Cern and neutrino: a perspective

La Thuile

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Sergio Bertolucci
CERN

European Strategy – Priorities

- Full exploitation of the LHC physics potential
- R&D and studies for next large scale facility
- European participation in a possible e+/e- collider in Japan (ILC)
- Neutrino physics programme to enable an European substantial role (in future long-baseline experiments)

The CERN Neutrino "Platform"

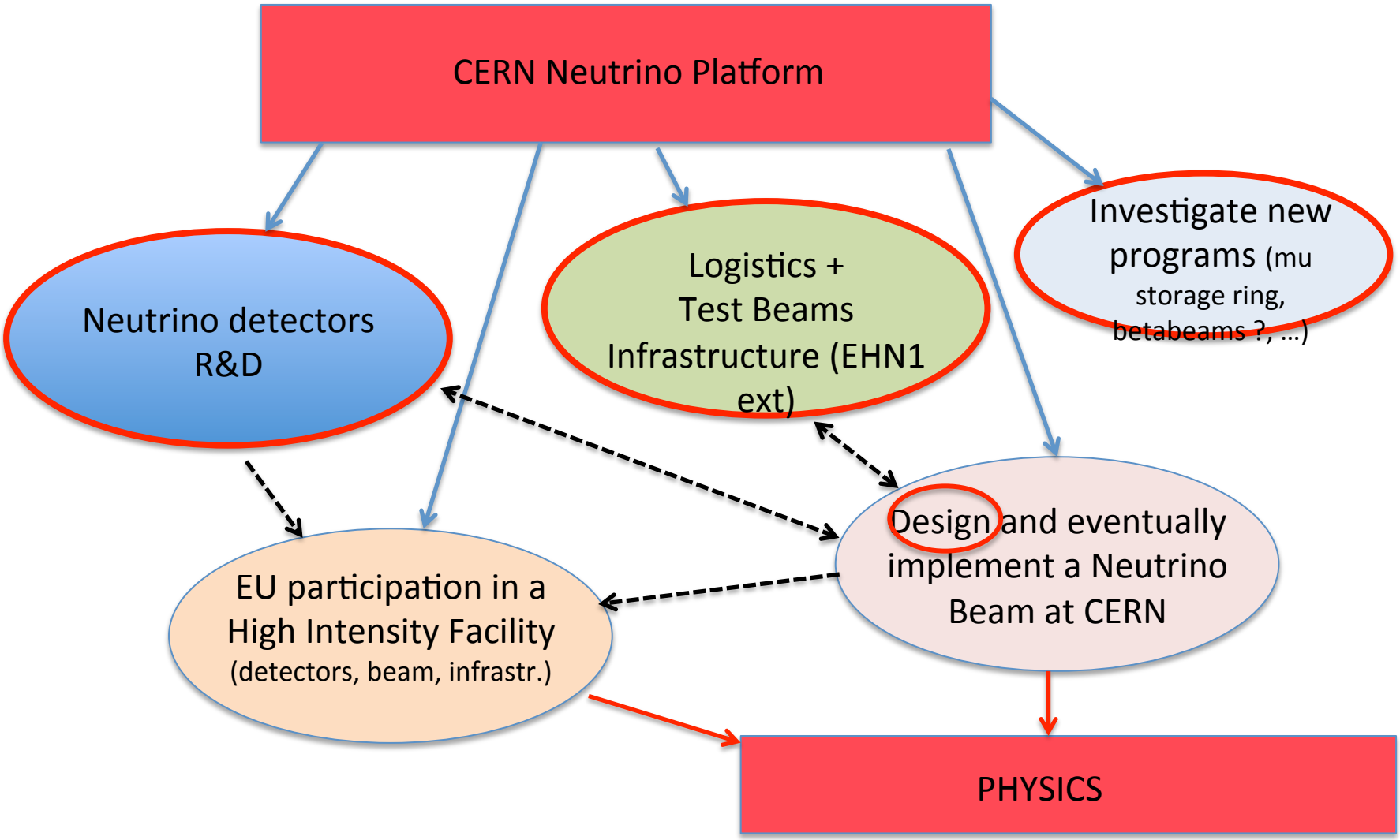
- enable large scale detector development and tests for neutrino detectors:
  WA104 refurbish ICARUS T600
  R&D on new Large LAr detector ("ICARUS++")
  R&D for air core muon detector
  WA105 R&D on 2-phase LAr prototype

