

# Cryogenics at ESS – Status and opportunities

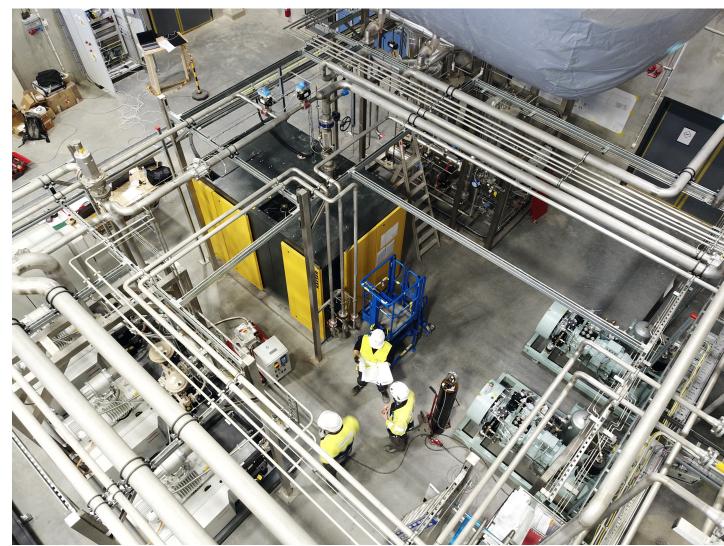
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### **Outline**

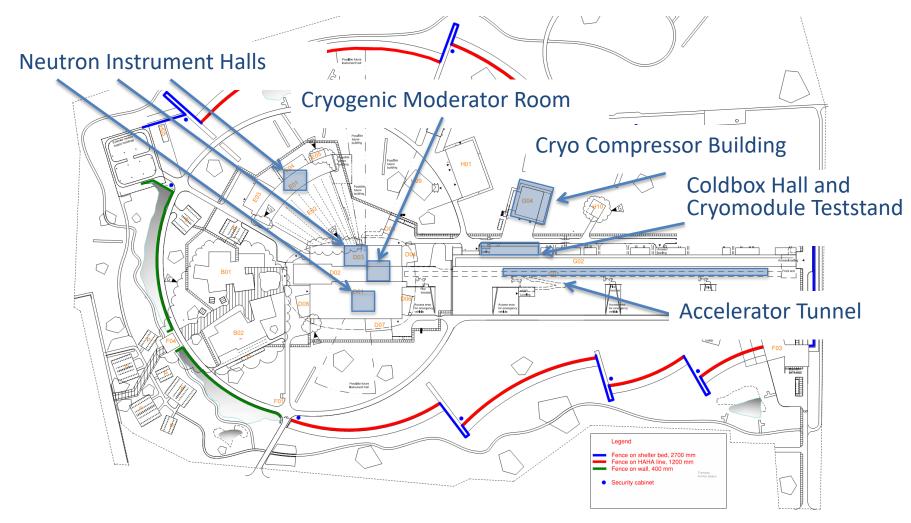


- 1) Current status
- 2) Upcoming challenges
- 3) Needed competences and capabilities of suppliers
- 4) Upcoming procurements
- 5) Summary



## (1.1) Reminder on Cryogenics at ESS





Cryogenic equipment and support scattered across the site, main cryogenics in compressor and coldbox building

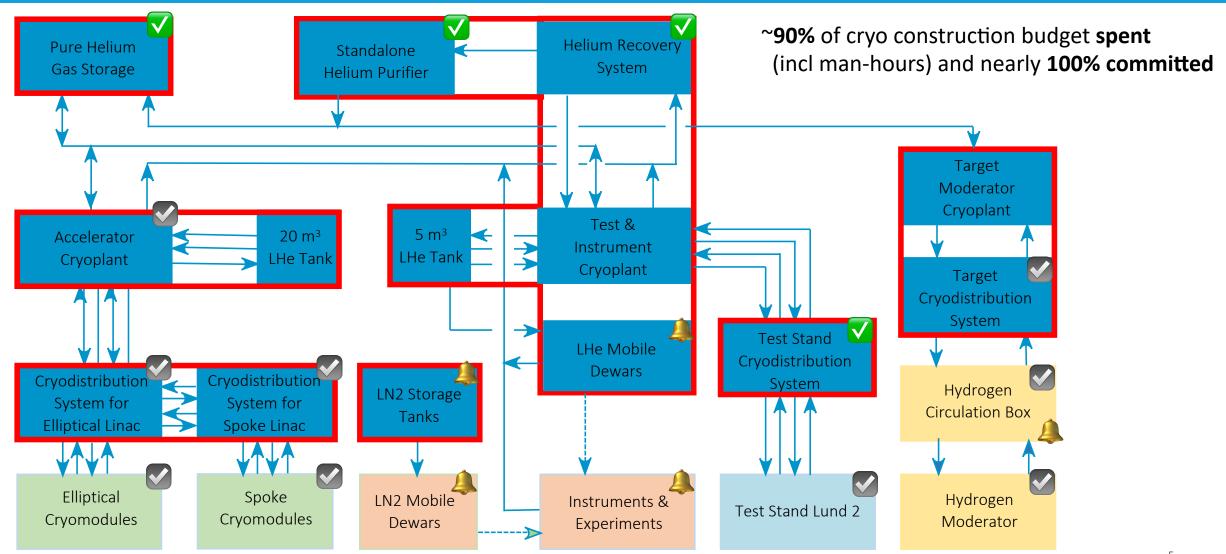
# (1.2) ...and where we are





### (1.3) System overview and status





# (2.1) How do our systems look like





Liquid helium handling

Compressor, oil and cooling systems

Special Coldboxes with a mix of high-tech and standard components

## (2.2) How do our systems look like



### Helium and nitrogen storage





High-tech cryogenic machinery

# Cryogenic distribution – vacuum insulated valve boxes and transfer lines



# (2.3) What is planned next – upcoming challenges



- Start-up and reliable operation of CM test stand
- Installation and testing of CDS for superconducting linac
- Finalise commissioning and testing of ACCP
- Modelling of complex scenarios (SV relief in linac, transients for CMS and TMCP)
- Commissioning superconducting linac
- Extend helium recovery system to neutron instrument halls
- Maintenance, overhauls
- Reliable operation



# (2.4) What is planned next – upcoming challenges





# (3) Companies delivering services to cryogenics



Tasks	Companies
Oil analysis	Element
Sensor calibration	Jmex
3 <sup>rd</sup> party inspections	Dekra
Safety relief valve calibration and certification	Mec-con
ODH detectors	Alfakomp
Vibration measurement analysis	SPM
Modelling software	Modelon
Helium	AGA, Woikoski
Gaskets	VTM
Installation works	Powerheat, TESI, Elajo
Tools	Ahlsell















### (4) Upcoming procurements



#### Redundant oil and screw compressor skid for ACCP including

- 1.5 MW motor
- On skid design for piping, valves, cabling, instrumentation
- Oil flooded screw compressor
- Bulk oil separator
- Oil cooler
- Oil pumps
- Water cooler
- Stand-alone controls

#### What else?

- Auxiliary equipment for target systems
- "small cryogenics" for NSS sample environments





#### **Furthermore**

- Overhauls
- Liquid nitrogen supply
- Smaller welding jobs
- Spares

# (5) Summary





- ESS Cryogenics increasingly dominated by start-up and operation
- All big procurements announced in 2018 placed, except redundant compressor skid
- Construction still for CDS and target cryogenics, for NSS in a few years
- Looking into maintenance, spares, calibration, small adjustment jobs now

