



HIE-ISOLDE Project Status Report

44th Meeting of the INTC

CERN, 26-27 June 2013

Yacine.Kadi@cern.ch

- Project Organization
- Budget 2013-2016
- Main Highlights & Issues
- Outlook



Project Organization

● Nominations:

- Walter Venturini Delsolaro (BE/RF) => DPL
- EMC coordinator ?

● Quality Assurance Plan:

- Hardware Baseline in place (EDMS) and now Operational
- Product Breakdown Structure finalized => equipment and document numbering
- Configuration Management => EN/MEF
- Follow-up of budget and work progress reporting => EVM set-up
- Technical Specs handled by CERN Project Office

● Documentation:

- HIE-ISOLDE website under re-construction => help of CATHI fellows
- EDMS => more than 600 documents produced
- HIE-ISOLDE project notes => 22 accessible through CDS

● Safety File:

- Descriptive Part of the Safety File has been checked and will be circulated for approval
- Hazard Inventory section and the Demonstrative Part are currently being checked.
- Operation Part and the Feedback Part are being drafted

Budget 2013-2016

Summary of the request for funding from CERN approved in the MTP2013

| kCHF | 2013 | 2014 | 2015 | 2016 | Total (2010-2016) |
|--------------|--------------|-------------|-------------|-------------|-------------------|
| Approved | | | | | |
| External | 4112 | 4946 | 2919 | 3963 | 17527 |
| CERN | 8392 | 2932 | 1532 | 401 | 16640 |
| Sub-Total | 12504 | 7878 | 4451 | 4364 | 34167 |
| Applied for | | | | | |
| BE | 555 | 535 | 80 | 80 | 1250 |
| EN | 1022 | 350 | 100 | 20 | 1492 |
| GS | 260 | 200 | - | - | 460 |
| TE | 425 | 545 | 193 | 192 | 1355 |
| Sub-Total | 2262 | 1630 | 373 | 292 | 4557* |
| Total | 14766 | 9508 | 4824 | 4656 | 38724 |

*Saved (re-use of ALEPH cry-plant) 2000 kCHF

Evolution of the Cost-to-Completion:

CtC 2010 = 35.3 MCHF

CtC 2011 = 35.7 MCHF

CtC 2012 = 36.5 MCHF approved (38.3 MCHF requested)

CtC 2013 = 38.7 MCHF requested

HIGHLIGHTS: Procurement

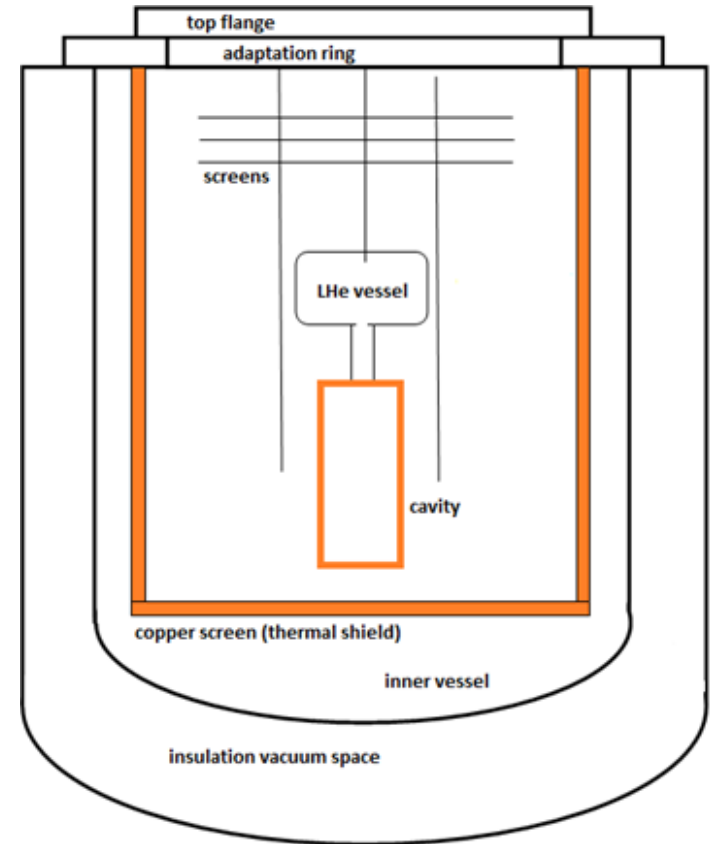
- Civil Engineering => metallic structures (bldg 170, 198 and 199)
- CV and EL Systems => installation work on-going until Q1 2014
- Copper forgings => all high-beta cavities + 5 options (15 for 2013)
- Cavity substrate => 5 for 2013, 15 + 5 options (2014-2015) => 2 pre-series by EN/MME
- SC solenoid => 4 high-beta cryomodules + 2 options (first 2 by March 2014)
- Cavity Alignment system design and fabrication => **CATE , 2 cryomodules**
- Clean room at SM18 => to be delivered in August 2013
- Beam Instrumentation => contract negotiation for the short boxes
- Invitation for Tenders
 - Cryogenic Distribution System (**September FC**) => launched
 - CM1 and CM2 vacuum + He vessels (**Price Enquiry**) => launched via CERN,
 - Quadrupole & Dipole magnets with associated power supplies and supports
- Market surveys
 - HEBT lines (vacuum system, long instrumentation boxes, inter-cryomodule supports, etc...) => **in progress**

