HIE-ISOLDE Project Status Report

67th ISCC Meeting
CERN, 9 July 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 then 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:

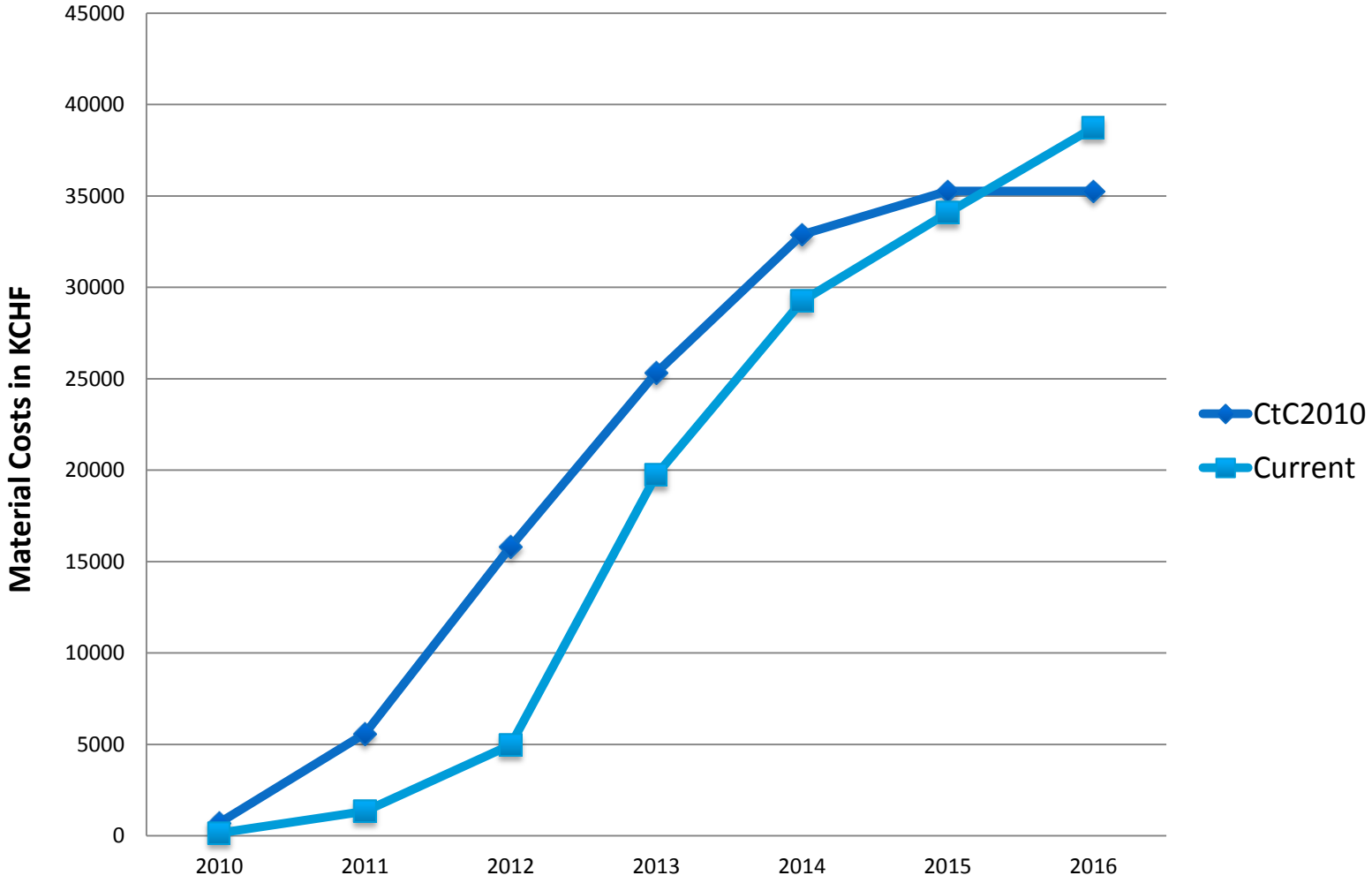
CtC 2010 = 35.3 MCHF

CtC 2011 = 35.7 MCHF

CtC 2012 = 36.5 MCHF approved (38.3 MCHF requested)

CtC 2013 = 38.7 MCHF requested

Spending Profile



Cost: External Funding Phase 1

Income

	KUL	ISOLDE	In Kind	Total
2007-2012	4.063.536	1.512.000	325.000	**5.900.536**
2013-2015	465.000	1.500.000	375.000	**2.340.000**
	4.528.536	**3.012.000**	**700.000**	**8.240.536**

