

# AD consolidation activities in LS2

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# Introduction

- Most of AD dates from ~1985 => Main components are > 30 years old....
- A small consolidation program (~2.3 MCHF), separated from the LHC program, started in 2009 in view of running AD until 2016 or so
- After approval of the ELENA project, the scope of the consolidation increased and is aimed at continued operation of AD for at least 10-15 years after ELENA physics has started which means 2030 - 2035
- Concerned items are: Target area, magnets, power converters, beam cooling, control system, Instrumentation, beam transfer equipment, RF, vacuum, Infrastructure etc.
- A major consolidation program with a budget plan of 23.8 MCHF was started in 2014.
- LS2 activities => majority of items will be completed

# Target Area – LS2

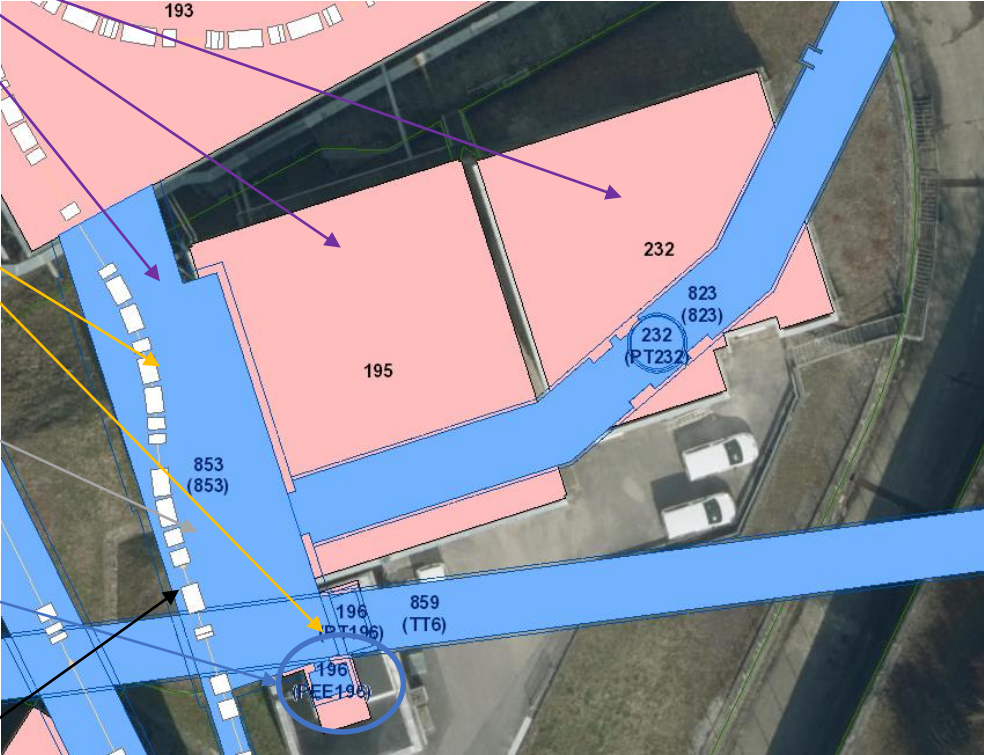
EDMS# 1548086, 1537538, 1548296

- Consolidation under EN/STI responsibility, main items only briefly mentioned here:
  - B196 (T.A. ventilation, target/horn cooling, RAMSES), new building to replace temporary shielding block structure.
  - New target design; air cooled instead of water cooled
  - Manufacturing of new Magnetic Horns
  - Re-design of target/Horn trolleys
  - New ventilation system
  - Magnet re-design and spares
  - Instrumentation, services, safety systems, infrastructure,... etc.

# Target Area work packages

- | Activity   |
|--|
| 1) <b>Manufacturing of new Targets and Target Beam Instrumentation</b> |
| 2) <b>Horn Manufacturing</b>   |
| 3) <b>Installation and Operation. of 195 test bench</b>                |
| 4) <b>Trolleys Design and Construction 232 Mock-up</b>                 |
| 5) <b>Upgrade of the cooling and ventilation system</b>                |
| 6) <b>Dismantling of the AD-T Area</b>                                 |
| 7) <b>Decontamination and repainting of the AD-T Area</b>              |
| 8) <b>Demolition of B196 and Construction of New Building</b>          |
| 9) <b>General refurbishment Activities B196</b>                        |
| 10) <b>New Concrete Mobile Curtain</b>                                 |
| 11) <b>AD-T Area Magnets Consolidation</b>                             |
| 12) <b>Consolidation of the Electrical Infrastructure</b>              |
| 13) <b>New Window FTA side</b>   |
| 14) <b>Overall reinstatement of the target area (853)</b>              |
| 15) <b>Definition of survey strategy</b>                               |
| 16) <b>Consolidation of Radiation Protection Detectors</b>             |