HIGHLIGHTS: Technical Advances

- HEBT activities => Integration and EMC issues being checked
- Design Study for the Intensity Upgrade well underway
 - Target + Front-end (FE8 and 9)
 - Offline separator test bench
 - HVAC + Cooling => nuclearization
 - Charge Breeder => assembly of electron gun, test at BNL (US)
 - Technical Workshop Nov. 28-29, 2013
- SRF activities
 - Cavity tests (more substrate, improved sputtering, procurement, etc...)
 - Cavity ancillaries (RF coupler and **tuner**)
 - LLRF (prototype, integration, etc...)
 - RF controls and interlocks
- Installation Coordination and Co-activity Planning

Collapse of test cryostat in SM18

- Insulation vacuum space was at atmospheric pressure when inner vessel was pumped
- Inner vessel did not withstand the external pressure and collapsed
- Copper screen and stainless steel threaded bars were deformed
- Cavity and insert remained untouched
- (Likely) time of the event: sometime during first pump down, 27 April 2013

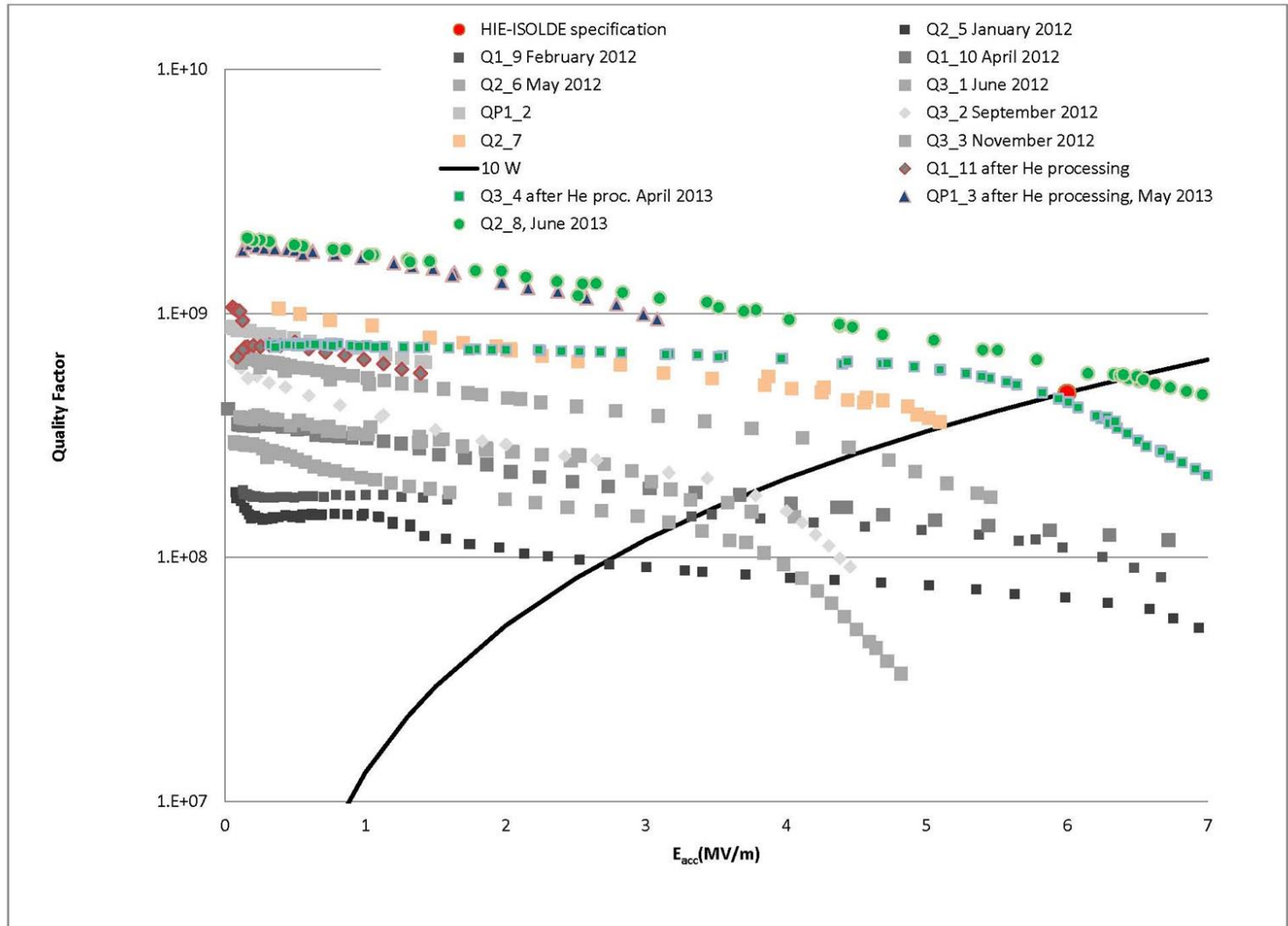


Recovery test cryostat

- Decisions
 - Use a spare cryostat and the old copper screen
 - Install a vacuum gauge and a pumping port on the insulation vacuum space of the spare cryostat
- Timetable
 - Friday 2 May 2013: Leak test of shield circuit → OK (!); Removal of clean area roof and floor platform, cleaning tests of spare cryostat
 - Monday 6 May: Removal of damaged cryostat and shield, checks and preparation of spare shield
 - Tuesday 7 May: Transport and cleaning of spare cryostat, drying overnight
 - Wednesday 8 May: cryostat back in hall, installation of Pirani gauge and pumping port, installation of cryostat in pit, pumpdown of vacuum space
 - Friday 10 May: leak test, reinstallation of clean area, conditioning
 - Monday 13 May: Installation of cavity insert (kept clean in meanwhile), pumpdown
 - Tuesday 13 May: leak detection, commissioning of cryogenics. Recovery.



