



ENGINEERING  
DEPARTMENT

# Opportunities for future tenders in the Engineering (EN) Department

M Nonis

7<sup>th</sup> October 2021

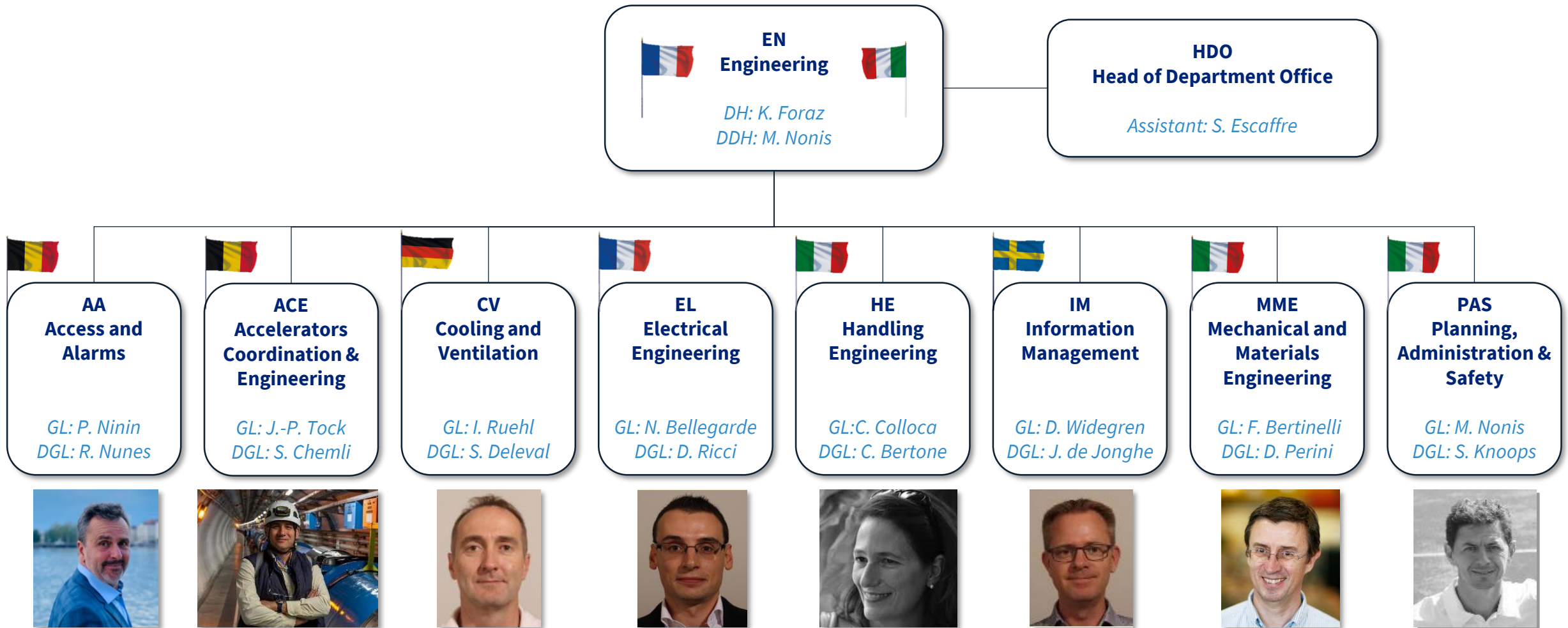
# ENgineering department – Mandate

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.

