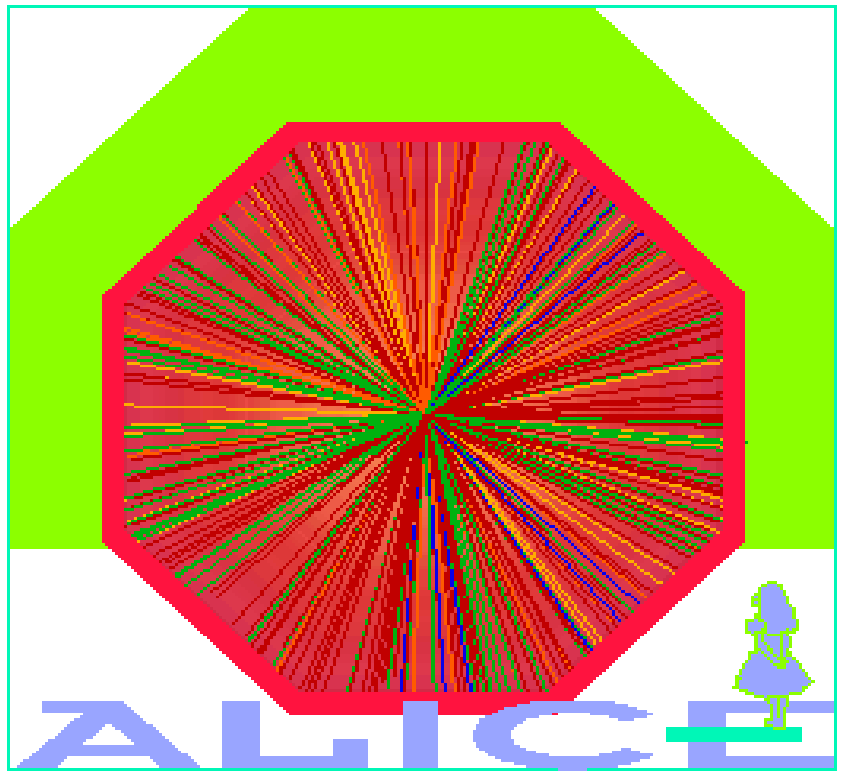
20th ALICE RRB

- Collaboration Status
- Project Status
  - ⇨ Integration, large structures
  - ⇨ Detectors (selection)
  - ⇨ Milestones & Summary



Organization & News

- Institutes:
  - ⇨ New: Frascati (Italy) — emcal project
  - ⇨ Applying: ISS Bucharest (Romania) — Grid computing
  - ⇨ Left: Lisbon (Portugal) — was inactive, no MoU signed

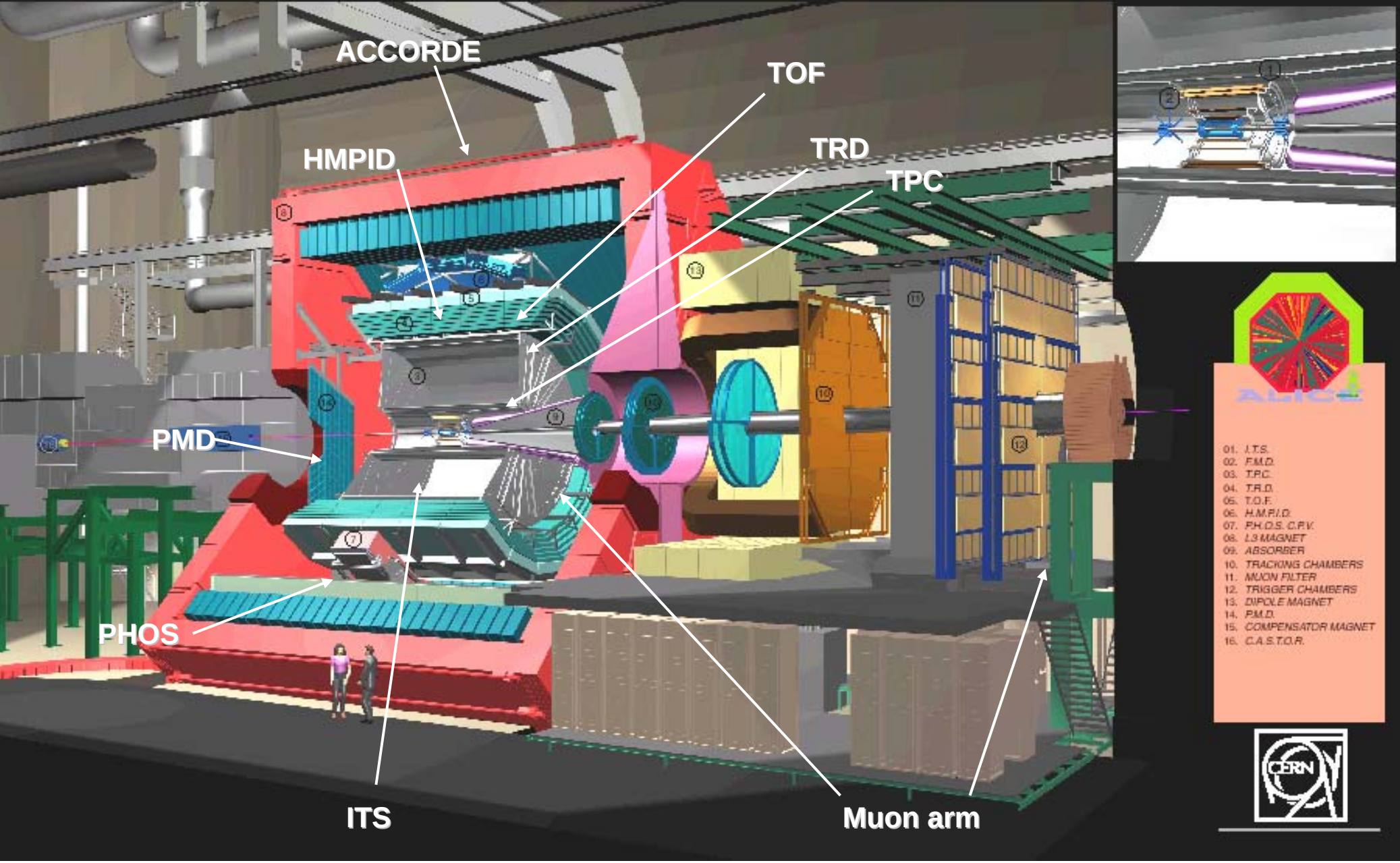
- Elections
  - ⇨ C. Fabjan re-elected as Technical Coordinator until mid 2008

- Organization
  - ⇨ Procedure for M&O payments approved
    - ✪ along the lines of Atlas/CMS (see H. de Groot's talk)

- LHCC
  - ⇨ Physics Performance Report Vol II — submitted — December 2005
    - ✪ PPR Vol I submitted end 2003, published in J. Phys G **30** (2004) 1517
  - ⇨ Computing TDR — approved — March 2006
  - ⇨ EMCAL TP — submitted — April 2006
  - ⇨ 6th ALICE Comprehensive Review — March 2006

Funding Issues

- US participation: **EMCAL for jet physics**
  - ⇨ 110 ton emcal, shashlik type (Pb-Sci), $\Delta y = 1.4$, $\Delta\Phi = 110^0$, PHOS R/O + electronics
    - ✪ under discussion with US since > 5 years
  - ⇨ **DOE project review (CD0)** Dec. 2005 with **very positive outcome**
    - ✪ scope: 5-12M$, 30-50 PhD,~10 new Institutes (LLNL, LBNL, ORNL, Wayne State, …)
    - ✪ full project needs European participation, activities in France & Italy started
  - ⇨ **time schedule as driven by physics:**
    - ✪ full calo before **2010 Pb run (**3rd HI run)
    - ✪ support structure is funded (US), has to be installed in **August 2006**
    - ✪ first module installed WS **2007/2008**,
    - ✪ finalize financial support in US & Europe between **end 2006 and early 2007**
    - ✪ in parallel : TP to LHCC by **April 2006**
- Other countries
  - ⇨ **China (~ 1.7 MSF): PHOS, Installation** **MoU signed** by MoE end 2005
    - ✪ discussions ongoing with additional FA's in China to increase the scope for PHOS
  - ⇨ **Germany (~ 5 ME): TRD completion, under discussion, looks promising**
  - ⇨ **Japan (~ 10 M$): TRD, PHOS several new proposals submitted, decisions by mid2006**



ALICE Detector

Planning

- Physics
  - ⇨ 'day 1' physics in 2007 with pp: **global event properties**
  - ⇨' early pp physics' 2007/2008: **detailed studies** of pp ('QCD at 14 TeV')
  - ⇨ first long heavy ion run **end 2008**

- work-plan until mid 2007
  - ⇨ ALICE schedule assumes experiment closed by 1 May 2007
  - ⇨ with current LHC schedule, this leaves 2 months for final commissioning
    - ✪ some small fraction of this could also be considered 'contingency'
    - ✪ will be revisited in case LHC schedule is modified
  - ⇨ expected start-up configuration mid 2007
    - ✪ **complete**: ITS, TPC, HMPID, muon arm, PMD, trigger dets (V0, T0, ZDC, Accorde),..
    - ✪ **partially complete**: PHOS(1/5), TOF(9/18), TRD (3/9 funded),
- beyond mid 2007
  - ⇨ 'Installation activity expected to continue beyond that date'
    - ✪ parts of the modular detectors (**TOF, TRD, PHOS**)
    - ✪ **EMCAL**

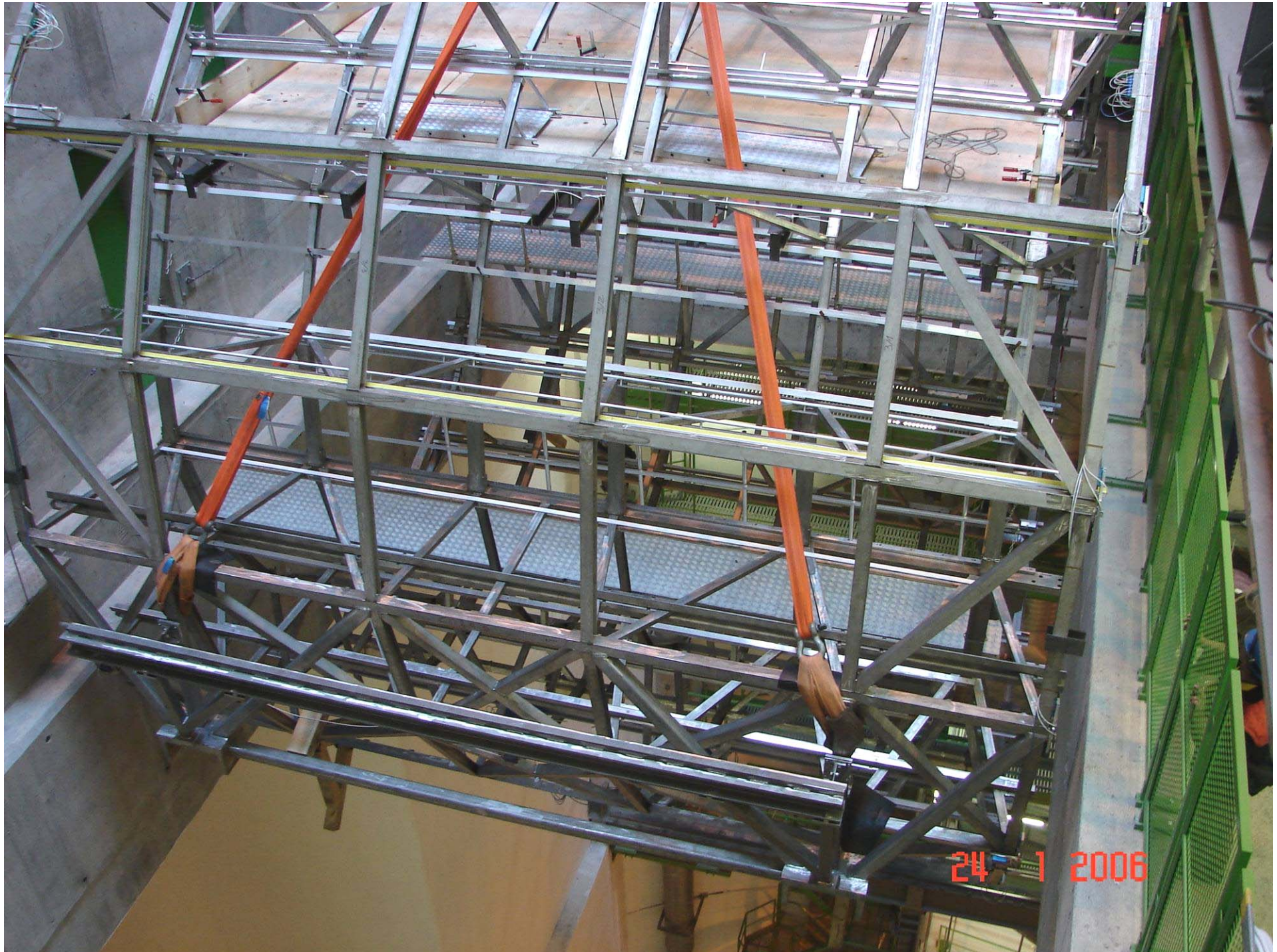
Installation Milestones

PHASE	Detector	Start	Finish
	Muon detectors	Apr 2006	Mar 2007
PHASE 2	Infrastructure / Absorber / Space-Frame	09.01.2006	03.04.2006
	HMPID/TOF/TRD mechanical insertion tests	2.05.2006	30.06.2006
	Magnet Power test	7.06.2006	9.06.2006
	PHOS/TOF/TRD/HMPID, Acorde, EMCal support frame	20.07.2006	01.09.2006
PHASE 3	Initial TPC installation	04.09.2006	02.10.2006
⟹	ITS Barrel (SDD,SSD) + Vacuum (central Be chamber) + Bake-Out	03.10.2006	08.11.2006
	FMD/V0/T0 (C side)	09.11.2006	28.11.2006
⟹	Pixel + ITS barrel + services	29.11.2006	10.01.2007
	TPC + ITS in final position	11.01.2007	30.01.2006
PHASE 4	TOF/TRD 2nd installation window	31.01.2007	06.03.2007
	Compensator platform / Mini Frame (services)	07.03.2007	03.04.2007
	FMD/V0/T0/PMD and Vacuum (A side)	04.04.2007	23.04.2007
	Final Vacuum Commissioning	24.04.2007	End April 2007
	Commissioning and Mobile Shielding	01.05.2007	Start LHC

