PHASE II IN WARM REGIONS

O. ABERLE

Collimation Working Group

07/06/2010

Overview

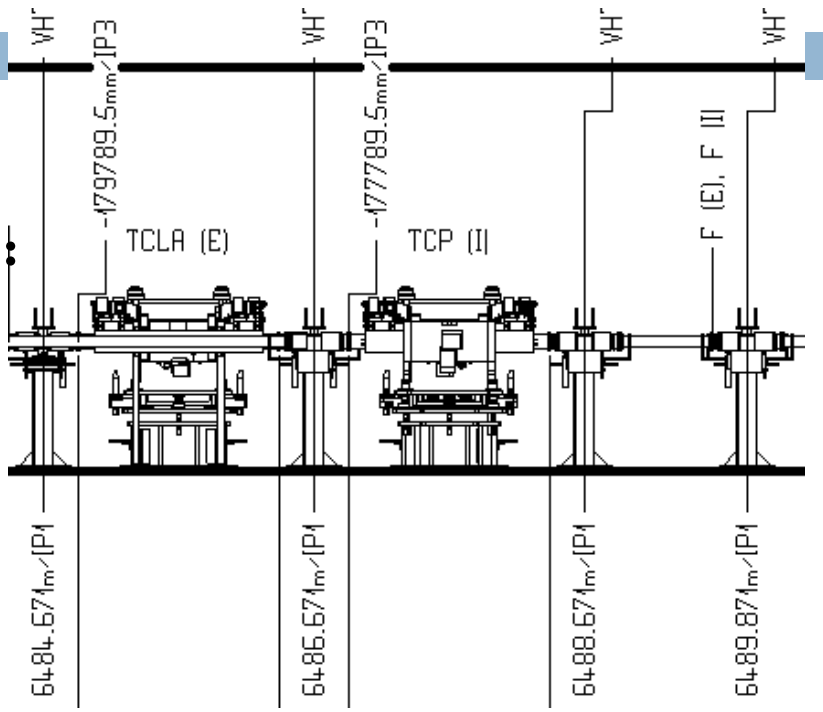
- Planned for 2012/13
  - Objectives and schedule
- Situation today
- To be done
  - 1 : In Point 3 (LSS)
  - 2 : In the other points
- Summary
- Questions and Discussion

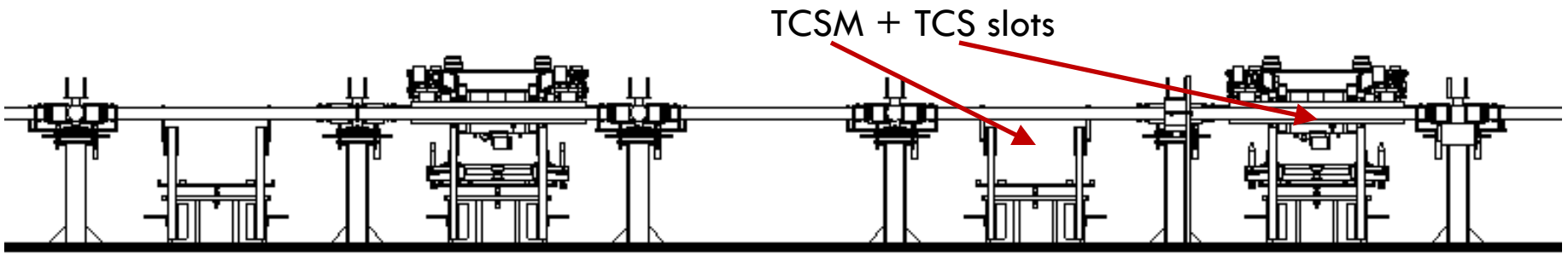
Planned for 2012/13

- **Year 2011:**
  - Summer: Review of lessons with LHC beam. Approval of construction plan to 2015.
  - Continuation cryo work and production for IR3 at full speed.
  - SPS and HiRadMat beam tests for phase 2 secondary collimators.
  - Start production of additional collimators: industry, CERN, SLAC.
- **Long shutdown end 2011 to beginning 2013:**
  - Implement cryo modifications and install 4 "cryo-collimators" for both IR3 dispersion suppressors.
  - Implement combined betatron/momentum cleaning in IR3 (install 10 collimators into the IR3 warm region).
- **Year 2013:**
  - The IR3 cryo collimation is operational. Combined betatron/momentum cleaning system is available in IR3.
  - Better collimation efficiency and lower impedance. Should allow for increased p and ion intensity.
  - Losses can be almost fully relocated to IR3 in case of IR7 problems with radiation to electronics.
- **Long shutdown 2014/15:**
  - Install 4 TCLP collimators in IR1 and IR5 (requires removal of TOTEM Roman Pots).
  - Implement **cryo collimation in IR7 and IR2.**
  - Install 30 phase II secondary collimators in IR3 and IR7 (complementing existing phase I collimators).
  - Install 2 hollow e-beam lenses as scrapers.
  - Install 2 new TCT's in IR2 to solve ZDC acceptance problem.
  - Install 2 tungsten collimators in IR6 (improved cleaning downstream of TCDQ, avoid quenches of Q4).
  - Install the agreed remote handling for the highly radioactive LHC cleaning insertions.
  - Install missing equipment for IR7 air ducts and commission modified ventilation and air conditioning.