- Extend North Area of SPS for testing large detectors with charged beams

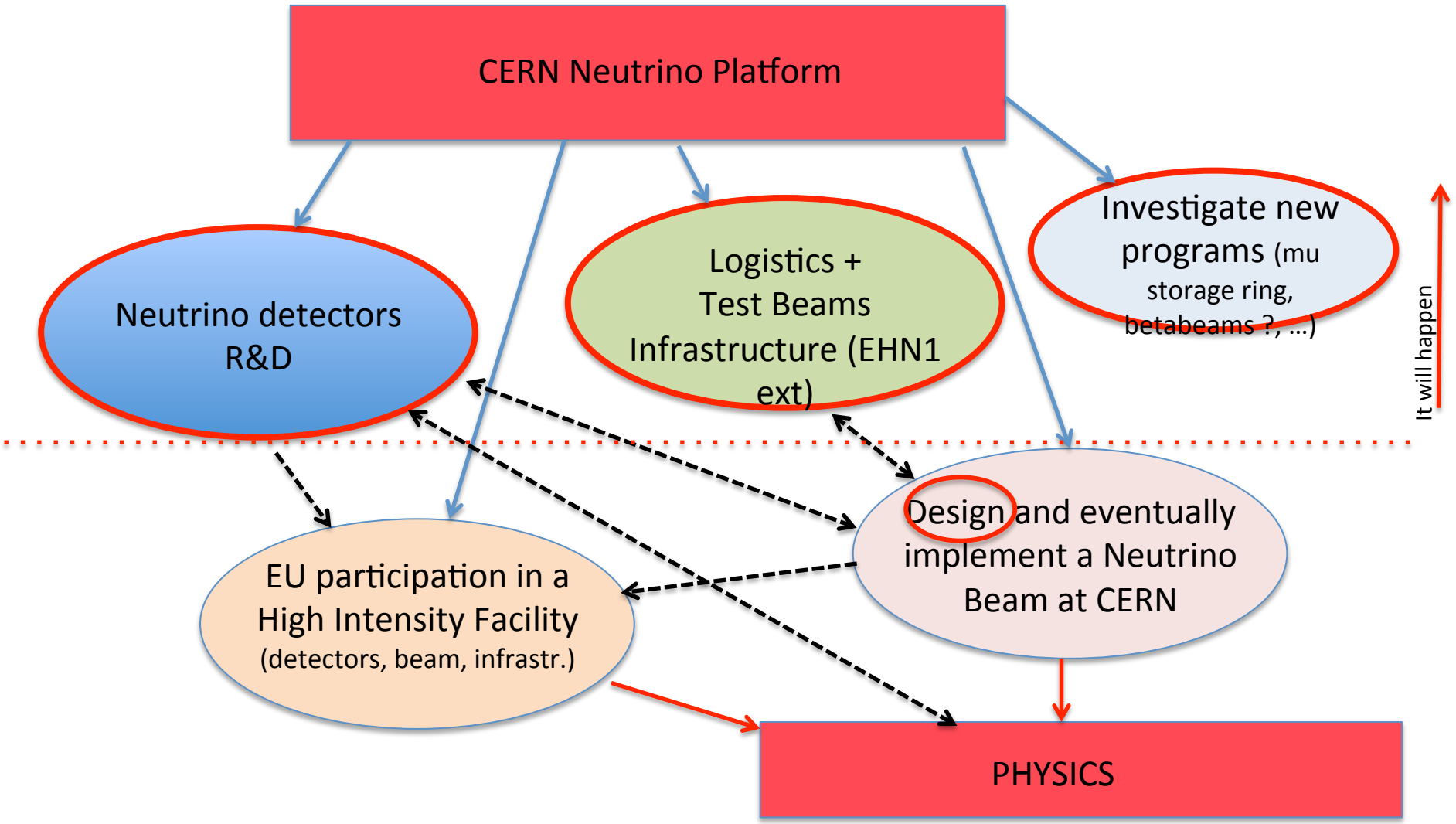
- Study for a neutrino (test)beam in the North Area completed soon.

- Discussion with US community progressing on a collaboration concerning LBNE, short baseline physiics, common efforts on detector AND accelerator topics.