Installation, Large Structures

- Space frame
  - ⇨ **installed inside L3,** TOF/TRD rails aligned
- Muon absorber (incl. vaccum chamber) & muon support structure
  - ⇨ installation **completed**
- Installation, services, infrastructure
  - ⇨ **contract** for gas/cooling pipes **signed**, work **started**
  - ⇨ **installation** of racks, cables, bus bars etc.. **ongoing**
- Overall Status
  - ⇨ progress & performance **satisfactory**
    - ✪ structures & magnets essentially completed (2 small spaceframes to come)
  - ⇨ **no major concerns, but large effort ahead in service installations !**
    - ✪ significant amount of work: ~ 30 km pipes, 10 000 cables (500 km)
    - ✪ coordination of large number of parallel activities

Moving the space frame into UX2 (Jan 2006)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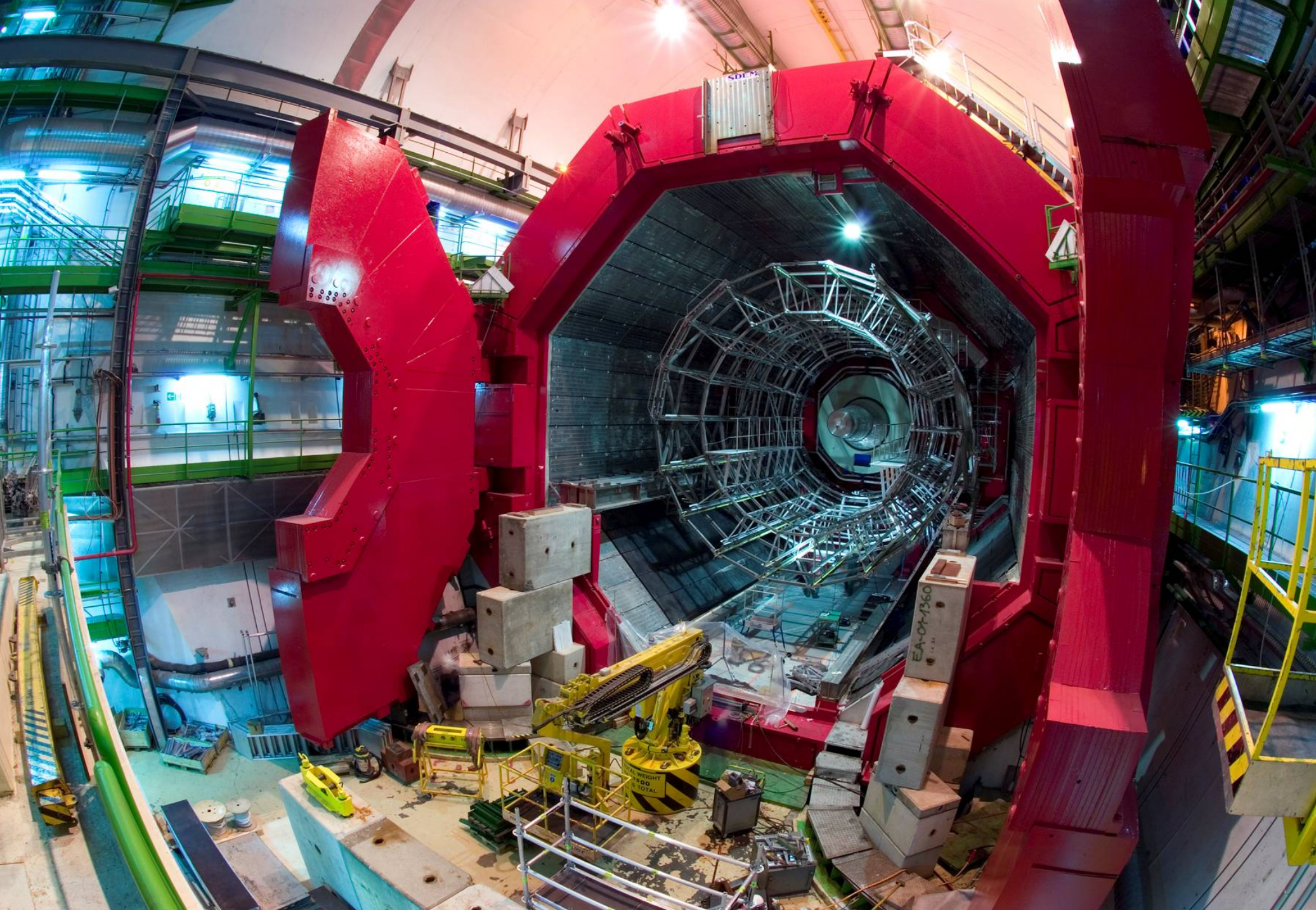
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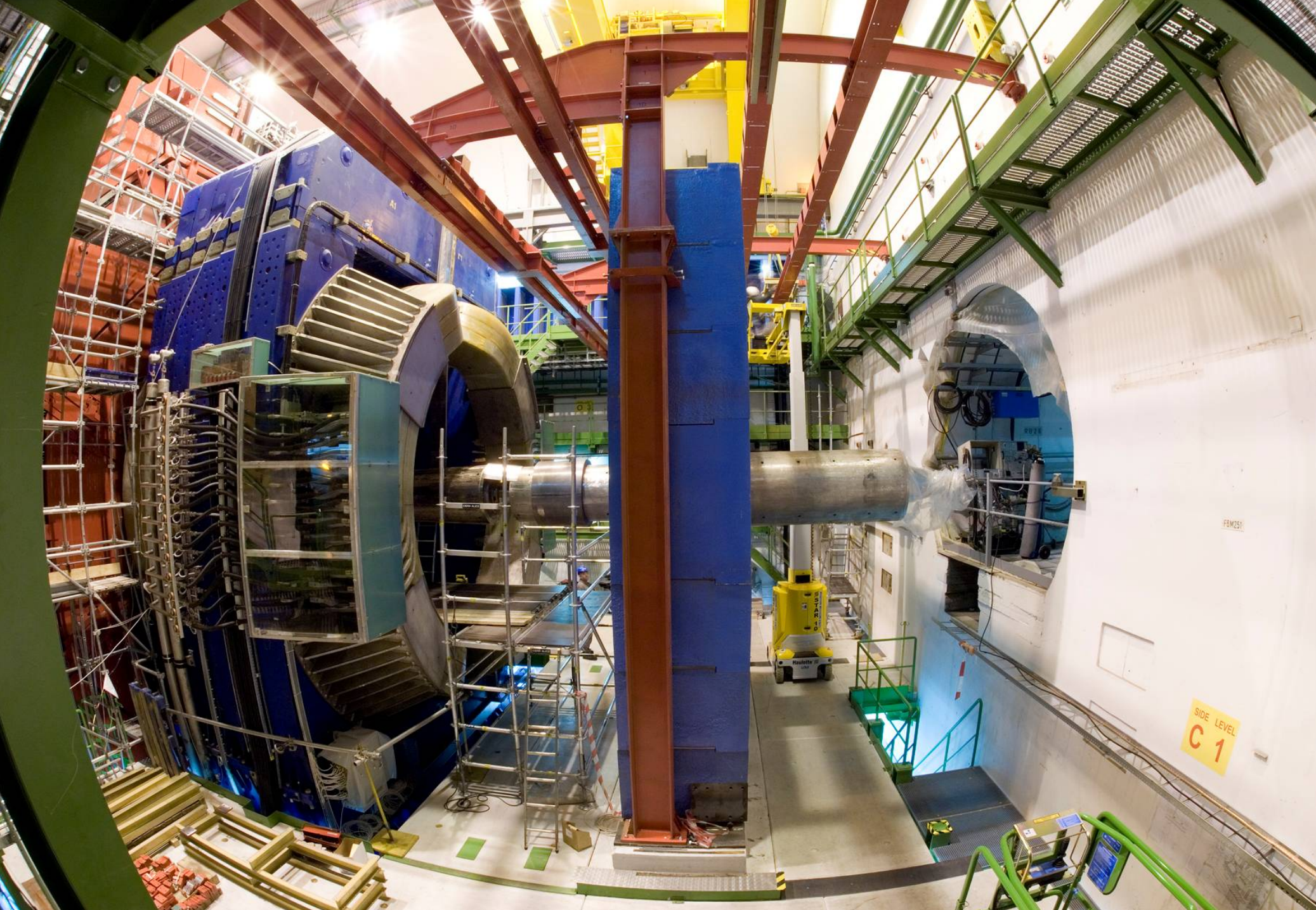
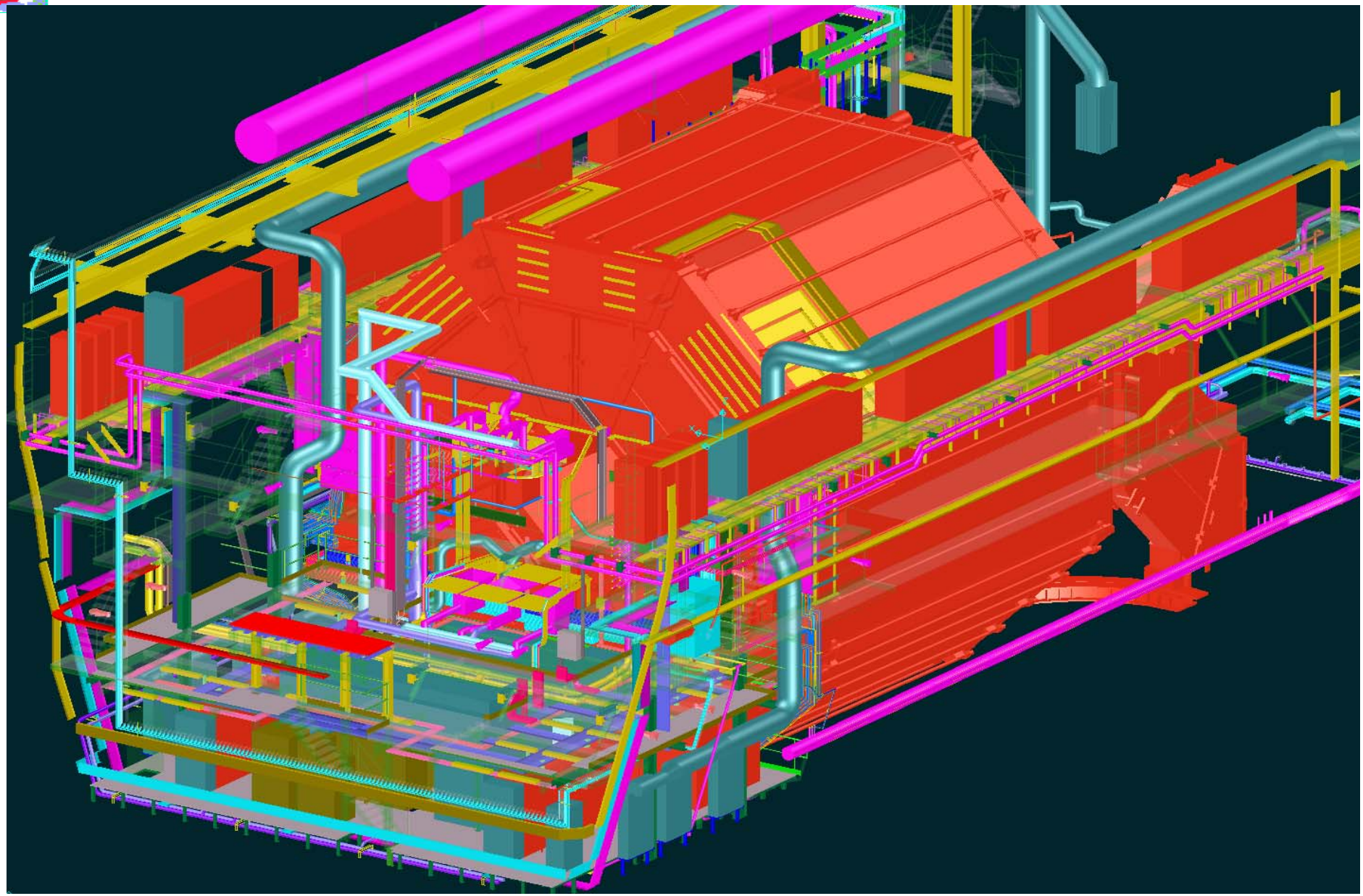
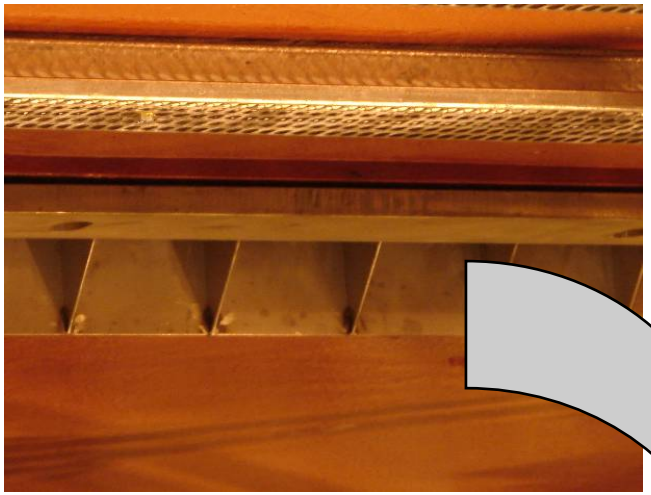

