



HIE-ISOLDE Project Status Report

TSR@ISOLDE Workshop
April 27th 2015

Y. Kadi

CM1 assembly status



Next:

- Pressure test
- Transport to ISOLDE Saturday May 2nd !

Baseline planning adopted in April 2014, with status

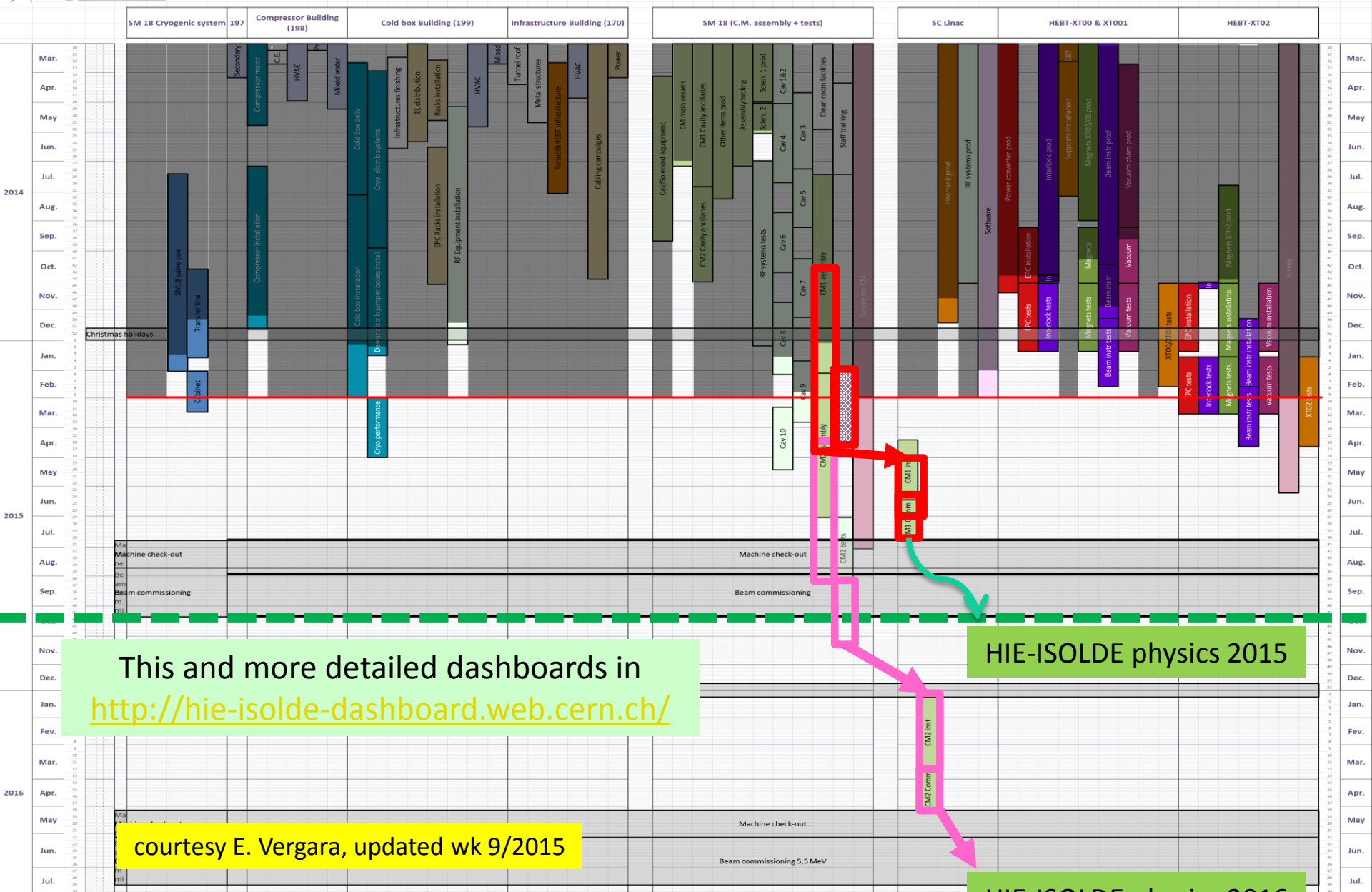


HIE ISOLDE COORDINATION SCHEDULE: Baseline

Baseline: 8/4/2014
Last update: wk9

EDMS:

Revision date:



This and more detailed dashboards in
<http://hie-isolde-dashboard.web.cern.ch/>

courtesy E. Vergara, updated wk 9/2015

HIE-ISOLDE physics 2015

HIE-ISOLDE physics 2016

Components:

- Cavities – assembled so far 10 from RI, 9 sputtered (6/10 RI + 2 CERN) – 5 used in CM1; QS2 was re-coated and tested (considerable improvement) => plan to have **next batch of 5** ready by June 2015.
- Solenoid#2 – new coil (#6) impregnated wk6; **passed training: Inom in 4 quenches** => delivery planned for ~~wk12~~ => **wk ??**.
- Vacuum vessel – metrology data controlled => OK
- He vessel => OK
- Thermal shield – all Ni plated panels arrived at CERN; MME repaired the damaged pipes (bent by Corima); pressure test => OK.

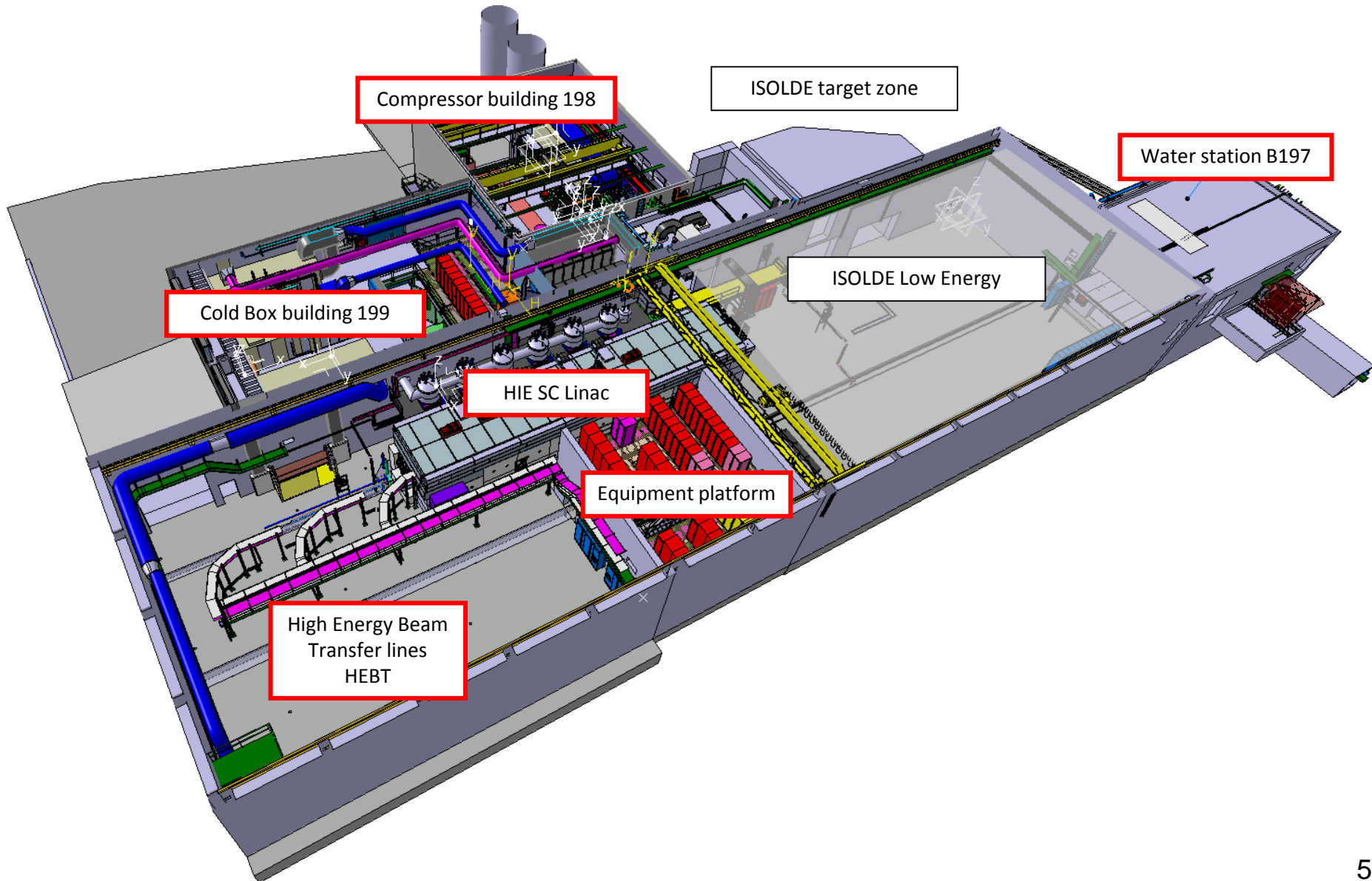
Planning:

- Announced assembly time for CM2 21 wks.
- Assembly start ca. ~~wk 14 (end March)~~ => **wk 19 end April**
- Assembly finish ca. wk 39-40 (end September)
- Cold test in SM18 ca. wks 41-48 (until end November)
- Installation in SC Linac SD 2015/2016, then HW commissioning
- Beam to ISOLDE start ca. April 2016 (?), beam commissioning 5-7 weeks, physics at 5.5. MeV/c could start ca. mid/end May 2016

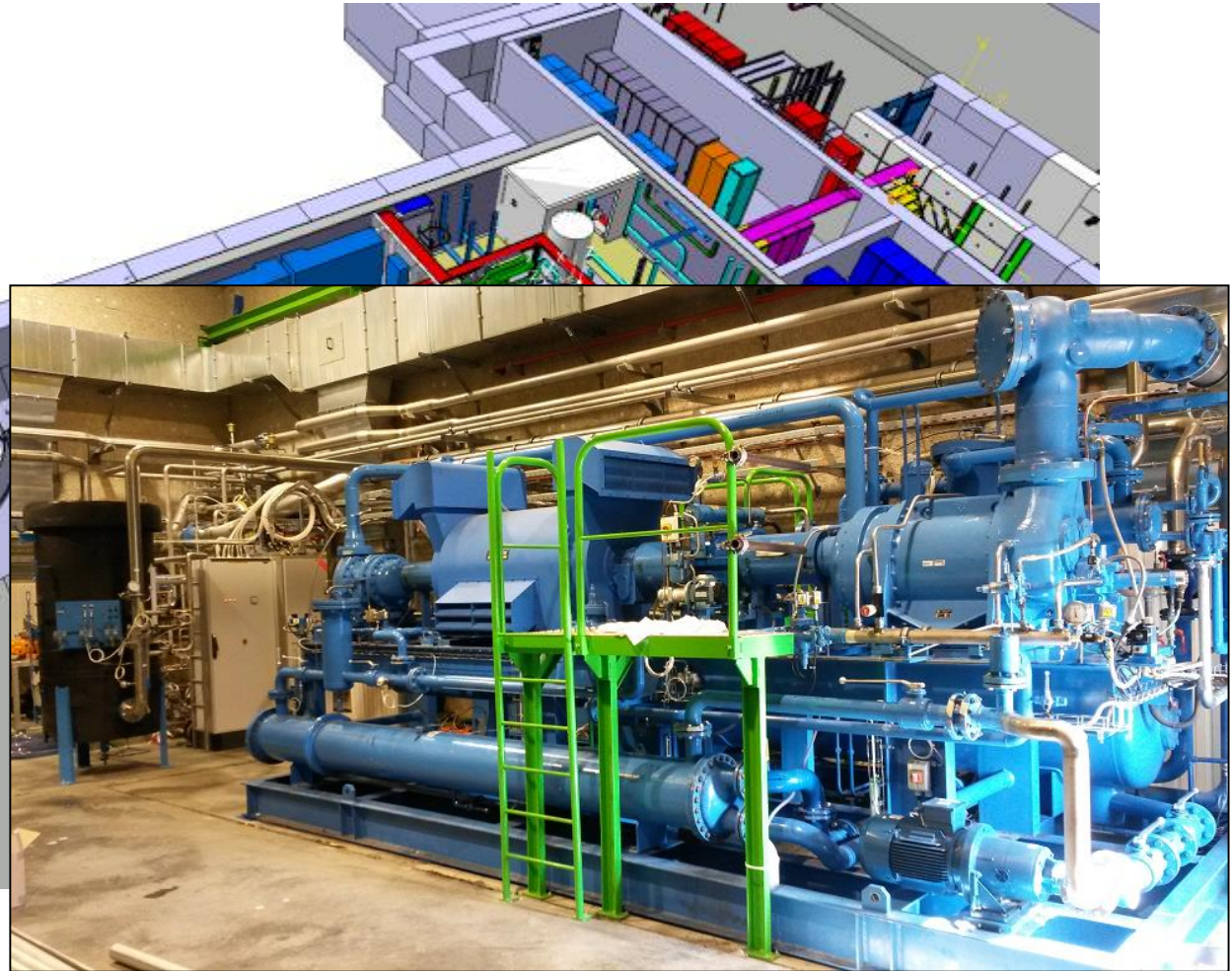
Manpower:

- TE-MS-C confirms deployment of same staff for CM2 as for CM1;
- As of end March gradual handing-over of the activities to BE-RF, while responsibility for assembly remains with TE-MS-C.
- To make up for that BE-RF intends to put additional staff (clean room technicians and RF engineer)