CERN Neutrino Project



CERN Neutrino Project



CERN Neutrino Platform

2014 -2018

Neutrino detectors R&D

MOUs preparation in progress

WA104: rebuild ICARUS T600 in bldg 185 and make it ready for a CERN or FNAL beam

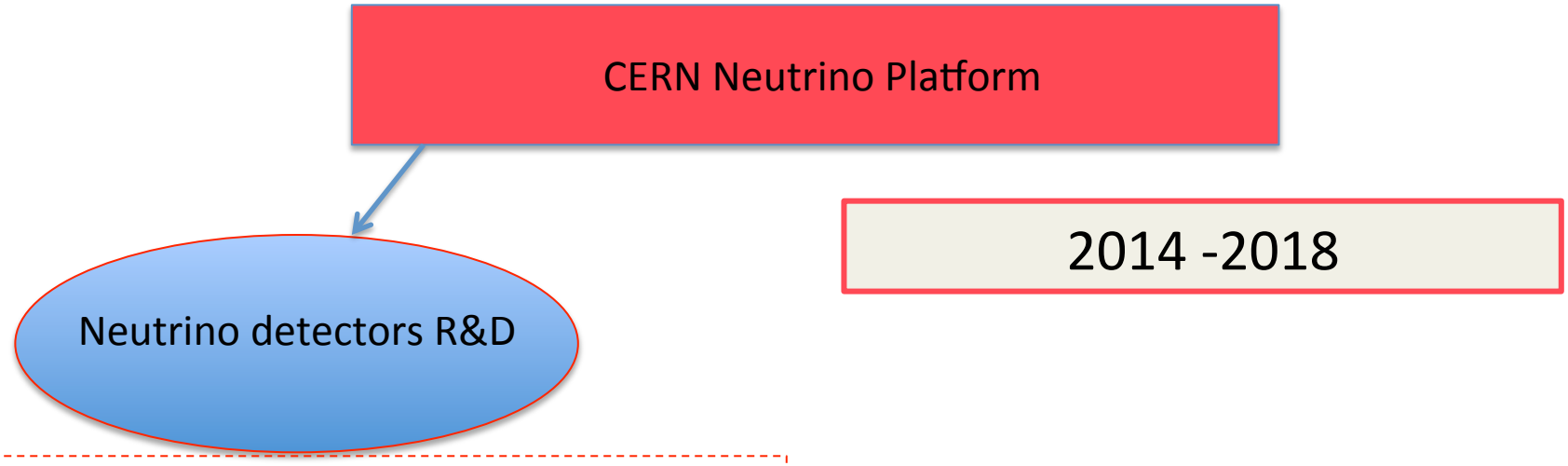
WA104: R&D on a new Large LAr TPC (ICARUS T150)

WA104: R&D on an AIR core muon detector (NESSiE) or eventually integrate a solenoid in the main TPC

WA105: R&D on 2 phases large LAr TPC prototypes

MIND : R&D on muon tracking detectors

USA : Start a common R&D effort with US groups and EU groups for a LBN



CERN direct contribution under evaluation:

- all logistics aspects
- cryostats (membrane and new ICARUS type)
- cryogenics
- controls
- DAQ
- magnets and B-fields
- integration and assembly
- host for visiting collaborators (PJAS, fellows, students, scientific associates,..)
- special studies (feasibilities, particular techniques, …)
- ……..

