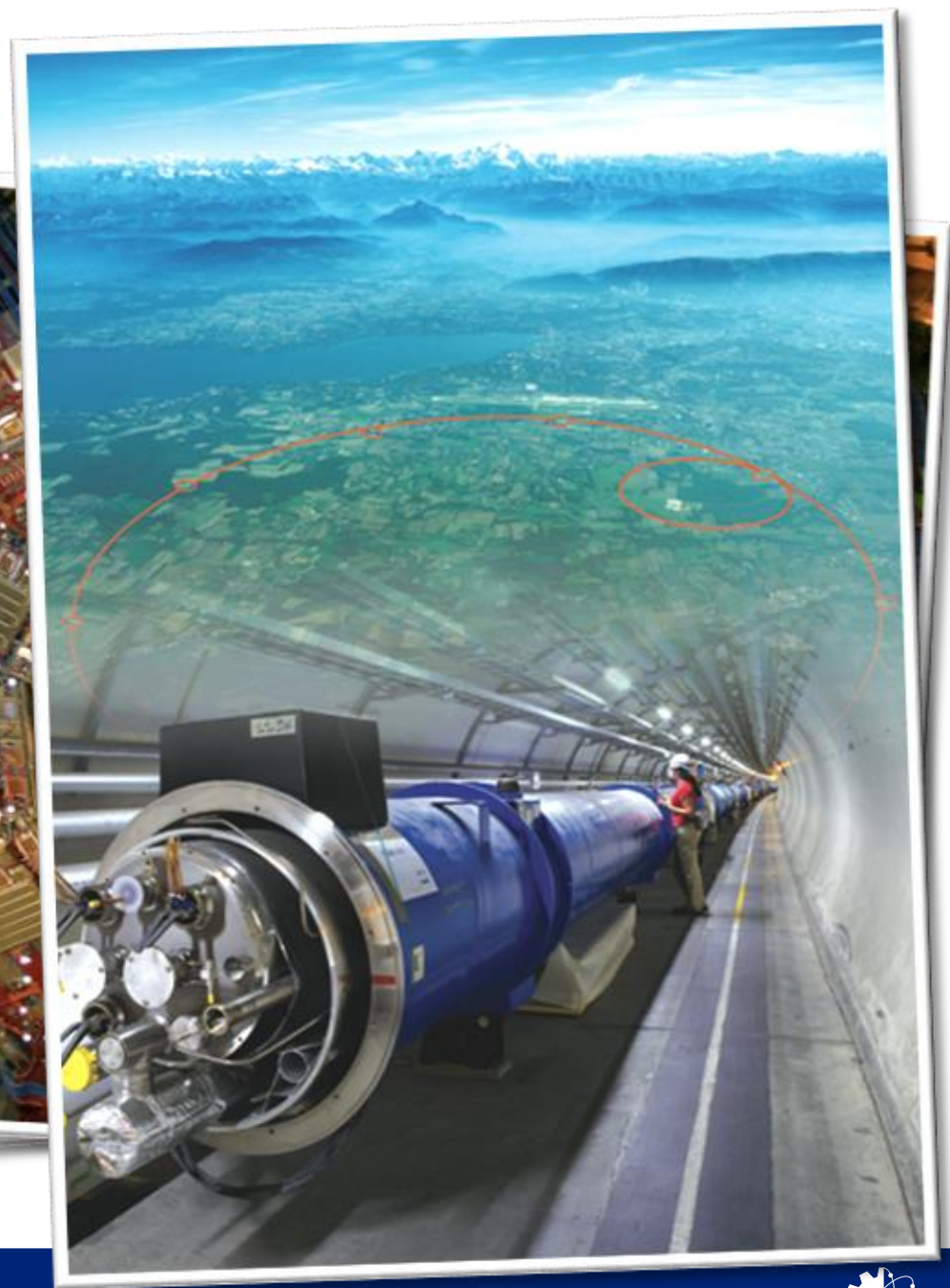
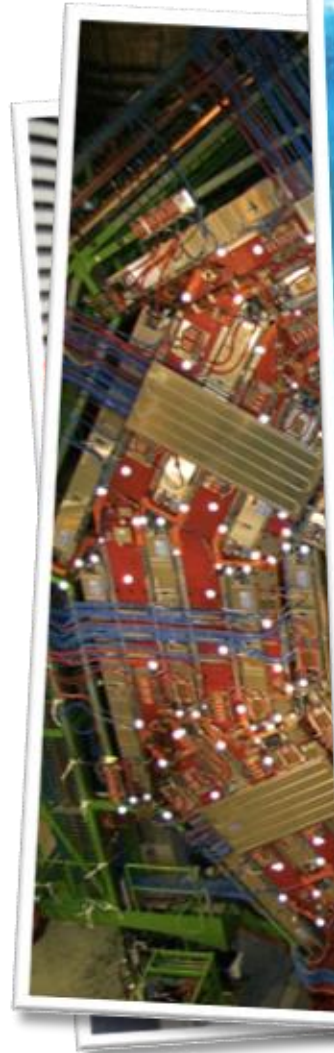
2. Detectors

Gigantic instruments that observe and record the results of the collisions

(particle trajectories, energy, charge...)