HIE Installation Progress



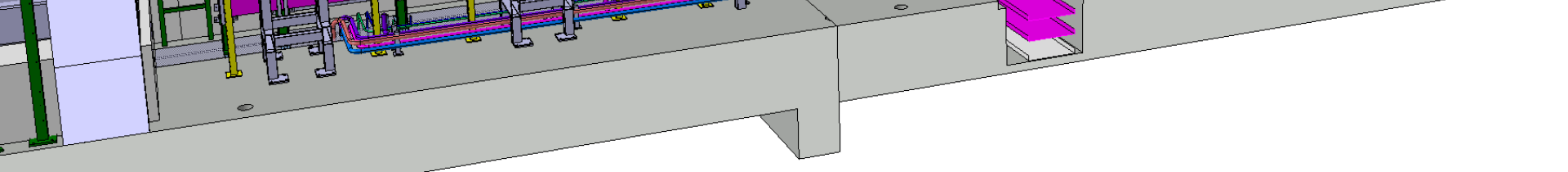
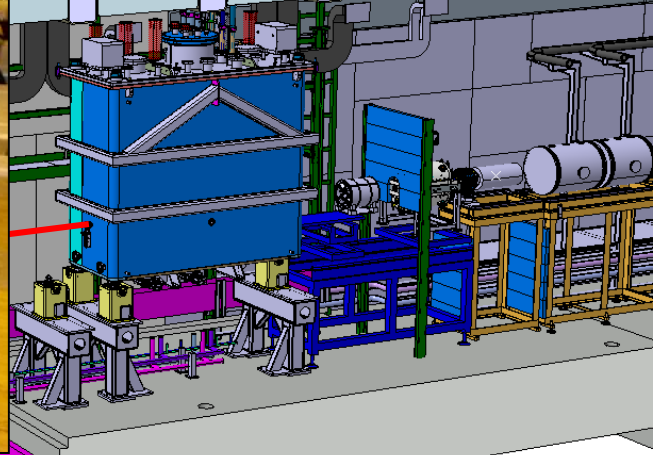
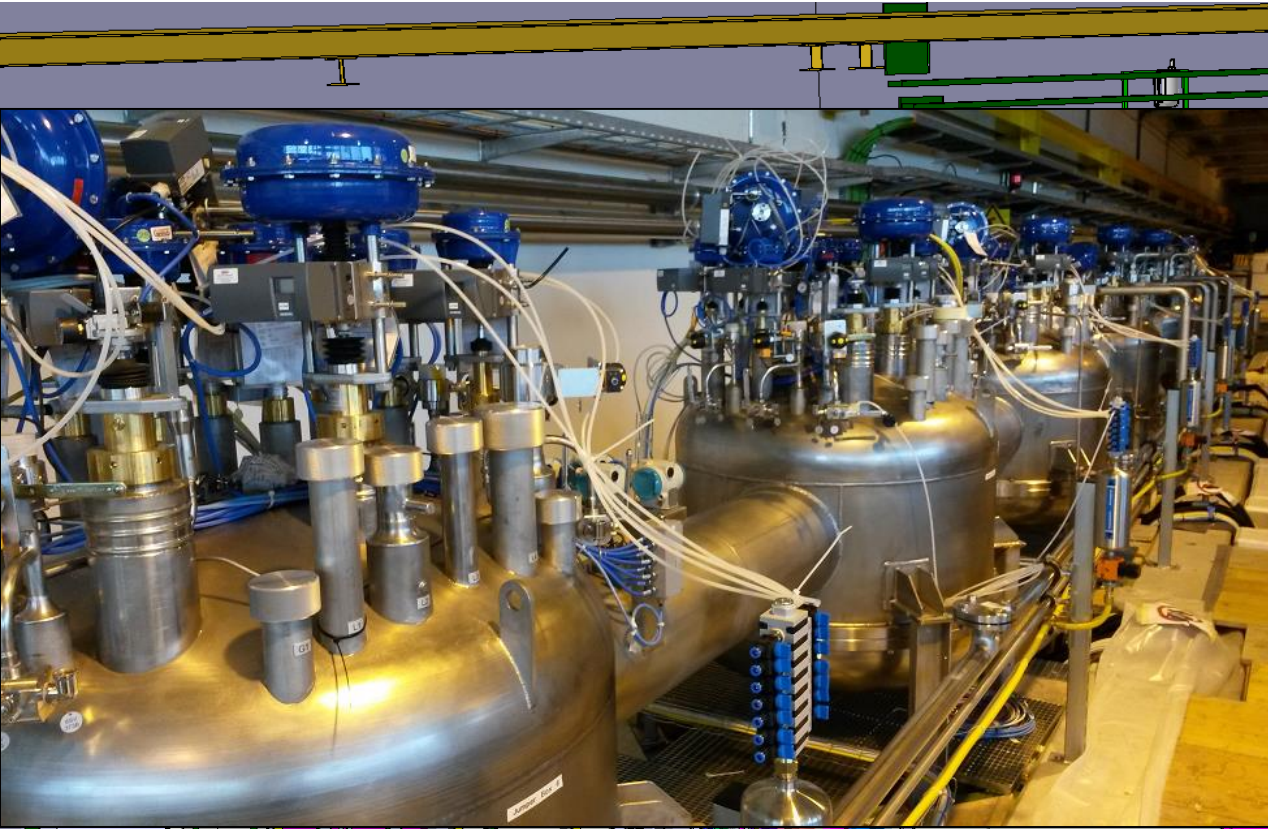
Compressor building 198



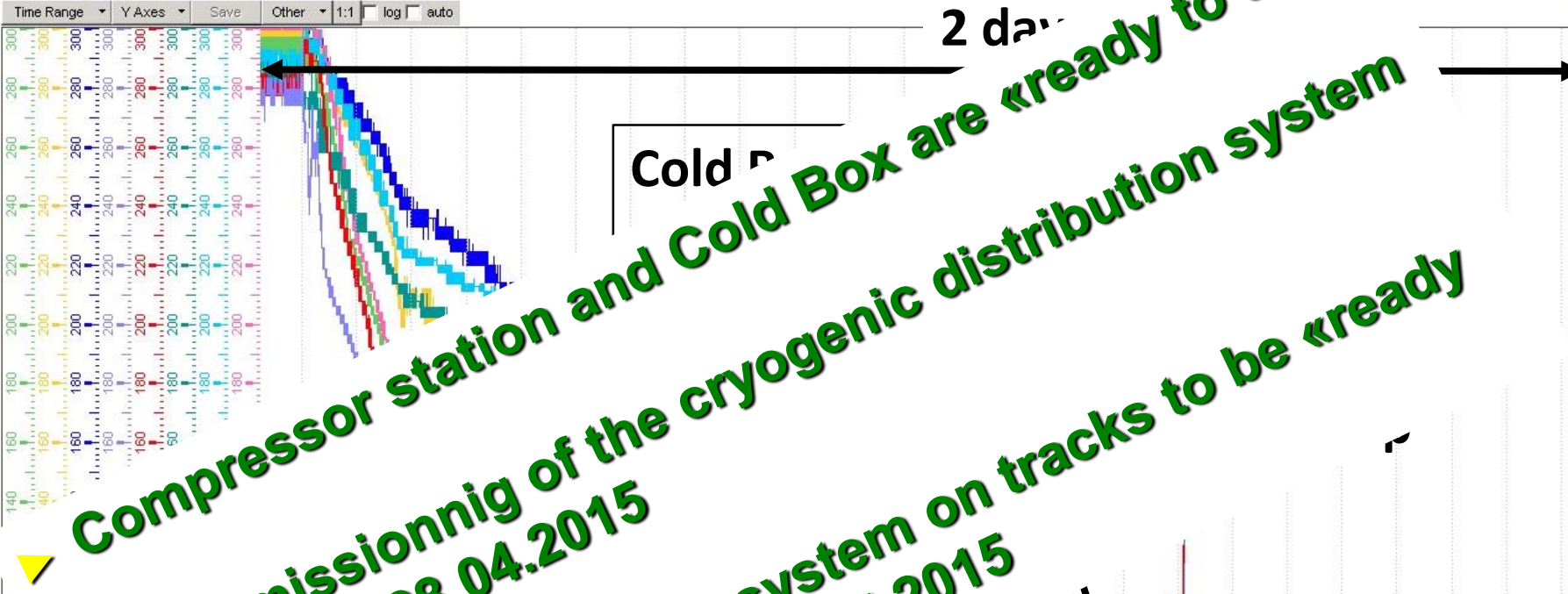
Cryo System: Compressors commissioning done. Liquid He made.



