

Cryostat Engineering for Helium Superconducting Devices

Welcome !

Introduction to the training

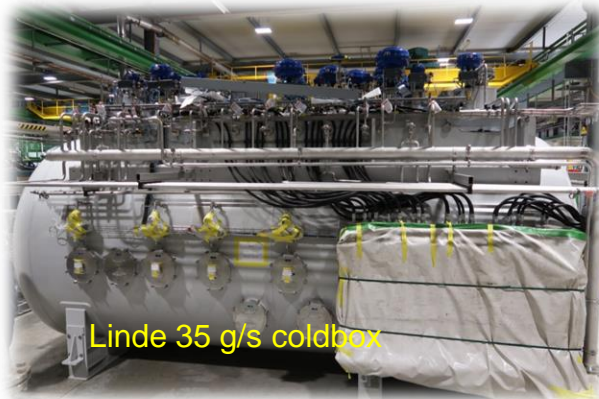
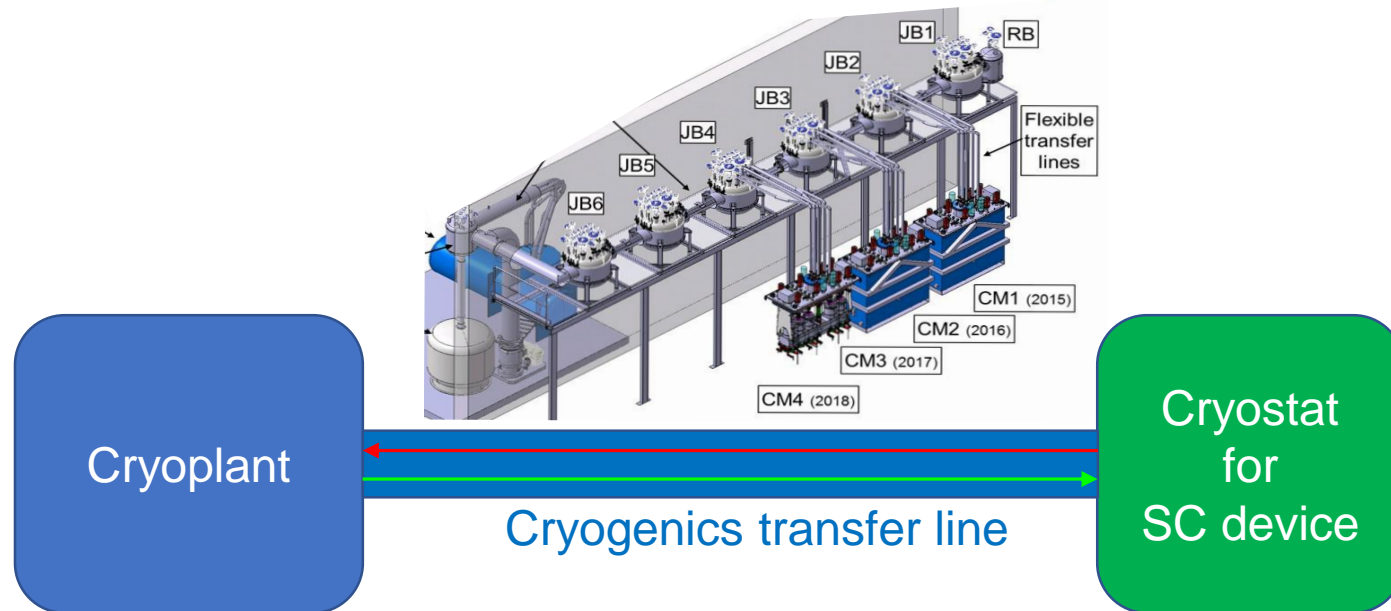
Aims of the training

- This course aims at acquiring knowledge in engineering design and construction of cryostats for accelerator superconducting devices operated with helium. It includes understanding the technical requirements and operational aspects of a cryogenic systems for helium liquefaction and refrigeration. The course is aimed at acquiring calculation tools for cryostat design and for heat transfer to helium (including superfluid).
- **Target audience:** engineers/scientists (and tech. engineers with relevant background)
- **Pre-requisites:** basic knowledge in thermodynamics, heat transfer and fluid mechanics, basic knowledge on superconducting devices and related technology

Cryostats for helium SC devices in accelerators



Integrated cryogenic system



Linde 35 g/s coldbox



Warm compressor station (Mayekawa)



Inside a HIE Isolde Cryomodule

Training schedule and material

- Indico page: <https://indico.cern.ch/event/1211961/>

Day 1 (7 November)

Morning: 8:30 Classroom: 593-R-010

- Introduction ([V.Parma](#)), 15'
- Thermodynamics refresher ([Ph.Lebrun](#)), 1 h

Coffee break (15')

- Helium refrigeration, part 1 ([G.Gistau](#)), 3h:

Lunch break (1h)

