

Update on HW commissioning

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on behalf of the HIE ISOLDE project

9th HIE-ISOLDE Physics Coordination Group meeting, *June 2016*

HW commissioning sequence

- 4.1. INTERLOCK TESTS
- 4.2. PUMP DOWN PROCEDURES
- 4.3. RF, INSTRUMENTATION AND ELQA CHECKS BEFORE COOL DOWN
- 4.4. LLRF TESTS
- 4.5. COOL DOWN PROCEDURES
- 4.6. ALIGNMENT MONITORING AND CORRECTION
- 4.7. RF CONDITIONING ABOVE TC
- 4.8. RF TESTS AT COLD
- 4.9. SOLENOID TESTS
- 4.10. HEAT LOAD MEASUREMENTS
- 4.11. THERMAL CYCLES

CERN
CH1211 Geneva 23
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EDMS NO.	REV.	VALIDITY
1511269	0.0	DRAFT

REFERENCE

HIE-O-HCP-0001

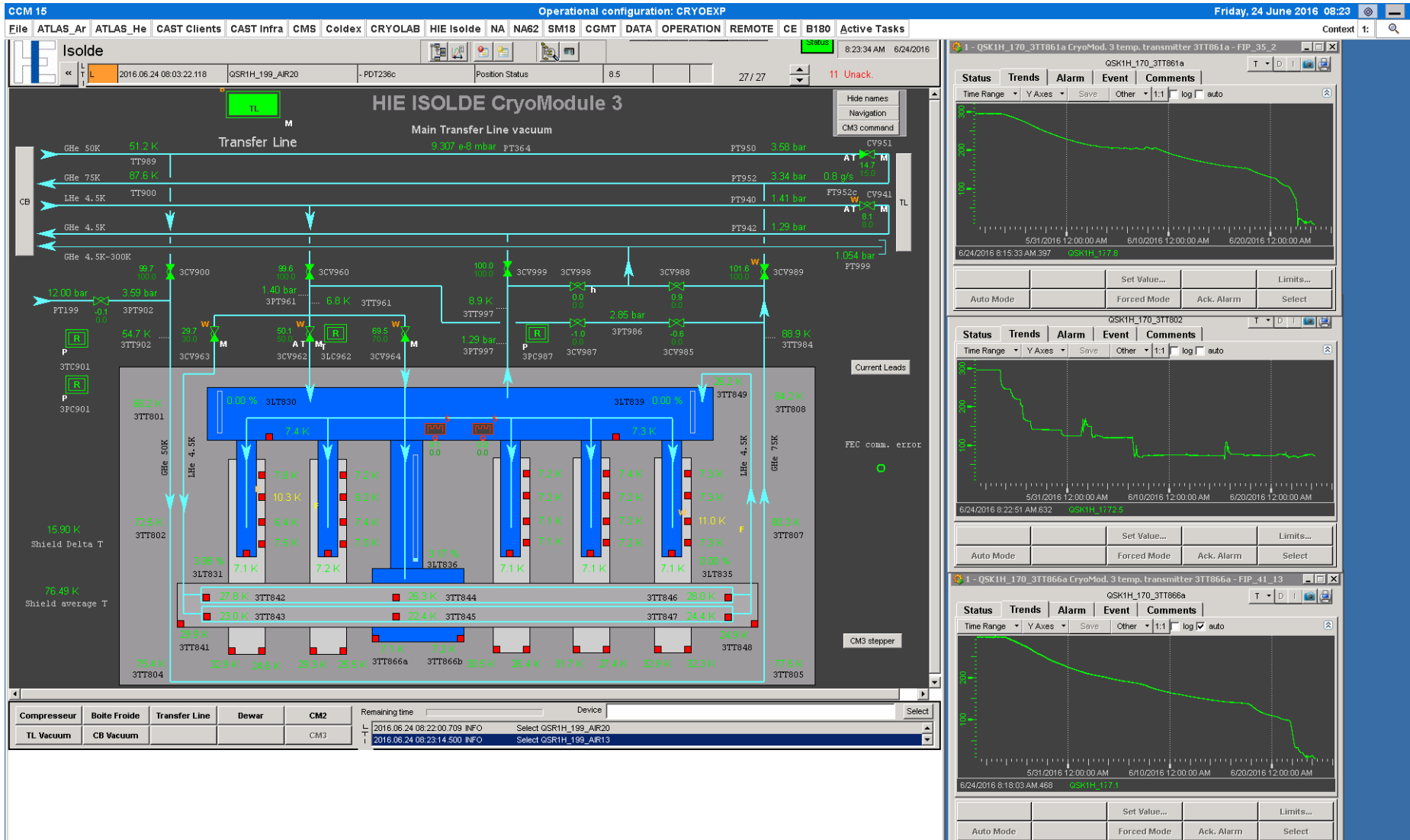
Date : 2015-01-14

Hardware Commissioning Procedure

Hardware Commissioning Procedure for the HIE-ISOLDE cryomodules

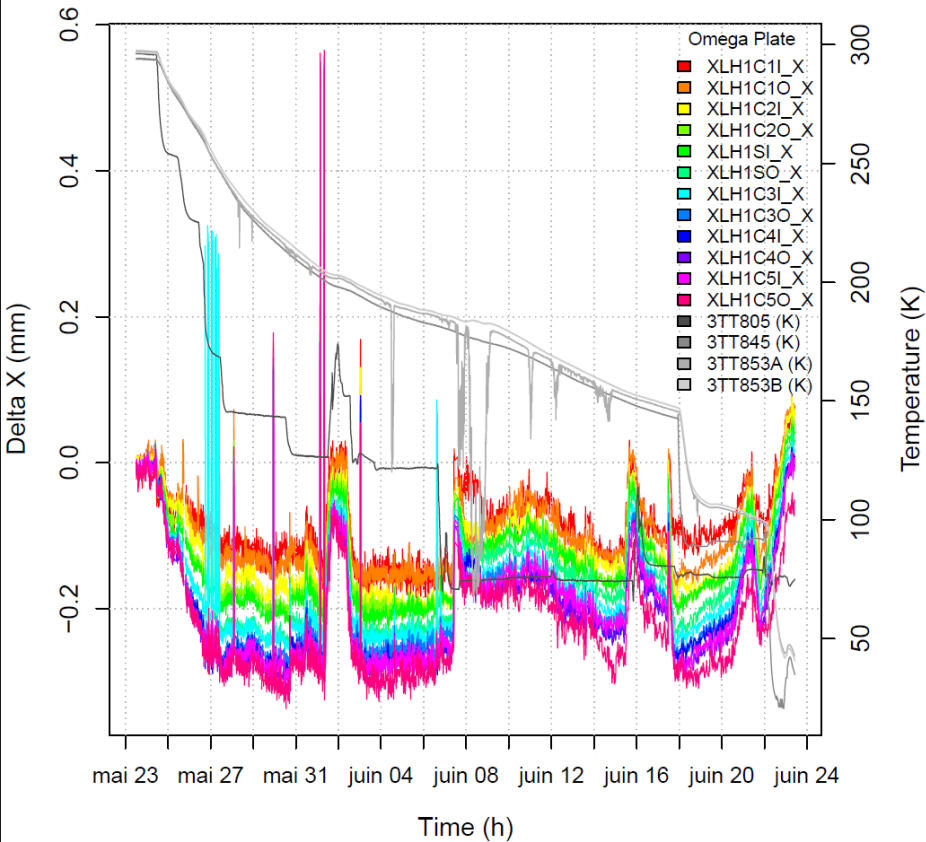
This document describes the sequence of tests and the parameters to be recorded for the hardware commissioning of the HIE-ISOLDE cryomodules.