Cryo: Last control cabling ongoing. Cold distribution line pressure tests done. Coldbox getting ready for commissioning phase.
RF: Amplifier HW tests ongoing. Slow control installed. LLRF ready.
Solenoid: rack ready for EPC. AC to be connected.
ODH and fire detection operational.



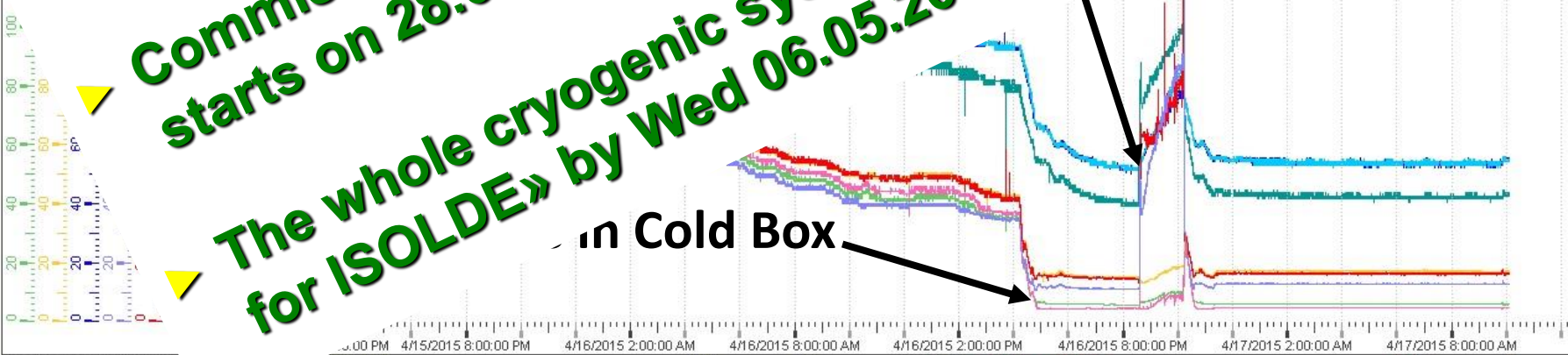
Cryo Cold Line & Jumper Boxes instrumentation installation finishing. Pressure tests done on Cold Line. Tunnel roof cleared by 28 April for the arrival of CM1. Cryo Module 1 installation Saturday 2nd May. Transport & handling test done. Scenario: Physics at $\sim 4\text{MeV/u}$ with 1 CM as of October (November) 2015



Compressor station and Cold Box are «ready to use»

Commissioning of the cryogenic distribution system starts on 28.04.2015

The whole cryogenic system on tracks to be «ready for ISOLDE» by Wed 06.05.2015



4/17/2015 10:04:54 AM .304	Phase sep. inlet temp (TT230c)	54.5	K	<input checked="" type="checkbox"/> Turbine 1 inlet temp (TT210c)	54.2	K
	Phase sep. return temp (TT240c)	17.2	K	<input checked="" type="checkbox"/> Turbine 1 outlet temp (TT215c)	42.6	K
		5.9	K	<input checked="" type="checkbox"/> Turbine 2 inlet temp (TT220c)	16.2	K
		4.7	K	<input checked="" type="checkbox"/> Turbine 2 outlet temp (TT225c)	13.0	K





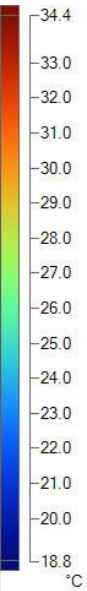
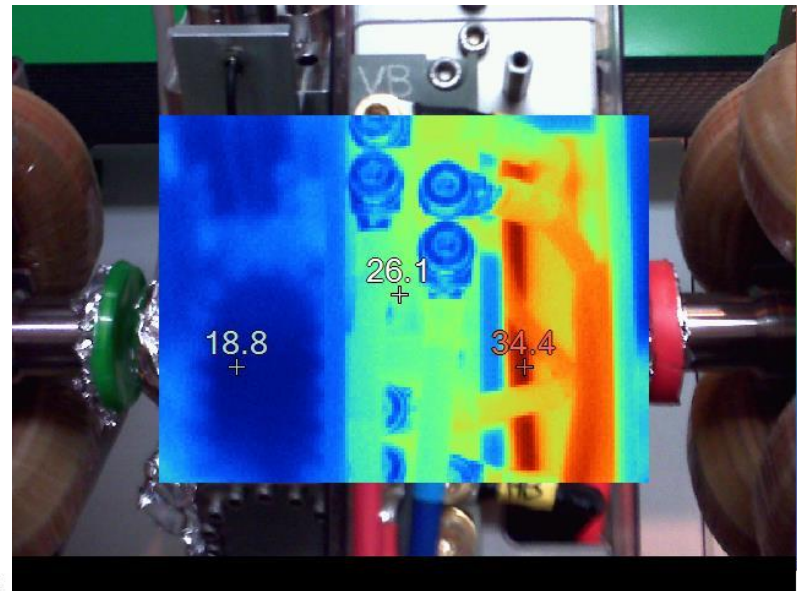
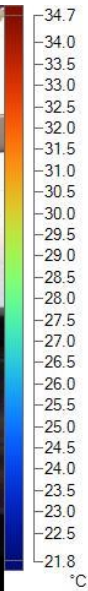
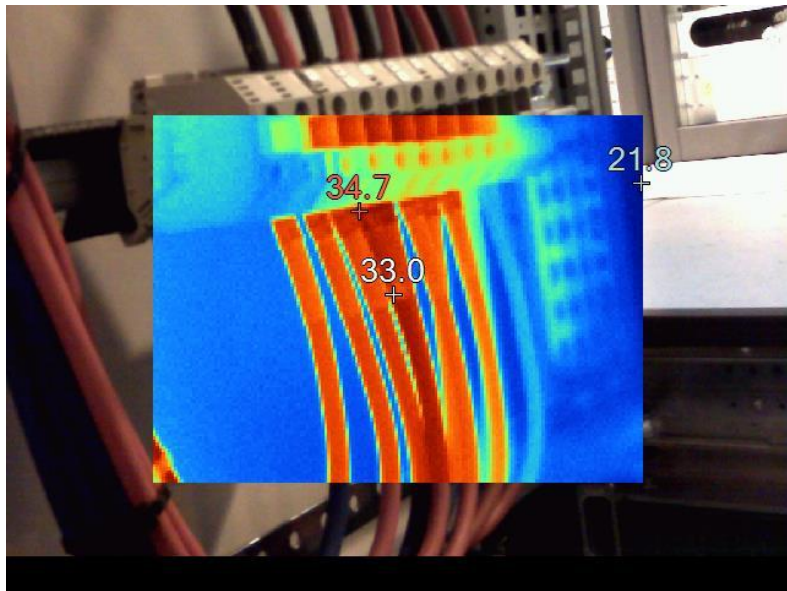
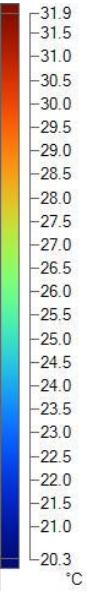
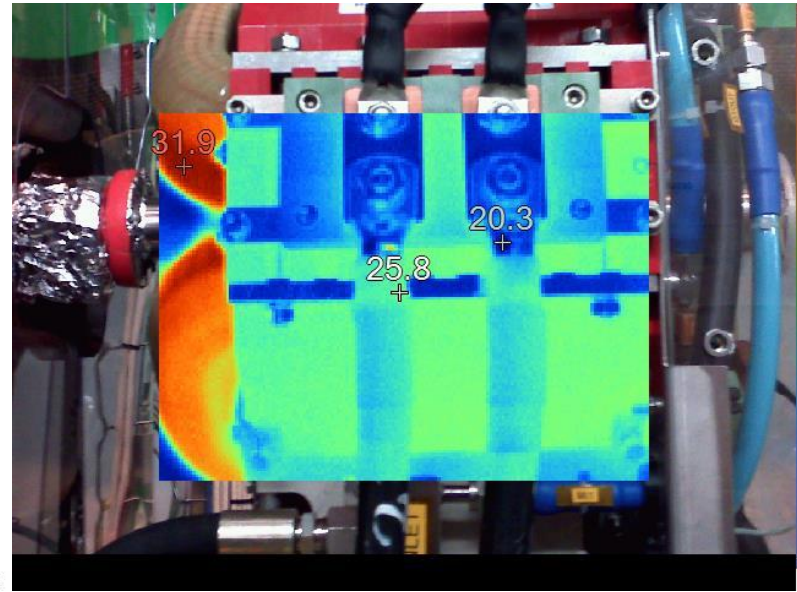
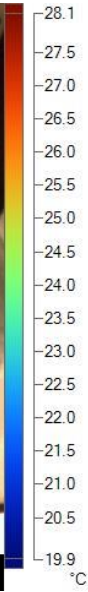
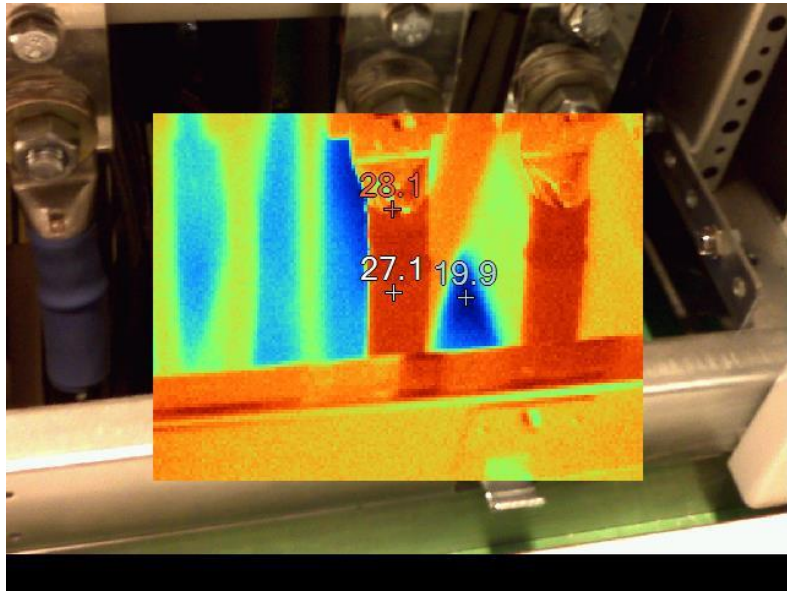
HW commissioning of XT00