SIDE LEVEL
C 1

Primary services (Power/Cooling/Ventilation)

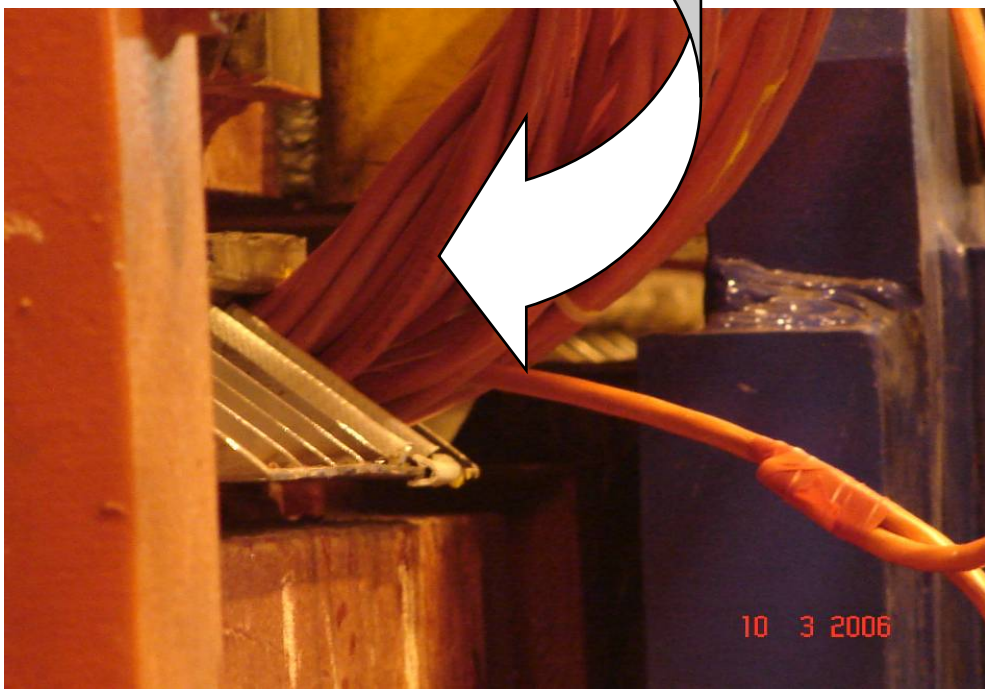


Infrastructure and services

Cable Installation

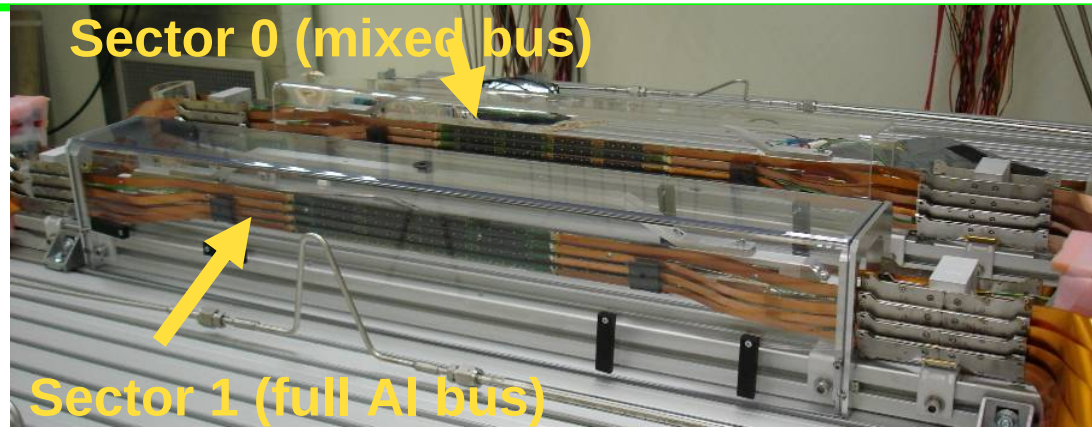


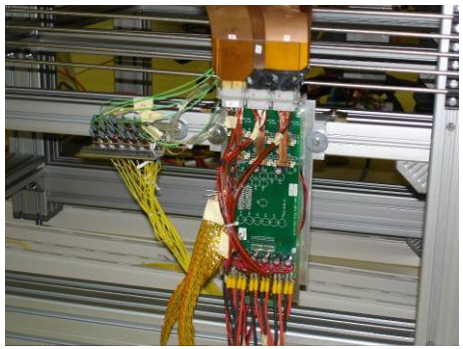
Cable ducts in L3 door

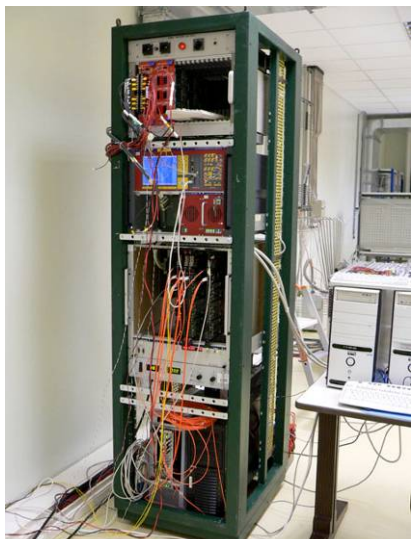


Silicon Pixels SPD

- **2 sectors (20%) under test in DSF**
  - ⇨ integration (cooling, electronics, DAQ, DCS,..)
  - ⇨ 3rd sector assembly completed
- Components production & test
  - ⇨ bump-bonded ladders ≈ 180 out of 240
  - ⇨ Al/polyimide pixel bus ≈ 50 out of 120
  - ⇨ all other components uncritical & in time
- Schedule
  - ⇨ **assembly time reduced** ≈ 4 weeks/sector
  - ⇨ 3 unrelated accidents (probe station/bonding/fire)
    - ✪ lost 3-4 weeks (gain in contingency lost !)
  - ⇨ **assembly**: 50% June, 100% October
  - ⇨ **ready for installation date end November 2006**
    - ✪ **schedule still on time,** but w/o contingency
- Concerns
  - ⇨ **extremely tight schedule**
  - ⇨ manpower (testing, sector assembly, integration)

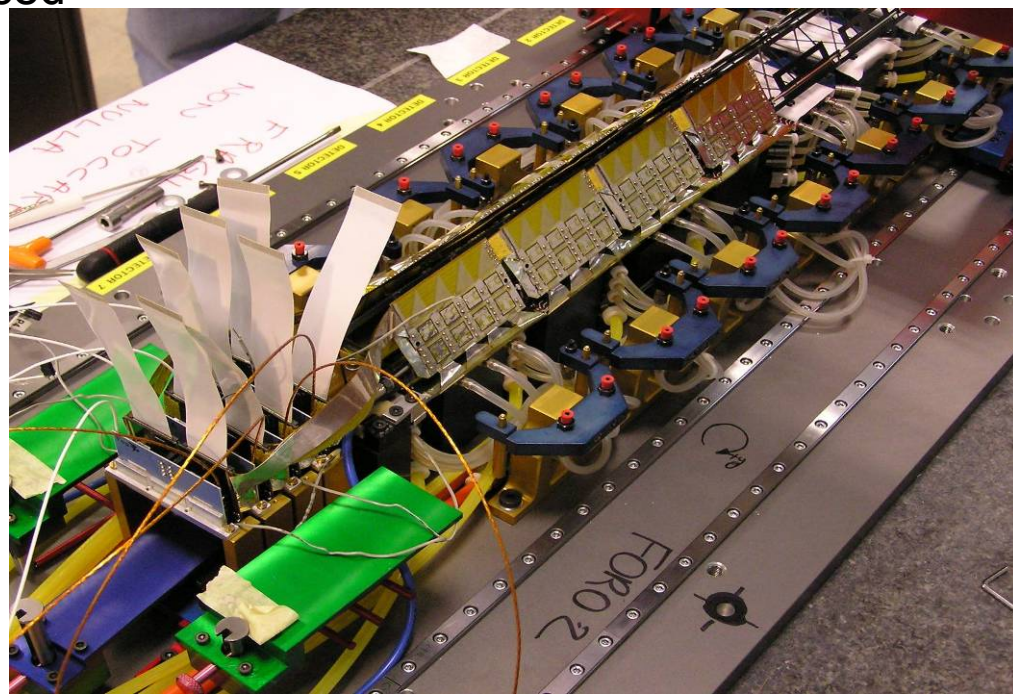






Silicon Drift Detector SDD

- **Status**
  - ⇨ detector production **increased (now 40 det/month)**
    - ✪ 212/260 (80%) acceptable detectors produced
    - ✪ yield somewhat improved (~60%)
  - ⇨ modules: 60% completed
    - ✪ rate (4/day) and yield very good
  - ⇨ ladder Assembly : mass production just starting after cable deliveries