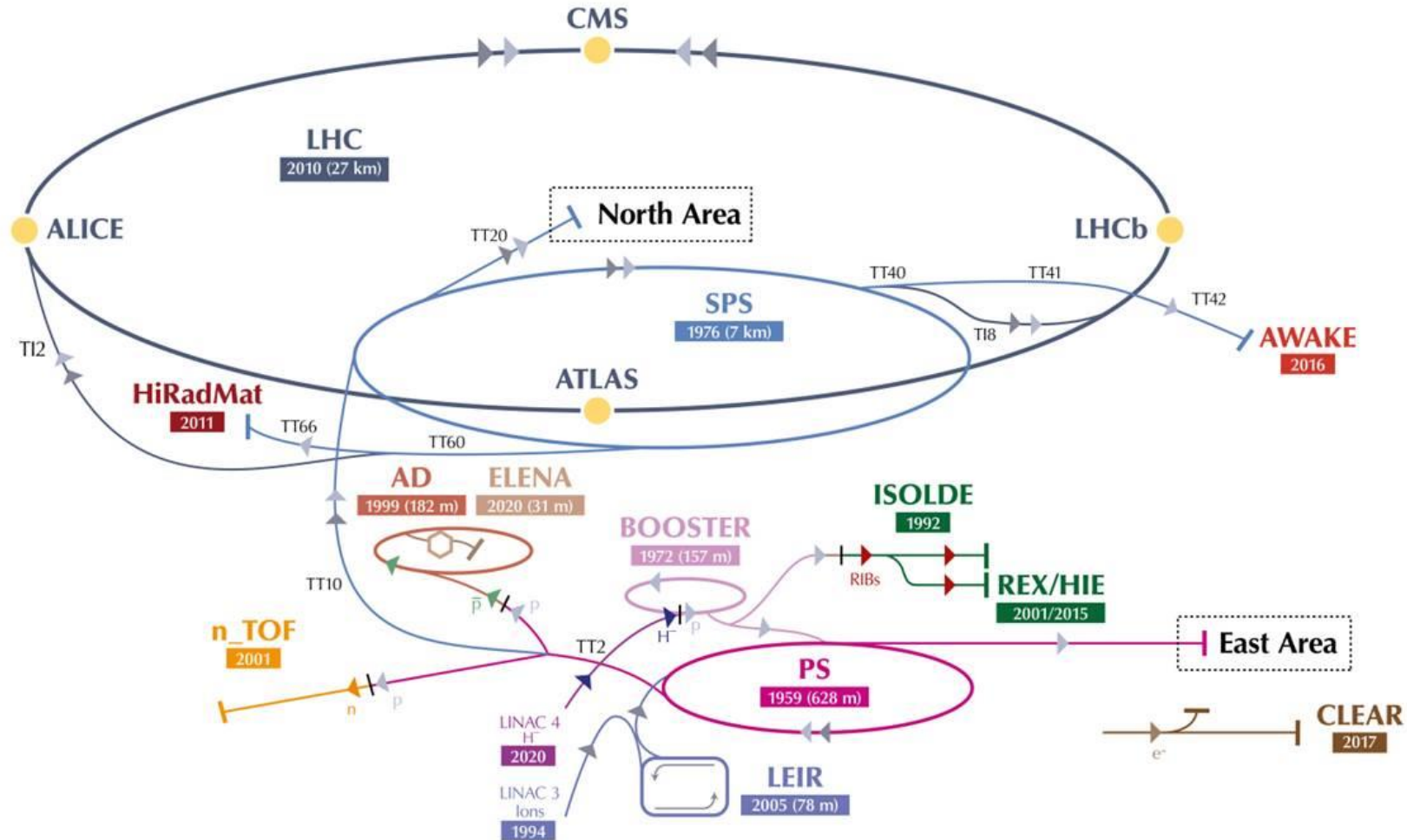
3. Computers

Collect, store, and send around the world the big quantity of data received from the detectors for data analysis

