SPD cryogenic system

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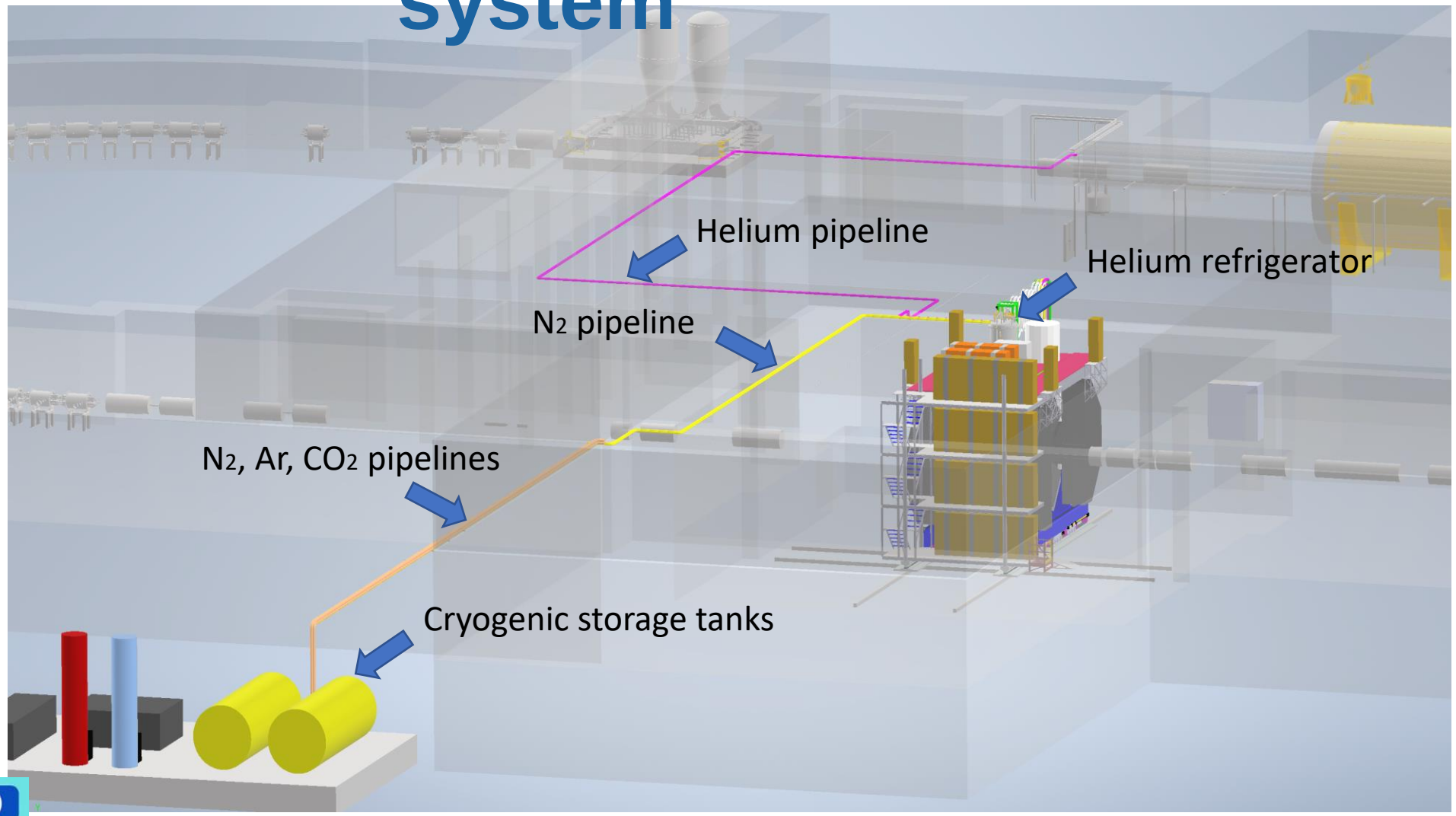
Outline

1. Cryogenic system
2. Cryogenic equipment
2.1. Helium system
2.2. Nitrogen system
2.3. Other systems
3. Steps creation & costs
4. Conclusions

