

DS-20k I&I Meeting, 17 Feb 2022

Report of DS-20k/LNGS/CERN meeting 10-11 Feb 2022

Marco Carlini

Installation and Integration working group

darkside
two-phase argon TPC for Dark Matter Direct Detection



TOPICS COVERED

- Cryostat timeline update
- Use of the DS-10 platform for the mockup
- AAr cryogenics and N₂ recovery
- Other business (schedule management software, requirements for personnel at LNGS during installation, management of general services during installation, safety courses).

Detailed minutes of the meeting here: [IntegrationMeeting-220211-mc-rt25.pdf \(infn.it\)](https://infn.it/IntegrationMeeting-220211-mc-rt25.pdf)

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CRYOSTAT TIMELINE UPDATE

- Cold cryostat: engineering contract is ready -> BoM for the cold cryostat expected for June/July -> material arrival at LNGS is expected to happen at beginning of 2023
- Warm cryostat: contracts for the beams supply and for the beam structure manufacturing will be ready within the end of the month -> beams supply (hopefully) end of May -> 3 months to manufacture the structure from the supply of the beams -> Sep to Dec warm structure construction at LNGS -> Jan 2023 start of cold vessel construction

I&I and LNGS team task:

- freeze cryostat position within mid-Apr in order to allow construction of the concrete basement
- Interface with LNGS services to plan logistics and worksite needs

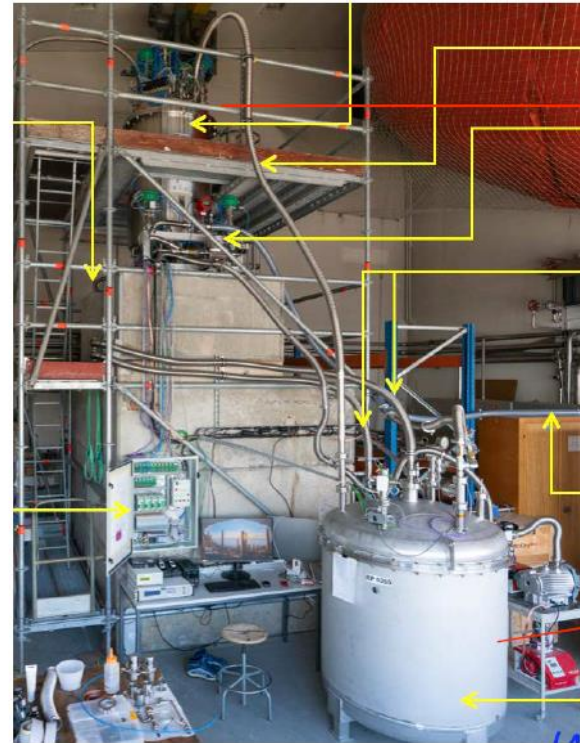
USE OF THE DS-10 PLATFORM FOR THE MOCKUP

- The director has been informed of the wish to reuse the DS-10 platform for the mockup project and the CTF top platform for the DS-20k condenser box and UAr cryo-system.

A document with the space requirements, timeline and intended use needs to be prepared.

My comment: LNGS services may ask also for other technical documentation (to be understood) and may include P&Id, ODH analysis, PED certification, weights.

Details can be found here: [Marzio_2022_02_11.pdf \(inf.n.it\)](#)



now at cern

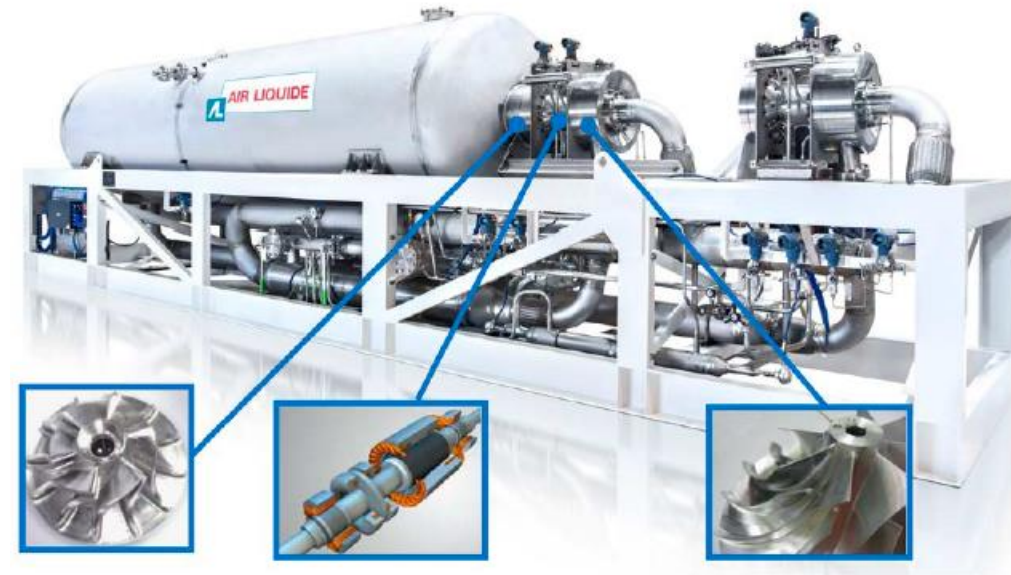


in the DS50 area

AAr CRYOGENICS AND N₂ RECOVERY

- Antonio D'Addabbo (LNGS cryogenic team) has presented the N₂ liquefaction system that LNGS plans to build for DS-20k and other experiments. Timeline: once requirements are frozen 6 months for tender process + 14 months delivery.