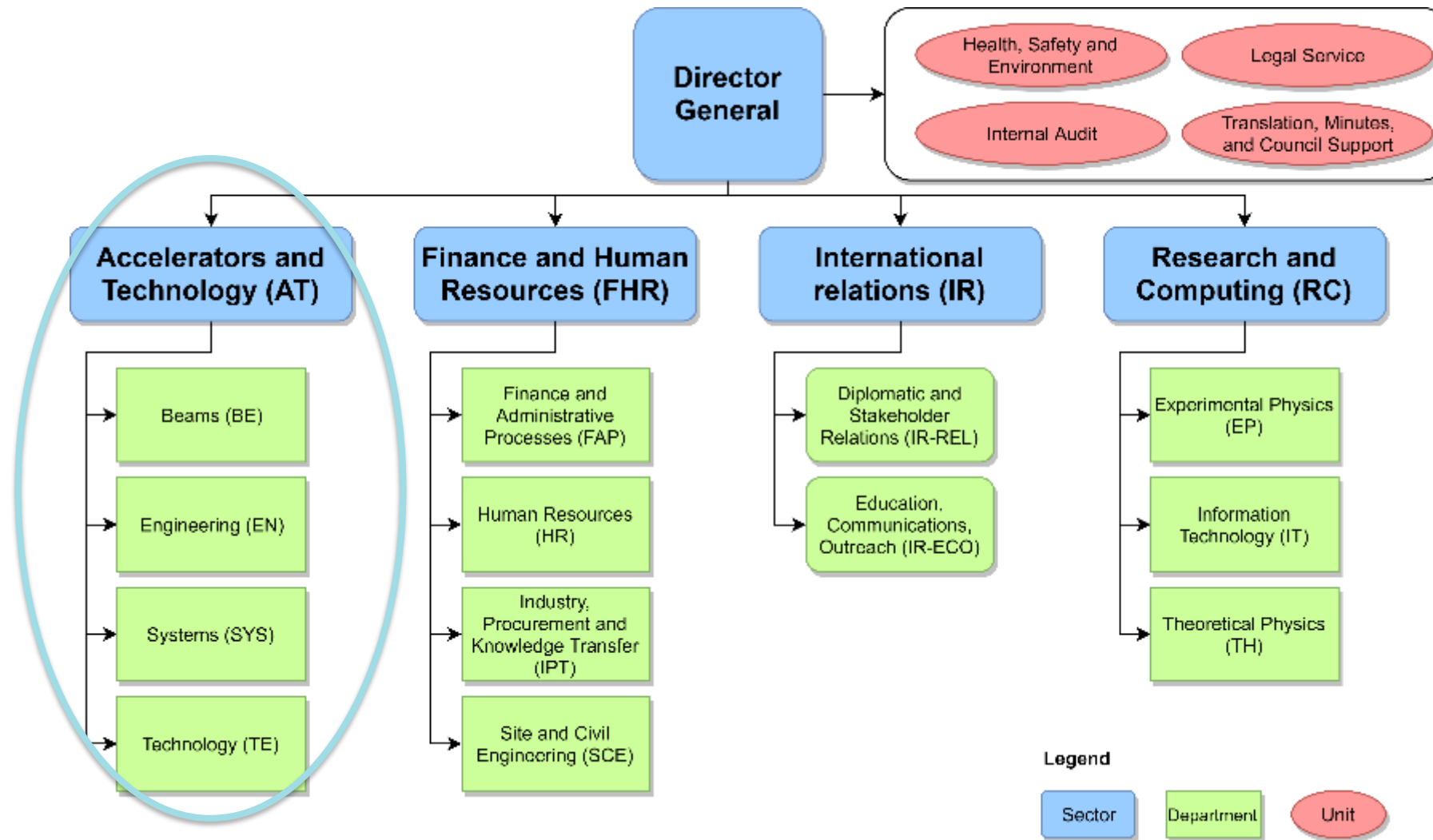


The CERN accelerator complex

Complexe des accélérateurs du CERN



CERN Structure



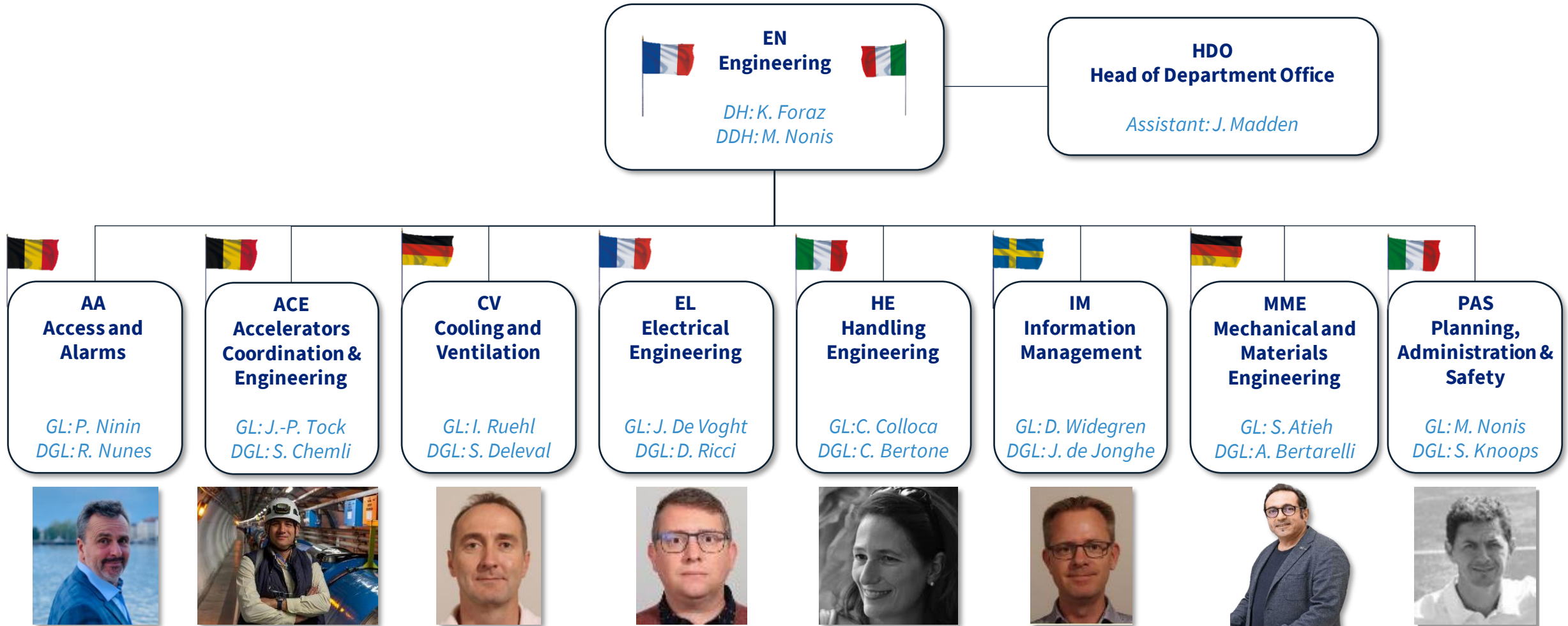
ENgineering department – Mandate

The Engineering Department (EN) provides CERN with the **Engineering Competences, Infrastructure Systems and Technical Coordination** required for the **design, installation, operation, maintenance and dismantling** phases of the CERN accelerator complex and its experimental facilities.

The activity of the Engineering Department is in the following fields:

- Operation, maintenance and consolidation of infrastructure systems for **cooling, ventilation, transport, handling, electricity, access and alarms**, as well as design and installation of infrastructure systems for the new facilities,
- **Mechanical engineering and materials expertise** for the design, the prototyping, the manufacturing and the assembly of accelerator and detector components,
- **Technical Coordination** for the technical stops and the shutdowns in the accelerators as well as support for projects.

ENgineering department - Organigramm



EN-AA - Access and Alarms



Fire Protection Systems

The AA group is in charge of the conception, design, installation and maintenance of the systems that ensures the Safety of the CERN Personnel, Users and Visitors, on all its site and facilities.

The Safety Systems concerns:

- *Fire and Gas/ODH detection, emergency phones and evacuation, alarm transmission and monitoring,*
