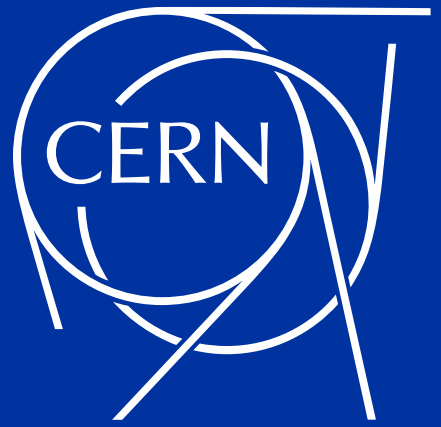


Target complex WP implementation milestones & timeline

HI-ECN3 BDF target & target complex initial review

Jean-Louis GRENARD

29-04-2024

Priorities for the TDR

- Target station design
- Target complex utilities design
- Target service building
- Definition of interfaces
- Definition of target and target ancillary lifecycle
- Definition and assessment of failure scenarios

Target station design

Move toward a detail mechanical design

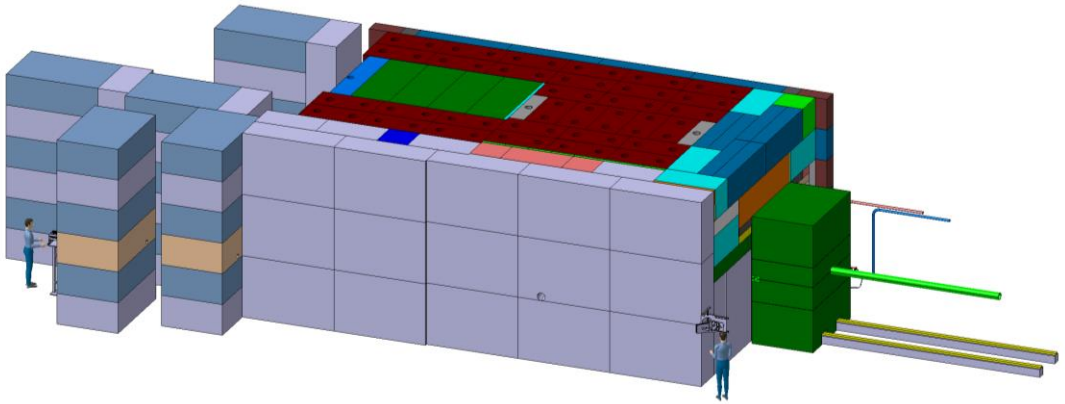
- Vacuum confinement → design supported by external partners
- Extraction system → design supported by external partners
- Shielding design → to update based on shielding recovery possibilities
- Target supporting interface → need to develop a model
- Utilities routing → need to built mock-ups to test handling and shearing

Design to be made compliant (and flexible) with target, beam line and experiment requirements

Target station pre-assembly

Full pre-assembly of the target station

- Debugging for installation procedures
- Rehearsal platform for exchange procedure and associated failure scenarios



Target service building

- **CE on the critical path**
  - Need the envelops defined by **end of 2024**
  - Constrains with exiting CE structure (911 shaft and TCC8 soil retaining wall)
  - Design of the building mainly driven by Cooling and Ventilation equipment
  - Building confinement to be defined (fire assessment)
  - Shielding assessment to define building superstructure
- **Equipment part of the building → staged implementation**
  - Service cell and associated tools
  - Hot Cell

  → Utilities made available but installation system staged

Ventilation systems

Target area & Target service building

- Need and definition of dynamic confinement(s)
- Fire risk assessment to be handled via a FIRIA
- REX of NA-CONS TCC2 FIRIA assessment to take in consideration

Cooling systems

Definition of preliminary need in term cooling power

- Water leak handling → retention vessel(s), sump(s)
- Possible hydrogen production in cooling circuit → ATEX room?

Tritiated water handling

- Built a new water release station vs using the existing one for RWTC

Safety systems

Access systems

Fire detection

Fire doors

Fire extinguishing means (including fire water collection)

Handling and robotic tasks and tools

Definition and design of remotely compatible interfaces

- Lifting points
- Supporting point and pre-guiding interfaces
- Shearing interfaces
- Casks