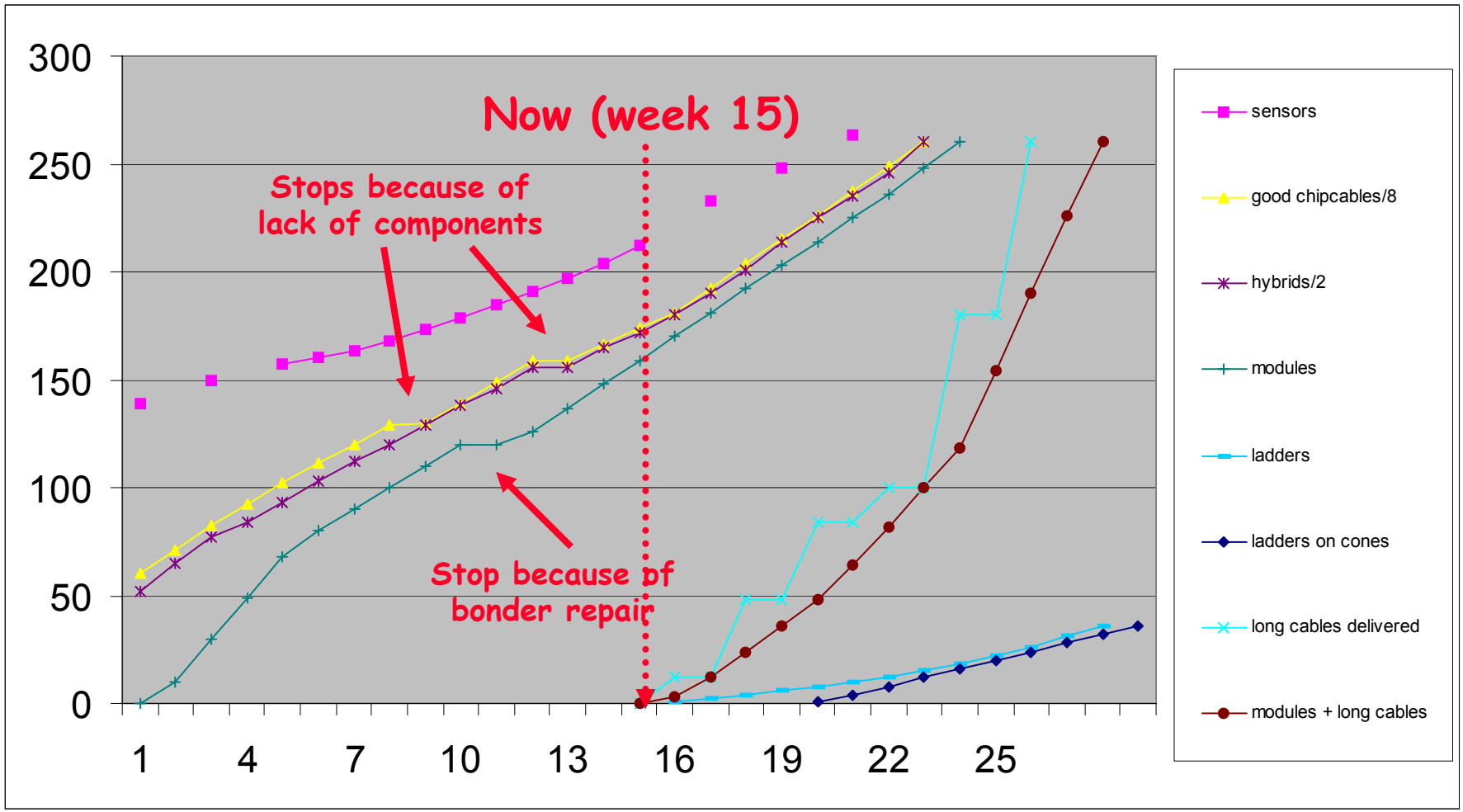


SDD prototype half ladder

- **Schedule**
  - ⇨ module assembly completed mid June
  - ⇨ detector assembly completed ~1 month later
  - ⇨ start installation early October 2006

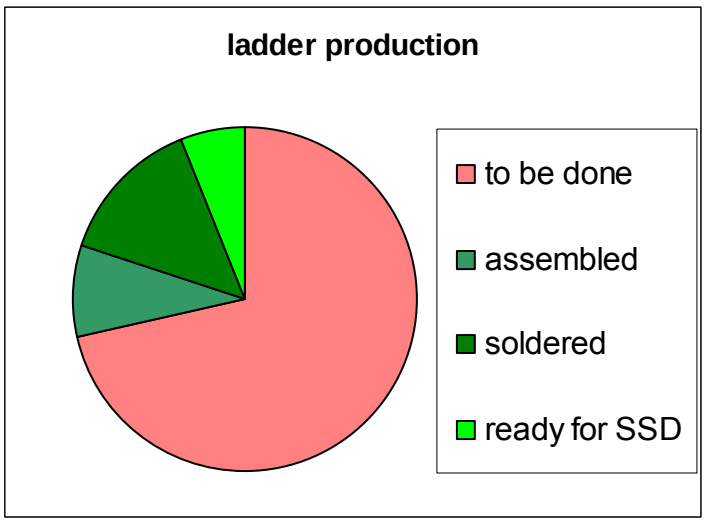
- **Concerns**
  - ⇨ **extremely tight schedule**
  - ⇨ detector & cable delivery on critical path
  - ⇨ 'just in time' delivery

Progress of SDD construction



Silicon Strip Detector SSD

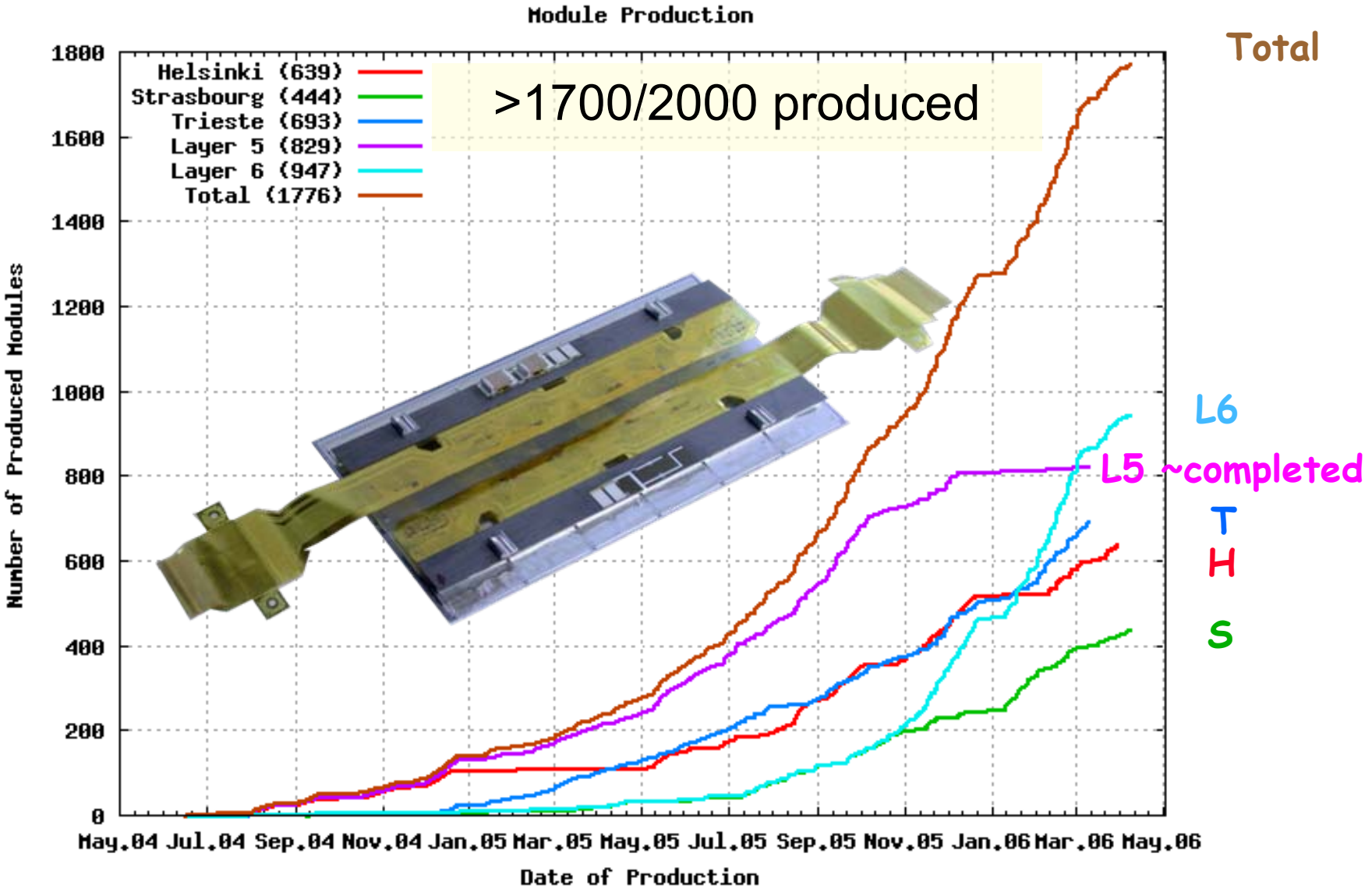
- Status
  - ⇨ sensor deliveries **completed**
  - ⇨ module assembly **(>85 % of total, layer 5 completed)**
    - ✪ all 3 sites **fully operational, ramping down speed** (Helsinki/Strasbourg/Trieste)
  - ⇨ ladder assembly (80 ladders in total)
    - ✪ assembled: 23 cables connected: 17 ready for installation: 5
    - ✪ speed increasing to **3 / week** (Amsterdam + Nantes)
  - ⇨ EndCap electronics boxes electronics **completed,** mechanics going on
  - ⇨ FEROM first full unit (1/16) ready, rest in production



- Schedule
  - ⇨ end **module** production: **May 06**
  - ⇨ start **ladder mounting on cone** **end May 06**
  - ⇨ **transport** to CERN **end Aug 06**
  - ⇨ ready for **installation**: **3 Oct 06**
- Concerns
  - ⇨ **extremely tight schedule**
  - ⇨ production limited by flow of components (cables, modules)
  - ⇨ testing speed at the limit (sensors, modules, ladders)