- *Interlocks to protect people from radioactivity, X rays, lasers, electricity and cryogenics hazards,*
- *Access control to all CERN conventional or nuclear facilities and sites,*
- *Video surveillance, protection and intrusion detection,*
- *Access data management applications.*



Video Surveillance

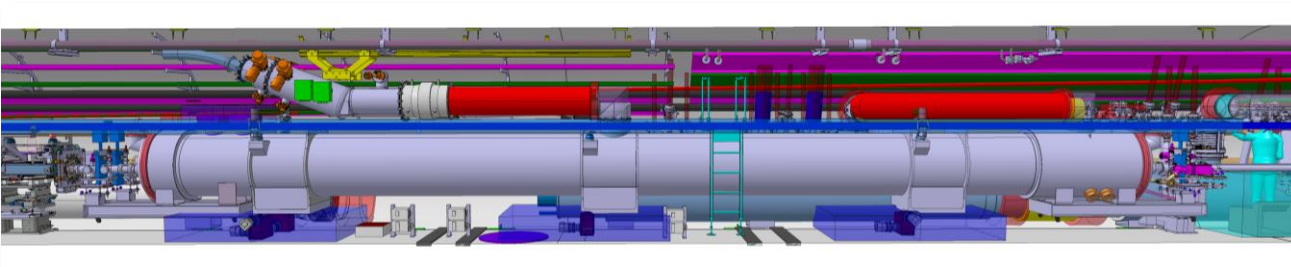
AA contracts: upcoming industrial opportunities

Ref.	Contract description	Comments	MS	IT	Contract	Cost range [kCHF]
-	Sniffer system renewal for LHC Experiments (ATLAS, LHCb, ALICE)	Development: detection (smoke, flammable & toxic gas), electronic acquisition card. Cabinets renewal. Depends on the experiment	On hold	On hold	-	750-5000
IT-4636/EN	LHC Evacuation System Renewal	Voice alarm system in the LHC (evacuation functions). Compliance with EN54. depending of Experiments.	On hold	On hold	-	5000-10000
-	Emergency call system in radioactive and non radioactive area	Framework supply	2024	2024	2024	1000-5000
MS-4867/EN	Supply and installation of Gas & Oxygen Deficiency Hazard (ODH) detection system	Eight-year blanket purchase contract for design, supply and installation of automatic Gas/Oxygen Deficiency detection systems for LHC surface and underground, including other premises and new systems to be deployed in the High Luminosity LHC (surface and underground). By 2026-2028, the existing detection systems in the LHC will have to be replaced. As a preliminary estimation around 600 ODH/Gas detectors will be required	On going	Aug 2023	2024	>10000