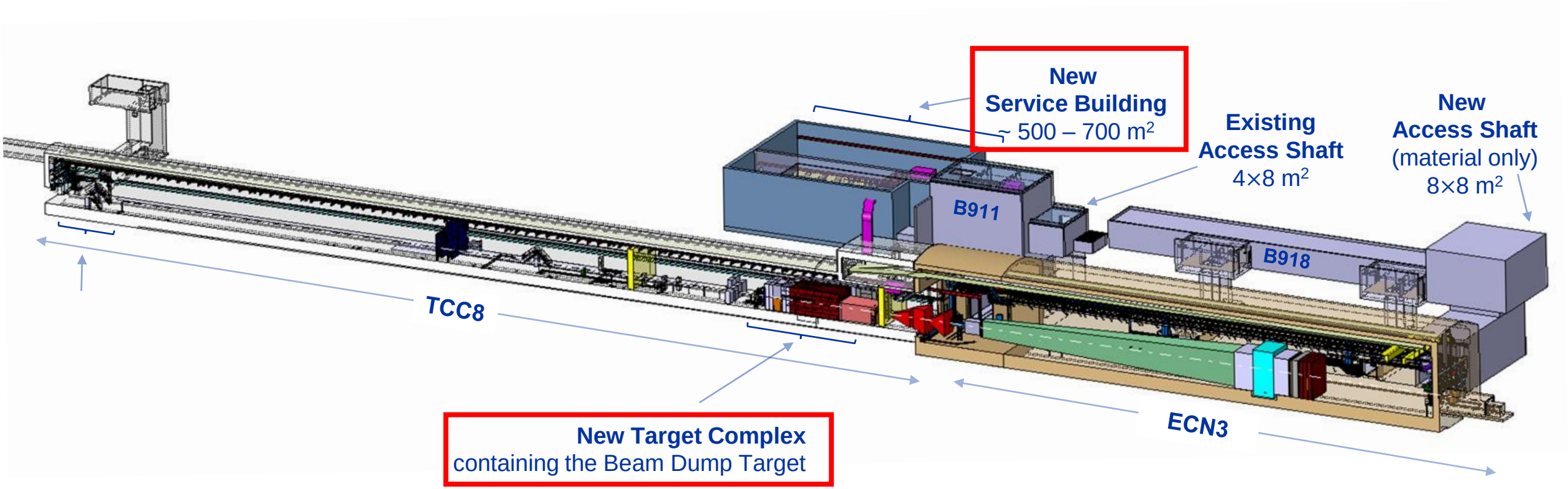
Definition and design of fixed remote handling infrastructure

- Cranes

Definition of remote handling tasks

- Target exchange
- Target preparation for final disposal

Interfaces



Physical interface in between all the different systems

WP external key Interfaces

Beam delivery WP2

- Position and definition of beam instrumentation
- Beam pipe
- Dilution system definition and position

Target WP3

- Cooling circuit design
- Supporting scheme
- Utilities routing
- Handling

Experiment WP5 + SHiP

- Magnetized hadron stopper
- Utilities routing in TCC8 and ECN3
- Shielding to minimize background
- Installation and maintenance tasks
- Experiment position

WP internal key Interfaces

- CE structure
- Cooling systems
- Ventilation systems
- Confinements
- Survey network
- Safety systems
- Remote handling tools
- Shielding
- Control systems (including protection systems)
- Irradiation stations

Target and target ancillary lifecycle

How to replace a target?

What is the process to move from an operational broken target to final repository?

- Target size reduction
- Target material separation
- Imposed final repository cask

Same apply for all target complex highly activated objects

- Probably more complex to handle
- Lot of destructive work to be performed

Definition and assessment of failure scenarios

Failure scenarios will trigger design choice and exclude certain technologies

- Defined redundancy level
- Back up plans
- Should contain all the different phases of the lifecycle of the complex
- Including unlikely events (ie earthquake)

Preliminary risk of failure modes been established and need to work with stakeholders

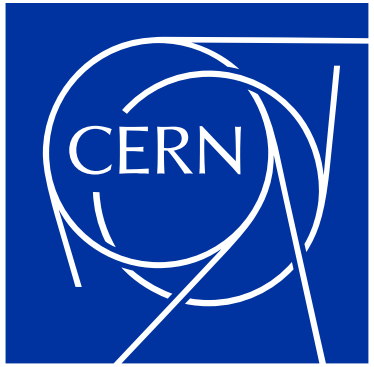
Up to the TDR delivery

- Many interfaces to handle
- Inputs to design the target complex building which is on the critical path
- Failure scenarios to take in consideration in the design
- Certain choice on the target and experiment may have major consequence target station design

→ Some parameters have to be frozen by end of 2024

→ Once the target station will be built and installed some elements can't be changed: ie vacuum vessel, target station position, target size (increase)

→ Adding extra features like irradiation stations at a later stage might be impossible



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