

WP3

Required interfaces for cryostat design / integration

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SPL 3rd Collaboration Meeting, CERN, Geneva
November 12th 2009

○ Goal

*Design and construct a full-scale cryomodule prototype (Part of the **SPL Design Study** for a Project Proposal in 2011-2012)*

○ Motivation

- *Demonstrate the **construction capability**, CM with **$\beta=1$ cavities** and **SC quadrupoles**;*
- ***Validate and improve design and construction features***
- *Learning of the **critical assembly phases***
- ***Enable RF testing on a multi-cavity assembly** (in real operating conditions)*
- *Learning of the critical assembly phases;*
- *Validate operation issues, **cryogenic cooling principles** and **acquire experience***
- *Estimate production **costs***

- CNRS-IN2P3 Tasks:

- 1/ To design and integrate the cryostat and to provide cryostat components for one cryomodule prototype;*

- 2/ To design and provide the supporting/guiding system for the string of cavities in the cryostat;*

- The deliverables:

- *Hardware components*
 - *Design and calculation reports, drawing files and design models*
 - *Fully documented industrial production files:*
 - *Material spec.*
 - *Designed calculations (construction codes)*
 - *Production drawings*
 - *Assembly procedures*
 - *Quality assurance and safety records*

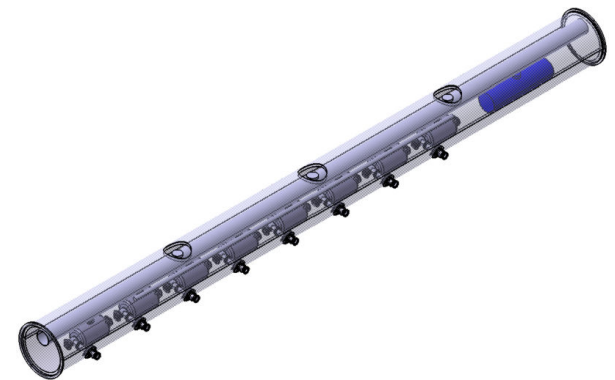
CNRS/IN2P3 contribution statement

- *CERN – CEA - CNRS/IN2P3 → collaboration agreement signed*

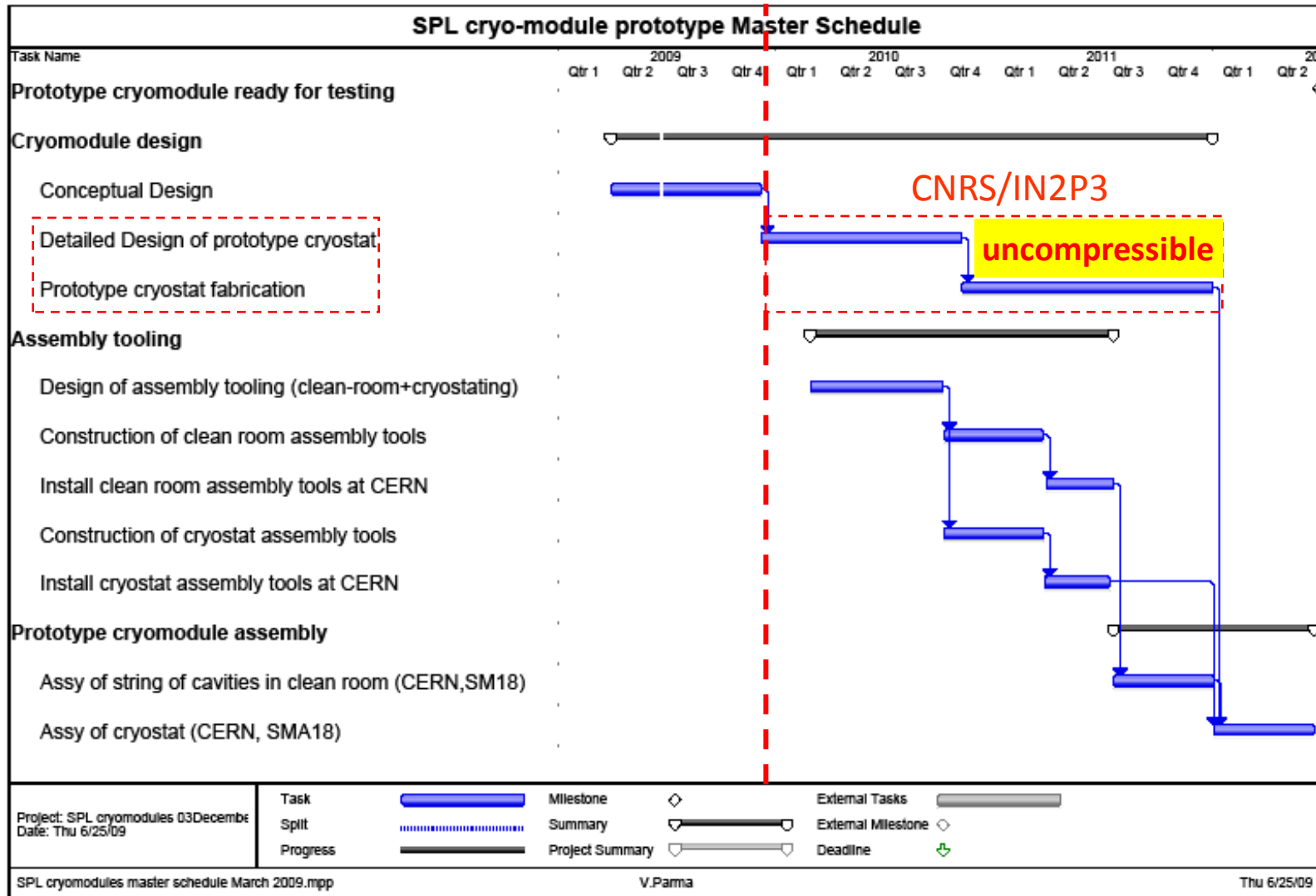
3rd SPL meeting,

Since then,

- *CNRS/IN2P3 taskforce (already) operational*
- *Work slightly began*
 - *Conceptual design (biblio...)*
 - *Vacuum vessel design*



- *But...*