Cool down of CM1 and CM2

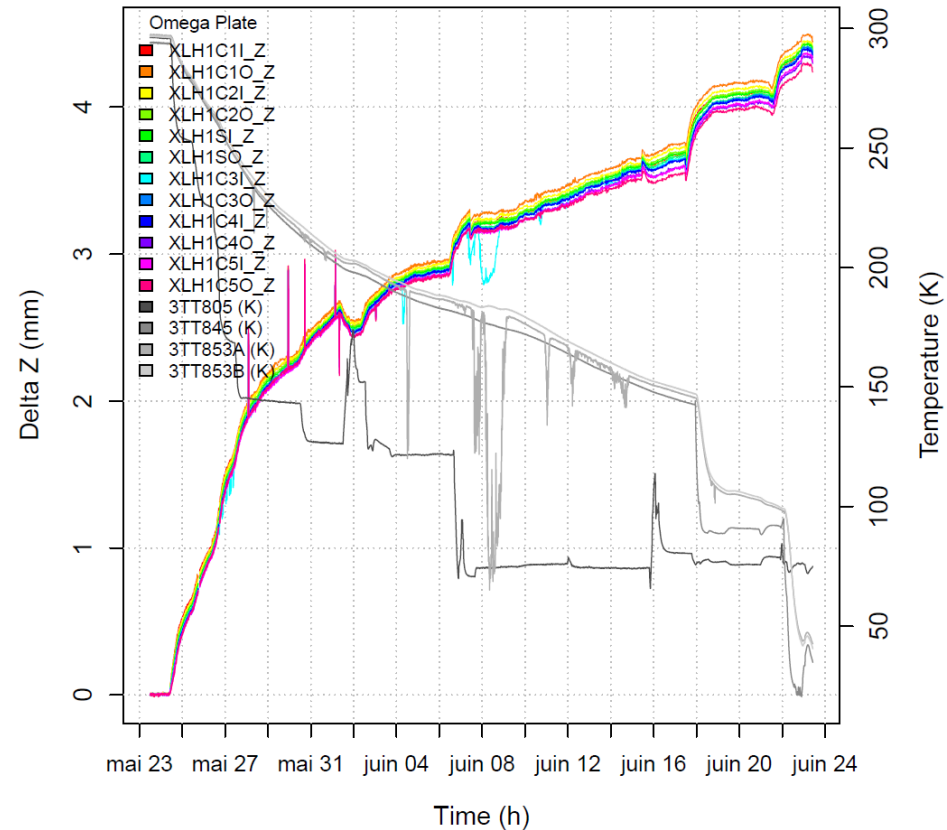


Alignment monitoring

Delta X (mm) over time during CM1&2 cool down
2016-05-23-->2016-06-24



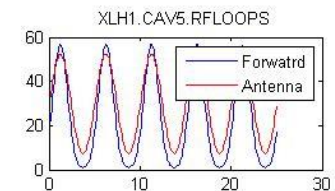
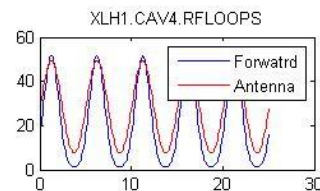
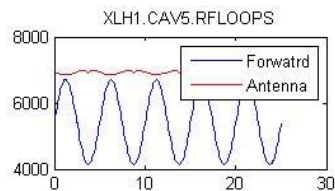