EN-ACE - Accelerator Coordination & Engineering

The group is in charge of the coordination of the activities for the interventions and changes to the LHC and its injectors. This includes:

- Configuration & layout management, including naming service,
- Integration studies and maintenance of the related 3D-CAD representations,
- Organization and scheduling of programmed stops, management of the mid- and long-term schedule,
- Worksites follow-up and management of the LHC sites,
- Management of electrical lock-out in LHC
- Operational safety coordination
- Sector Quality Service, giving support to the stakeholders of the A&T sector.
- support and/or advices in small size works, such as metal frames, Manufacturing, installation and maintenance of doors.

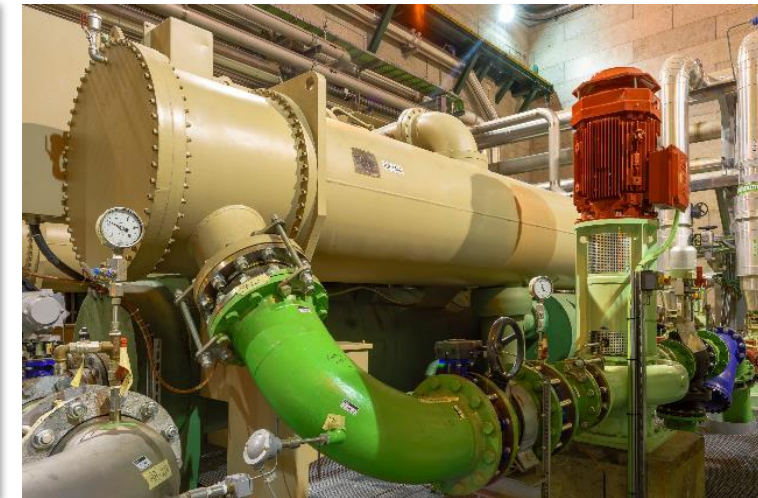


ACE contracts: upcoming industrial opportunities

Ref.	Contract description	Comments	MS	IT	Contract	Cost range [kCHF]
MS-48727EN	Service contract for health and safety coordination	Service contract for health and safety coordination for large project during conception phase, realization and exploitation phase including safety training, safety advice and risk analysis. Requirements: knowledge of Swiss and French rules	On going	July 2023	2025-2032	750 – 5000

EN-CV – Cooling & Ventilation

The CV group is in charge of the design, installation, commissioning, operation and maintenance of the cooling systems, pumping stations, air conditioning plants and fluid distribution systems of all accelerators, their experimental areas and some of the special cooling systems of LHC sub-detectors. In addition it performs **Computational fluid dynamics (CFD) simulations**, as well as studies on fluid dynamics, ventilation, heat transfer, smoke behaviour, gas and radio nuclides propagation.



CV contracts: upcoming industrial opportunities (1/2)

Ref.	Contract description	Comments	MS	IT	Contract	Cost range [kCHF]
MS-4847/EN	Supply of engineering services in the domain of cleanrooms and chemical process areas	Predesign for cleanrooms with all related infrastructure and predesign of all HVAC systems during Aug. 2023-Jan. 2024, + detailed design Feb. 2024-June 2024, for SRF building at p1 (SM18) in Meyrin (CH) (6200 m2, containing chemical process areas, cleanrooms, technical rooms, goods reception areas and office spaces). Competence and experience required: design of ISO 4 cleanrooms and chemical process areas	May 2023	Sept 2023		200 - 750
MS-4885/EN	Maintenance for cooling and HVAC systems	2 contracts for : preventive, corrective & predictive maintenance and operation services on approximately half the equipment pool of the Cooling and Ventilation systems + modifications works + stand-by duty. Expertise and business in the maintenance and operation of industrial installations of cooling and ventilation and at least 10 years experience in the fields required		Nov 2023	2024	> 10000
-	SRF building: HVAC, extractions and air cleaning	Supply. HVAC installations in the office areas, CV technical room, general services area and chemistry process areas including execution design, procurement, HVAC installation, testing and commissioning		Aug 2025		5000-10000
-	SRF building: cleanrooms	Supply. Cleanrooms construction (ISO 8 to ISO 4) including execution design, procurement, cleanrooms' construction, HVAC installation, cleanrooms' electrical installation, testing & commissioning, validation		Aug 2025		5000-10000
-	Air Handling Units	Blanket purchase contract for the supply of customised industrial-type air handling units (flow rate range from 1'500 to 80'000 m3/h)	July 2023	Oct-Nov 2023	2024	1000-5000

CV contracts: upcoming industrial opportunities (2/2)