- *...but*
 - *Needs of general layout specifications*
 - *Needs of interfaces specifications*

- *To:*
 - *Start the design and integration study by the beginning of 2010 = NOW !*
 - *Short Term need (ST) (by end of 2009)*
 - *Carry out this detailed design*
 - *Mid Term need (MT)*

- *3rd SPL meeting (or conceptual design period):*

we should fix the Short Time needs

○ Longitudinal layout:

- *Pattern for string of cavities* (Short Term)
- *Sectorization* (ST)
 - *cryostat (vacuum, cryogenics)*
 - *beam (vacuum, diagnostic)*
- *Quadripoles* (ST)
 - *Cold/Warm*

○ Cross sectional layout

- *Cryostat supporting system* (ST)
- *Orientation of RF coupler (vertical): Top/bottom* (ST)
- *Cavity string supporting reference (GRP ?)* (ST)

○ *Cryogenic layout*

- *T°, pressures* (ST)
- *Elements types (valves...) and dimensions (pipes)* (ST)
- *Cooling down protocol (spec.)* (ST)

○ Cavity

- *Outer diameter (LHe vessel)* (ST)
- *Mass (order of)* (ST)
- *Alignment specifications (to be confirmed)* (ST)
- *Alignment outer reference* (ST)
- *String assembly procedure* (ST)
- *Supporting mech interface* (MT)

○ Tuner

- *Type (geometry, motor position...)* (ST)
- *Volume* (ST)

○ Coupler

- *Mech. Interface* (MT)
- *Cooling* (MT)

Beam dynamics

○ *Quadripoles (if SC)*

- *Alignment specifications* (ST)
- *Expected mass and volume* (ST)

- *Cryostat handling* (MT)
 - *Out of and in the tunnel*

- *Alignment method (2, 3 points)* (MT)

- *CERN cryogenic test facility interface* (MT)

Instrumentation

- *Instrumentation needs* (MT)
 - *Should not be neglected in cryostat integration*
 - *Mostly known from users/partners*
 - *Might be already specified (feedthroughs...)* → (ST)

THANK YOU