CERN Neutrino Platform

2014 -2016

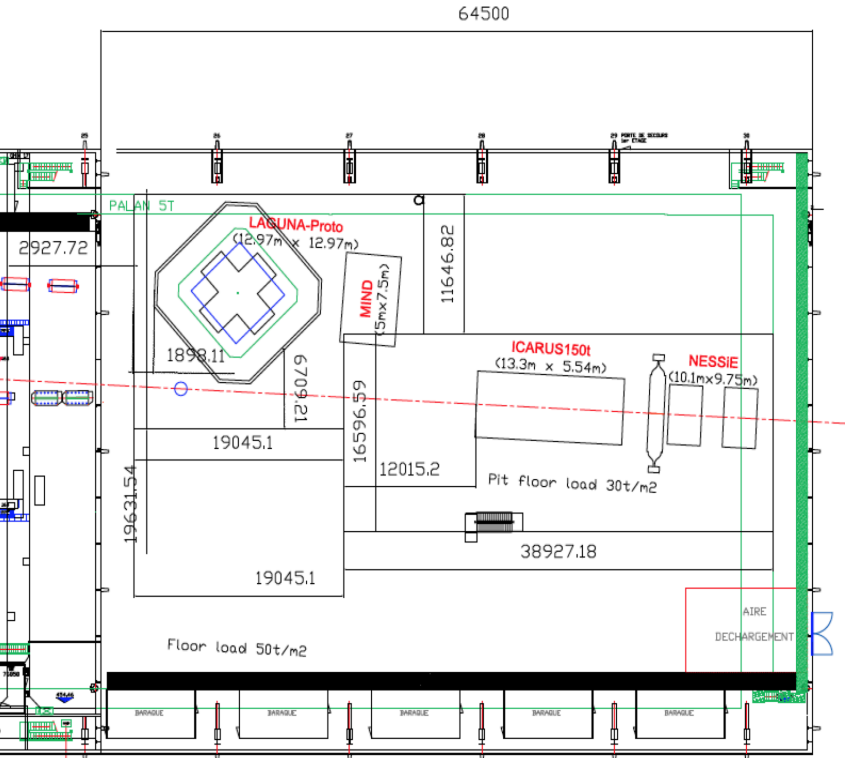
Logistics +
Test Beams
Infrastructure (EHN1 ext)