Cavity tests



HIGHLIGHTS: Issues

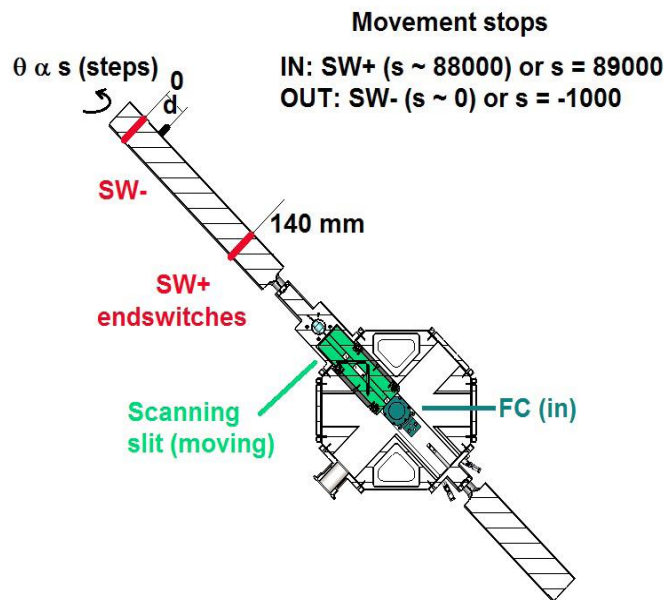
● Design of prototype Diagnostic Box

- AVS delivered Faraday Cup which was tested at REX-ISOLDE
- Body of the DB was being tested (particule contamination and degassing) when it **Failed => need to re-design mechanical part**
- Additional Resources needed to develop the electronics for acquisition and motor control but also for the mechanical design => under review within BE/BI
- MS => in stand by (7 short and 13 long DBs)

● Integration issues (building 170):

- Advance on tunnel/shielding design and integration
- Cable routing

Failure of the prototype short DB



History log of the experimental test done with the HIE DB:

- 20 August 2012: Installation of HIE DB in REX-ISOLDE Hall
 - From 20 August 2012 to 5 February 2013: Experimental measurements with stable beams ($A/q = 4$ and $A/q = 3.5$); mainly Faraday cup test but also beam profile measurement including movement of the scanning slit (during this period, about 100 IN-OUT scans of the scanning slit were performed).
 - 8-9 April 2013: Tests of the scanning slit software, approx. 350 IN-OUT cycles.
 - 10-15 April 2013: Stress test of the scanning slit mechanism (run of 1340)
- Total number of IN-OUT cycles of the scanning slit mechanism: approx. 1800.

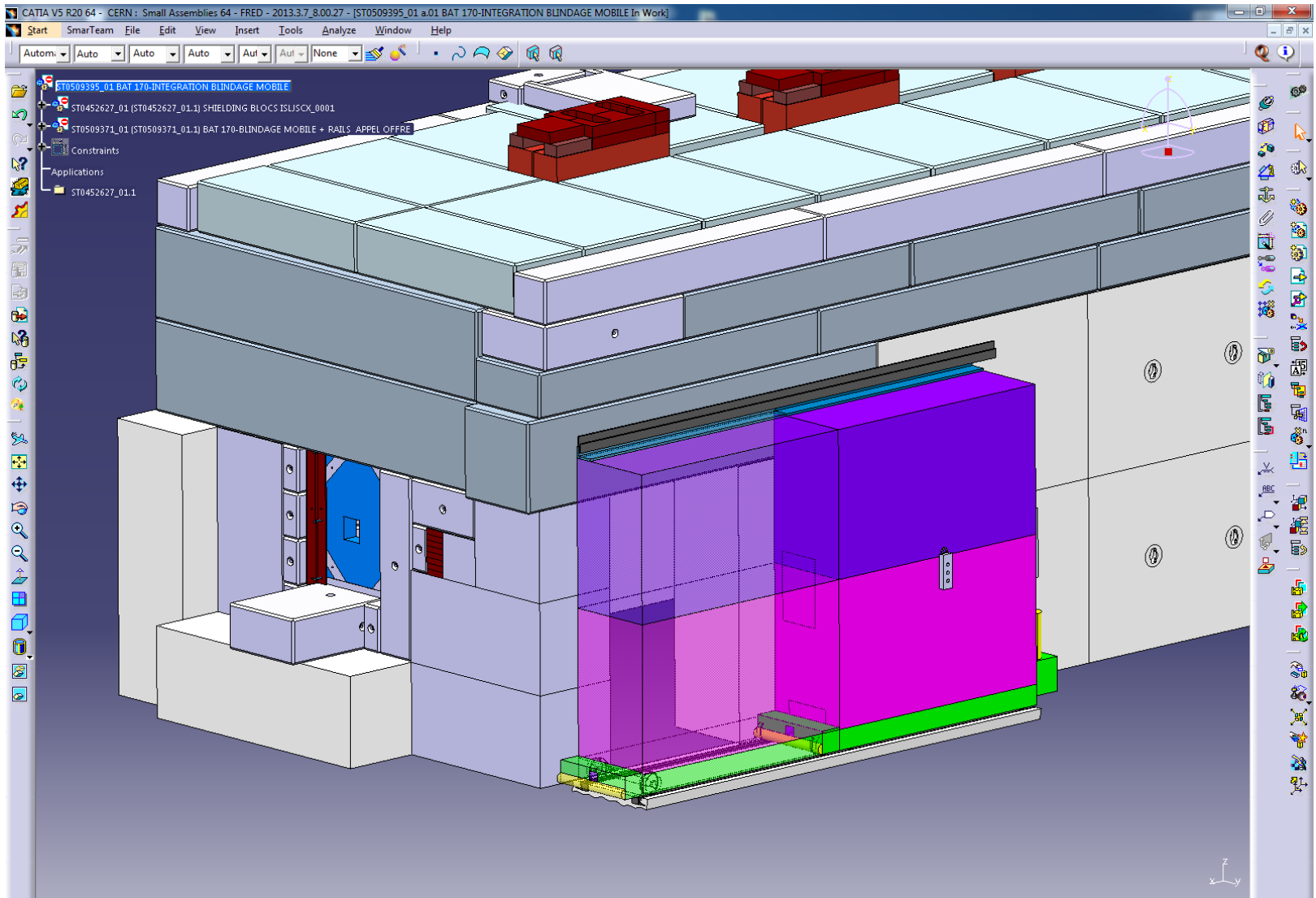
HIE-BDB-TN-0001 (edms# 1284254)