1.097.162

Expenses

	Linac+HEBT Procurement	Salaries (*)	R&D	Total
2007-2012	604.000	1.226.000	2.023.837	**3.853.837**
2013-2015	5.000.000	100.000	0	**5.100.000**
	5.604.000	**1.326.000**	**2.023.837**	**8.953.837**

4.506.838

(*) to be considered additional expenses on salaries of **6.0 MCHF** (2011-2014) already covered by EU-FP7-ITN Marie-Curie program: CATHI

- The missing income of **0.7 MCHF** => loan from CERN

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: Procurement

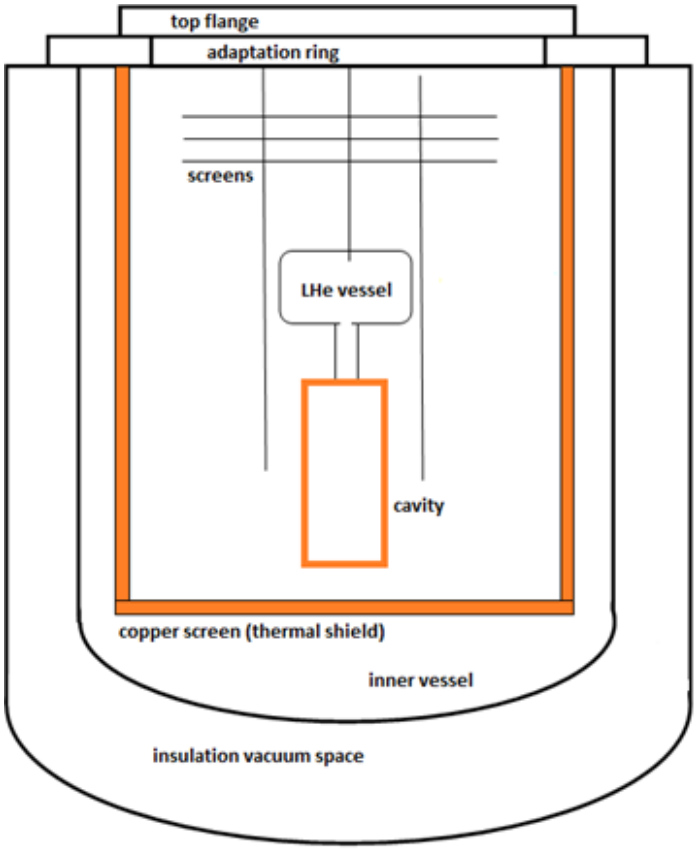
- Already engaged for Phase-2 (10 MeV/u):
  - High-beta cavities => (45+16kCHF)*10 = 610 kCHF
  - SC solenoids => (85 kCHF * 2) = 170 kCHF
  - Beam Instrumentation => (45 kCHF * 4) = 180 kCHF