Module production by 10 April 06

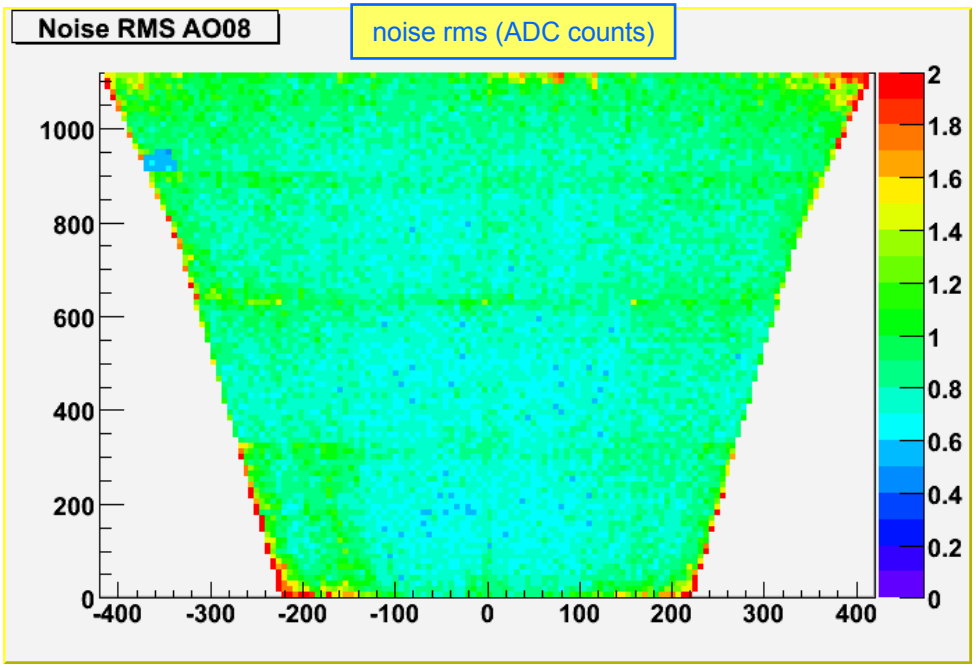
Production Data Base

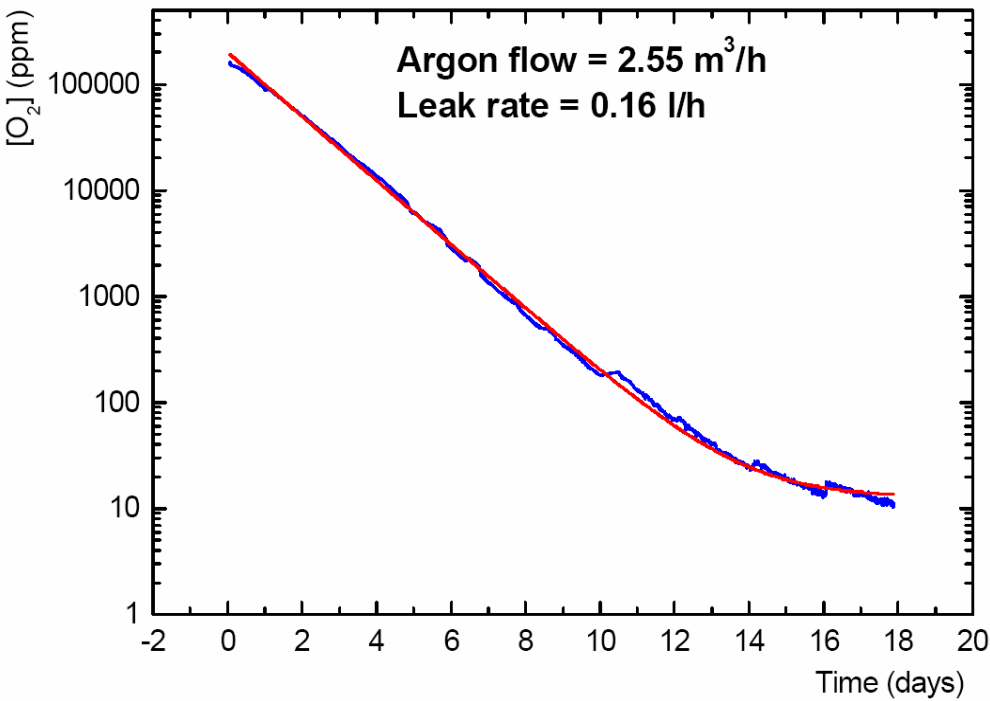


Completed ladder

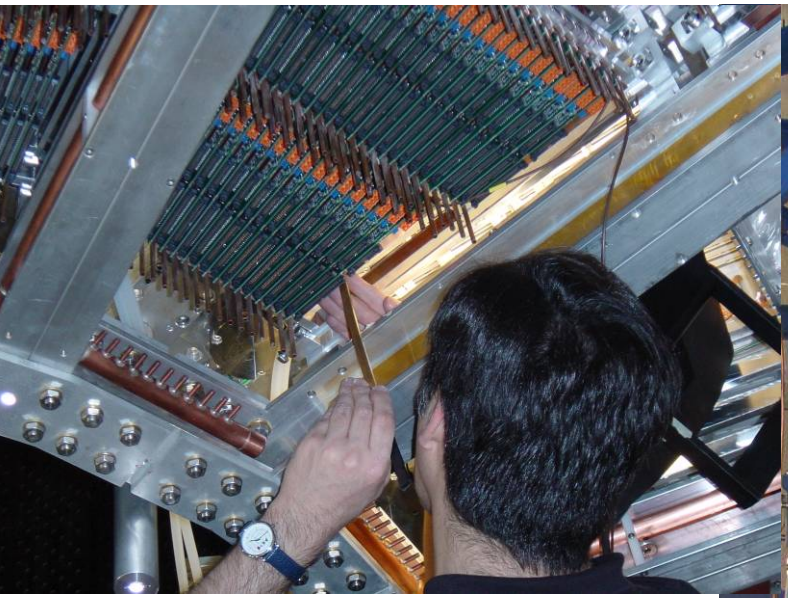
TPC

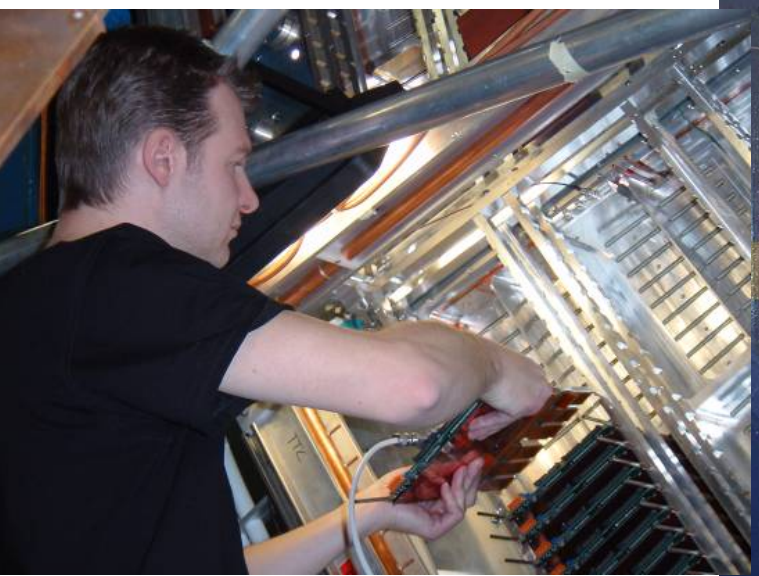
- Status: started commissioning
  - **Oct/Nov 05:** precision survey, alignment and leak test
    3ppm O_2 for nominal flow rate (specs = 5 ppm)
  - **Jan – Mar 06:** FEE installation (2 shifts/day, 6 days/week)
  - **now**: FEE, HV, gas commissioning;
    - FEE performance close to theoretical limit
  - start with laser & cosmics **May 06**
  - start of installation **4 Sept 06**

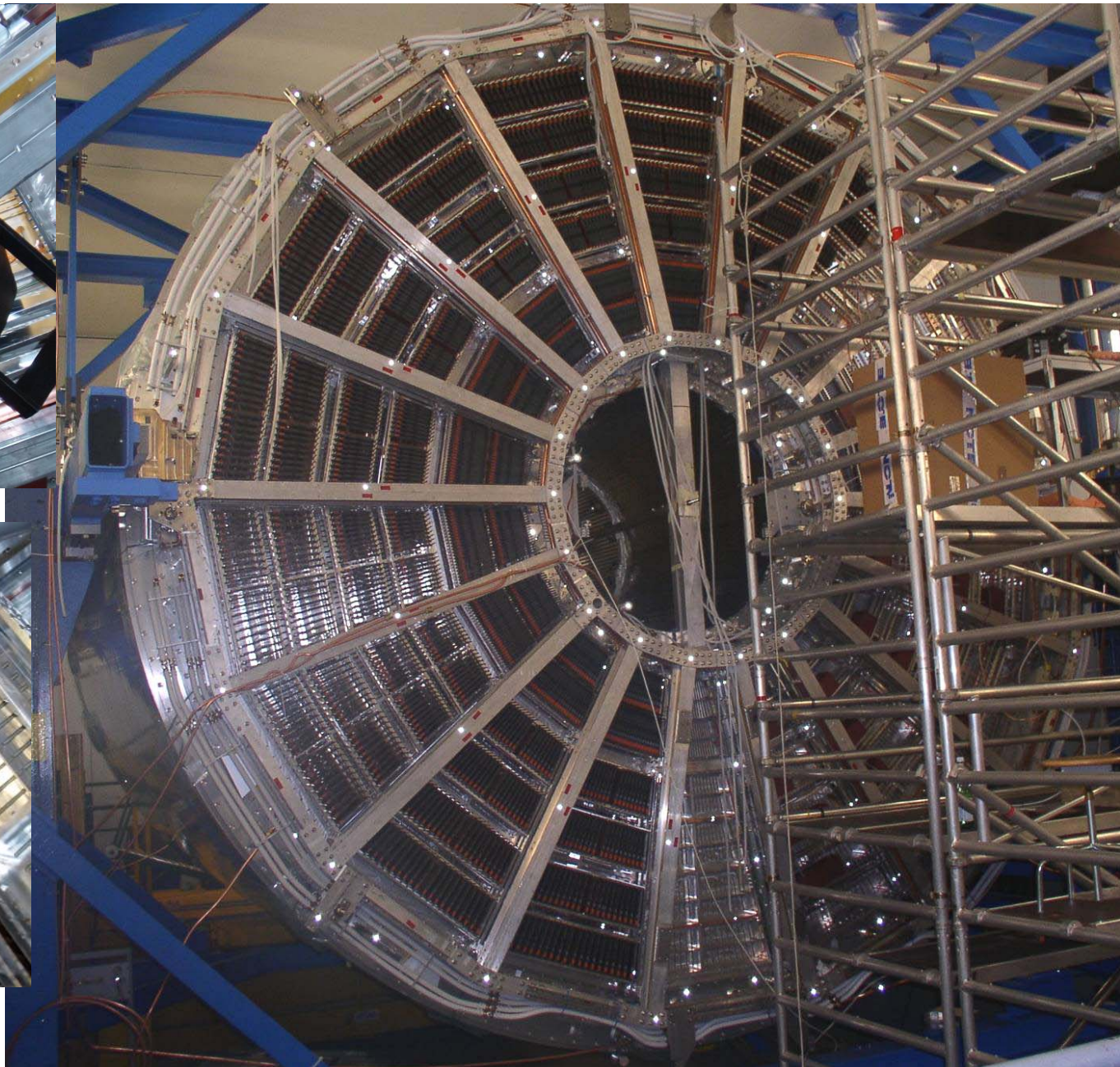




FEE installation



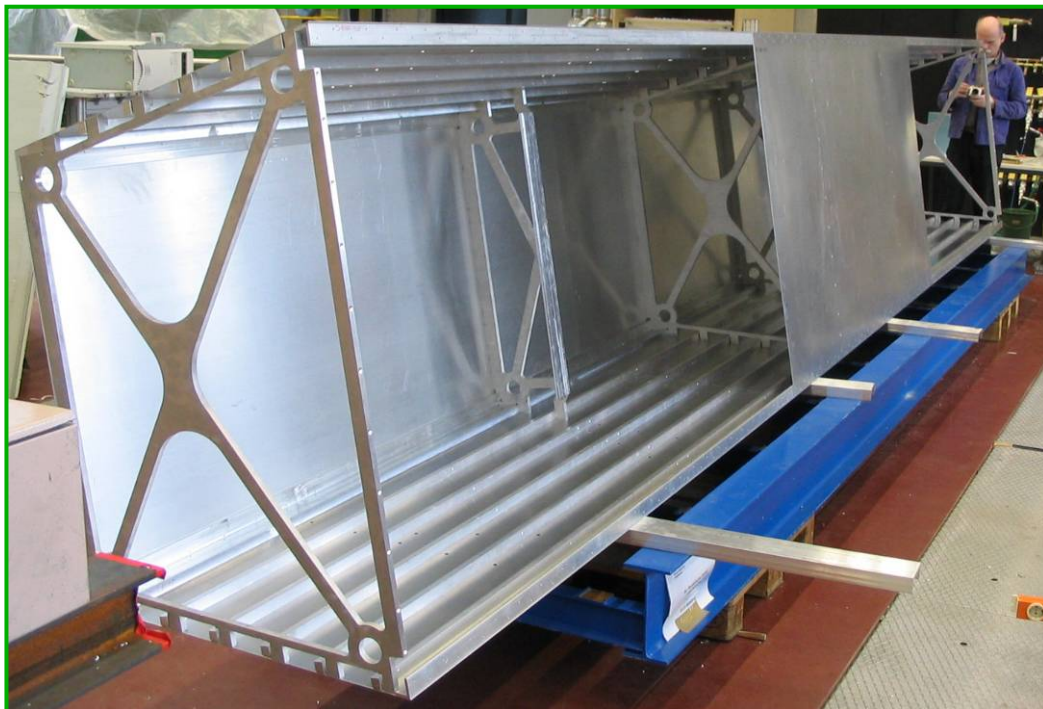




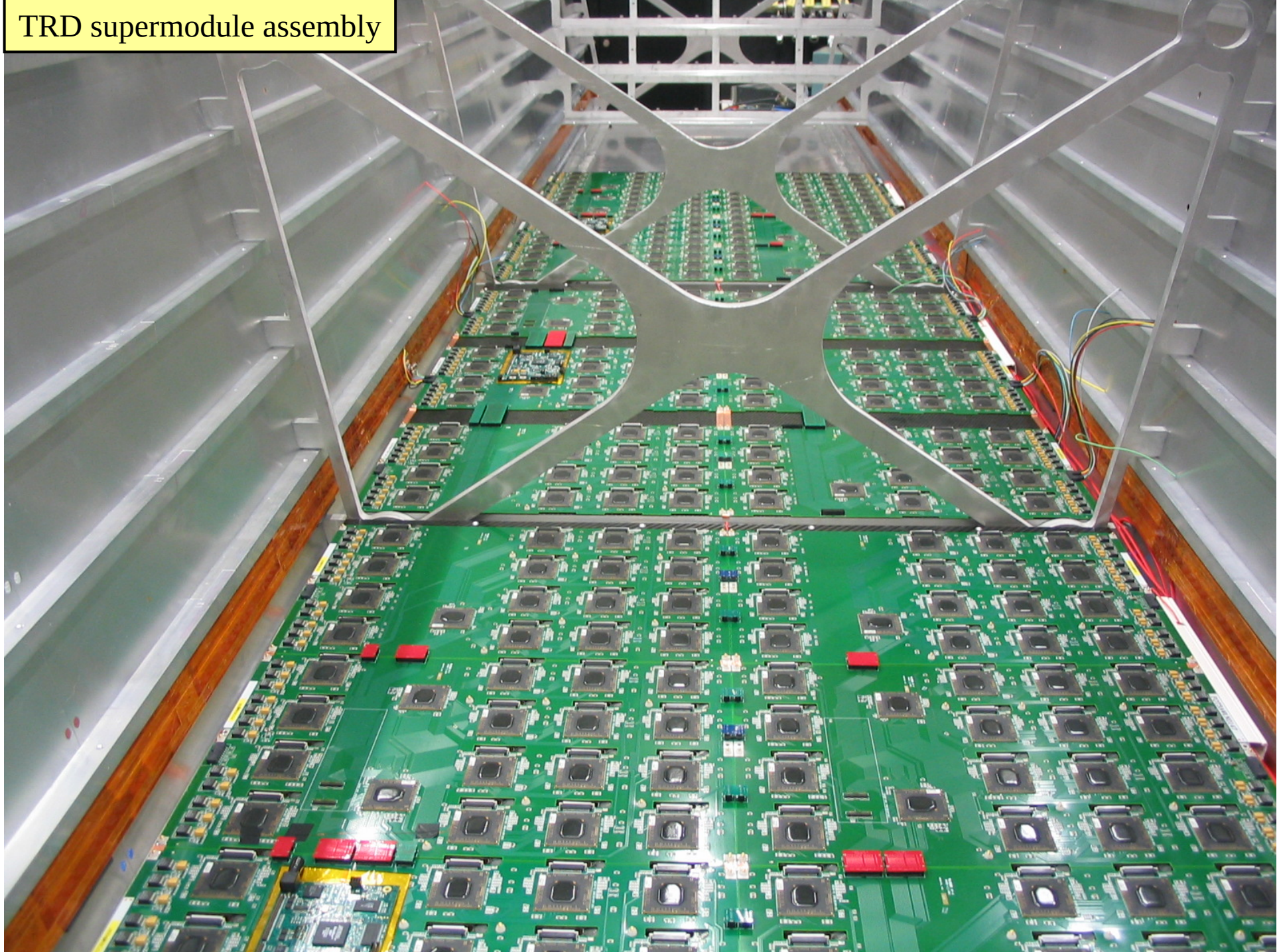
TRD

- **Chambers**: 167 chambers done (2/3 of funded part) GSI,HD, Frankf., JINR, Bucharest
  - ⇨ **mass production** : ongoing (5.5/week) , completion end 2006
- **Electronics**:
  - ⇨ **Digital chip, R/O board & MCM:** in production
  - ⇨ **TRD pre-trigger**: design & prototype completed
- **Assembly**
  - ⇨ 1st Supermodule started, ready for installation August
  - ⇨ 2 more SM's early 2007
- **Concerns**
  - ⇨ **tight schedule**
    - ✪ electronics delays, new chamber 0 design