Afternoon: 14:00 Classroom: 593-R-010

- Helium refrigeration, part 2 ([G.Gistau](#)), 1h:
- Visit of a CERN cryogenic installation (SM18):

Coffee break (15')

- Cryostats for SC devices, part 1 ([V.Parma](#)), (1 h)

End of day 1: 17:45

Day 2 (8 November)

Morning: 8:30 Classroom: 593-R-010

- Cryostats for SC devices, part 2 ([V.Parma](#)), (2 h)

Coffee break (15')

- The technology of superfluid helium ([Ph.Lebrun](#)), 2 h

Lunch break (1h)

Afternoon: 13:45 Classroom: 593-R-010

- Low temperature measurements and instrumentation ([Juan Casas](#)), 2h

Coffee break (15')

Classroom: 572-R-010

- Tutorial: case study part 1, 2 h

End of day 2: 18:00

Day 3 (9 November)

Morning: 8:30 Classroom: 572-R-010

- Tutorial: case study part 2, 2 h

Coffee break (15')

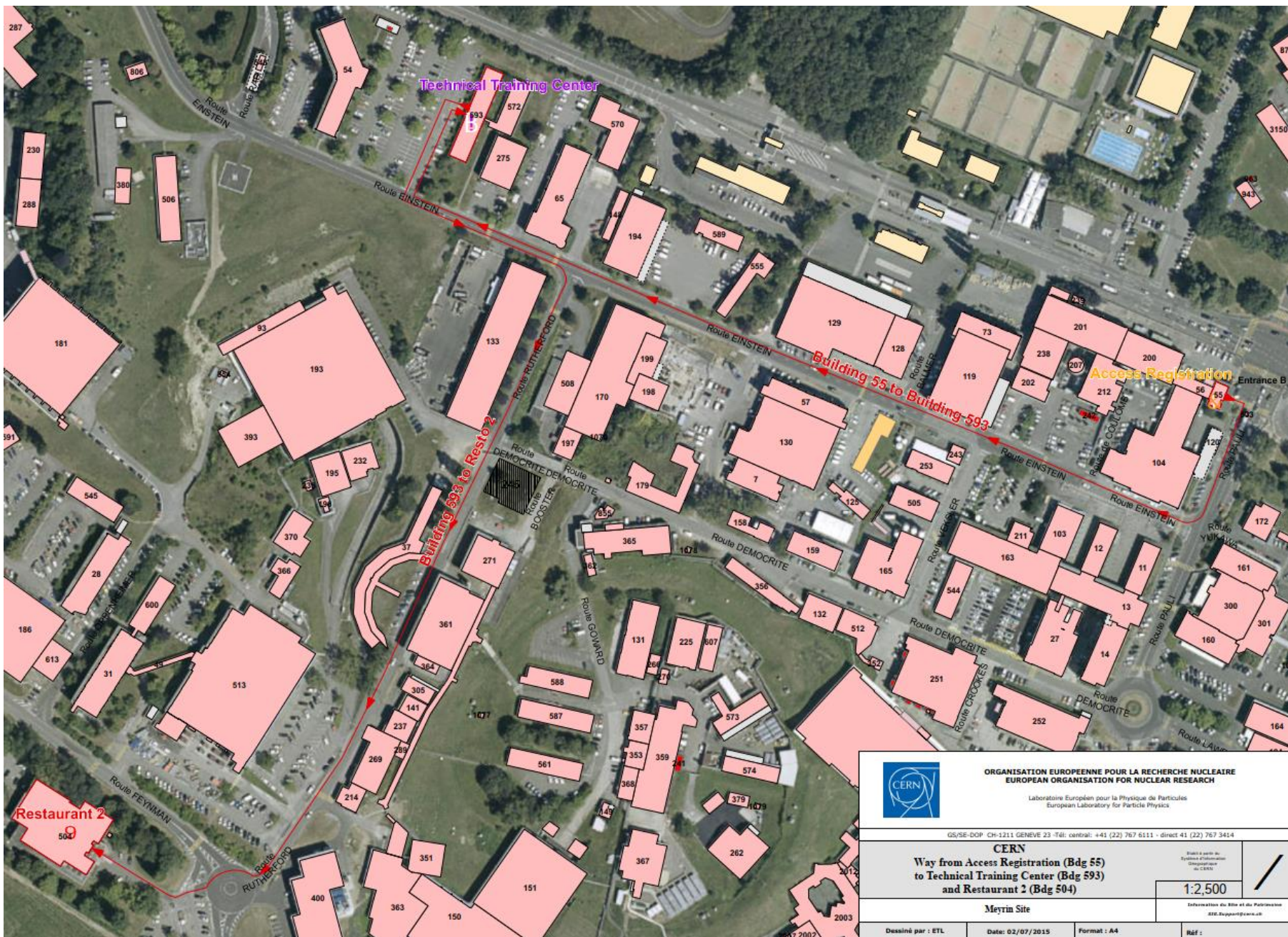
Classroom: 593-R-010



- Presentations and discussion of case studies, 2 h (students by groups)
- Wrap-up and conclusions on training.