- Work on procedures: February 2015 (EC closed 3 March)
- Safety inspections: 2 March, 6 March
- 2 March-12 March, 7 commissioning steps on 14 circuits

Magnet family	Slot name:	Power Converter name	PC IST	DC cable connection	Water check	ELQA OK/Not OK	WIC-magnet interlock test	WIC-PC interlock test	PC-circuit connection	PS setup 10% Inom	Polarity Test	Heat Run	Performance test	I min op	I nominal	Released for OP
Quadrupole	XT00.MQ.0100	XT00.RQ.0100												2	132	locked
Quadrupole	XT00.MQ.0200	XT00.RQ.0200												2	132	locked
Quadrupole	XT00.MQ.0300	XT00.RQ.0300												2	132	locked
Steerer	XT00.MC.0450	XT00.RCH.0450												0	45	locked
		XT00.RCV.0450												0	45	
Quadrupole	XT00.MQ.0500	XT00.RQ.0500												2	132	locked
Quadrupole	XT00.MQ.0600	XT00.RQ.0600												2	132	locked
Steerer	XT00.MC.0750	XT00.RCH.0750												0	45	locked
		XT00.RCV.0750												0	45	
Quadrupole	XT00.MQ.0800	XT00.RQ.0800												2	132	locked
Quadrupole	XT00.MQ.0900	XT00.RQ.0900												2	132	locked
Steerer	XT00.MC.1050	XT00.RCH.1050												0	45	locked
		XT00.RCV.1050												0	45	
Quadrupole	XT00.MQ.1100	XT00.RQ.1100												2	132	locked