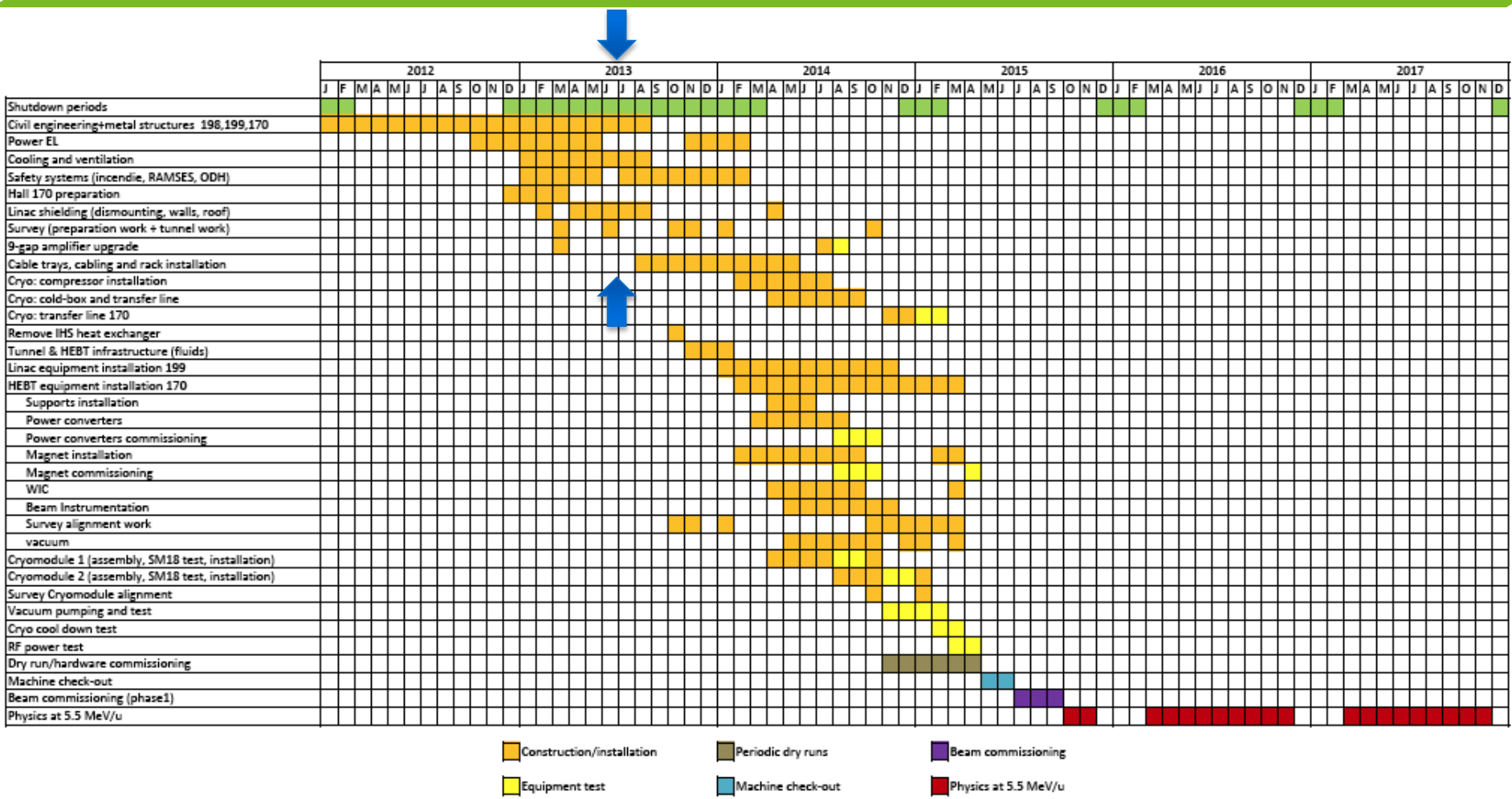
HIGHLIGHTS: Issues

- Design of prototype Diagnostic Box
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 - Additional Resources needed to develop the electronics for acquisition and motor control but also for the mechanical design => under review within BE/BI
 - MS => in stand by (7 short and 13 long DBs)
- **Integration issues (building 170):**
 - Advance on tunnel/shielding design and integration => blocs ordered
 - Cable routing => ongoing finalizing all DICs

Shielding of HIE SC Linac (EN/HE)



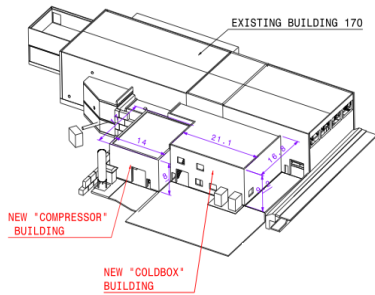
Project Schedule



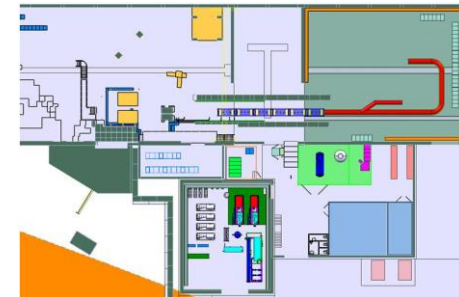
EDMS No. 1143510 (April 2013 ver.14)

Conclusions

- The strategic decision to refurbish the ALEPH cryo-plant will bring an additional delay of about 6 months => already integrated
- The identified **additional cost of 2.557.000 CHF** to cover Material, Personnel and R&D have been included in the MTP2013 and approved by Council (June 2013).
- Re-deployment & allocation of extra resources approved:
 - cryo-module → (in total 5 man years)
 - refurbishment of the ALEPH cryo-plant → (in total 8.3 man years)
 - Electronics for Beam diagnostic boxes
- However it should be considered that in case extra resources related to:
 - beam instrumentation (in total 4 man years)are not made available, as requested, further delays will apply.
- operation budget prepared and submitted for approval.
- Reviews for 2013:
 - Cost and Schedule together with Risk Assessment
 - Safety



Thank you



HIE-ISOLDE web site -> <http://hie-isolde.web.cern.ch/hie-isolde/>

CATHI-ITN web site -> <https://espace.cern.ch/Marie-Curie-CATHI/default.aspx>