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

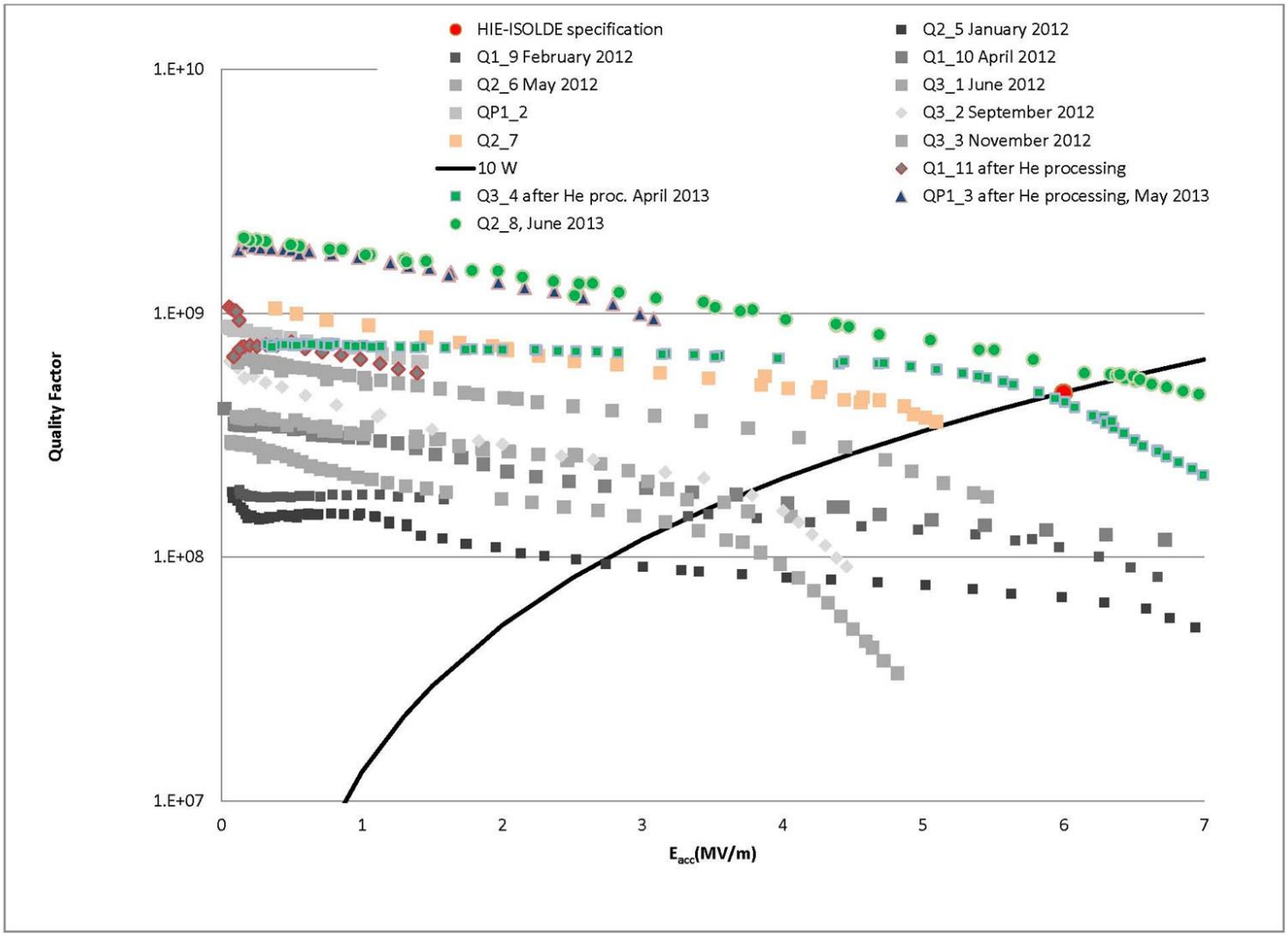
- Insulation vacuum space was at atmospheric pressure when inner vessel was pumped
- Inner vessel did not withstand the external pressure and collapsed
- Copper screen and stainless steel threaded bars were deformed
- Cavity and insert remained untouched
- (Likely) time of the event: sometime during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

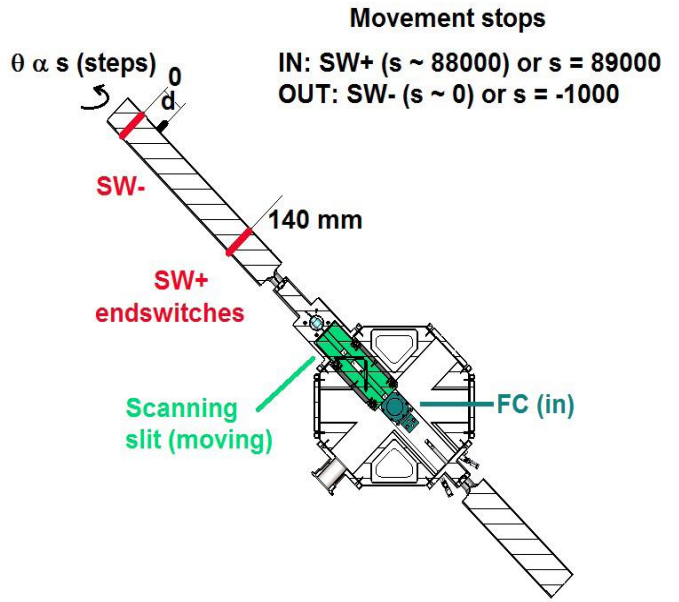


HIGHLIGHTS: Issues

- **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.