Ref.	Contract description	Comments	MS	IT	Contract	Cost range [kCHF]
-	Water treatment plant	Supply contract for Installation of a water treatment plant composed of sand filter, ultrafiltration, softener, reverse osmosis, tanks, pumps, control and power cubicles		Q2-Q3 2024	2024	1000-5000
DOs	Various small cooling or ventilation systems	Around 4 DOs for small cooling or ventilation systems				< 200 each

EN-EL – Electrical Engineering

The EL group is in charge of

- The **electrical distribution network from 400 kV to 400/230 V**. Its main missions are to operate, maintain, extend and renovate the network, analyse and make projections for CERN electrical energy consumption and manage relations with the energy suppliers;
- the **cabling and optical fibres activities**. Its main missions are to install control cables, water cooled cables, and fibre optics for users. This activities include the management of infrastructures (cable trays, ducts, patch panels,etc.) and the necessary removal of old and unused installations.



EL contracts: upcoming industrial opportunities

▪ Supply contracts (simple supply or blanket purchase contracts)

Ref.	Contract description	Comments	MS	IT	Estimated volume	Cost range [kCHF]
IT-4727/EN	Supply of Optical Fibre microducts and protected microducts.	Five-year blanket purchase contract for the supply of 7, 10 or 12mm optical fibre microducts and 25, 40 or 50mm protected microducts pre-fitted with 7, 10 or 12mm optical fibre microducts.	Done	July 2023	130 km microducts + 60 km protected microducts	200-750
IT-4855/EN	Supply of cast-resin dry-type power transformers	Five-year blanket purchase contract for the supply of cast-resin dry-type power transformers, rated 18/0.4 kV, 18/3.3 kV and 3.3/0.4 kV, and with rated power between 50 kVA and 12 MVA.	On going	July 2023	110	5000-10000
IT-4860/EN	Supply of single and three core insulated power cables covering rated voltages from 1.8 kV up to 20 kV_m	Five-year blanket purchase contract for the design, supply and delivery of single and three core insulated power cables covering rated voltages from 1.8 kV up to 20 kV.	On going	July 2023	110 km	750 - 5000
IT-4807/EN/HL-LHC	Supply, installation and commissioning of a 38 MVA 66/18 kV power transformer with accessories at CERN's Point 5 site in Cessy, France	Contract for the design, supply and installation of a 38 MVA 66/18 kV power transformer with accessories at CERN's Point 5 site in Cessy, France. The installation work is foreseen in early 2025, the commissioning in the middle of 2025 and the energisation in 2026.	Ongoing	July 2023	1	200 - 750
/	Supply and installation of 24 kV compact distribution switchgear and prefabrication substation.	Five year blanket purchase contract for the supply and installation of 24 kV compact distribution switchgear and prefabrication substation for the North Area	Q4 2023		50 cubicles and 3 substations	200-750
/	Supply of radiation resistant single mode optical fibres	Supply of radiation resistant single mode optical fibres	Q3 2023	Q4 2024	2200 km	750-5000

EL contracts: upcoming industrial opportunities

▪ Service contracts

Ref.	Contract description	Comments	MS	IT	Estimated volume	Cost range [kCHF]
IT-4766/EN	Provision of preventive and corrective maintenance services for power electrical distribution equipment and lighting systems	Service contract for the provision of preventive and corrective maintenance for power electrical distribution equipment and lighting systems, including transformers, batteries, battery chargers, uninterruptible power supplies and low voltage switchboards.	Ongoing	August 2023	Service Contract	750-5000
/	Provision of maintenance services for high voltage (HTB) power electrical equipment on the CERN site	Framework service contract for the preventive and corrective maintenance for high voltage (HTB) power electrical equipment rated 400 kV and 66 kV at CERN, including power transformers, circuit breakers, switches, measurements instruments and busbar systems.	2024	2024	Service Contract	750 - 5000
/	Supply of Uninterruptible Power System (UPS) rated 20 – 200kVA.	Five year blanket purchase contract for the supply of uninterruptible Power System (UPS) rated 20 – 200kVA.	Q4 2023	Q1 2024	50	750- 5000
/	Supply of Uninterruptible Power System (UPS) rated >400kVA.	Supply of 11 high power uninterruptible Power Systems (UPS) rated >400kVA.	Q4 2023	Q2 2024	11	750 – 5000
/	Supply of radiation resistant LED lights	Supply of radiation resistant LED lights	Q1 2024	Q3 2024	2360	750-5000
/	EPC Contract for the supply of two diesel generators (2 + 1.6 MVA)	Supply, installation and commissioning of two diesel generators (2 + 1.6 MVA) to be installed in P5.	Q3 2023	Q4 2023	2	750- 5000