Situation today

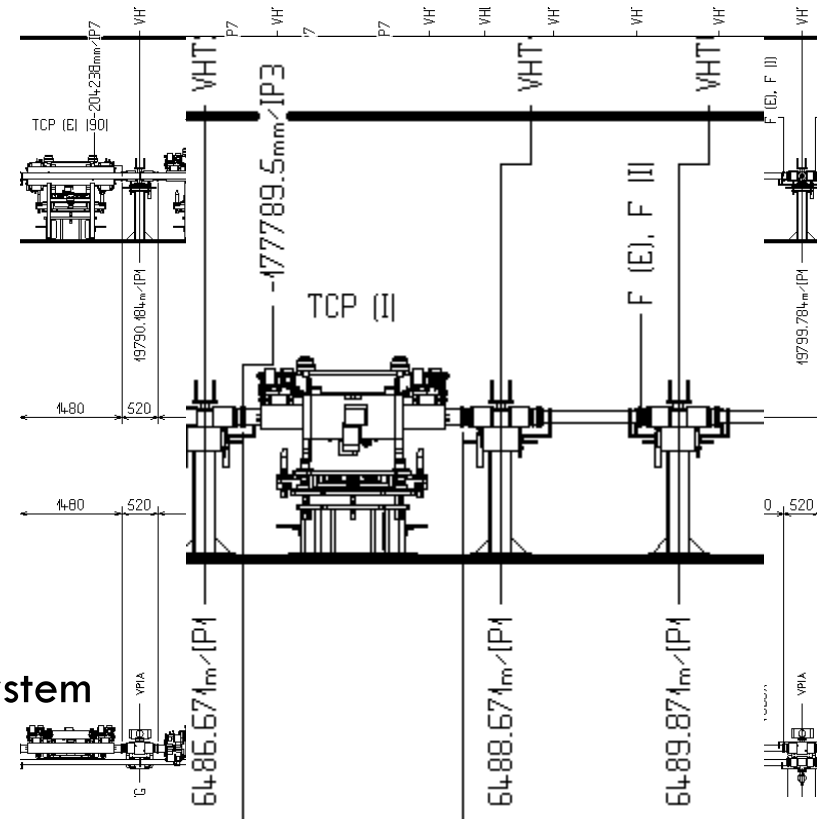
- IR 3 and IR 7
  - 8 + 22 TCSM locations prepared:
    1. Base support installed
    2. Cables up to the last few meters ready (No BPM!)
    3. Rack space reserved, has to be reorganized
    4. Vaccum replacement chambers ok





To be done in 2012/13

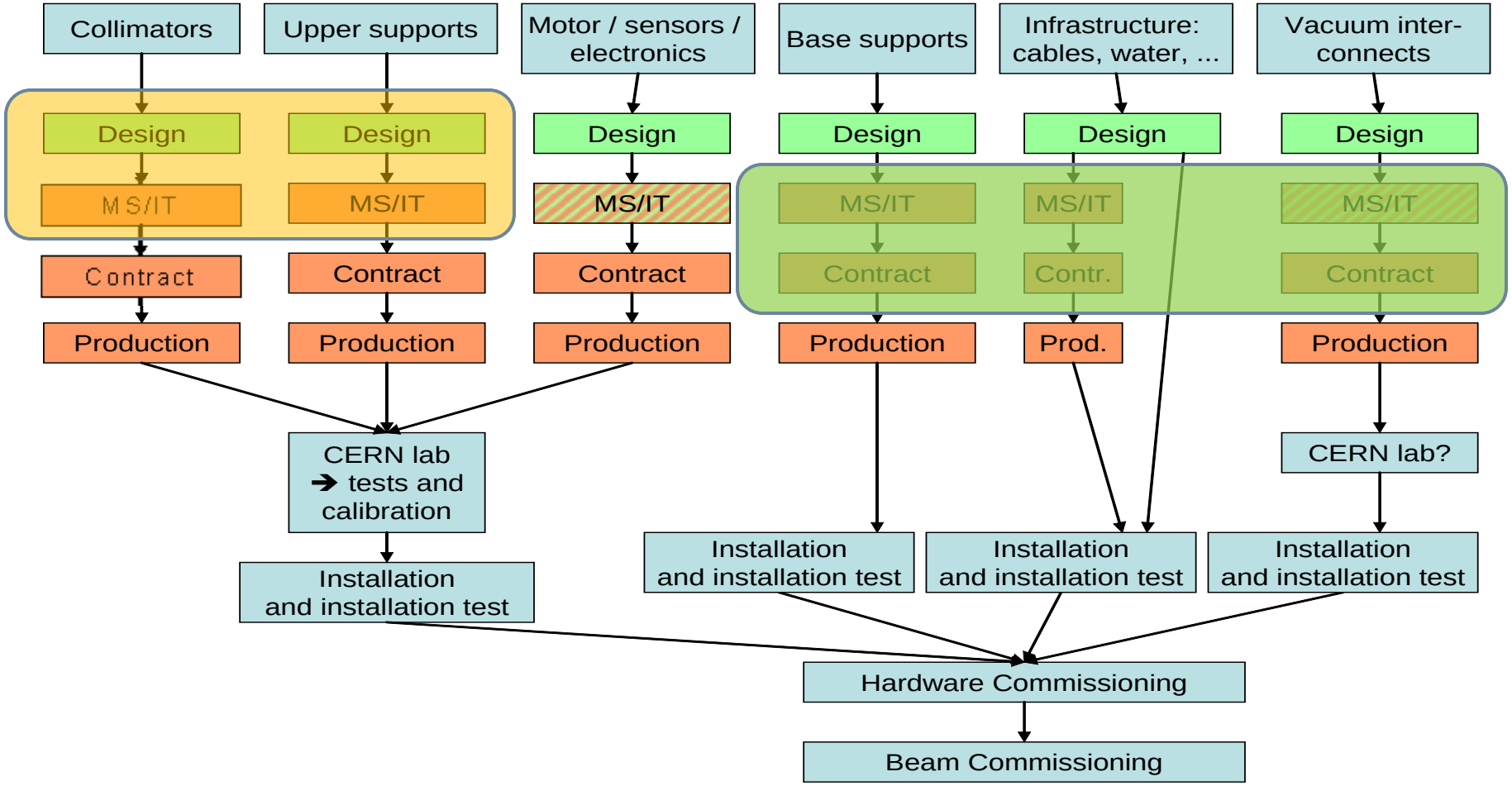
- IR 3 in 2012/13 (combined betatron/momentum cleaning in IR3)
  - 8 locations of phase 2 (TCSM) ok
  - Use Scraper location for additional TCP, Layout modification (Cooling and cables ok, supports and vacuum chambers to do)
- IR 7 in 2012/13
  - 22 locations to be equipped with phase 2 plug-ins. Alignment of supports for phase2.
- Points to work on:
  - Pull cables for BPMs (IR3 and IR7)
  - Work on flow rate/distribution for the final system (flow-fix?)
  - Auto retraction – clutch?