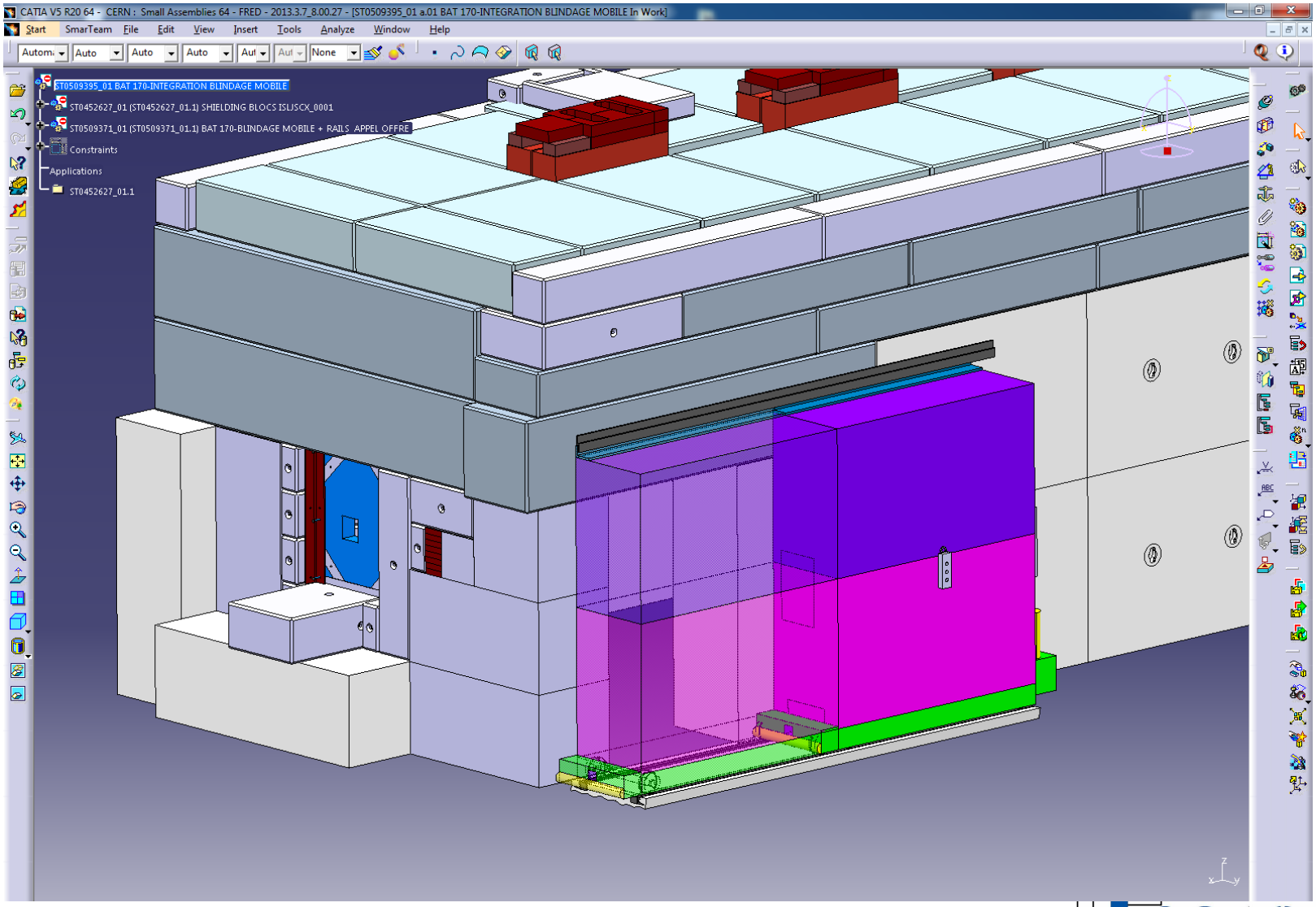
HIE-BDB-TN-0001 (edms# 1284254)