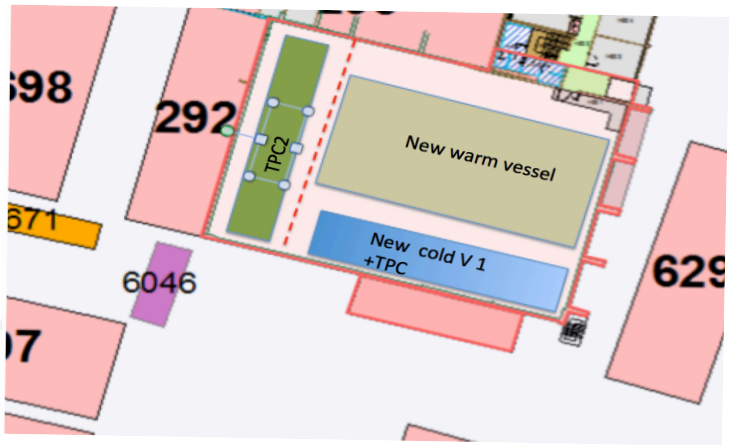
Bldg. 182 :

To be prepared for the 1x1x3m^3 LAGUNA prototype

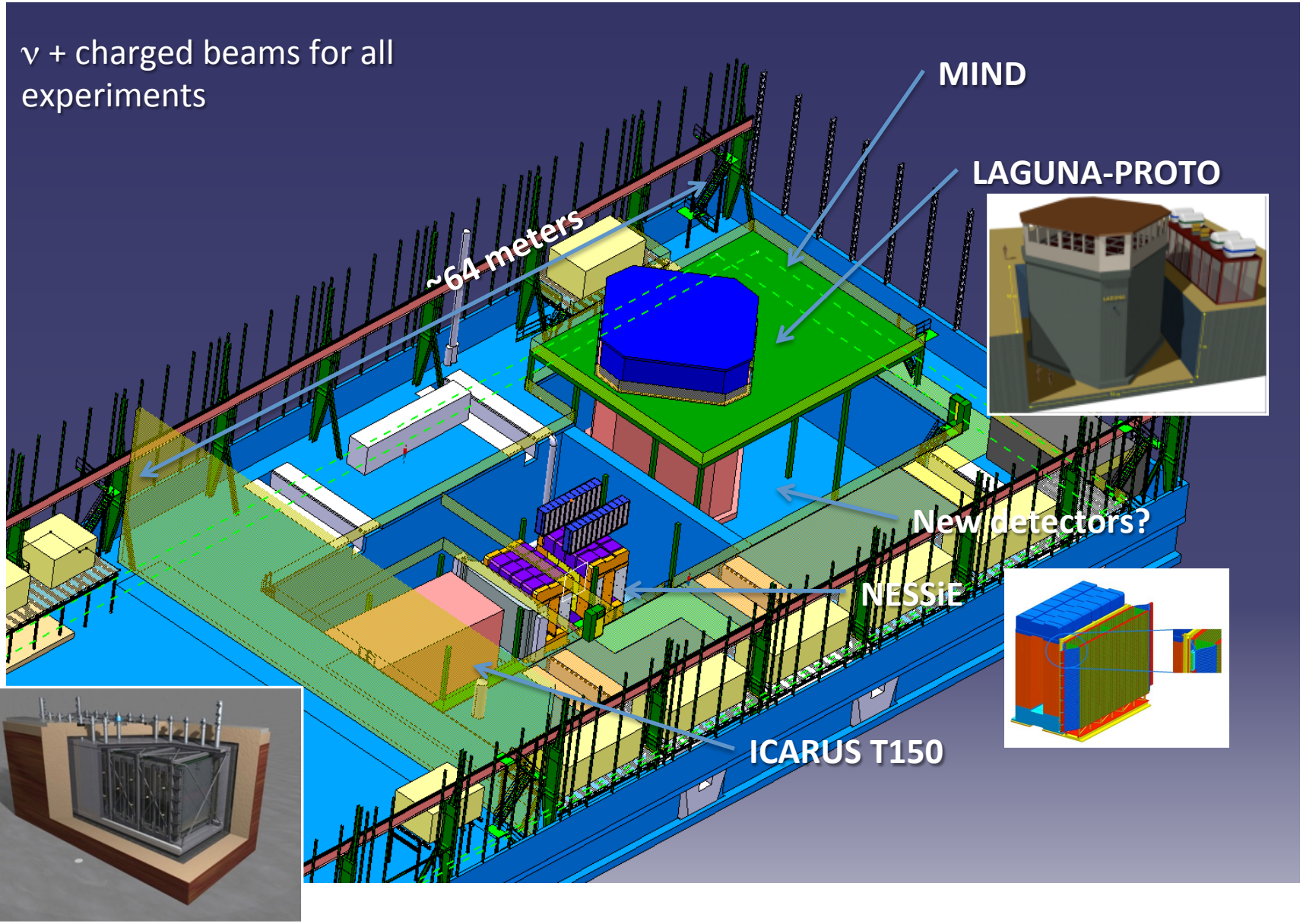
Bldg. 185 :