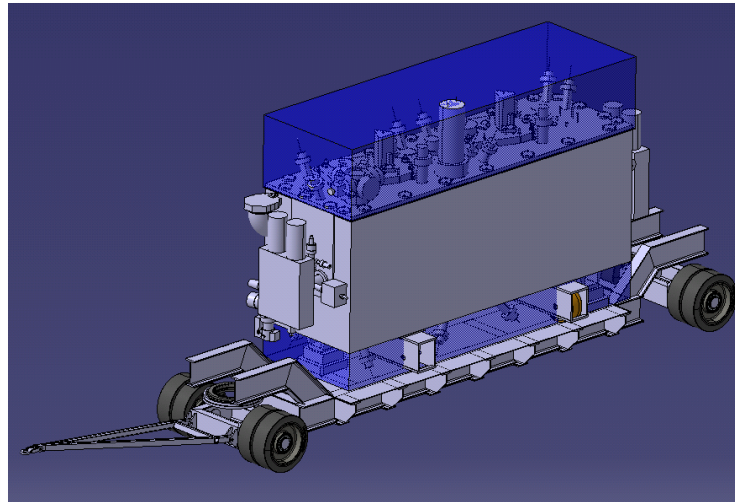
EN-HE - Handling Engineering

The HE Group prepares, organizes and coordinates all transport and handling operations for the CERN accelerators and experiments as well as the transport of thousands of conventional items, chemical and radioactive products per year. The Group manages and maintains all the industrial transport, handling and lifting equipment, personnel and material lifts.

The Group is specialized in the **design, integration and feasibility studies related to the transport and handling operations**. Both standard industrial and custom-built transport and handling equipment is being procured, installed and commissioned.



ALICE TPC transport



LHC connection cryostat

HE contracts: upcoming industrial opportunities

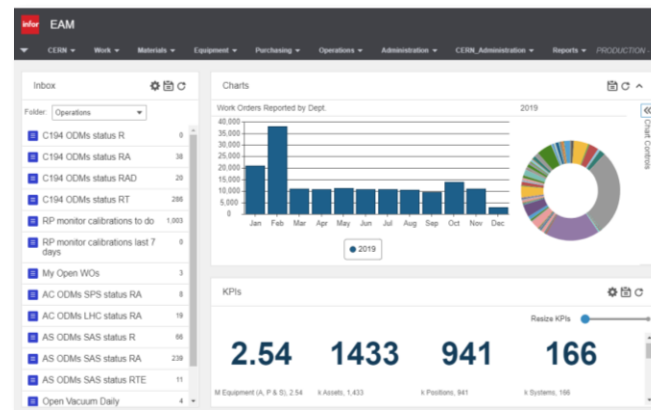
Ref.	Contract description	Comments	MS	IT	Contract	Cost range [kCHF]
-	Supply and installation of 1 overhead crane for clean room	Cleanroom specific requirements. Capacity to be defined.	t.b.d.	t.b.d.	2023-2024	< 200
-	Electrical tow tractor 35t capacity for LHC TAN transport	Supply contract	n.a.	2023	2024	< 200
-	Replacement of a 100 t road tractor for semi trailers	Supply contract	n.a.	2024	2024	< 200
-	Wire guided sideloader	Load handling capacity:1.8t. Load handling height: 6m. Aisle width: 2200mm. The supplier shall have more than 5 years of experience in manufacturing load handling machines and providing reliable after-sales support.	n.a.	2024	2025	< 200
IT-4824/EN	Supply of one Custom-made Cryogenic Magnets Transport vehicle refurbishment	Supply of one Custom-made Cryogenic Magnets Transport vehicle refurbishment including the design of new vehicle software, replacing all electrical components with a similar up-to-date model and inspection of all mechanical components and frame structure. Cryo Magnet transport vehicle is self-propelled, battery-powered and can be driven manually or semi-automatically by using inductive guiding wires and a radio controller. 3m high x 3 m wide x 7m long with lifting capacity of 37 t.	On going	On going	2024	200 - 750

EN-IM – Information Management

The IM group provides **applications and support for engineering information management** throughout the whole Organization and its different projects.

This includes for example mechanical CAD tools (such as CATIA), Product Lifecycle Management systems (Smarteam / Aras), the Engineering Data Management Service (EDMS) as well as the Enterprise Asset Management platform (Infor EAM).

The group helps implementing and configuring these tools according to user needs while ensuring that coherent processes are applied and provides user training.

