

Summary of Engineering
Integration meetings
CERN 18-20 Nov 2019

Integration engineering coordinators

- Interface coordinators – detector (Zeug), installation (Freitag), facility infrastructure (Fowler, Mladenov, Resnati)
- Responsibilities
 - Oversight of the successful planning of deliverables of the elements in their purview to the FS
 - Oversight of the design of elements in their working group. Includes assisting in the preparation for design reviews.
 - Oversight of all interfaces between elements within their working group and adjacent elements
 - Oversight and approval of drawings in their working group
 - Creation of documents or drawings to establish and control interfaces
 - Lead change efforts that may affect critical interfaces

Detector engineering coordinator

- Engineering lead – K Zeug
- This contains elements of the APA, PD, HV, CE consortia.
- Interface with APA, PD, HV, CE, CISC consortia to integrate detector elements and define the envelopes.
- This includes all detector elements in the final installed state, detector services inside the LAr volume and anything that physically connects to the flange on the warm side that supports APA, PD, HV, CE operation. The DSS is an exception to the above rule, as the interface is instead at the connection point on the DSS beam.
- Independent verification that detector mechanical designs from individual consortia are consistent with ICDs
- Make recommendations on interference resolution
- Components that touch Ar (liquid or gas) excluding DSS, Cryo and membrane.

Installation engineering coordinator

- Engineering lead – J Freitag
- All detector I&I elements to be installed and the associated infrastructure.
- This also includes working with logistics, detector, cryogenics and cryostat to manage interfaces for all detector components from surface to 4850 station at bottom of Ross shaft and to the detector caverns and CUC. Custom tooling and packaging required for material movement
- Integration and infrastructure needed for the cleanroom, all installation work stations/platforms, custom tooling, custom fixtures, conveyances and cold boxes.
- Infrastructure required and movement of detector elements inside the cryostat to their final position, includes trolleys, access equipment, false floor.
- Ash River planning

Facility engineering coordinators

- Engineering leads – D Mladenov/J Fowler/ F Resnati
- Coordination of all other elements. Interfaces outside of the TPC detector and installation cleanroom.
- Includes all mezzanines, racks, cable trays, vent piping, position and alignment of flanges, barracks, bridge and connections
- Will manage the interfaces between the internal cryostat, cryogenics and DSS.
- Interfaces with the external facility and CF.
- Determines the position of the detector inside the cryostat.
- Overall integration of all elements

Consortia technical leads

- Design lead engineers – CE, APA, HV, PD, DAQ, CISC
- Responsibilities
 - Interaction with the engineering coordinators to successfully provide consortia deliverables to the FS
 - Oversight or monitor of all design of elements within the consortia
 - Manage personnel available to accomplish designs within consortia
 - Review designs of adjacent elements that may effect their elements
 - Creation of documents or drawings for design of elements, analysis required. They should ultimately have approval responsibilities.
 - Lead design change efforts within the consortia
 - Negotiate with other technical leads to define interface boundaries

Design and Interface contacts

- Design responsibilities*

- CE Mechanical Eng – M Zhao
- HV Mechanical Eng – V Guarino
- PD Eng – D Warner
- APA Mechanical Eng – D Wenman
- DAQ – G Lehman
- CISC and Cal Eng - ?
- Electrical overview – T Shaw
- Mechanical overview – G Gallo
- Cryogenics – D Montanari
- Cryostat and cold boxes – D Mladenov
- Cleanroom and detector installation – J Freitag

Tech Lead – M Verzocchi
Tech Lead – B Yu
Tech Lead – D Warner
Tech Lead – A Marchionni
Tech Lead – A Thea

- Interface responsibilities*

- Installation – J Freitag
- Detector Integration – K Zeug
- Electrical – T Shaw
- Mechanical – G Gallo
- Cryogenics – D Montanari
- Cryostat – D Mladenov
- All others – J Fowler/D Mladenov
- Top of cryostat infrastructure – F Resnati