ICARUS 600 will be moved here and will be reconstructed and made operational





EHN1 extension :

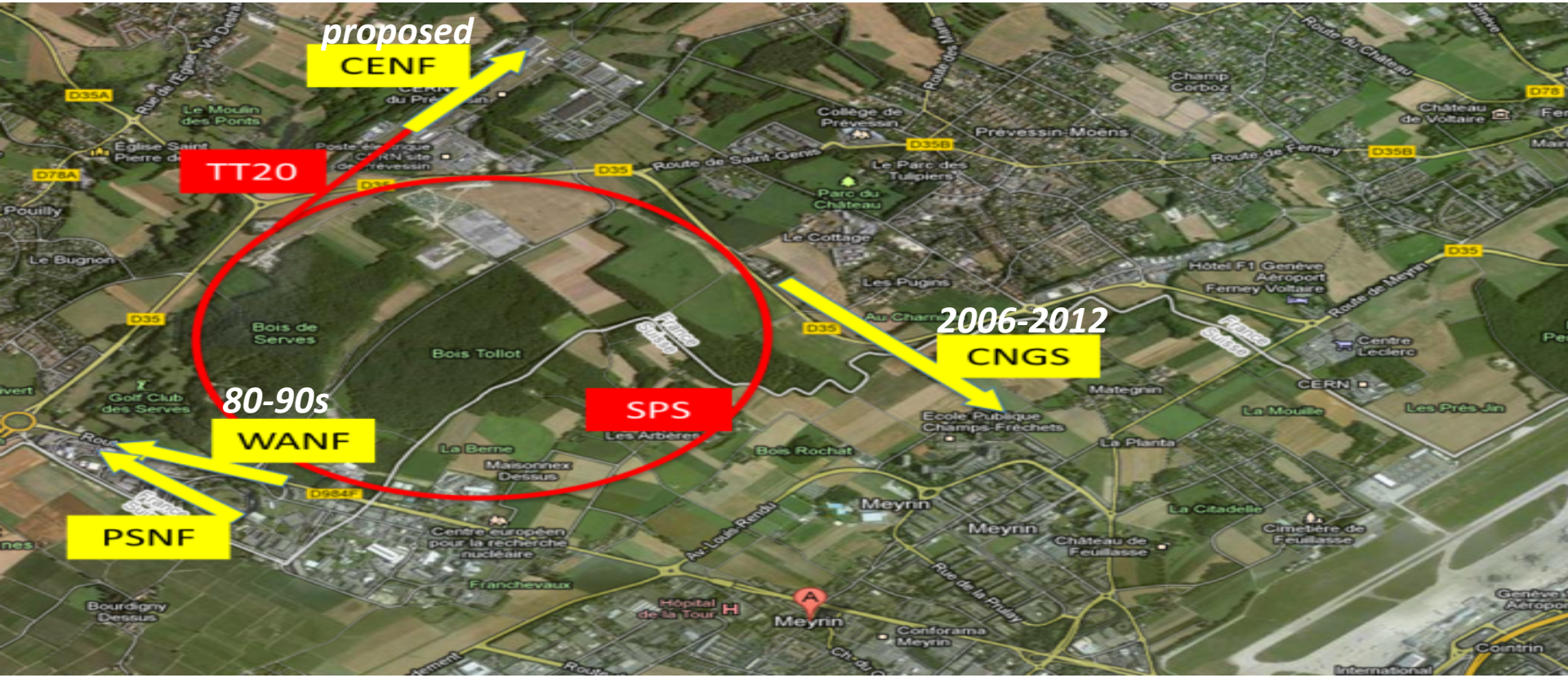

ν + charged beams for all experiments
MIND
LAGUNA-PROTO
~64 meters
New detectors?
NESSiE
ICARUS T150

