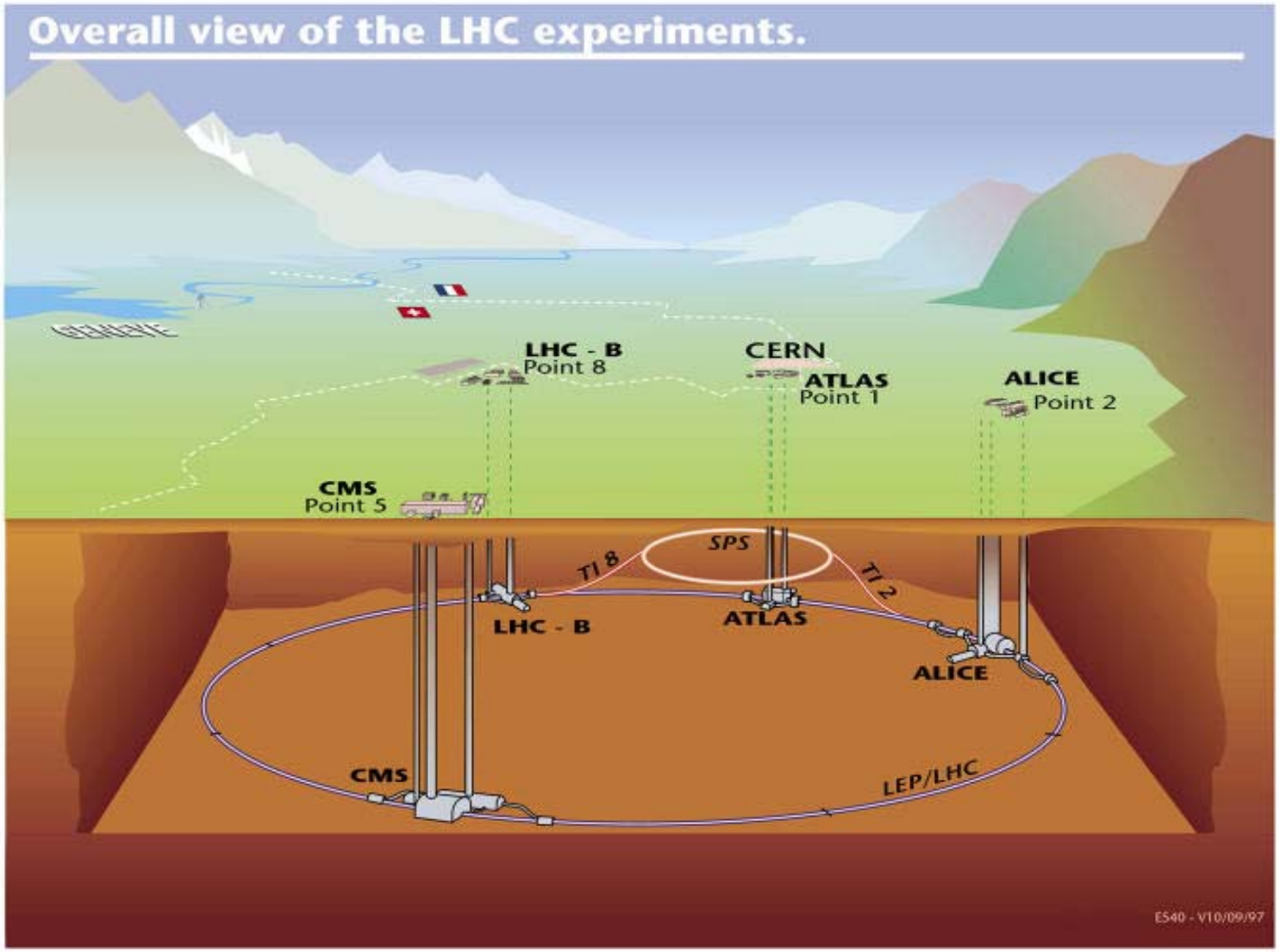
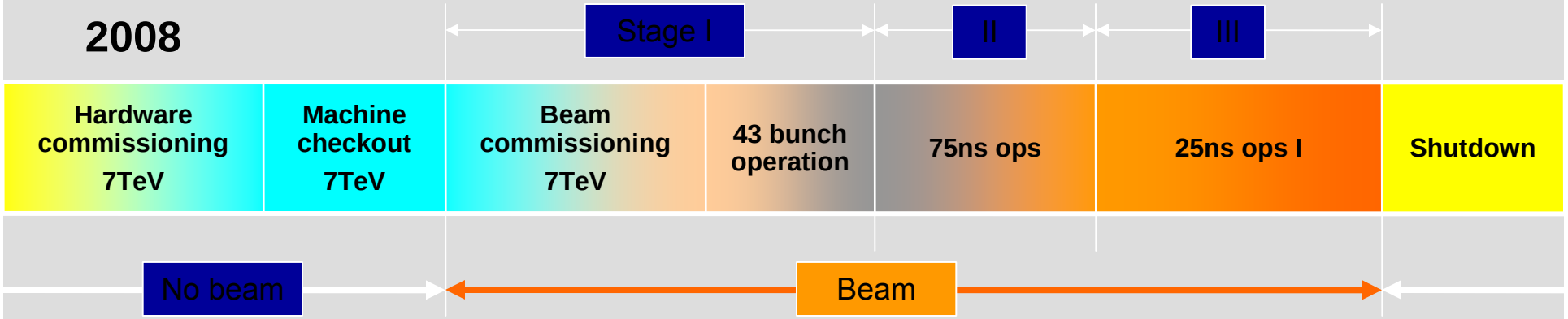
CMS:
Opportunities for Additional Support