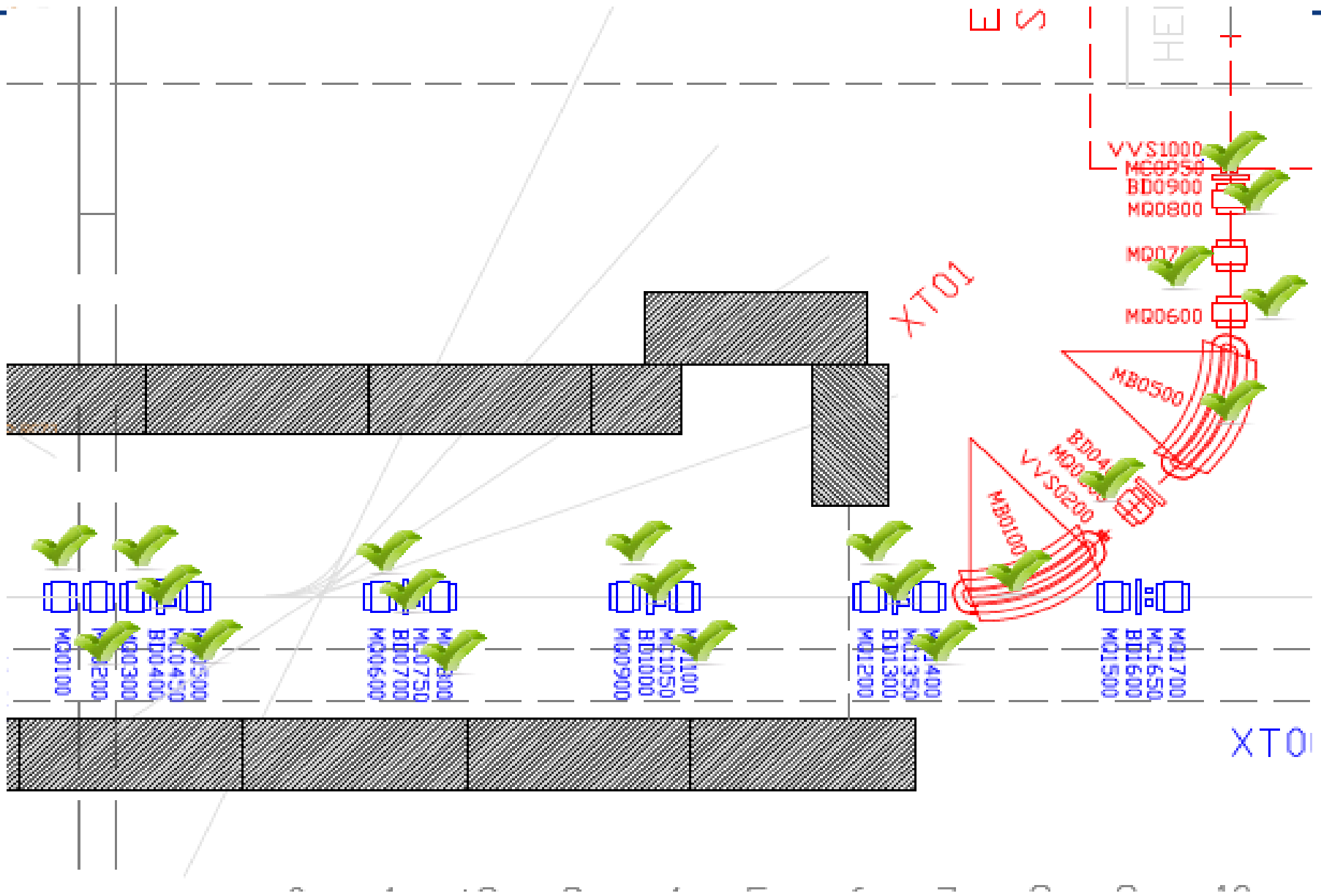


IR pictures from 13 hrs heat run





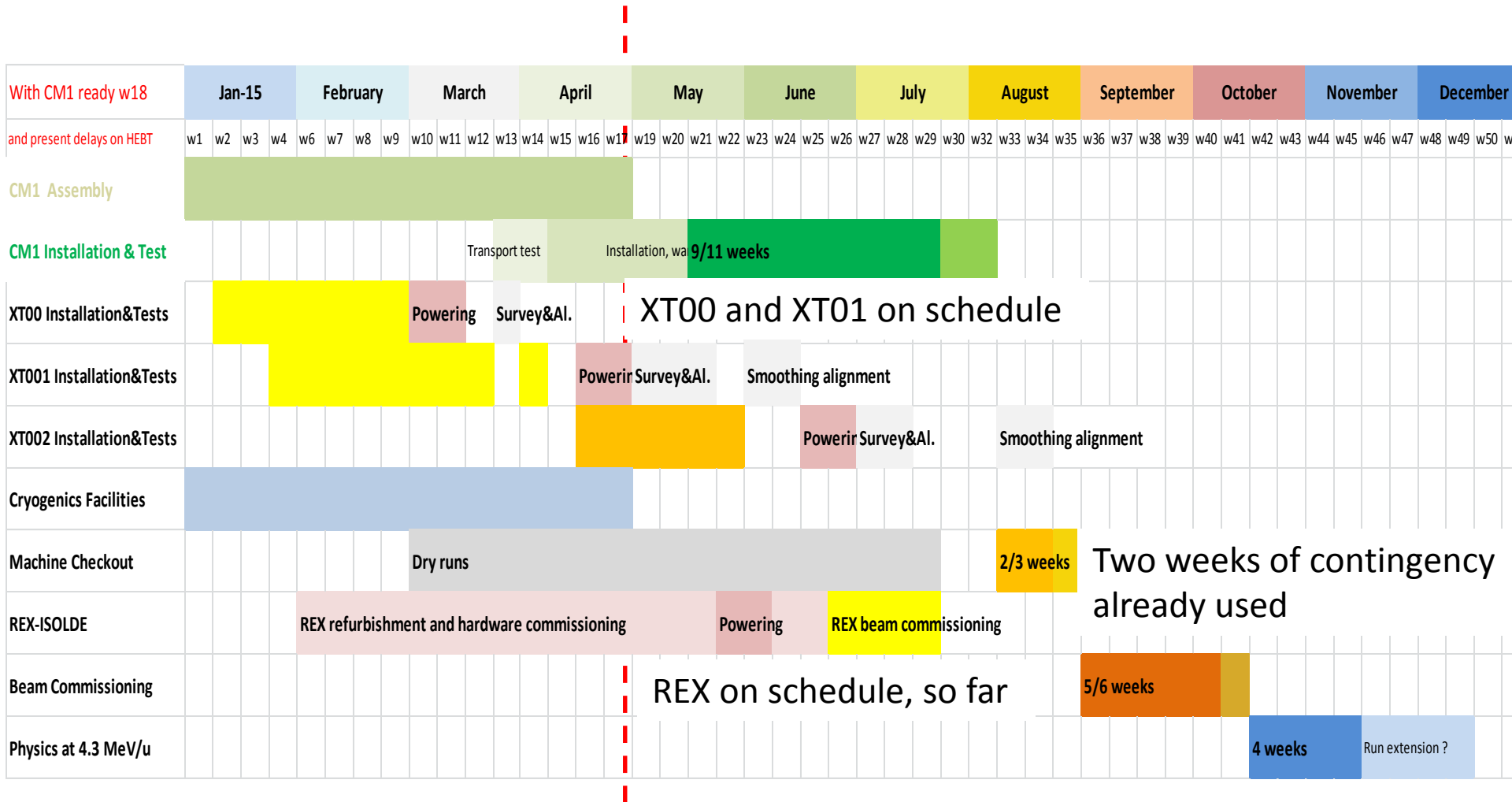
Status of XT00/1



In summary

- **HW Commissioning of the HEBT magnet circuits**
 - ✓ XT00 done
 - ✓ XT01 done
 - XT02 planned for week 25
- **Commissioning of Cryogenics (see Nicolas's talk)**
 - ✓ Warm compressors done
 - Cold box: ongoing
 - Distribution lines, Dewar and Jumper boxes: ongoing
- **Survey and alignment**
 - In two phases (rough and smooth)
 - XT00, tunnel part, rough alignment done in week 13
 - Need to do XT00-XT01 early enough for REX start-up with beam
- **Installation CM1 in the Linac:** Saturday 2 May (end of week 18)
- **CM cold tests** May-July 2015
- **Dry runs** of individual systems whenever possible, controls debugging (BE/OP)
- **Machine Checkout** at the end of July
- **Beam Commissioning** as from week 35 (end of August), 7 weeks