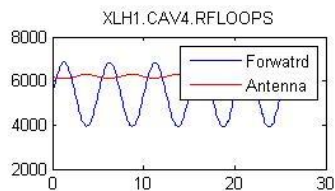
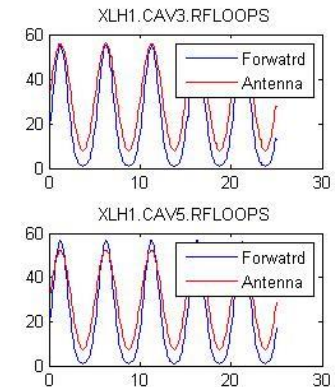
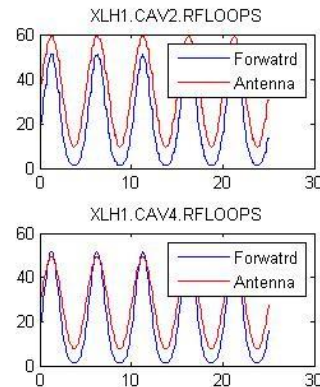
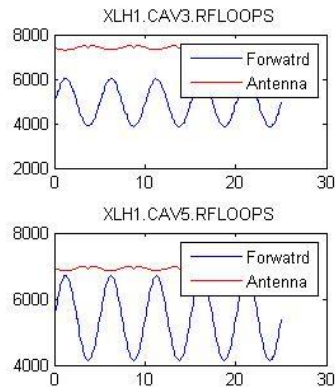
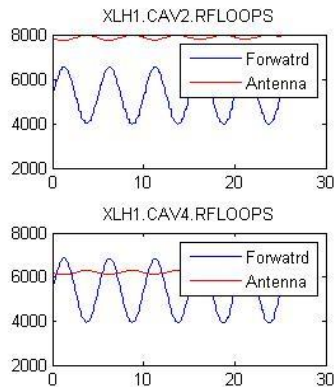
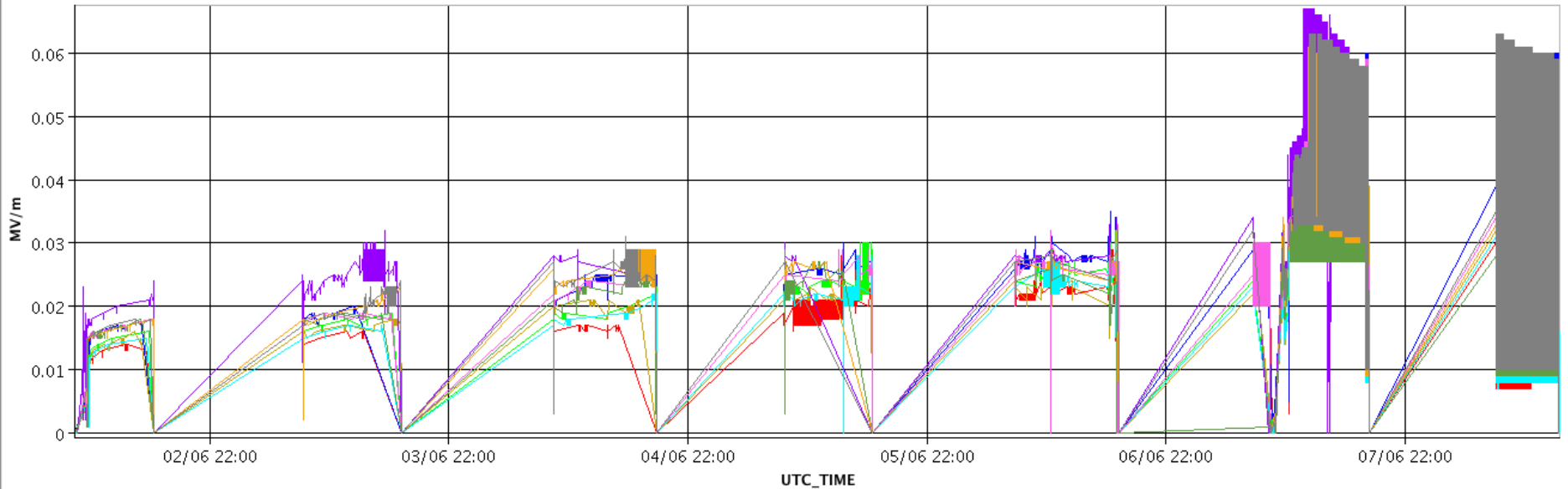
Delta Z (mm) over time during CM1&2 cool down
2016-05-23-->2016-06-24