CERN Neutrino Platform

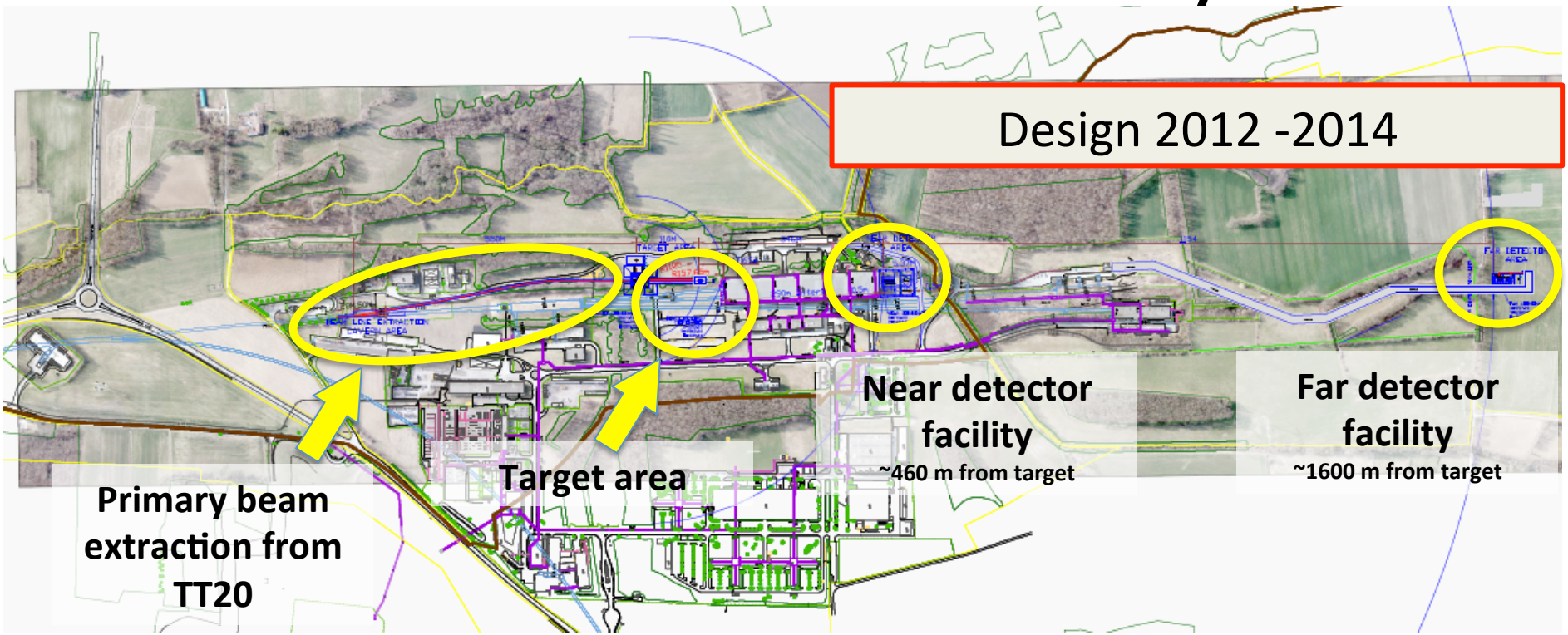
Design 2012 -2014

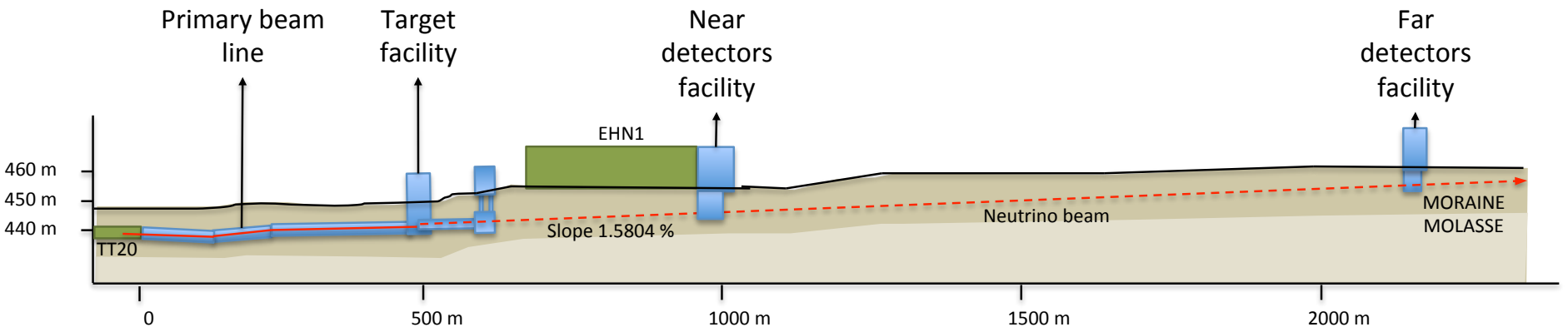
Eventually Construct 2015 -2018

Design and implement a Neutrino Beam at CERN



CERN Neutrino Facility

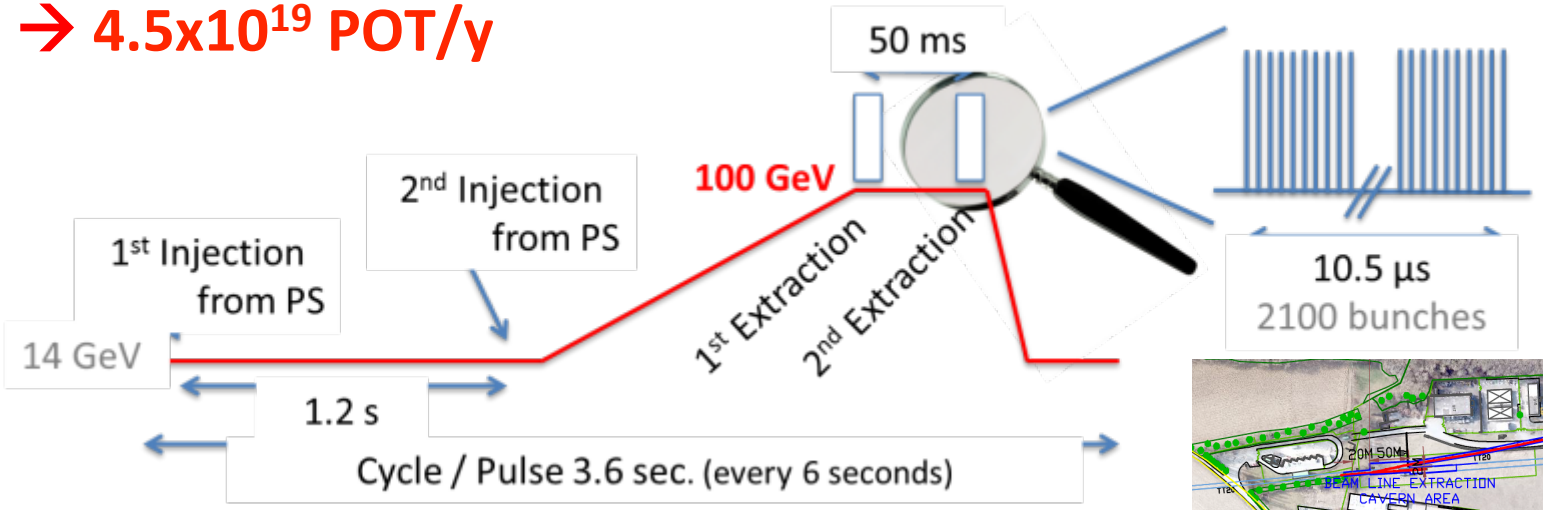


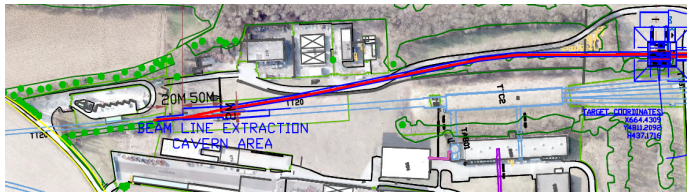


Primary proton beam characteristics

- Beam time structure similar to CNGS
- Primary beam momentum **100 GeV/c**