To be done for 2014

- IR 1 and 5
  - 4 TCLP's (at Roman pot location)
  - Install supports, alignment
- IR 2
  - 2 new TCT's
  - Infrastructure not prepared
- IR 6
  - 2 new TCT's (TCLA)
  - Infrastructure not prepared

To be done for phase 2



Summary

- Implement combined betatron/momentum cleaning in IR3 (install 10 collimators into the IR3 warm region) straight forward
- 5 TCS and 3 TCP spares available
  - 4 collimators in radioactive storage
  - 1 TCS with the vacuum group for testing. Leaking!
  - 1 TCLP with the tansport group for remote handling
- New supports, plug-ins, cables, control systems etc.

Questions and Discussion

- Number of new collimators to be produced?:
  TCS
  TCP
  TCT at CERN!
- Change scraper locations (2) in IR 3 to TCP?
  Change scraper locations (6) in IR 7 to hollow ebeam-lense?
- Integrate TCT‘s into the Layout (IR 2 and 6)
- Move and/or install TCT‘S to Point 1 and 5?
- Production conflicts within central work shop, B 252 and B 867!

Spare slide

IR	Hardware	#	Justification	Construction	Infrastructure
1	TCLP installed	2	Interaction debris for **nominal luminosity**	OK	prepared
	TCTH, TCTVA moved	4	Phase 1 IR upgrade (if change in D2-D1 region)	OK	move
	TCT (new type?) installed	4	Phase 1 IR upgrade (reduced aperture in matching section)	new	new
2	TCTH installed	2	Improve **signal acceptance in ZDC**	new	new
	TCRYO installed	2	Remove limit on **ion luminosity**	new	new
3	TCSM installed	8	**Lower impedance (1/2), faster setup (h → s), longer lifetime LSS3 (x 3)**	new	prepared
	Shift positions of 24 SC magnets by 3m, 3cm		Space for collimators at critical loss locations		
	TCRYO installed	4	**Better efficiency (x 15-90)** with collimators in SC dispersion suppressor	new	new
5	TCLP installed	2	Interaction debris for **nominal luminosity** (after removal of Roman Pots)	OK	prepared
	TCTH, TCTVA moved	4	Phase 1 IR upgrade (if change in D2-D1 region)	OK	move
	TCT (new type?) installed	4	Phase 1 IR upgrade (reduced aperture in matching section)	new	new
6	TCLA installed	2	**Reduce quench risk** after TCDQ	new	new
7	TCSM	22	**Lower impedance (1/2), faster setup (h → s), longer lifetime (x 3), lower R2E (1/8 – 1/2)**	new	prepared
	Shift positions of 24 SC magnets by 3m, 3cm		Space for collimators at critical loss locations		
	TCRYO installed	4	**Better efficiency (x 15-90)** with collimators in SC dispersion suppressor	new	new