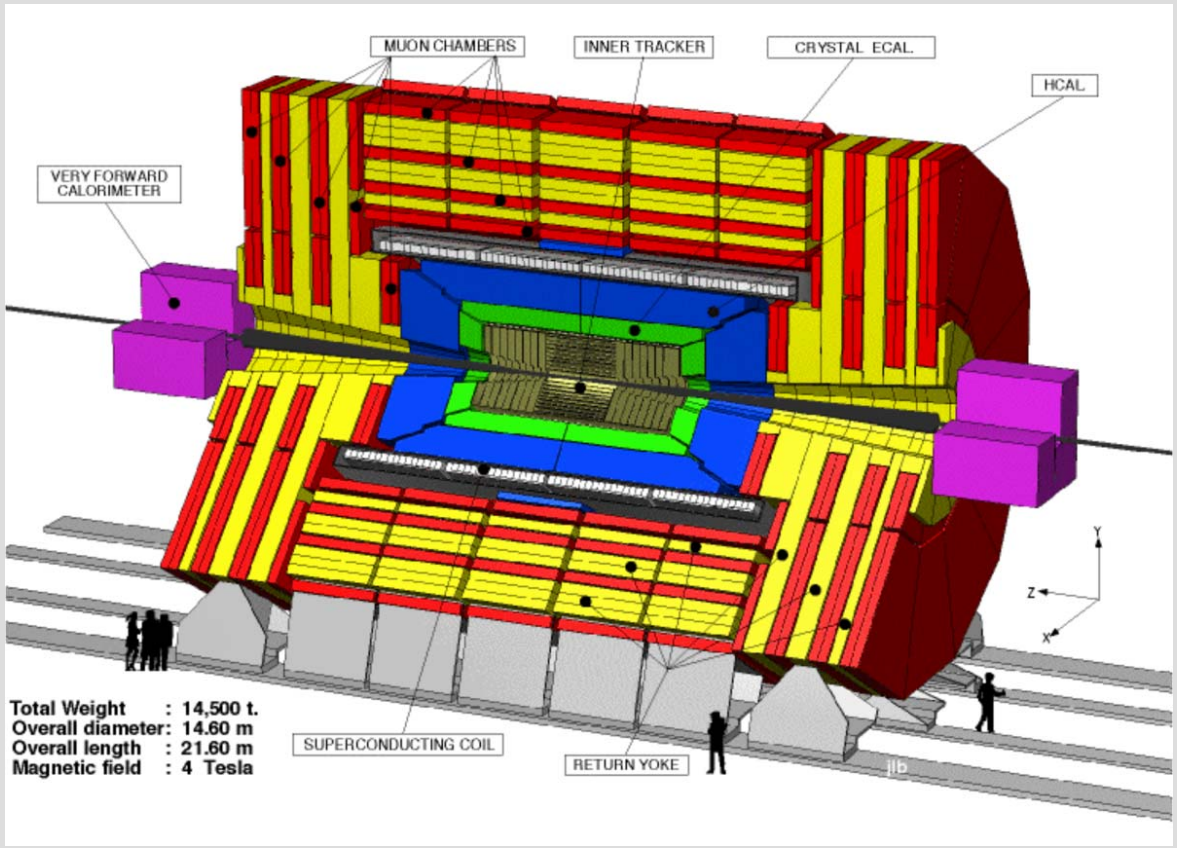
LHC Schedule

- Last magnet installed — March 2007
- Machine and experiments closed — 31 August 2007
- First collisions — November 2007
  - Engineering run at $\sqrt{s}$=900 GeV
  - Squeeze only toward end of run, L~10^{29} $cm^{-2}s^{-1}$
  - 3 month shutdown over winter months
- 75ns commissioning down to 25ns — April-October 2008
  - First collisions at $\sqrt{s}$=14 TeV
- Half intensity at 25ns — 2009 physics run
  - Followed by longish shutdown

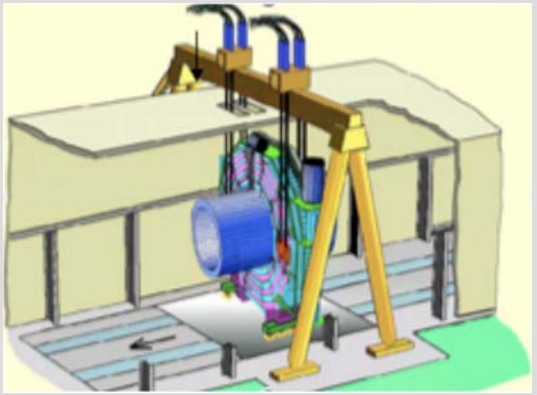


UXC55 Installation Schedule

Section	CMS Designation	Weight in tonnes
1	HF+	250
2	YE+3	410
3	YE+2	880
4	YE+1	1310
5	YB+2	1250
6	YB+1	1250
7	HB+	700
8	YB0	1920
9	HB-	700
10	YB-1	1250
11	YB-2	1250
12	YE-1	1310
13	YE-2	880
14	YE-3	410
15	HF-	250