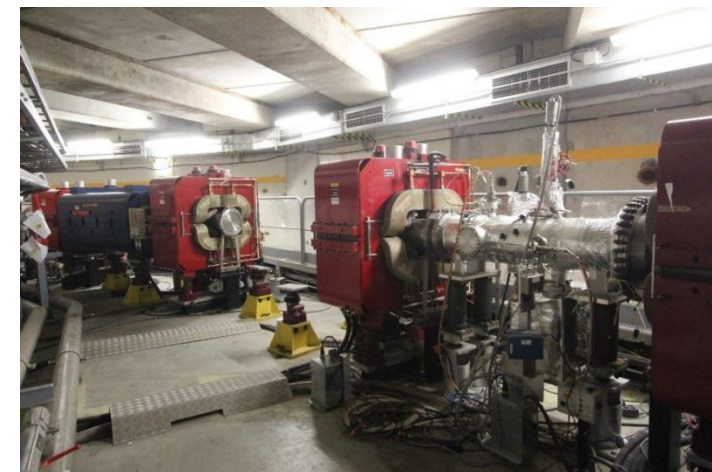
<https://edms.cern.ch/panorama#id=36410861&lon=0.00&lat=0.00&fov=90.00>



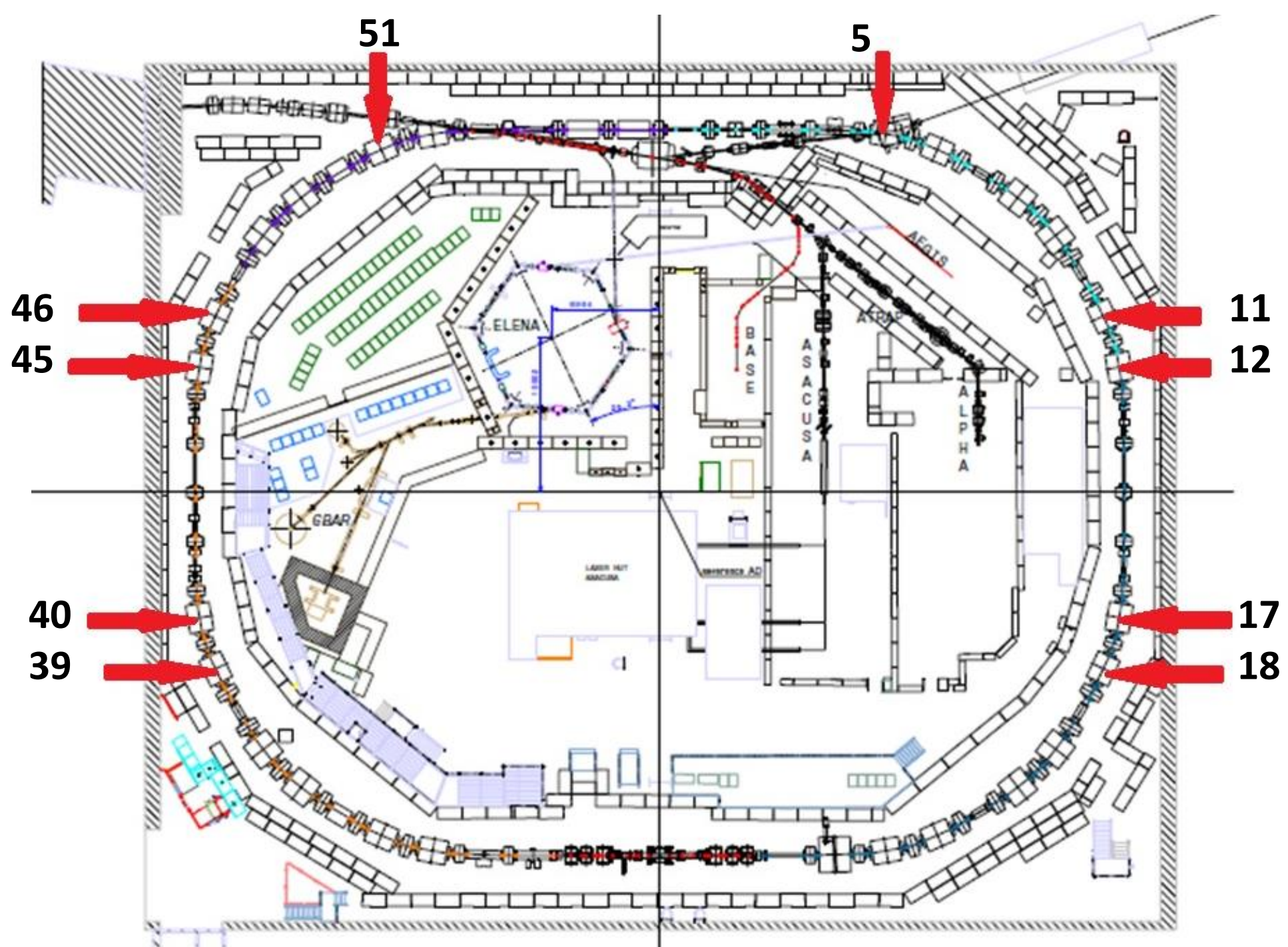
Courtesy C.Torregrossa  
EN/STI

# Magnets AD ring

- **AD ring:** 16 BHN, 8 BHW, 28 QW, 27 QN, 2 QS.
- **BHN** re-shimming campaign ongoing with 1-2 units/year
  - BHN 06, 23, 24, 33, 34 renovated, BHS 52 planned for YETS 17/18
  - Remaining 10 units to be done in LS2
- **BHW** less urgent – needs and schedule to be defined
- **QW/QN/QS** in-situ repair campaign completed ~ 10 years ago
- **QN/QS:** New campaign prompted by QDS01 problem
  - QDS01 repaired in-situ due to difficult access. QDN33 repaired in workshop since adjacent BHN33 was anyway removed (EYETS 16/17)
  - Complete EYETS 16/17 measurement campaign showed only a few units with small (0.3mm) coil movement
  - Units adjacent to BHN:s removed for renovation will be done at the same time (QN 55 and 56 in YETS 17/18).
- **QW** less urgent – more robust clamping system, no action to be taken



- Under consideration by TE/MS:
- BHN renovation to be completed in LS2 – 10 units remaining
- Adjacent QN:s to be treated at the same time, total number depends on space and tooling availability



# Power converters

- Magnetic Horn pulser (TE-ABT) EDMS#1556057
  - Complete renewal of old system employing mercury switches
  - B195
- Pulsed power converters for injection line magnets (TE-EPC) EDMS#1549323
  - New capacitor discharge design, MegaDisCap/MarxDisCap
  - 12 units to be replaced, 4 already operating