Cryogenic system



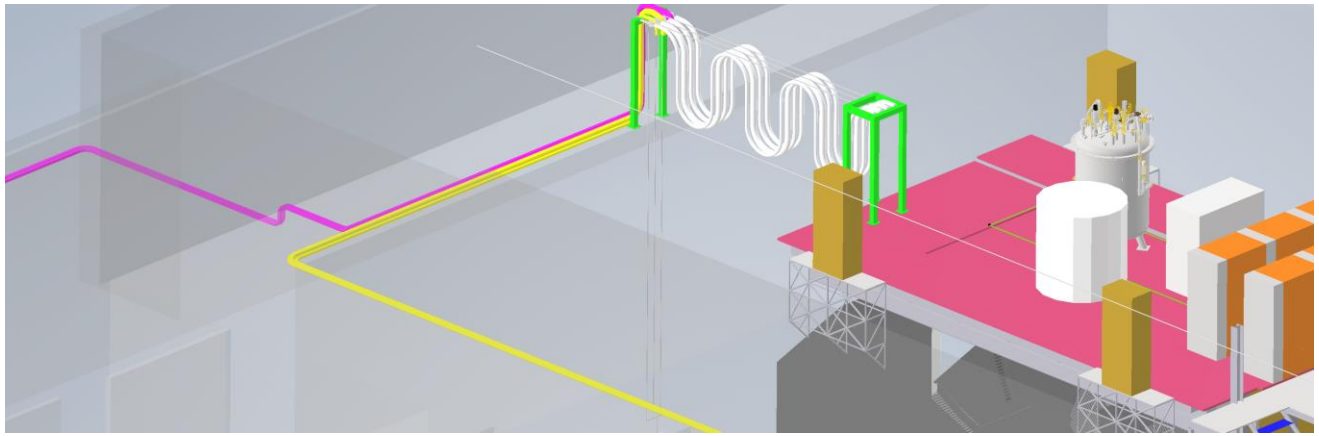
2.1. Helium system

Refrigerator

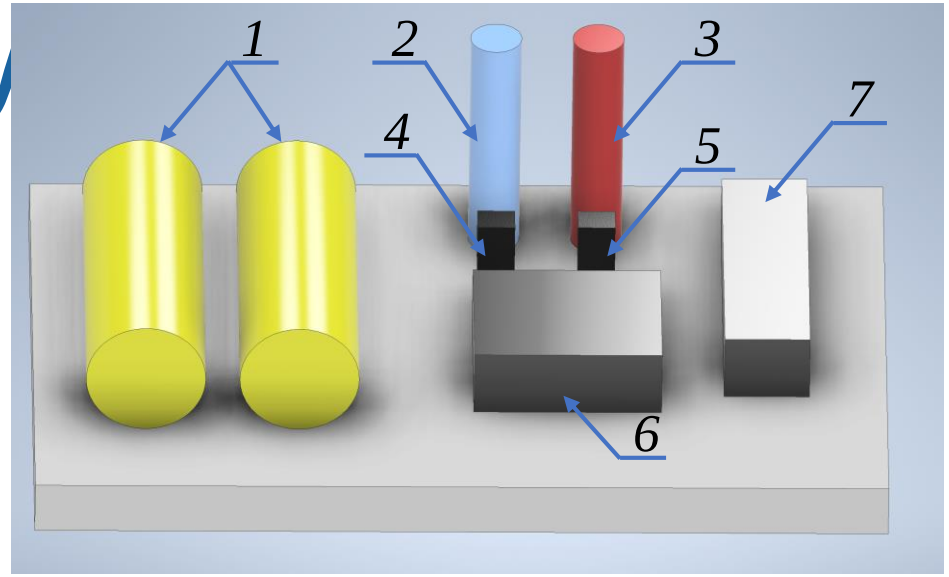
100 W @ 4.5 K (140 l/h)
16 g/s
3.0 Mpa
2000 mm x 3500 mm

Pipelines

Rigid pipes	Flexible pipes
220 m	40 m
ø60 mm high pr.	ø60 mm high pr.
ø100 mm low pr.	ø100 mm low pr.