Super Module

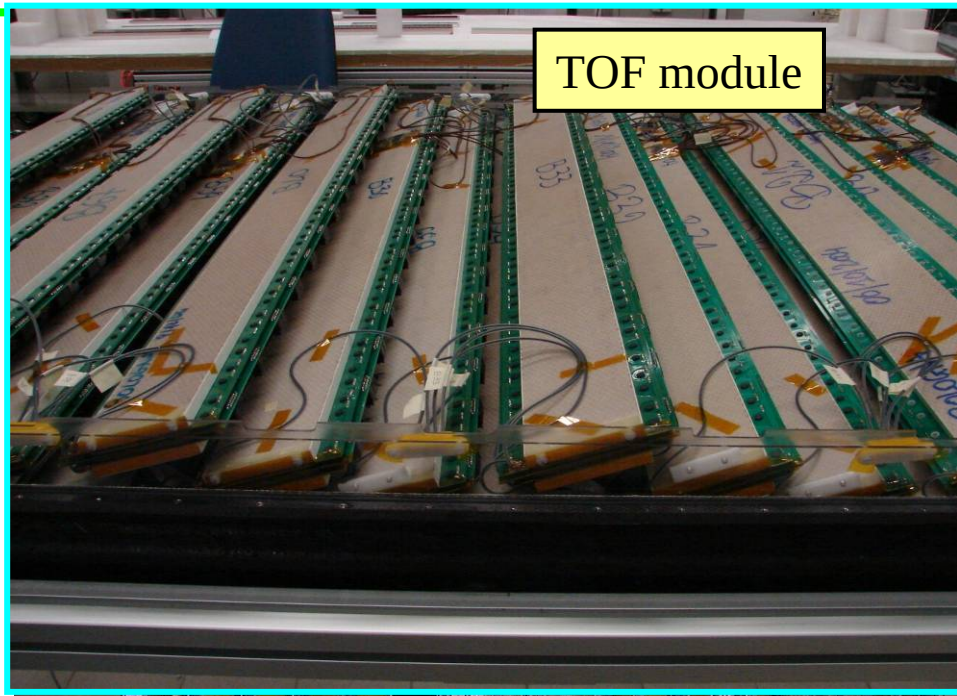


TRD supermodule assembly



TOF

- **Status**
  - ⇨ strip construction: 55% done
  - ⇨ module production : 30 % done
  - ⇨ FEE cards: production in line with detector
- **Schedule**
  - ⇨ strip completed: **Nov 06**
  - ⇨ modules completed: **May 07**
- **Installation**
  - ⇨Supermodule assembly : starting in **May 06**
  - ⇨2 SMs installed **Aug 06**
  - ⇨7 more SMs ready for installation : **Dec 06**



Muon Arm

- Tracking
  - ⇨ chamber production complete
    - ✪ testing largely complete

Assembly

-station 4: [**Apr 06** - Jun]
-station 5: [Jul - Oct]
-station 1: [Apr - Sep]
-station 2: [Jul - Dec]
-station 3: [Nov - **Jan 07**]

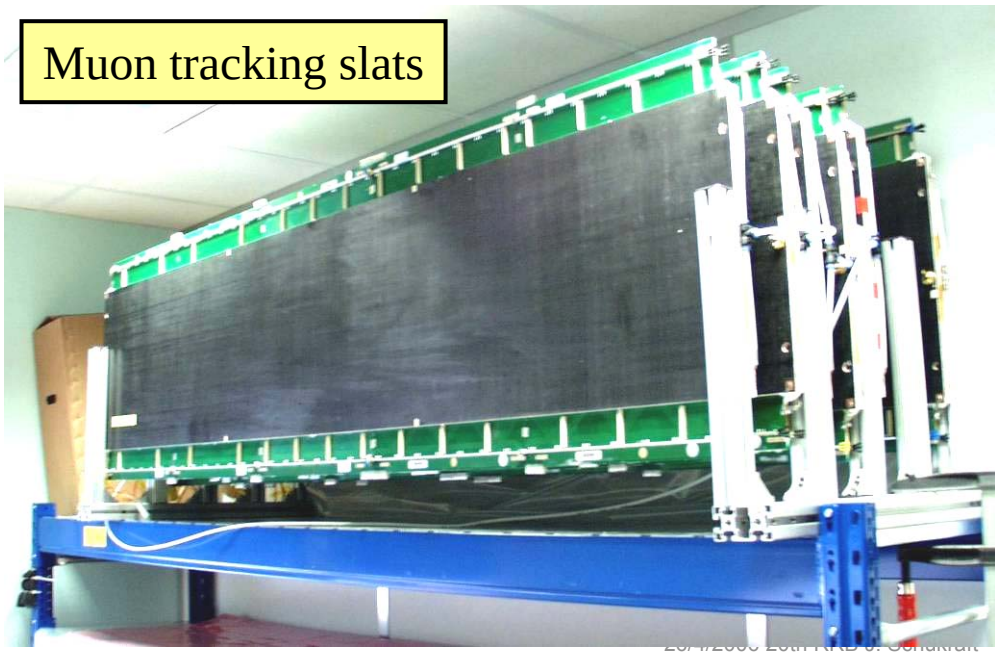
Installation

-station 4: [**May 06-** Jul]
-station 5: [Aug - Nov]
-station 1: [Jul - Oct]
-station 2: [Nov - Jan]
-station 3: [Feb - **Mar 07**]

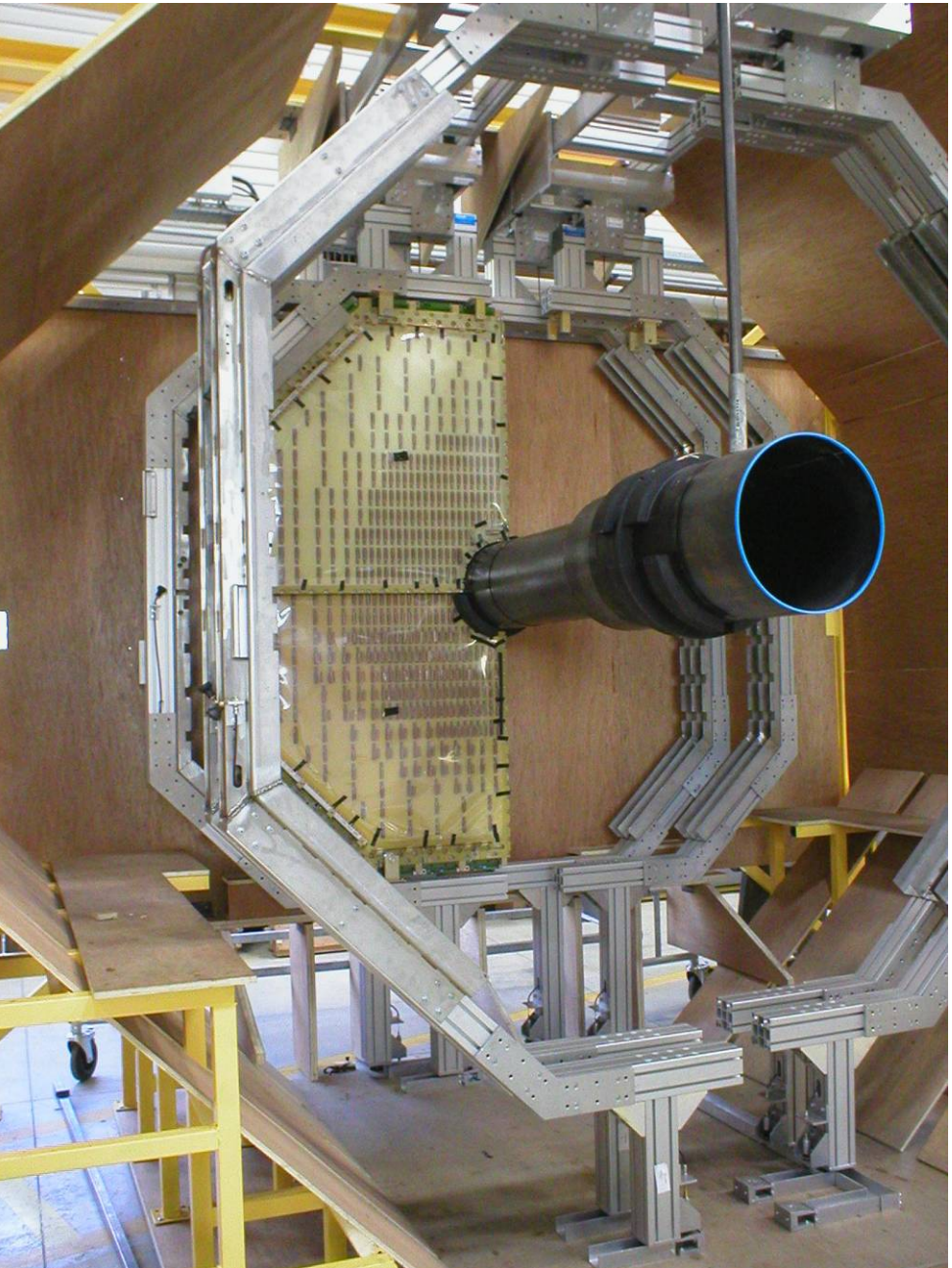
  - ⇨ FEE electronics:
    - ✪ FEE production: MANAS **chips(50%) at packaging**, FEE board MANU **on critical path**
    - ✪ production problem (soldering quality) in company, now solved. Try to increase production speed
    - ✪ **1st batch** (1500/20 000) **delivered** early April, **assembly started** at CERN