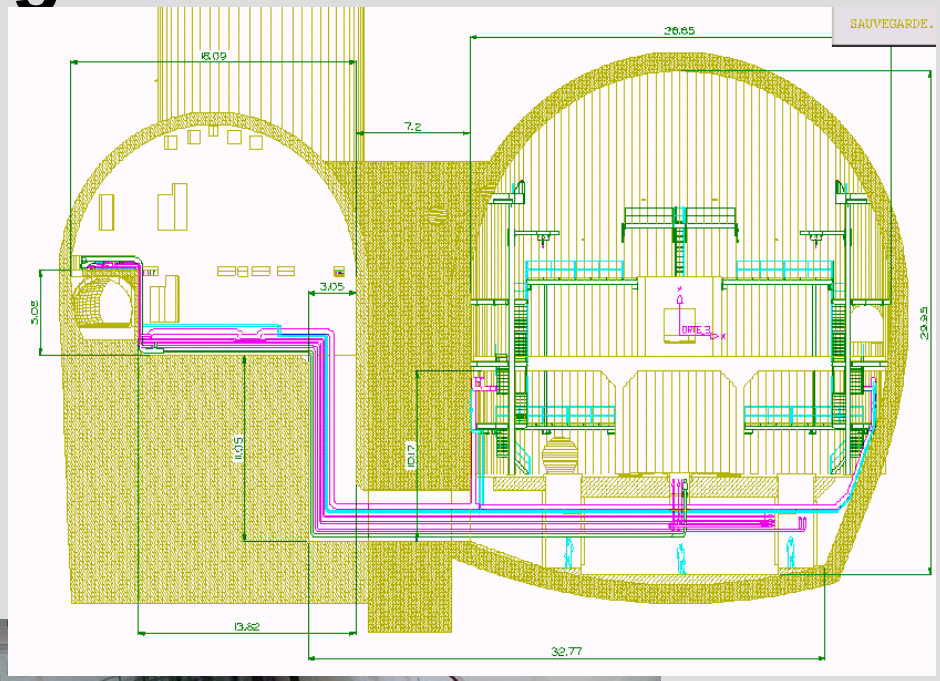


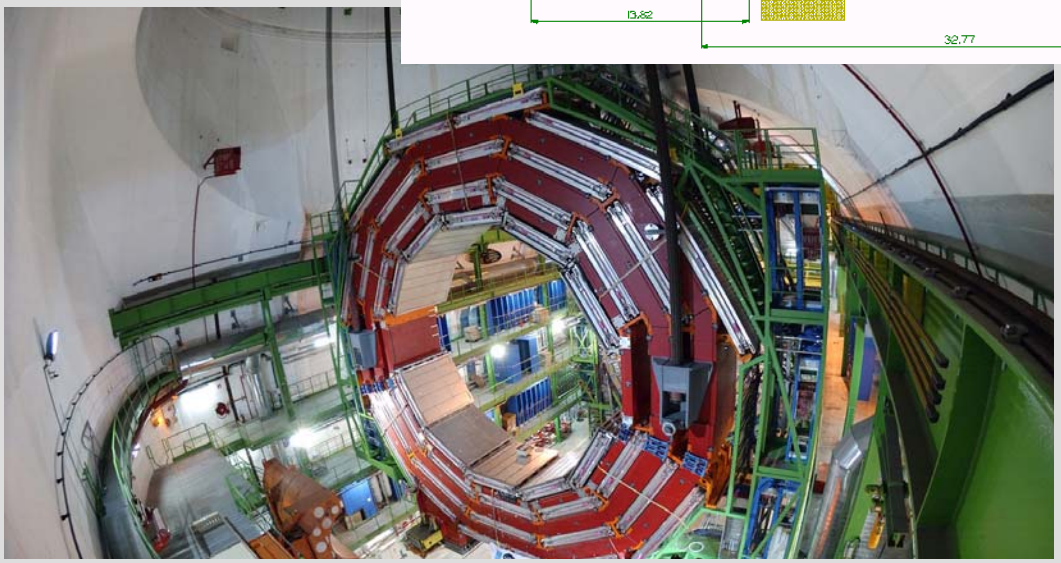
"15 piece jigsaw puzzle"



CMS Underground Caverns