2.2. Nitrogen sy



Cryogenic tanks platform

1 – Two storage tanks for LN_2, 2 – Storage tank for LAr, 3 – Storage tank for LCO_2, 4 – Evaporator for LAr, 5 – Evaporator for LCO_2, 6 – Storage bottles, 7 – Equipment room

Pipelines

Cryogenic line

LN_2 – 120 m (rigid tube)

LN_2 – 40 m (flexible tube)

Warm line

Ar – 100 m (rigid tube)

N_2 – 100 m (rigid tube)

CO_2 – 100 m (rigid tube)

2.3. Other systems

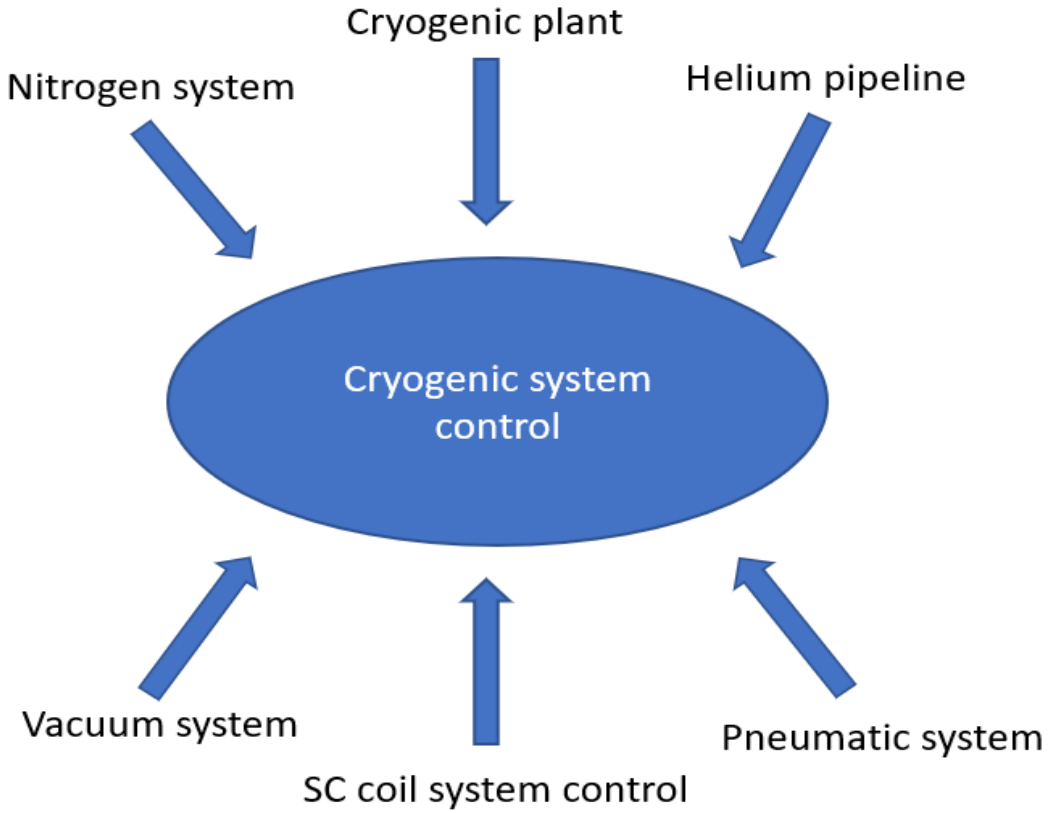
- Vacuum system

Diffusion vapor pump and pumping station with two foreline pumps

- Pneumatic system

2.3. Other systems

- Cryogenic system control



3. Estimating the costs and power consumption of systems

	Name of system	Costs, к$	Power, kW
1	Cryogenic plant	3 330	2
2	Helium pipeline	500	-
3	Nitrogen system	1 500	2
4	Vacuum subsystem	500	14
5	Pneumatic subsystem	50	3
6	Cryogenic system control	500	2
	Total	6 380	23

Steps creation

SPD	2022				2023				2024				2025				2026				2027			
	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV
Cryogenic plant																								
Helium pipeline																								
Nitrogen system																								
Vacuum system																								
Pneumatic system																								
Cryogenic system control																								

Technical task

Contract execution

Assembly & Test

Commissioning

4. Conclusions

The cooling capacity, mass flow rate and working cycles of the cryogenic plant are calculated.

The development of technical tasks for a cryogenic plant and a platform for cryogenic storage tanks is in the active phase.

The work is carried out according to the plan.

Thank for your attention!