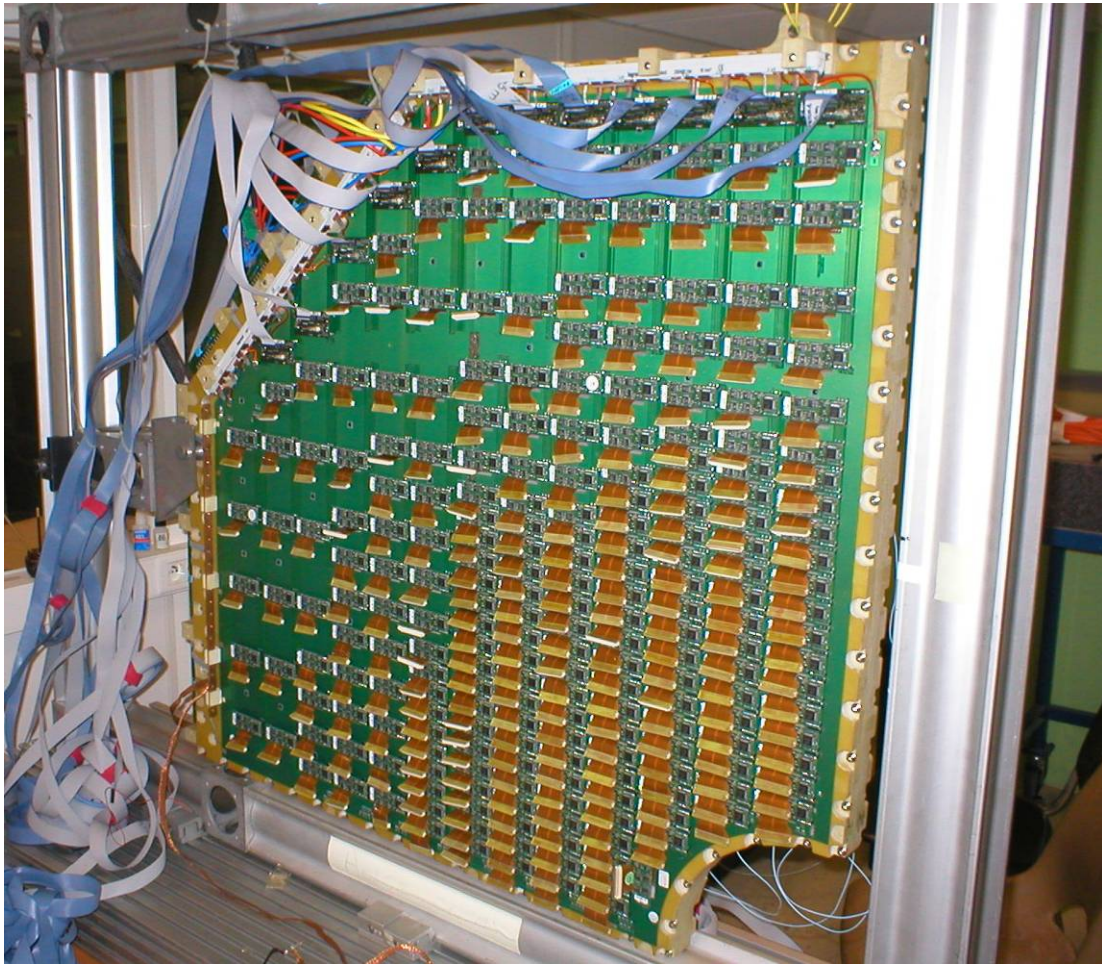
- Trigger
  - ⇨ chamber production & testing complete
  - ⇨ FEC production & testing complete
  - ⇨ Trigger electronics production on schedule

- Concerns
  - ⇨ **little float left in schedule**
    - ✪ delay in tracking electronics



Muon Tracking Chambers





Muon tracking assembly of station 1
(Orsay)

Other Detector Systems

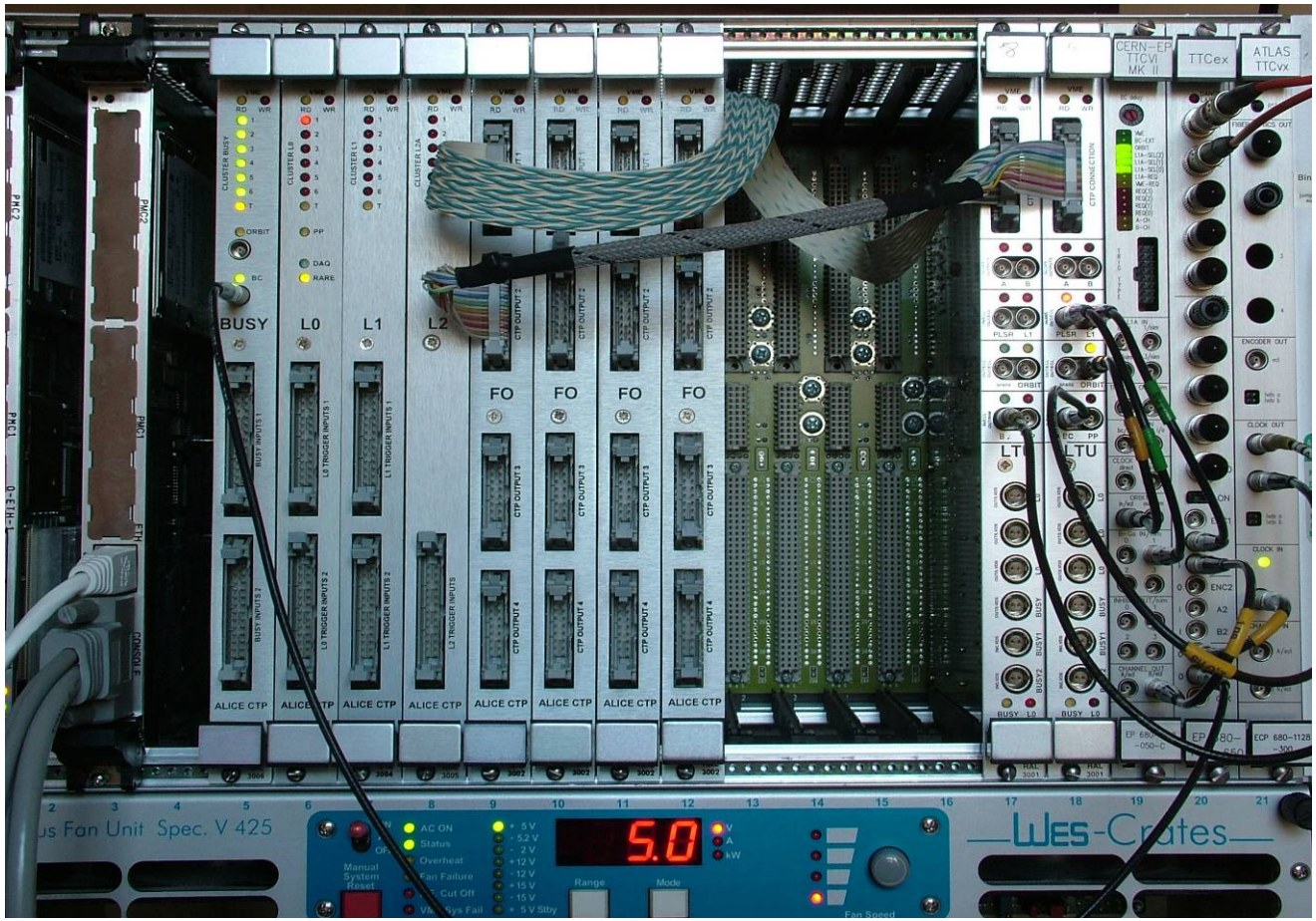
- **HMPID**: well on track
  - ⇨ **construction completed** (incl. photocathodes)
  - ⇨ under commissioning, **installation**: Aug 06 (waiting for gas installation)
- **PHOS**: on (reduced) track
  - ⇨ **Crystal** production (Apatity): **stopped** (lack of funds), >10,500 (of 18,000) accepted
  - ⇨ **FEE production** module 1 finished**, 1st module** complete end Mai 06
  - ⇨ **Concern**: funding in Russia for mechanics & cooling (modules 2-3)
- **Forward Detectors** (V0, T0, FMD, PMD, ZDC):
  - ⇨ **all in production**, on track
- **Trigger, DAQ, HLT, Control** (DCS, ECS):
  - ⇨ all systems progressing **well and on schedule**
- **Offline**
  - ⇨ **calibration and alignment** software included
  - ⇨ **distributed analysis** prototype released to expert users
  - ⇨ **physics data challenge** has started with 'V0 boxes' in all T1/T2 sites
  - ⇨ **Concern**: missing computing resources

First PHOS module

10.04.2006

Trigger: CTP Test Setup

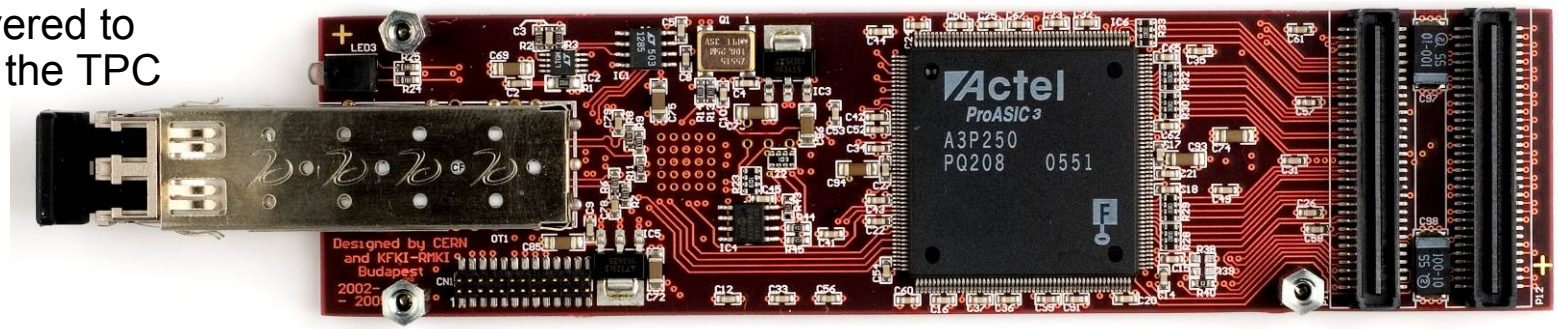
(Birmingham)



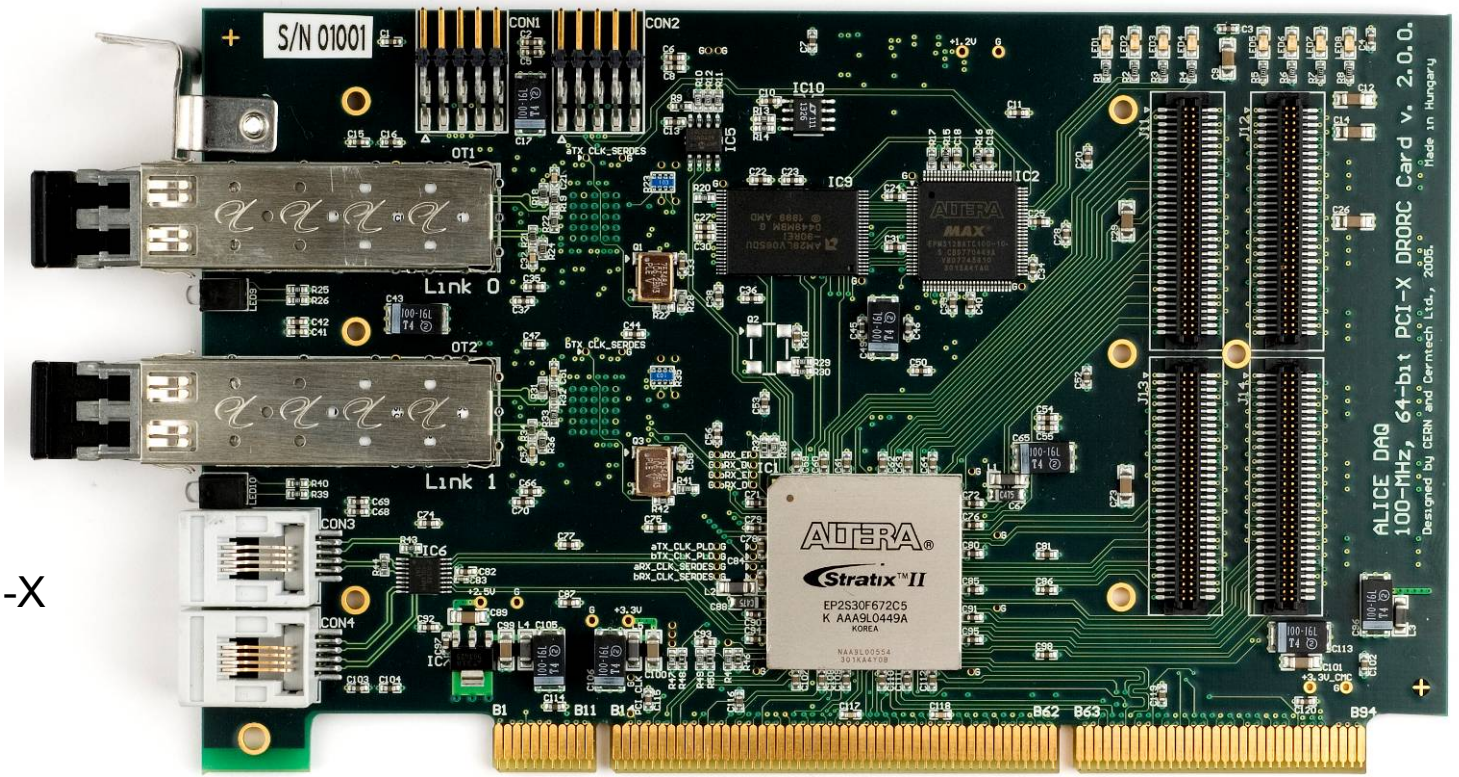
- CTP boards (except INT) now being tested together as a single system. In this picture, there are also two LTUs corresponding to two separate detectors.