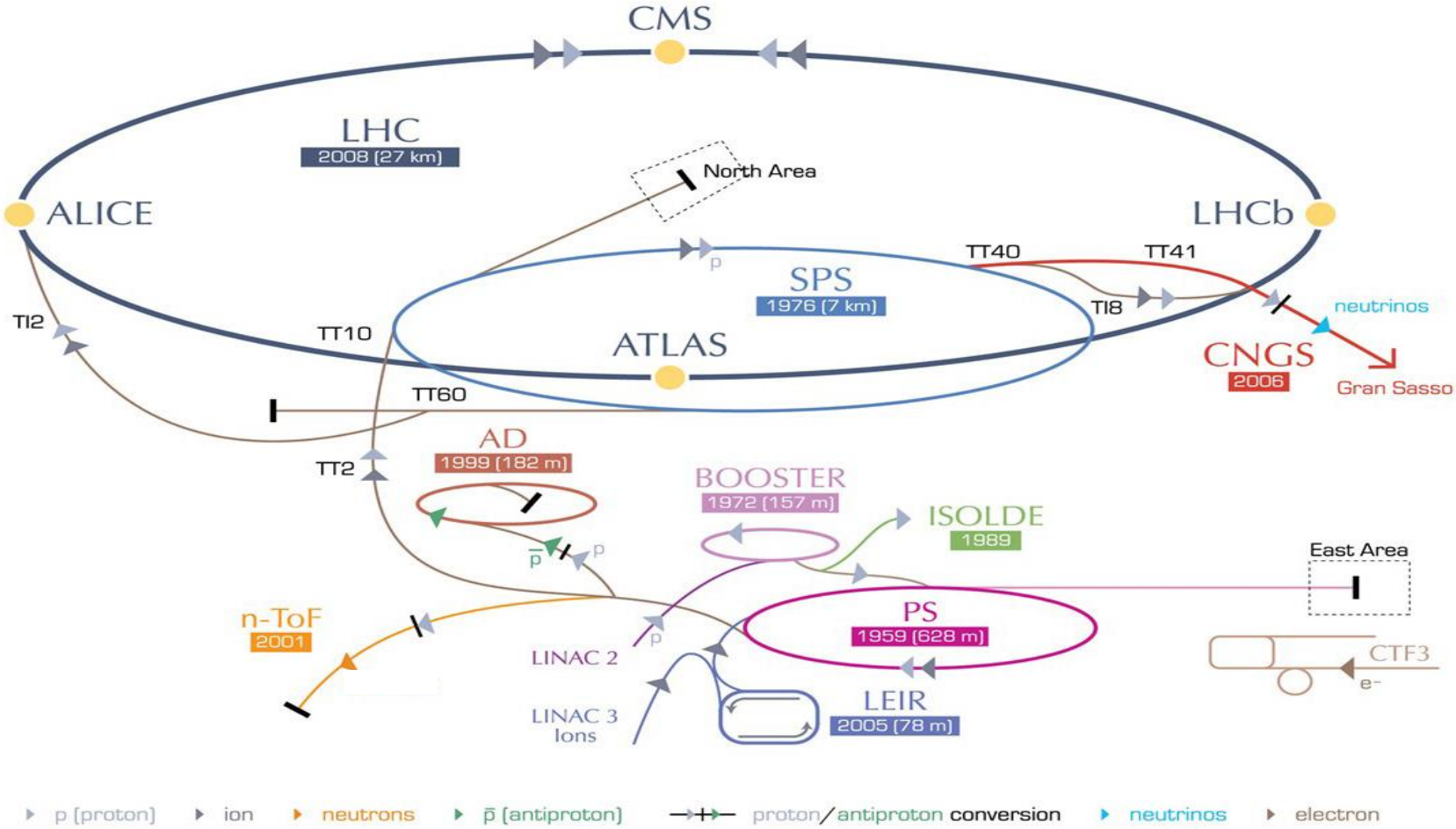
The activity of the Engineering Department is in the following fields:

- 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.