Details can be found here: [N2 liquefaction plant 2022 02 11.pdf \(infn.it\)](#)



Turbo-Bryton (TBF) systems from Air Liquid

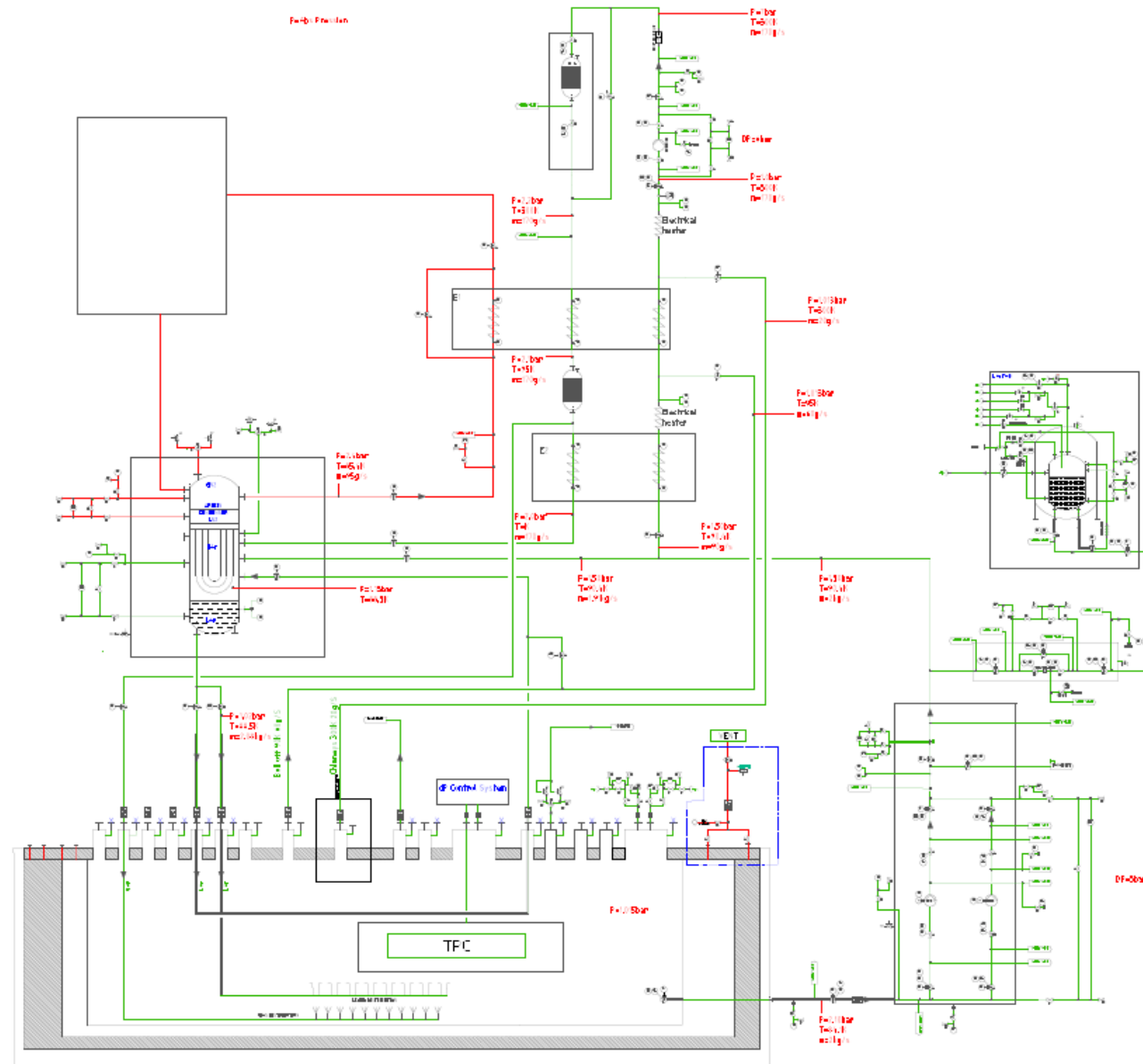
System name	Electrical consumption	Cooling power @68K	Water cooling	Re-liquefaction capability	Size (LxWxH) (m)	Mass	Cost
TBF-175	200 kW	17 kW	9.3 Kg/s	~0.2 t/h ~174 smc/h	9.5 x 1.7 x 2.65	15 t	2.7 M€
TBF-350	410 kW	40 kW	18.6 Kg/s	~0.45 t/h ~394 smc/h	11 x 1.7 x 2.65	17 t	3 M€

AAr CRYOGENICS AND N₂ RECOVERY

- Johan Bremer (CERN cryogenic team) has presented the progress on the AAr cryogenics P&Id.

Marzio has proposed to start working on a document to agree on the interfaces between the LNGS cryogenic group and the Collaboration

High quality P&Id can be found here:
[AAr cryosystem 2022_02_11.pdf \(inf.n.it\)](#)



OTHER BUSINESS

- Federico G. has presented several options for schedule/project management software.
- Marzio has presented office requirements for personnel @LNGS during installation phase.
- Cryogenics support structure design needs to be finalized and shared with LNGS RUP (procedure responsible) and engineering firm as soon as AAr cryosystem layout is available.
- Access for cryostat cold structure construction will be granted through the use of the “passerelle attrezzate” requiring a minor modification with the addition of a dedicated small stairway.
- Safety courses are needed before the installation phase; possible subjects might be: confined environment, work at height, safety in the use of cryogenics, ...
- Preliminary discussion on how to achieve general services such as crane operators, portering, scaffolding (dedicated contract with company vs exploiting LNGS services)