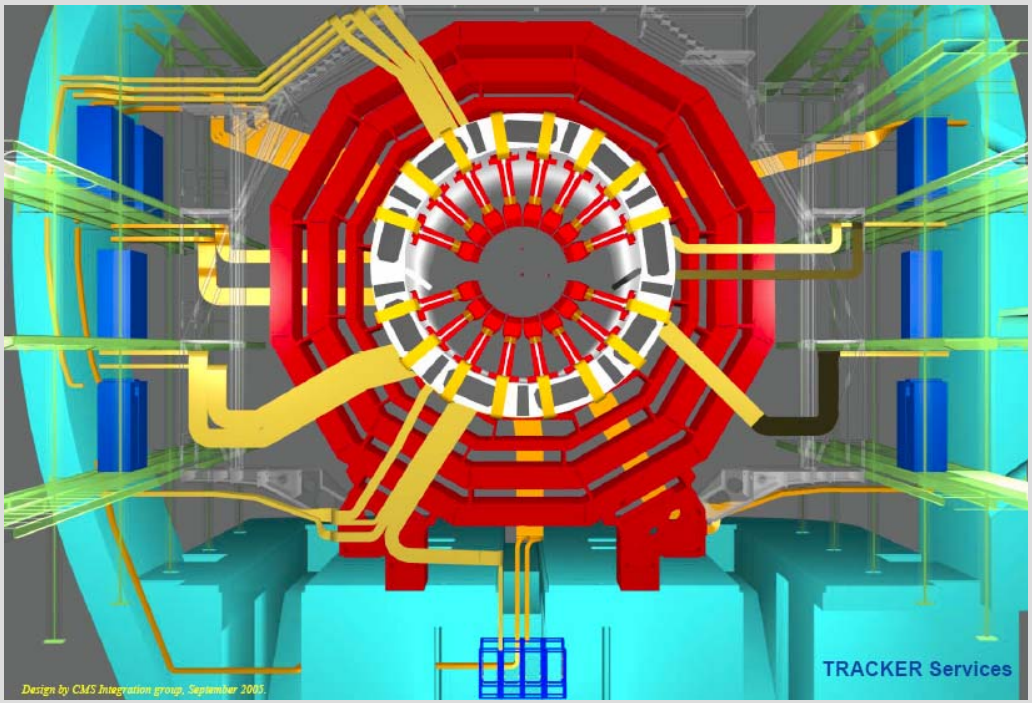
Tracking System connections:
Fiber optics
Low voltage cables
Cooling pipes (C_6F_{14})
gas