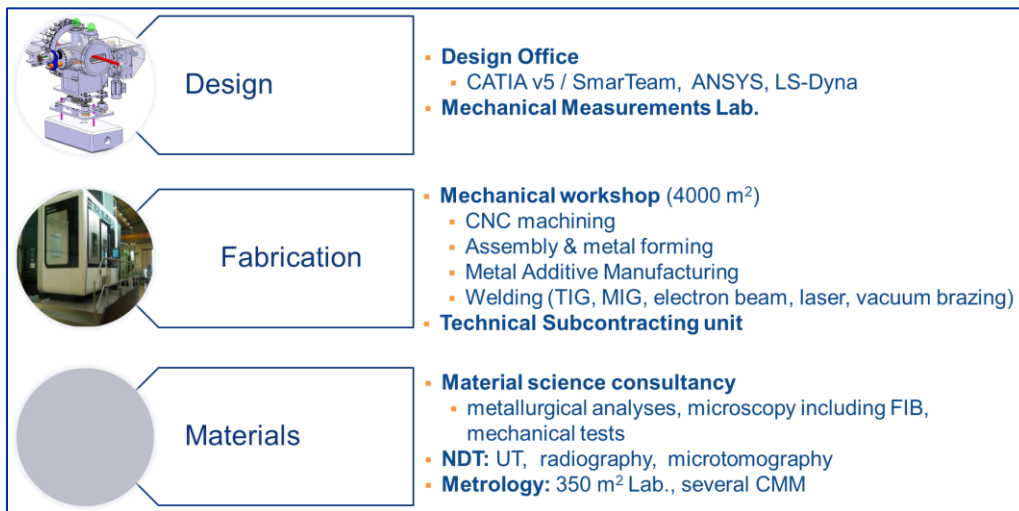


EN-MME - Materials & Mechanical Engineering

The mandate of the MME group is to provide to the CERN community specific **engineering solutions combining mechanical design, fabrication and material sciences**, using in-house and industry facilities, for beam accelerator components and physics detectors – prototypes and development.



Rotating Table for SC magnets assembly



High precision 3D scanner metrology



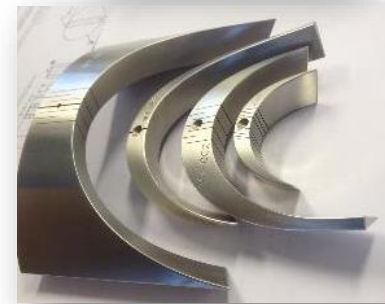
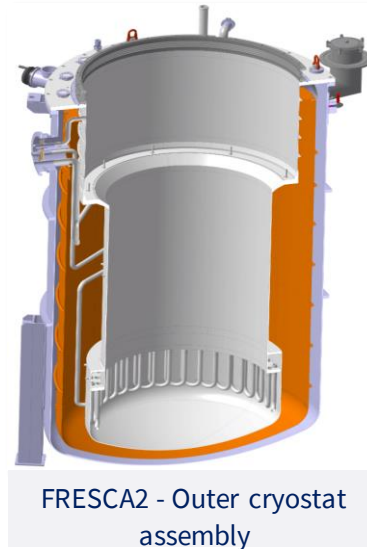
High precision press brake forming

MME contracts: upcoming industrial opportunities

HIE- Isolde Cavities



- Long Overhang Machining from Monoblock Copper - D320 x L900
- Tolerances in the tenth of mm..



CRAB Cavity

Mechanical workshop: 2'000 – 2'500 orders/year

Ref	Contract description	Comments	MS	IT	Cost range [kCHF]
-	Workshop, Fabrication at CERN	Service contract. Personnel required: mainly technicians in welding, machining, metrology...		2025	>10000
MS-4795/EN	Provision of mechanical design services on the CERN site	One or several framework contracts for the provision of mechanical design services. Collection and analysis of design requirements, definition of design parameters, execution of studies, detailed design, as well as manufacturing follow-up.	June 2023	Feb 2024	> 10000

MME contracts: upcoming industrial opportunities (suite)

Ref	Contract description	Comments	MS	IT	Cost range [kCHF]
-	Replacement milling equipment DMU60	Supply		2024	200-750
DO-33507	DQW Outer Vacuum Vessel (HL WP4)	For Crab cavities, supply of machined and welded equipment		2023	<200
-	Remplacement vacuum brazing furnace BOREL 1/2	Supply		2023	<200
-	Remplacement air brazing furnace BOREL 2/2	Supply		2023	<200
MS-4883/EN	Supply of a new five-axis Computer Numerical Control (CNC) milling machine	High precision, standard five-axis CNC milling machine, for machining of small-size equipment, to be delivered in 2024. High speed and rigid HSK63 spindle, allowing dynamic and accurate machining of 5 sides of a workpiece. The machine bed structure shall be of one single component (cast iron). Indicative specifications : - Travels: X 600 mm, Y 500 mm, Z 500 mm; - Table Load : min 500 kg; - Volumetric position uncertainty (XYZ): P max 5 ?m; accessibility to 5 sides of the machined component, travels covering whole worktable in 3-axis configuration	Aug 2023	Oct 2023	200 - 750
MS-4881/EN	Supply and installation of a laserFIB-SEM	Supply and installation of a laserFIB-SEM, composed of a high-resolution ion-based FIB-SEM chamber connected to a chamber for laser processing. It shall include the following detectors: - Secondary Electron (SE) and Back-Scattered Electron (BSE) - Energy Dispersive X-ray Spectroscopy (EDS) - Electron Backscattered Diffraction (EBSD) - Scanning Transmission Electron Microscopy (STEM)	Sept 2023	Dec 2023	750 - 5000

Contact persons in the Groups

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Thank you for your attention

Q&A