HIE ISOLDE roadmap 2015

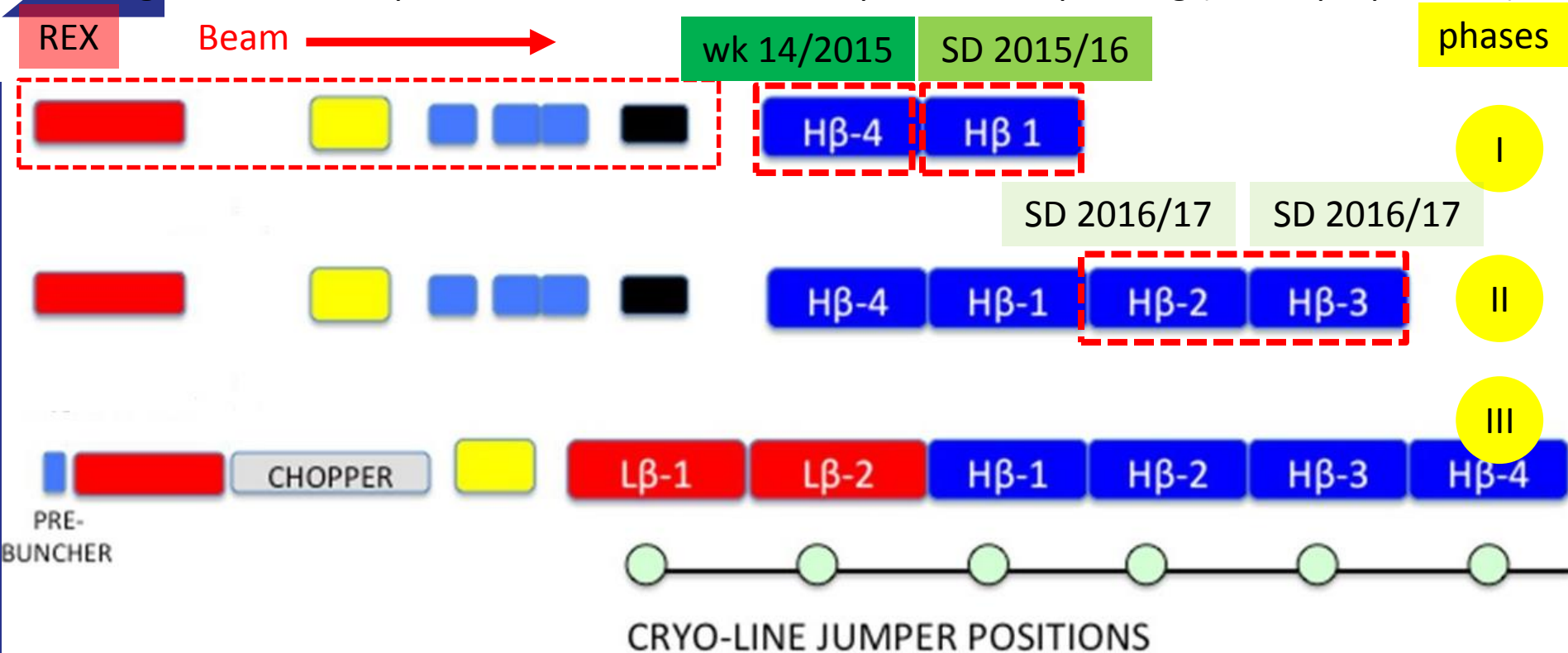




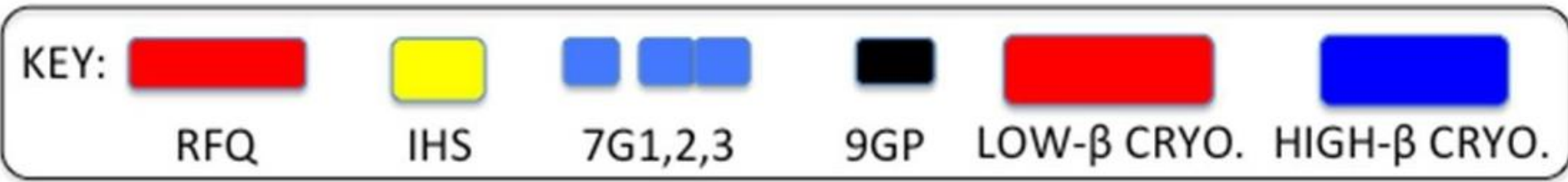
Phase II (CM3 + CM4)

HIE-ISOLDE Roadmap

Green light to continue procurement for HIE-ISOLDE phase II still pending (under preparation)



Legend:



Existing REX-structures:

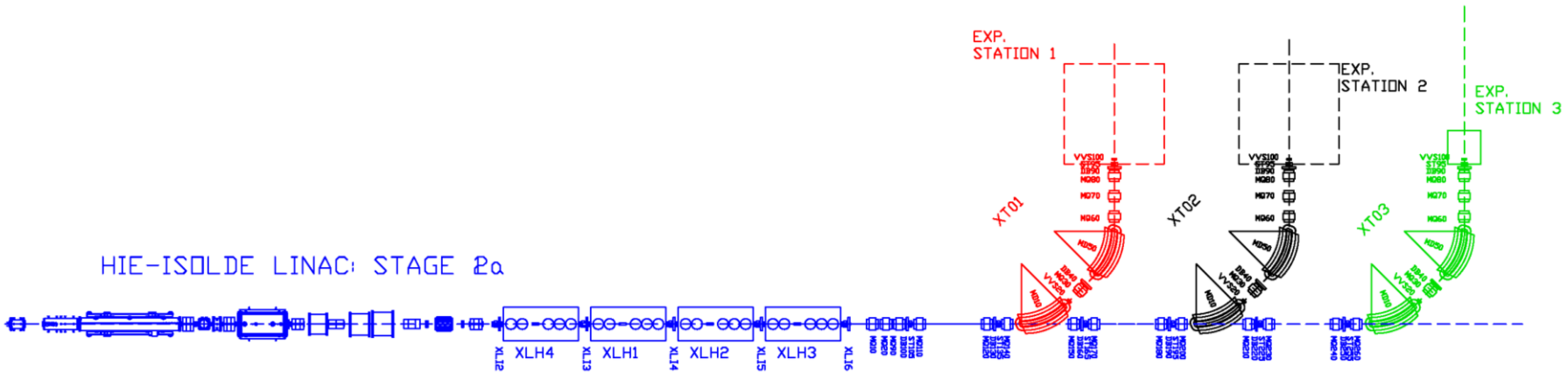
RFQ, IHS: 20-gap IH-structure, 7GX: 7-gap split-ring cavities, 9GP: 9-gap IH-structure