HIGHLIGHTS: Issues

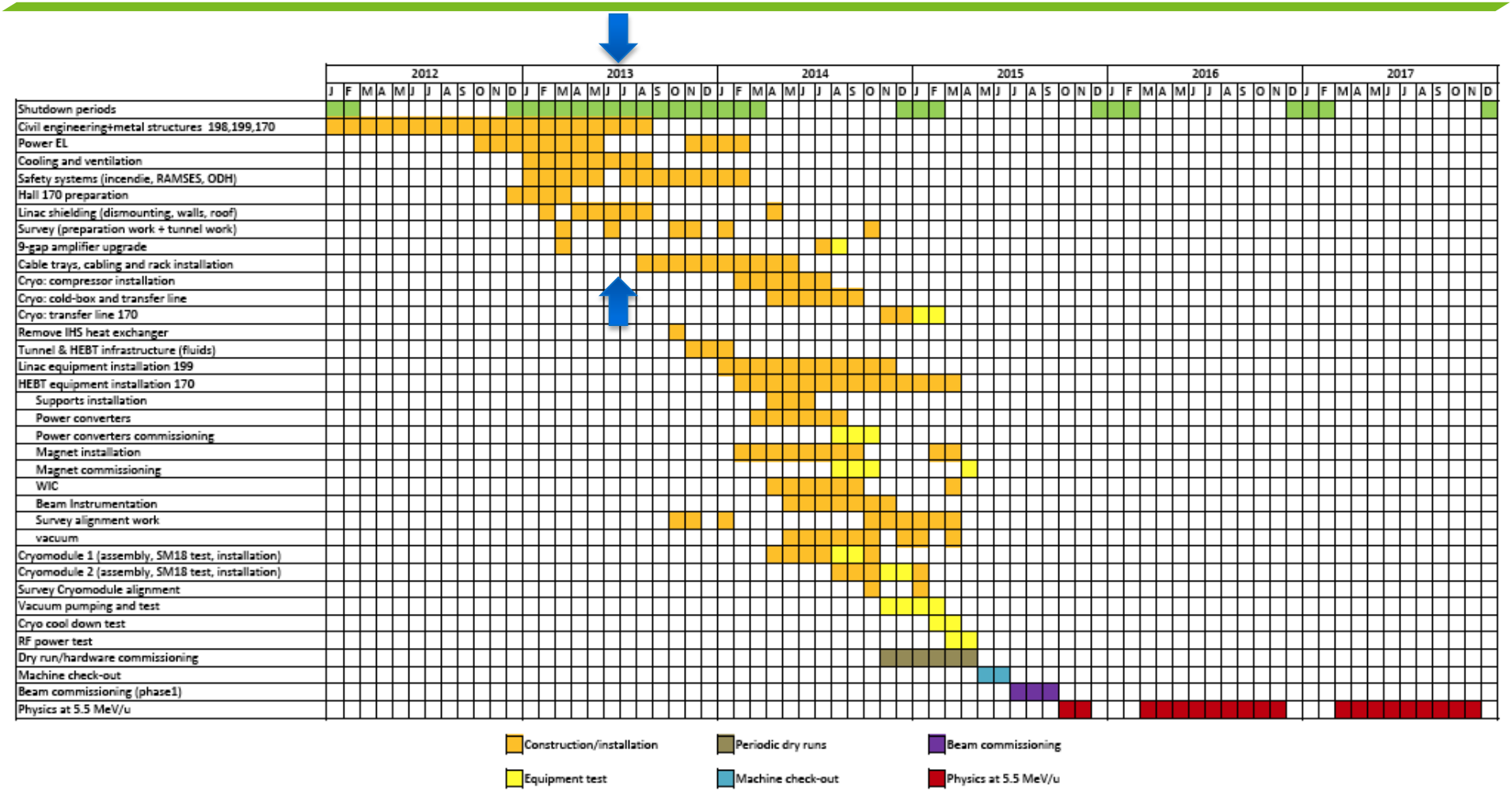
- Design of prototype Diagnostic Box
  - AVS delivered Faraday Cup which was tested at REX-ISOLDE
  - Body of the DB was being tested (particule contamination and degassing) when it **Failed => need to redesign mechanical part**
  - Additional Resources needed to develop the electronics for acquisition 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 => blocs ordered
  - Cable routing => ongoing finalizing all DICs

Shielding of HIE SC Linac (EN/HE)



Project Schedule

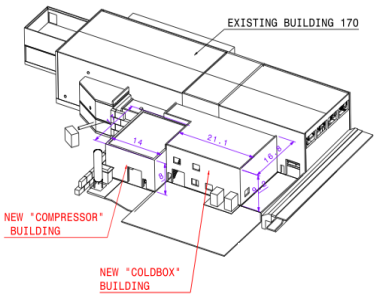


EDMS No. 1143510 (April 2013 ver.14)

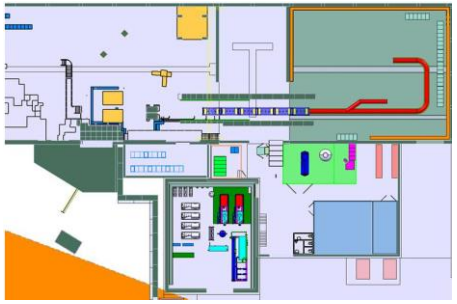
Conclusions

- 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 => early November
  - Safety Review => early November
  - HIE-ISOLDE Technical Workshop => 28-29 November



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