Conditioning of low field multipacting bands

Timeseries Chart between 2016-06-01 09:00:00.000 and 2016-06-09 00:00:00.000 (UTC_TIME)

→ ALLHIE.199.XLH1.CAV1:RDBCK_CH1FIELD
 → ALLHIE.199.XLH1.CAV2:RDBCK_CH1FIELD
 → ALLHIE.199.XLH1.CAV3:RDBCK_CH1FIELD
 → ALLHIE.199.XLH1.CAV4:RDBCK_CH1FIELD
 → ALLHIE.199.XLH1.CAV5:RDBCK_CH1FIELD
→ ALLHIE.199.XLL2.CAV1:RDBCK_CH1FIELD
 → ALLHIE.199.XLL2.CAV2:RDBCK_CH1FIELD
 → ALLHIE.199.XLL2.CAV3:RDBCK_CH1FIELD
 → ALLHIE.199.XLL2.CAV4:RDBCK_CH1FIELD
 → ALLHIE.199.XLL2.CAV5:RDBCK_CH1FIELD



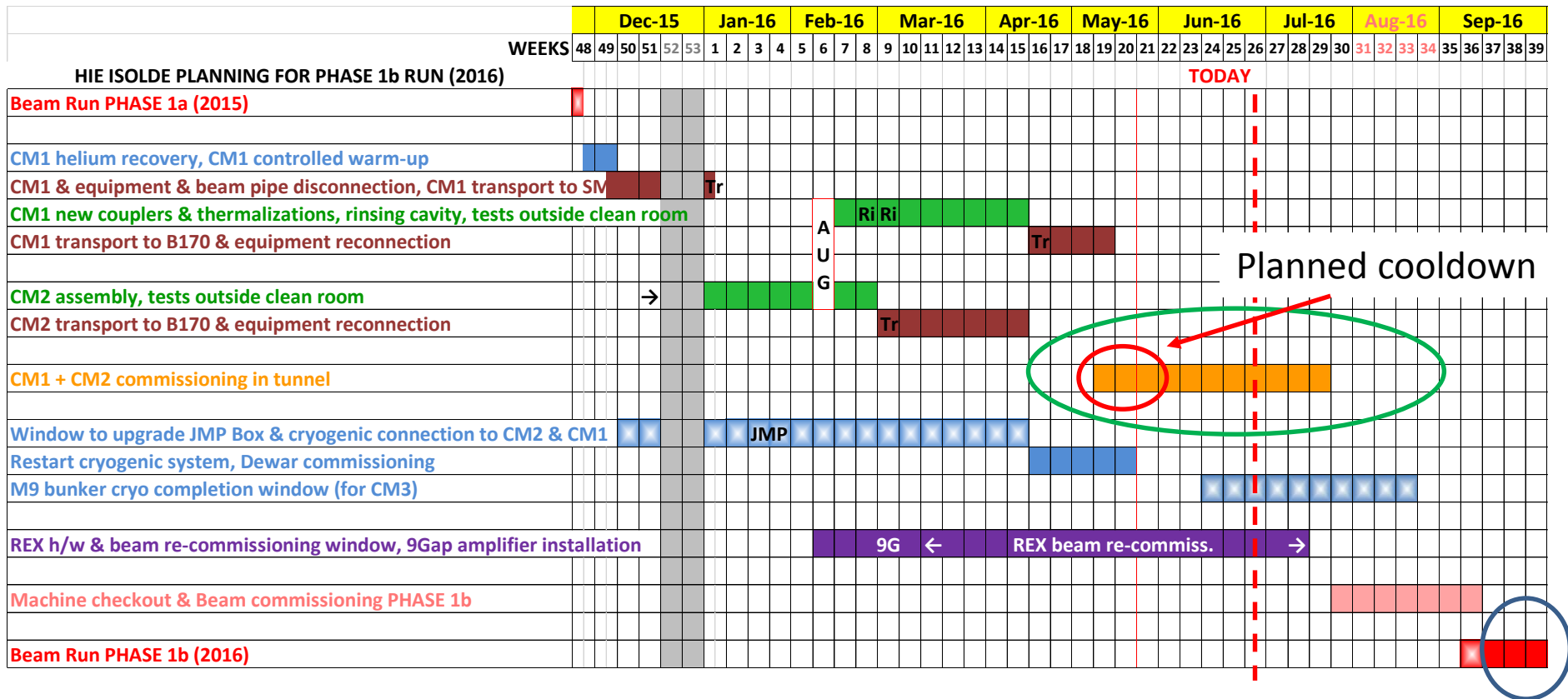
Issues emerged during the cooldown process

- Several **pollution issues at the restart of the compressor** station
 - H₂O pollution
 - Air leaks
 - Compressor stopped to renew gear box oil
- Automatic cooldown processes had not been fully commissioned **last year**
→ we were mostly running in **manual mode** (with one dedicated operator)
- The TE-CRG operation team requested some **modifications to the automatism** in order to **ensure the safety of the cryo-modules**
- These modifications were implemented and needed to be tested
- **Cool down of the 4.5 K circuits** (including cavities) started in week 25
- Cold mass was < 15 K on Friday 25 June.
- Still problems stabilizing the system during filling 2 cryomodules with liquid
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- **These issues so far caused 4 weeks delay on the planning**

Status of RF tests at cold (30 June)

- All cavities at 4.5 K on Tuesday 28 June
- All coupler and tuners moved at cold
- Tuning done on all cavities, operational bandwidth ~ 5 Hz
- Multipacting conditioning at 1.5 MV/m done on all cavities
- Access in the tunnel for cold cable measurements done (1 day)
- Q-E measurements of CM1 ongoing
- Field emission detected in 2 cavities above 4 MV/m
- 3 cavities clean up to ~ 5 MV/m.
- CAV2 already pushed close to 6 MV/m

HIE ISOLDE phase 1 roadmap



- **Possible mitigations**

- Cut heat load measurements and thermal cycles (for Q_0 optimization) ~1/2 week
- Carefully consider the needs for alignment
- Beam commissioning program also de-scoped (see A. Rodriguez Rodriguez talk)

Summary

- HW commissioning ongoing
- Issues with cool down → 4 weeks delay
- RF tests at cold ongoing now CM1&CM2
- Indications of field emission at ~ 5 MV/m
- Several technical unknowns still laying ahead
- Impact on start of Physics run to be assessed