  - Assuming successful construction of new permanent magnets in target area: Q9050 & Q9052 converters will no longer be needed
  - B370/B193

# RF & Stochastic cooling

- C02: New Finemet cavity to be installed in sector 01, including new DSP-based low-level system. EDMS# 1552197
- C10: no activity planned inside AD ring enclosure
  - C10 Final stage: Not yet defined; waiting to test refurbished TH116 Triode vacuum tubes in 2018.
  - C10 Electronics upgrade.
- Stochastic cooling: Under discussion, (fellow has been requested)
  - Amplifier upgrade. (on top of shielding sector 03/04). 50% of amplifiers to be dismantled. TBC. EDMS# 1689140
  - Stochastic cooling: pickup tanks renovation, Under discussion, no conclusion yet. TBC. Sector 03/04



# Vacuum

- Completion of the consolidation program EDMS#1555723
  - Ion pumps, bake-out equipment, vacuum chambers; will be completed in LS2
- ELENA transfer lines
  - Installation
  - Ion pump and instrumentation reconfiguration
  - DEM line ?
- Vacuum activities related to actions on AD equipment:
  - Ring magnet renovation
  - New electron cooler
  - Stochastic cooling kicker tanks
  - Target area window displacement in FTA line

# Infrastructure

- New Cryo distribution to experiments. TBC. Draft5. EDMS#1562701
- Demineralised water cooling station renovation. EDMS#1548299
  - 12 months duration during LS2

# Instrumentation & electron cooler

- Installation of new electron cooler in sector 29 during second half of LS2. TBC. Document to be published.
- BCCCA & cryostat: No intervention planned needing access through shielding (sector 15)