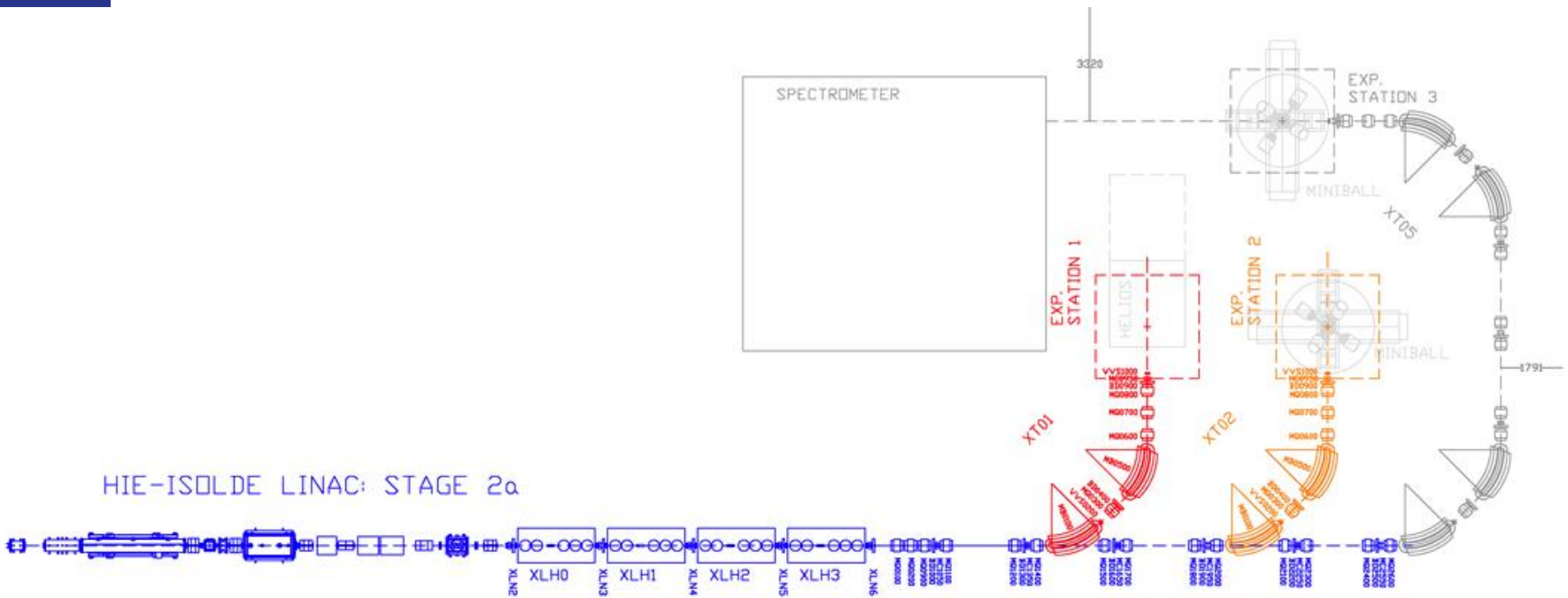
3rd Beam Line

Layout XT03 + potential U-turn

HIE-ISOLDE LINAC: STAGE 2a



HIE-ISOLDE LINAC: STAGE 2a



Two proposals for HIE-ISOLDE beam line extensions have been suggested for the future (i.e. sometime after the initial installation of XT01 and XT02).

- 1. XT03:** to accommodate a small travelling detector 1 x 1 m (included in Cost-to-Completion of Phase-3). This would involve the addition of 2 dipoles, 8 quadrupoles, 4 long DB and 3 steerer magnets, plus associated vacuum chambers. The rest of the infrastructure has already been installed (Phase1).
- 2. U-turn:** to accommodate MINIBALL + Large Angle Spectrometer setup (enables in parallel to connect to the TSR) or a HELIOS type detector as pursued by the UK ISOL-SRS collaboration which was recently awarded a total budget of £4.8M (2015-2019) by the STFC (UK), for exploitation of the TSR. This would involve the addition of 4 dipoles, 11 quadrupoles, 6 long DB and 4 steerer magnets, plus associated vacuum chambers, cabling, power convertors, interlocks, cooling and supports. This is not in the present CtC.

Components required

Both proposals will be technically feasible, from the point of view of optics and performance, with the addition of standard periods of 2.62m and standard bend configurations into the lattice.

Item	Number	Spares	Unit Cost kCHF	Total kCHF*	
				Infrastructure	Machine
Magnet MD		4	1	110	550
Magnet MQ		11	1	22	264
Magnet ST		4	0	13	52
Convertor MD		2		65	130
Convertor MQ		7		15	105
Convertor ST		3		12	36
Long Diagnostic Box		6	1	32	192
Vacuum pump + gauges		6		11	66
New vacuum sector		2		12	24
Vacuum chamber MD		2		25	50
Vacuum chamber MQ		7		5	35
Vacuum chambers SSS/triplet		4		5	20
Interlocking MD/MQ/ST (incl. cabling)		20		2	40
MD jacks		6		4.5	27
Supports type Doublet/Triplet		3		4	12
XYZ stages		12		2	24
Cabling MD/MQ/ST magnets + racks		10		5	25
Cabling DB + rack		4		5	10
Cabling vacuum		4		5	10
Cooling MD/MQ/ST		14		2.5	35
Installation and survey (man-months)		3		8	24
Design layout/integration (man-months)		4		8	32
Beam dynamics (man-months)		2		8	16
Control Software (man-months)		2		8	16
Total					479
					1361

* included in the CtC Phase3 = 570 kCHF

- ✓ It was suggested that the HIE-ISOLDE beam quality could be improved by the insertion of an energy-spread reducing de-buncher in the U-turn in order to improve the Q-value resolution of HELIOS (EDMS 1183997). Such a de-buncher is of advantage, but deemed not necessary by the ISOLDE Collaboration;

- ✓ Before any implementation can be decided, studies will be needed to define or check:
 - Cooling and Ventilation capacity;
 - Rack space;
 - Cabling layouts;
 - Integration;
 - Interlocking;
 - Vacuum sectorisation;
 - Stray fields;
 - Beam dynamics confirmation.

Summary

- **Phase I** shall normally be ready in time (provided no major technical issues turn up – transport incident, major vacuum leak, pollution, RF performance...).
Present ready-for-installation date of CM1 = wk 18/2015; CM2 = wk 48/2015
- Procurement for **phase II** (CM 3 + 4) is being launched – approved by management mid April 2015.
- Construction for **phase II** (CM 3 + 4) planned for 2016, allowing physics with 4 high-beta CMs as of 2017.
- Budget for **phase II** (CM3 + 4) has been consolidated in MTP2015
 - FSU for cryomodule assembly;
 - cost increase of components;
- To be considered for MTP2015:
 - machine spare parts;
 - consolidation of cryogenic system;
- Maintaining current level of resources + Continued high commitment needed at all levels to make the above plans a reality.

- GS/SE : DANIEL PARCHET, ELISEO PERES-DUENAZ, ROLAND ARNOUL
- EN/MEF : STEPHANE MARIDOR, GUILLAUME KAUTZMANN,
JEAN-CHRISTOPHE GAYDE, ESTRELLA FERNANDEZ
- BE/ABP / OP : FREDERIK WENANDER, JOSE ALBERTO RODRIGUEZ
- PH/SME : MARIA BORGE, MAGDA KOWALSKA
- EN / TE/HDO : YACINE KADI, FABIO FORMENTI, VOLKER MERTENS
- BE/RF : DANIEL VALUCH, WALTER VENTURINI, LUCA ARNAUDON, ERIC
MONTESINOS
- EN/CV : PAUL PEPINSTER, FREDERIC BORRALHO
- EN/EL : RENE NECCA, JEAN-CLAUDE GUILLAUME, GEORGI GEORGIEV, JEAN-
PIERRE BILLON-GRAND, MICHELE MARTINO, CHRISTOPHE COUPAT
- TE/CRG : NICOLAS DELRUELLE, JOS METSELAAR
- EN/STI : RICHARD CATHERALL, ANA-PAULA BERNARDES
- GS/DI : CYRILLE BEDEL, YANNICK BERAUD (EN/MEF)
- TE/MSC : YANN LECLERCQ, LLOYD WILLIAMS, VITTORIO PARMA, JEREMIE BAUCHE
- DSG/RP : JOACHIM VOLLAIRE, SANDRA GIRON, ALEXANDRE
DORSIVAL
- TE/ABT : BRENNAN GODDARD, MATTHEW FRASER
- TE/VSC : GIOVANNA VANDONI
- BE/BI : ENRICO BRAVIN, WILLIAM ANDREAZZA, ESTEBAN CANTERO
- EN/MME : ANTTI KOLEHMAINEN, MARC TIMMINS
- TE/MPE : RICHARD MOMPO



Thank you for your attention