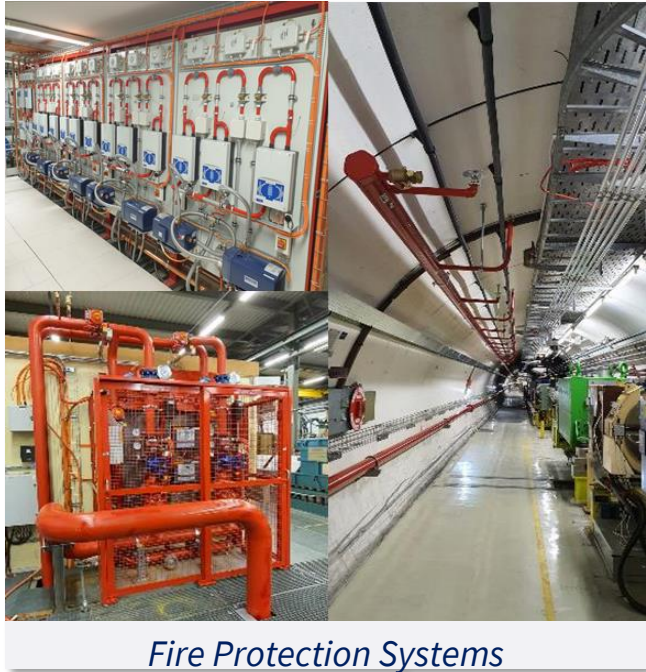
# ENgineering department - Organigramm



# CERN Accelerator chain



# 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

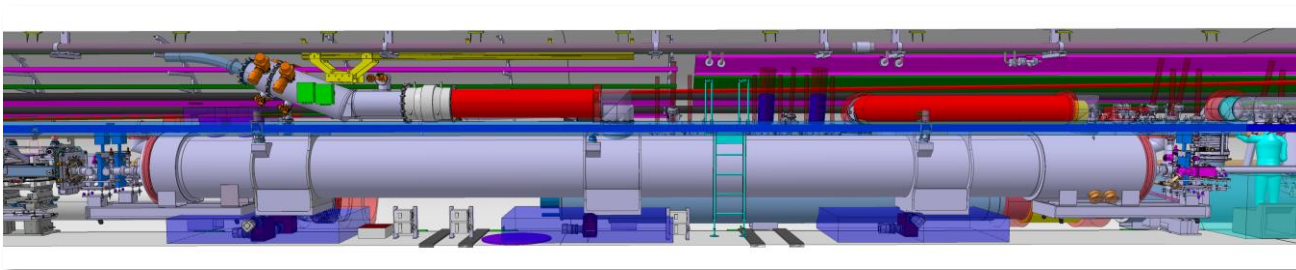
# EN-AA Alarms and Access : Future Contracts

Ref:	Scope	MS	IT	Contract Start/End	Remarks	Cost range
IT-4509/EN	<b>Supply and Installation of Site Access Control and Video Surveillance Systems</b>	May-2021	Nov-2021	Q12022-LS3	Supply and installation of Site Surveillance (SUSI) security systems for all CERN sites: access control, video surveillance and protection systems, road gates and barriers, access devices for buildings and specially secured areas, video cameras etc	C
MS-4600/EN	<b>Industrial Controls and Safety Systems Supply</b>	Jul-2021	Q12022	Jan-2023 - 2029	Maintenance & projects: upgrade/modify existing systems and supply of new ones covering studies, design, implementation, installation and commissioning. AA, CV, EL controls. O&M interventions mostly @ CERN Requires wide variety of computing skills and strong methodology, compliance with safety standards (IEC5108/11/13), audited by Nuclear Authorities.	D
	<b>CERN Safety Alarms Monitoring Renovation - CSAM2 Phase I &amp; Phase II</b>			2023-2024 + 2027-2037	1) Hardware replacement of alarm acquisition devices new functionalities for the existing SCADA (PcVue)(*), SPS/LHC alarm and CSAM rack cabling. 2) Replacement of the SCADA - personnel safety alarms (level-3-alarms) and technical alarms.	A B
	<b>LHC &amp; Experiments Automatic Gas and ODH detection systems renewal</b>	Q1 2022	2022-2023	2023-27 (End LS3)	Oxygen deficiency detection, flammable gas and toxic gas detection in LHC. Technology options to be investigated (radiation resistance, EMC). Covers: LHC (renewal) & HL-LHC (new) and maintenance for all CERN sites.	C
	<b>Sniffer system renewal for LHC Experiments (ATLAS, LHCb, ALICE)</b>	Q12022	2022-2023	2023-27 (End LS3)	Development: detection (smoke, flammable & toxic gas), electronic acquisition card. Cabinets renewal	B
	<b>LHC Evacuation Renewal</b>	S12022	2022-2023	2023-27 (End LS3)	Voice alarm system in the LHC (evacuation functions). Compliance with EN54.	C
	<b>North Area consolidation access safety and access control</b>	T.b.d.	T.b.d.	>2026	Project under study. Tender for personnel protection system. <i>Use future contract MS-4600 for NA Phase I: NA consolidation preliminary studies and pilot.</i> Use existing contracts (B1212, B1522, B1523) for fire safety (fire detection, sprinklers) foreseen for LS3.	C
	<b>Personnel Protection System eSPS, BDF</b>				<i>Projects under study</i>	tbd