Tech Leads – B Miller J Stewart

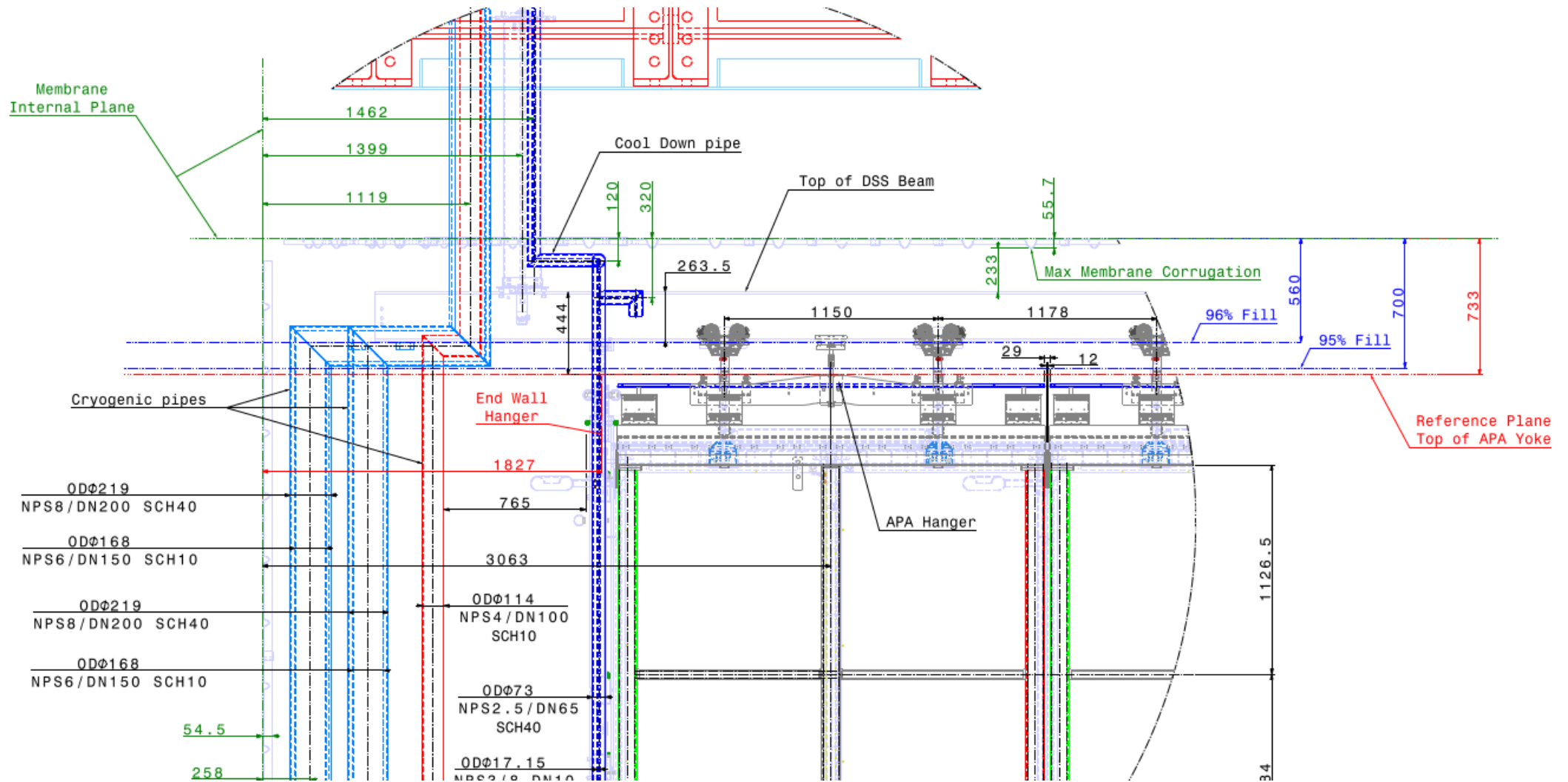
Tech Leads – B Miller J Stewart

- J Fowler/D Mladenov – Overall integration of all models
- Compliance Working Group – O Beltramello, T Shaw, G Gallo, New compliance engineer

*Responsibilities:

- Each lead is expected to coordinate efforts within their team to ensure progress and quantify status
- Ensure adequate resource planning

Established critical dimensions and layout drawings



What's Next

- Release v5 of models in mid December
- Release detector placement layout drawings in mid December
- Think about how to release models representing other phases of the process.
- More discussion at Feb meetings

Back ups

Detector scope

- Engineering lead – K Zeug and consortia engineers
- Custom material handling devices beyond what is planned by SDSD (carts and wagons)
- Custom lifting tooling (beyond standard slings and tooling)
- Cable management inside the cryostat
- Cable management during installation (cold box test, for doublet)
- Components that touch Ar (liquid or gas) excluding DSS, cryogenic piping and cryostat membrane

Installation scope

- Engineering lead – J Freitag
- Cleanroom (includes inside the cryostat), work platforms, air filtration, SAS, lighting, electrical distribution, compressed air
- Conveyances, hoists and cranes inside cleanroom
- Connection from DSS to installation infrastructure
- Access equipment and work floors
- Structures inside cleanroom to support I&I
- Material needed for detector movement on rails
- Clean room life safety and egress
- Custom lifting tooling (beyond standard slings and tooling)

Facility scope

- Coordinator – F Resnati
- Engineering resources – D Mladenov/J Fowler
- Barracks and layout (life safety, power and cooling)
- DSS
- Structures needed on cryostat and mezzanines to support I&I
- Flange height, support and alignment
- Cable tray layout and support
- Vent piping layout with cryogenics
- Rack layout but not rack builds
- Tolerancing and stack up should be covered somewhere?

Cryogenic design oversight and planning

- Engineering lead – D Montanari
- Cryogenic equipment and instrumentation
- Cryogenic system for coldboxes
- Internal cryogenic cooldown piping
- Internal cryogenic recirculation piping
- Cryostat valves, pumps and protective structures
- Piping to the caverns and support

Electrical design oversight and planning

- Engineering lead – T Shaw
- Detector and AC power distribution
- Detector grounding
- Rack builds (with the DAQ)
- Rack safety systems
- Cable and fiber routing and lengths
- Cable management from detector flanges to racks
- ESD planning
- SSDD (with DAQ)
- Computing and cyberinfrastructure