- Fast extraction: beam excitation via injection kicker in LSS1 and extraction in LSS2
- Novel solution tested for low intensities during recent beam tests
- ~720 kJ/pulse → ~200 kW on target (max)

→ 4.5x10^{19} POT/y





CERN Neutrino Platform

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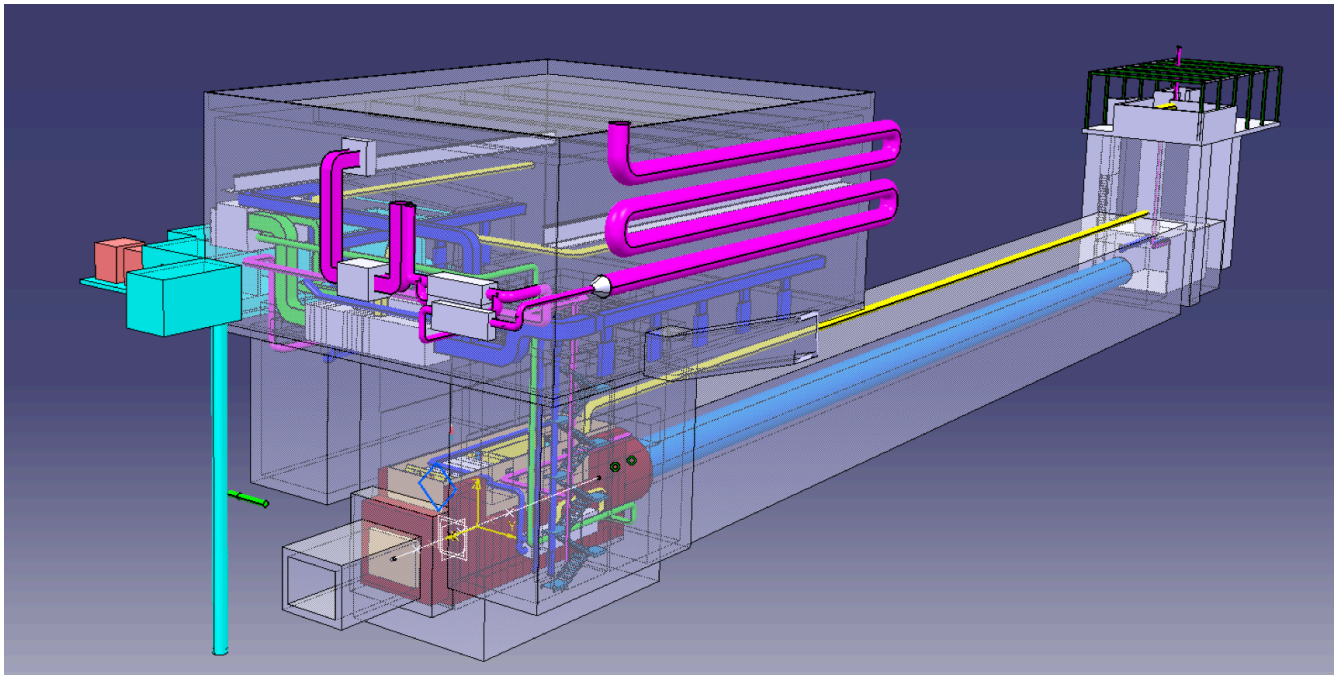

Target area, decay pipe and hadron absorber/dump

THANK YOU!