# 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 A

Ref.	Contract description	Comments	MS	IT	Contract	Cost range
	Safety coordination (2 contracts)	Knowledge of Swiss and French rules	2022	2022	2022-2029	C



# EN-CV – Cooling & Ventilation

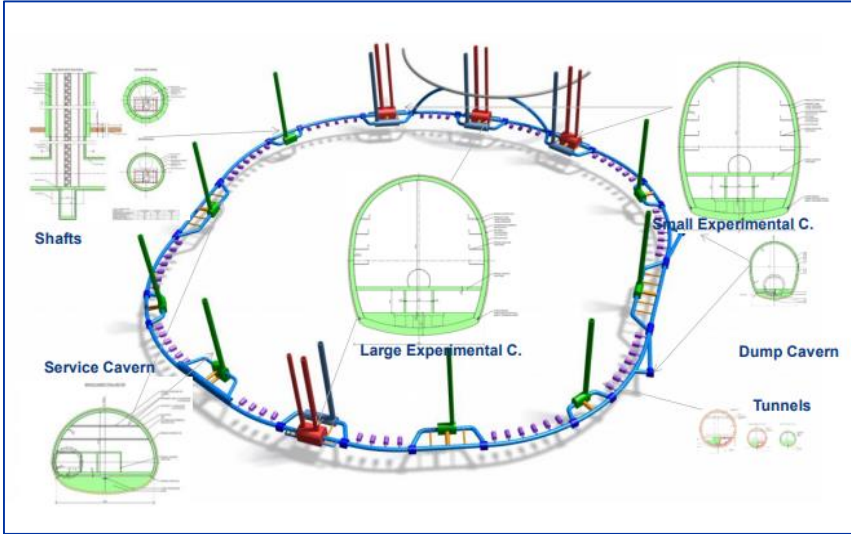
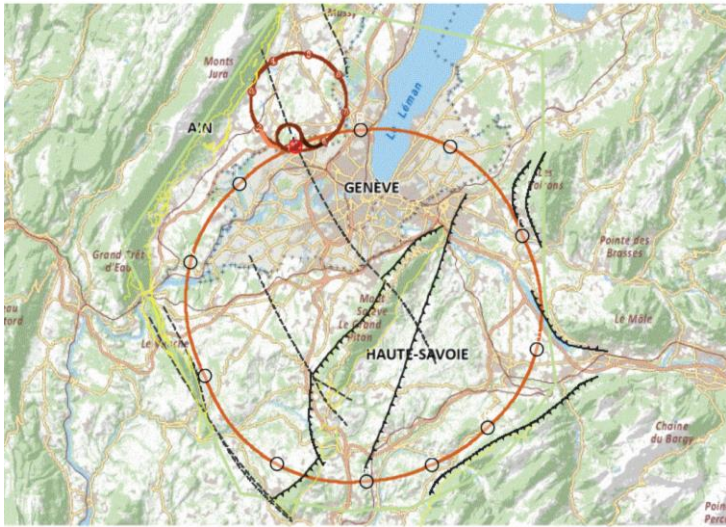
The CV group is in charge of the design, installation, commissioning, operation and maintenance of the cooling systems, pumping stations, air conditioning plants and fluid distribution systems of all accelerators, their experimental areas and some of the special cooling systems of LHC sub-detectors. 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 A

- Consultancy contract

Ref.	Contract description	Comments	MS	IT	Contract	Cost range [kCHF]
	Studies for ventilation systems for FCC	Consultancy specialised on environmental, safety and energy consumption aspects	2022	2022	2022-23	A
	Studies for cooling systems for FCC		2021	2022	2022-23	A
	Recurrent tendering of supply and installation of cooling and/or ventilation plants following approval and financing of projects					A-B