- End of training: 13:00 -

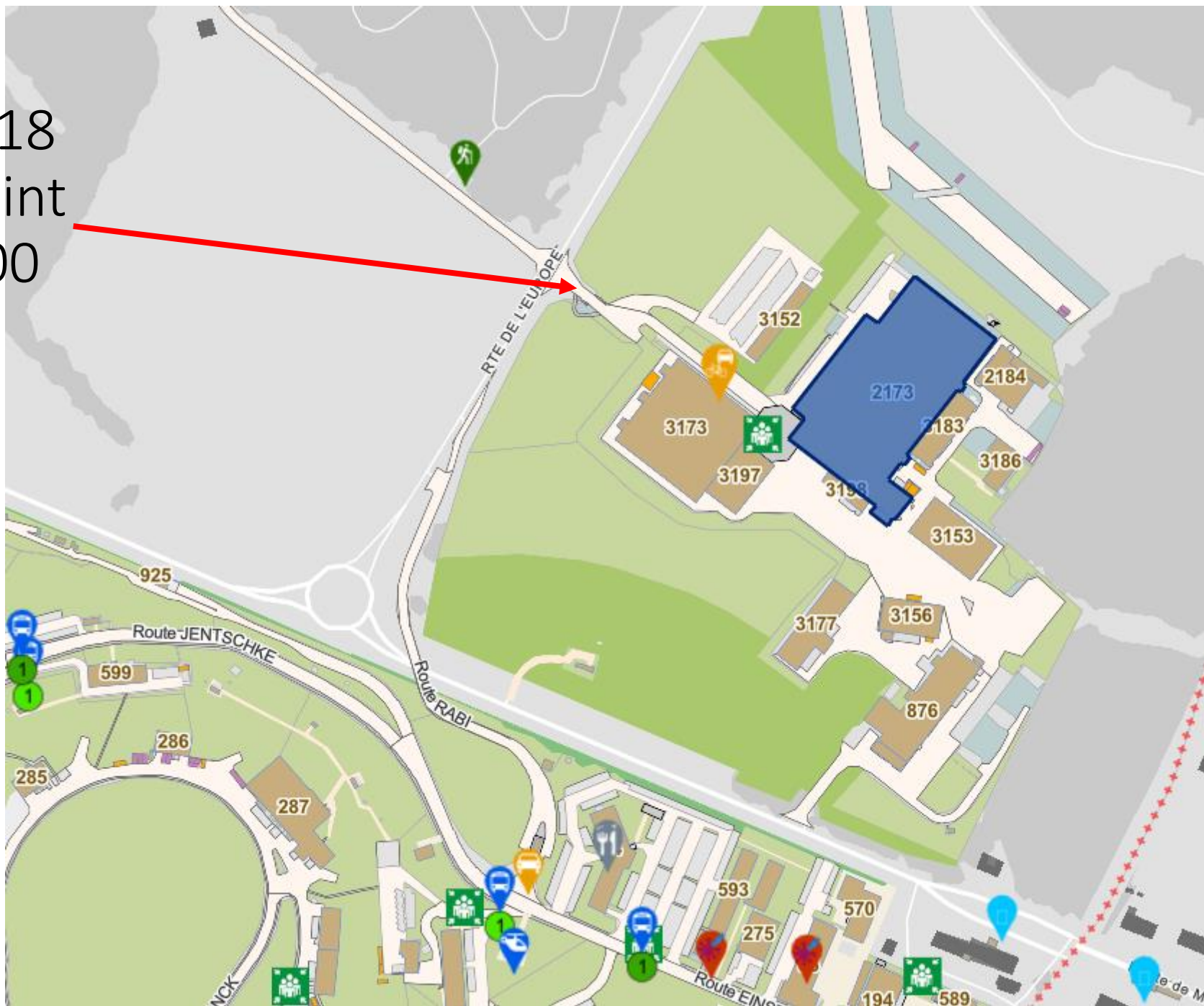
Tutorial by teams

- A real case study: design of a cryostat for FCCee
- Set up 4 teams (2 x 3 and 2 x 4 students)
- 4 hours of teamwork in training room with PCs (*Cryostat Toolbox S/W* available)
- You can use your laptops and any S/W you wish
- 2 hours for teams' presentation (1/2 h per team)



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GS/SE-DOP CH-1211 GENEVE 23 -Tél: central: +41 (22) 767 6111 - direct 41 (22) 767 3414	
CERN Way from Access Registration (Bdg 55) to Technical Training Center (Bdg 593) and Restaurant 2 (Bdg 504)	
1:2,500	
Meyrin Site	
Dessiné par : ETL	Date : 02/07/2015
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Visit of SM18
meeting point
Time: 15:00



Questions ?