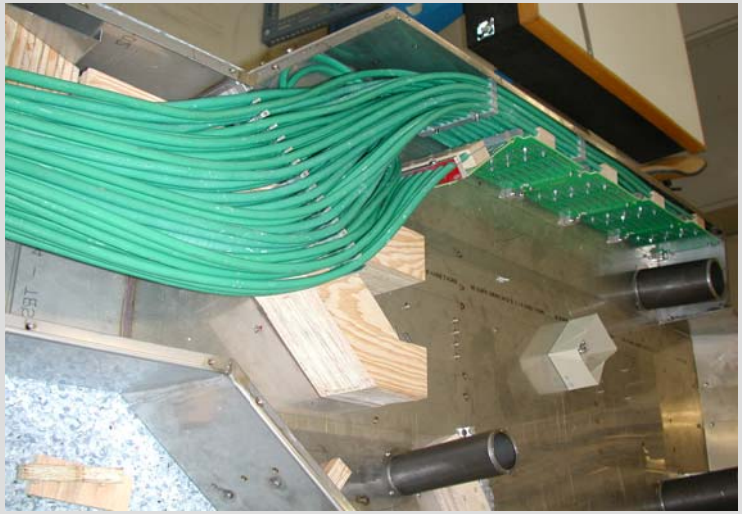




YB2 lowered on January 19

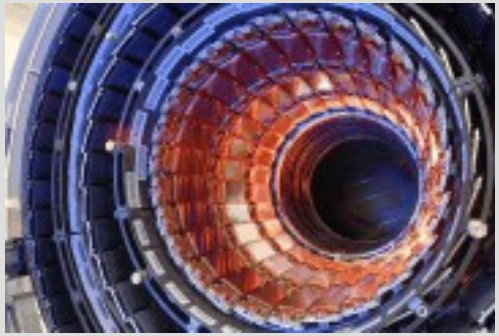
Tracker Services



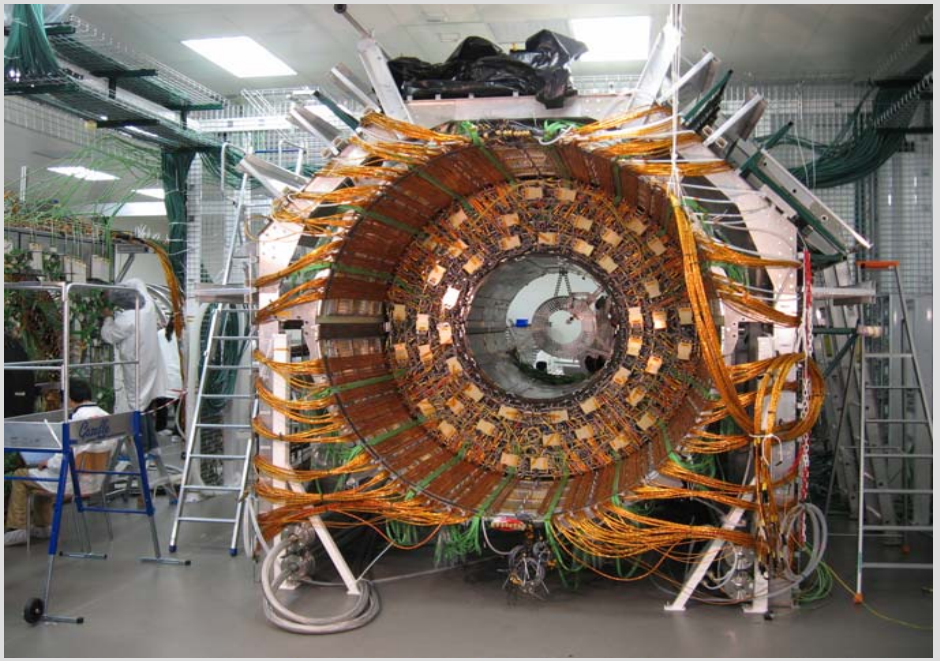


Organized in PP1's in 53º crack.