# 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 works: upcoming industrial opportunities A

- **Supply contracts (blanket purchase contracts up to 5 years)**

- Equipment supply, installation, commissioning (and sometimes maintenance)
- **12** currently in place

Ref	Contract description	Comments	Market Survey	Invitation to Tender	Estimated volume	Cost range
MS 4707	Supply of 18 kV and 3.3 kV switchgear	Existing contract with Casagrande	Q3 2021	Q4 2021	300 cubicles	C
	Supply of 48 V DC systems	Existing contract with Borri	Q3 2021	Q4 2021	140 systems (2 types)	B
	Supply of LV switchboards	Existing contract with ABB	Q1 2022	Q2 2022	70 units	B
	Supply of UPS systems	Existing contract with Borri	Q2 2022	Q3 2022	150 units	B
	Supply of optical fibre ducts	New contract	Q4 2021	Q1 2022	200 km	A
MS 4643	Supply of water-cooled cables	New contract	Ongoing	Q4 2021	120 cables – 2.5 km	B
	Supply of 24 kV compact switchgear	Existing contract with Ormazabal	2023		TBD	A
	Supply of radiation resistant single mode optical fibres	New contract	2023		1500 km	A/B
	Supply of lead acid batteries			1/2022		A

# EL works: upcoming industrial opportunities B

## ■ Maintenance contracts (service contracts up to 7 years)

- Installation services (electrical, cabling and fibre optics)
- 2 currently in place
- Maintenance of equipment
- 6 currently in place

Ref.	Contract description	Comments	MS	IT	Cost range
MS4717	Maintenance of Borri UPS systems	Existing contract with Borri	Q4 2021	Q1 2022	B
	Maintenance of 400 kV and 66 kV transformers	New contract	2022		A
	Maintenance of diesel generator sets	Existing contract with 2H Energy	Q1 2022	Q2 2022	A
	General maintenance services	Existing contract with COMSA	Q2 2022	Q4 2022	C

## ■ Installation contracts (service contracts up to 7 years)

Ref.	Contract description	Comments	MS	IT	Cost range
IT 4664	Electrical installation and cabling contract	Existing contract with COMSA	<i>Completed</i>	<i>Ongoing</i>	<i>D</i>
IT 4645	Installation of optical fibre cabling systems	Existing contract with COMSA	<i>Completed</i>	<i>Ongoing</i>	<i>D</i>

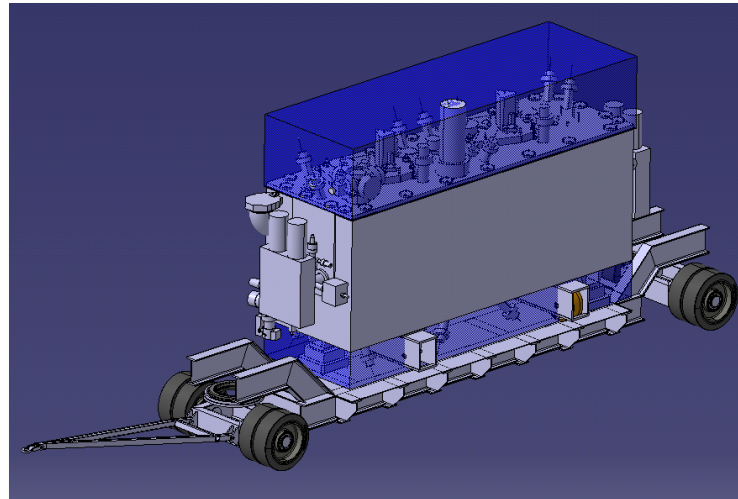
# EN-HE - Handling Engineering

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 A

Ref.	Contract description	Comments	MS	IT	Contract	Cost range [kCHF]
IT422	Provision of maintenance services for cranes and hoists	IS contract	out	11/2021	2022	B
IT4692	Provision of transport and handling services	IS contract, specialized companies	10/21	12/2021	11/2022	D
	Supply and installation overhead crane rails		1/22	6/2022	2023	B
	Supply and installation of 1 overhead crane for clean room				2023	A
	Refurbishment of a ROCLA vehicle				2022	A
	Supply of a 100 tons road tractor for semi-trailers				2024	A
	Supply of two forklifts				2022	A
	Supply of a 2.5t side loader				2022	A
	Supply and refurbishment of personnel lifts up to 3 tons capacity for tertiary buildings		out	1/2022	6/2022	B
	Electrical tow tractor 35t capacity for LHC TAN transport				2022-2023	A
	Supply and installation of shielded motorized doors		out	11/2021	3/2022	A