Tracking System Readiness



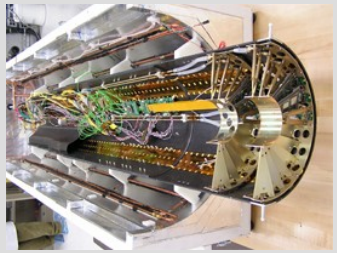
TIB/TID+



TOB inside thermal screen

TEC+

All strip modules at Tracker Integration Facility since last year. Slice tests now underway. Will need to stop ~May in preparation for move to Point 5. Over 70 million channels in final Tracking system!



Two forward pixel half disks, recently delivered for the engineering run.

Tracker Integration Schedule

- YB0 lowered (February)
- HCAL +/- installation 2 weeks
- PP1 +/- installation 1 week
- HCAL/ECAL pipework 3 weeks
- Tracker pipework 8 weeks
- Tracker cables 6 weeks
  - 11 cables/shift, 2 shifts/day, 4 crews/shift 5 days/week
- ECAL cabling + Tracker fibers 8 weeks
  - 2 shifts/day, 2 crews/shift, 6 days/week
- Infrastructure installation 5 weeks

33 weeks

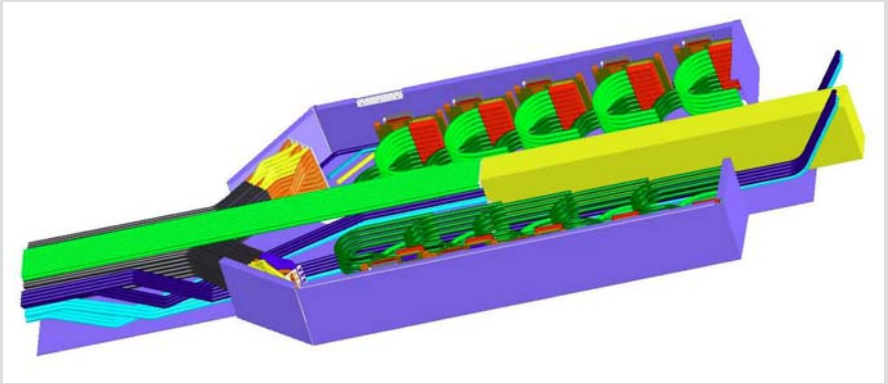
From December CMS Week Tracker meeting presentation by S. Moccia. Many operations necessarily serial.

Tracker Integration Schedule cont.

- The installation of CMS Tracker services is clearly a critical path item.
- In addition to the actual installation of services there is a LOT of engineering and drafting work that needs to be done in support of this effort.
- Recent discussions involving CMS Management have led for an appeal for additional resources to help cope with the very tight schedule.

In the words of one anonymous wit: “It is clear that a SURGE is needed…”

On-going PPD Effort on Integration



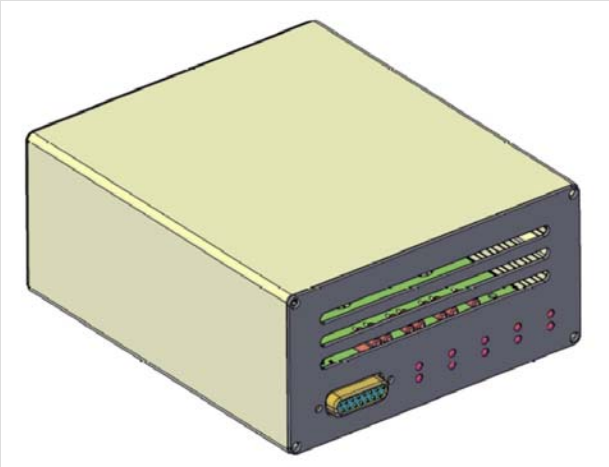
- Stefano Moccia
  - In residence at CERN
  - Recently assigned to CMS Integration office; playing critcal role in Tracker I&I effort.
- Linda Bagby
  - Layout of Tracker services
  - Stack 4 boards (PP1)
  - At least 6 months effort in 2007