# 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.



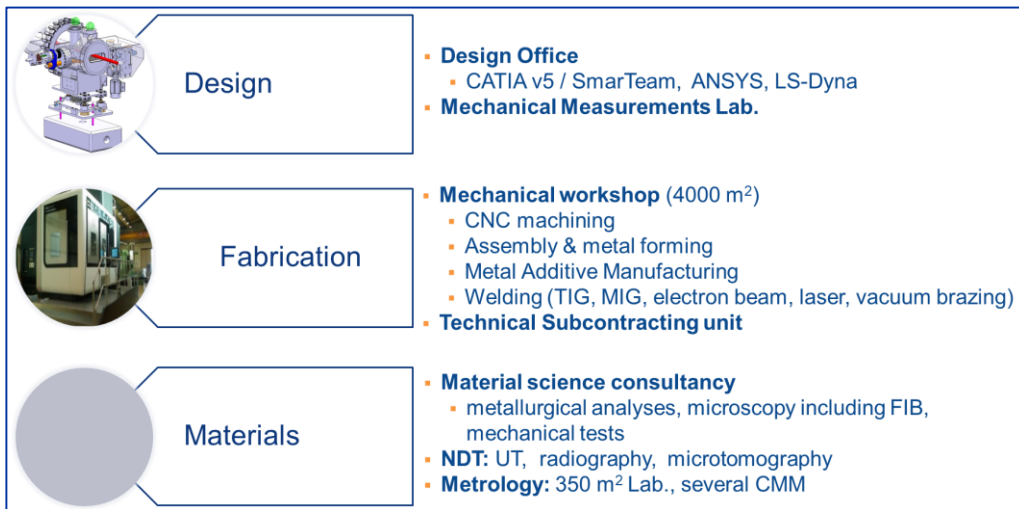


# EN-MME - Materials & Mechanical Engineering

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



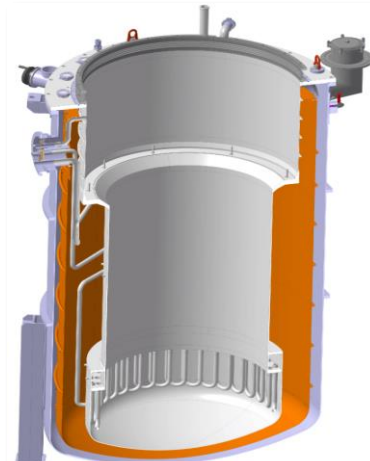
High precision press brake forming

# MME works: upcoming industrial opportunities

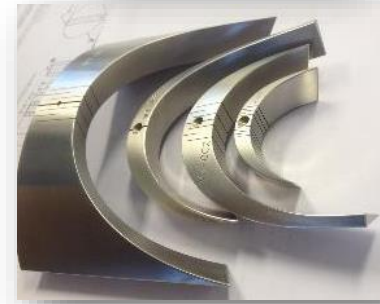
HIE- Isolde Cavities



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



FRESCA2 - Outer cryostat assembly



CRAB Cavity

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

Ref	Contract description	Comments	MS	IT	Cost range
	Design office	Activities at CERN site	Q1 2022	Q3 2022	D
	Workshop, fabrication at CERN		Q3 2022	Q1 2023	D
MS4716	Supply of a standalone Instrumented Indentation Hardness (IIH) testing system		Q3 2022	Q4 2022	A
MS4679	Supply of a hydraulic press brake		Q3 2022	Q4 2022	A

# Contact persons in the Groups

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# Thank you for your attention

## Q&A