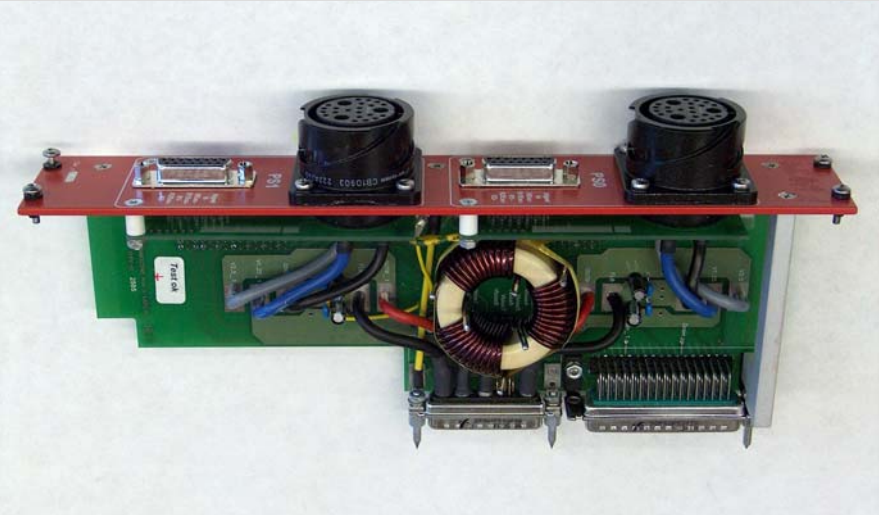
http://www-ppd.fnal.gov/EEDOffice-w/Projects/CMS/Silicon_TRacker/index.html

- Patch Panel 1 (PP1) boxes
  - 2*16 stainless steel shallow boxes
  - Marvin Johnson (ret., CERN) and Dick Loveless (WI)

- Pixel PP1 design, modeling, and installation
  - Rauch, 4 months 50-60%
  - Howell, small fraction

On-going PPD Effort on Integration





- PP1 Boards
  - 224, 9 connector boards
  - Green, Huffman
  - Will assemble locally in February and March
- PP1 Control Stack 4 boards
  - 3-connector boards similar to PP1 9-connector boards
  - 236 connector pairs for TOB/TEC
  - 120 pairs for TIB/TID
  - Bagby, Green, Huffman
  - Through April
- PP1 load boxes
  - 20 boxes to test installed LIC cables
  - Green, Huffman
  - Complete by March?
- CAEN power supply filter addition
  - Engineering (Johnson), Green, Huffman
  - ~1 month

http://www-ppd.fnal.gov/EEDOffice-w/Infrastructure_group/Huffman/Web/default.html

New Opportunities

- PP1 freon piping layout
  - Define 3D layout of pipes inside PP1
  - ~20 construction drawings
  - Some input needed by end of February; several months effort
  - Complicated pipe bends $\Rightarrow$ imply pre-bending on CNC machines
  - Will require close contact with Marvin Johnson and Dan Wenman (WI PSL), Rauch?
- Dry air system for the Tracking system
  - Design and build a rack or panel that carries all the manifolding and instrumentation for pressure and flow regulation and safety devices.
  - Standalone project following initial visit to CERN
  - Del Allspach? UCSB engineers?
  - Needed by August
- Control system to prevent condensation on the insulation surrounding the cooling pipes
  - Heating wires will be identified and purchased in the next few weeks.
  - Engineering is needed for a system to control the heating: power supplies, interlocks, etc.
  - Needed by end of year.

New Opportunities

- Cooling pipe routing on balconies
  - Requires presence at CERN due to many interference issues
  - 2 months of designer time
  - Needed by mid-April
- Detailer to work with Stefano
  - 5 ton, 10m^2 platform for 6m working height
  - Tooling for Tracker pre-cabling work from PP1's to balcony racks.
  - Work could be done at FNAL with some travel to CERN
  - Platform drawing needed by mid-March
- Supervisors for technician crews?
  - Willingness to work long hours and linguistic abilities in either Bulgarian, Chinese, French, or Russian would be considered a plus.

Except for the last point the input was provided by Stefano Moccia.