DAQ: Data Link

- DDL production:
  - From March to June 2006
  - 108 cards delivered to equip 1 side of the TPC

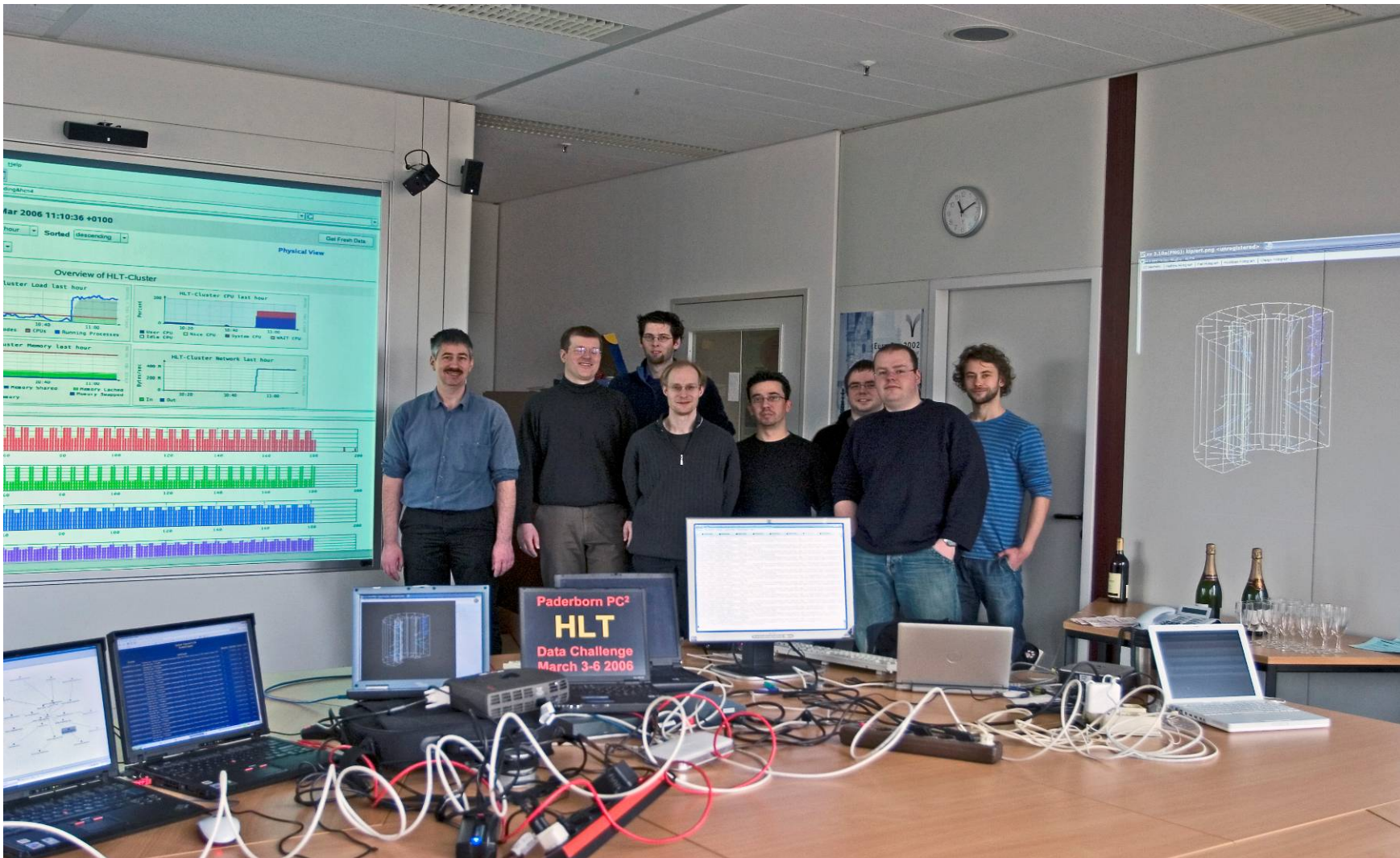


- D-RORC final prototype
  - Faster FPGA
  - Compatible with PCI-X 64 bits 100 MHz



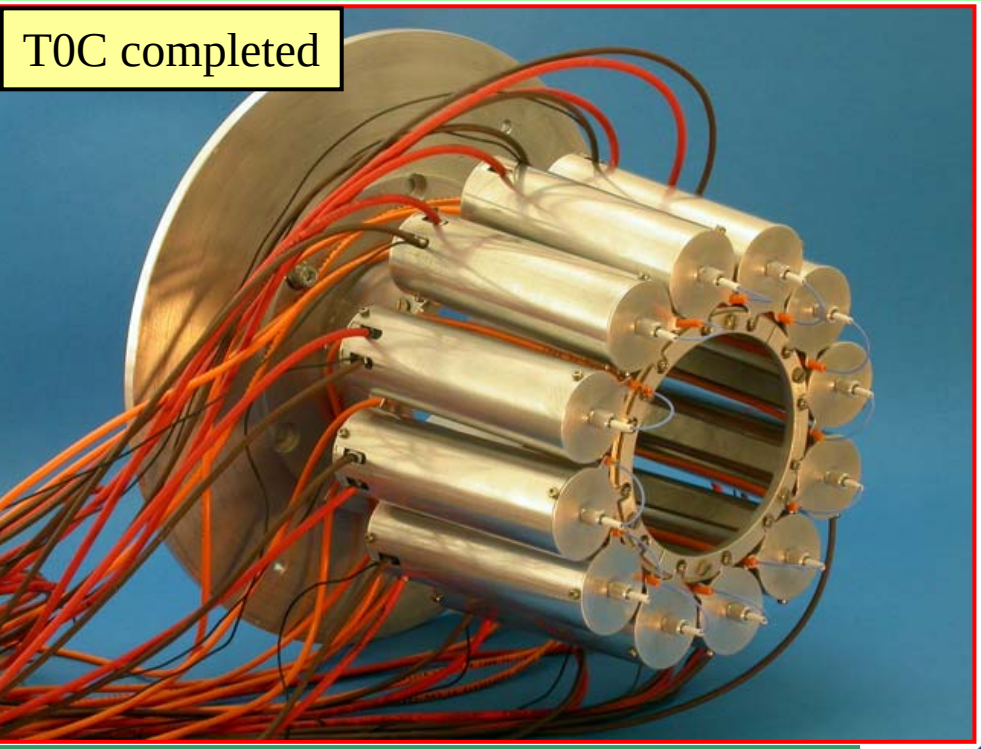
HLT Integration Test at PC² at Paderborn

- 200 Dual Xeon 3.2 GHz nodes
  - ⇨ Integration and scaling test using clusterfinder/tracker software **for full TPC**
  - ⇨ Rate >**230** Hz, limited due to CPU load

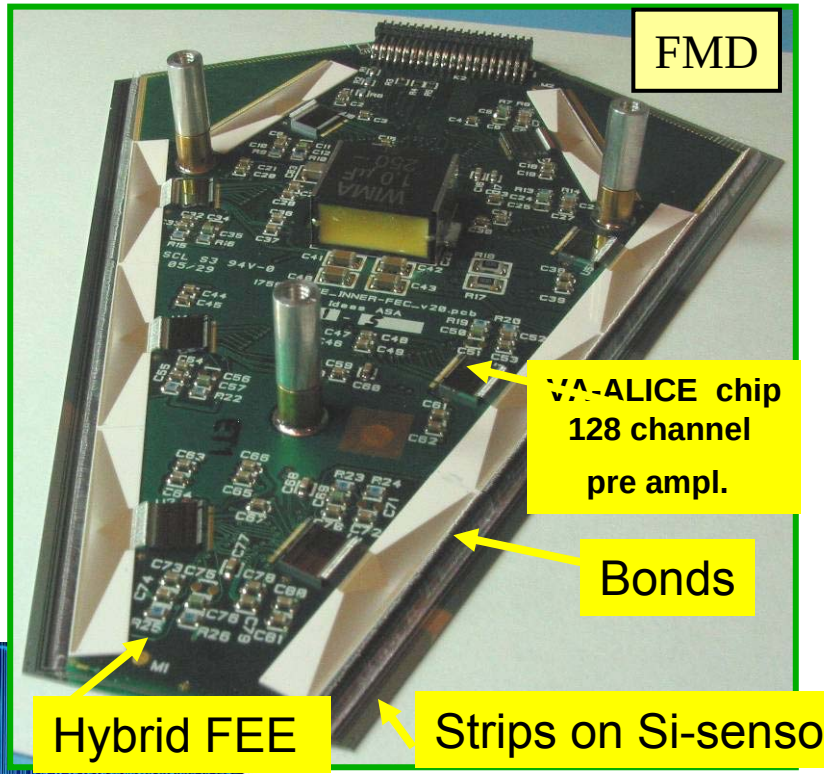


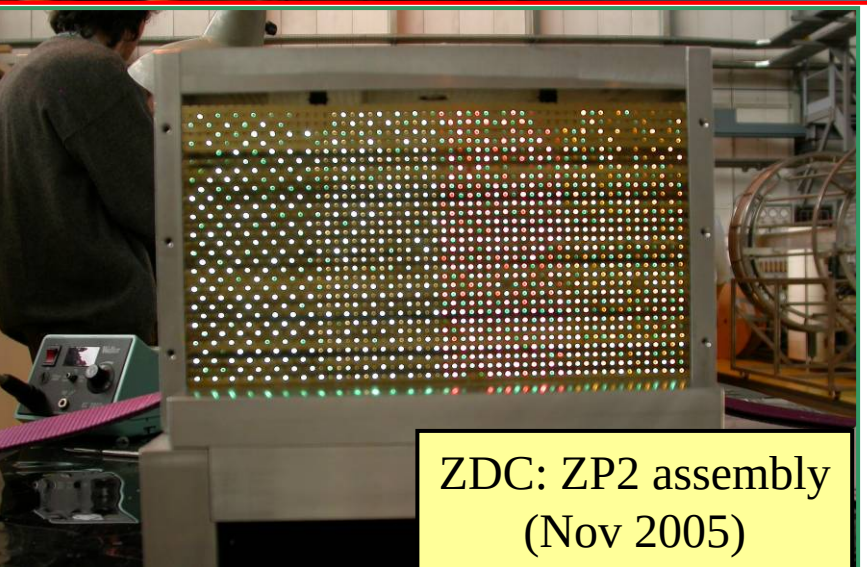
Forward Detectors

T0C completed

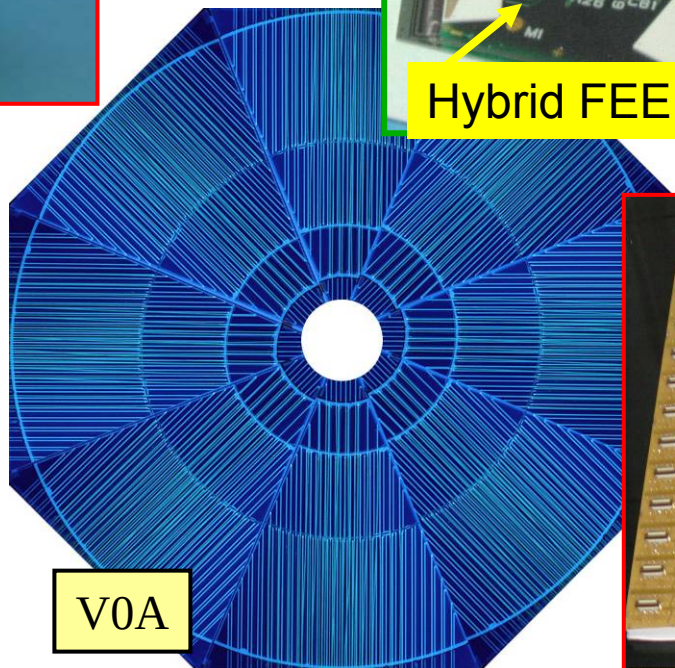


FMD



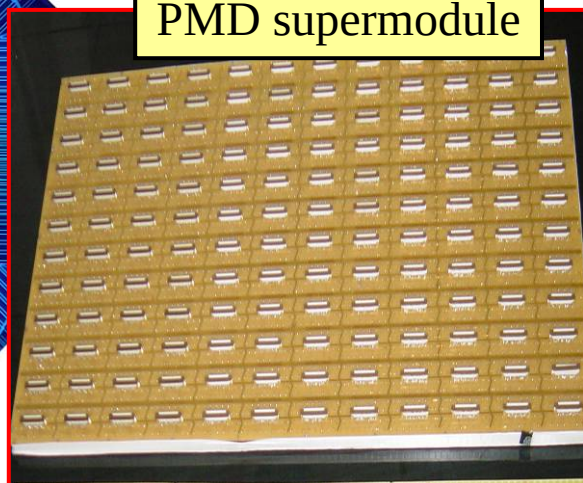


ZDC: ZP2 assembly
(Nov 2005)

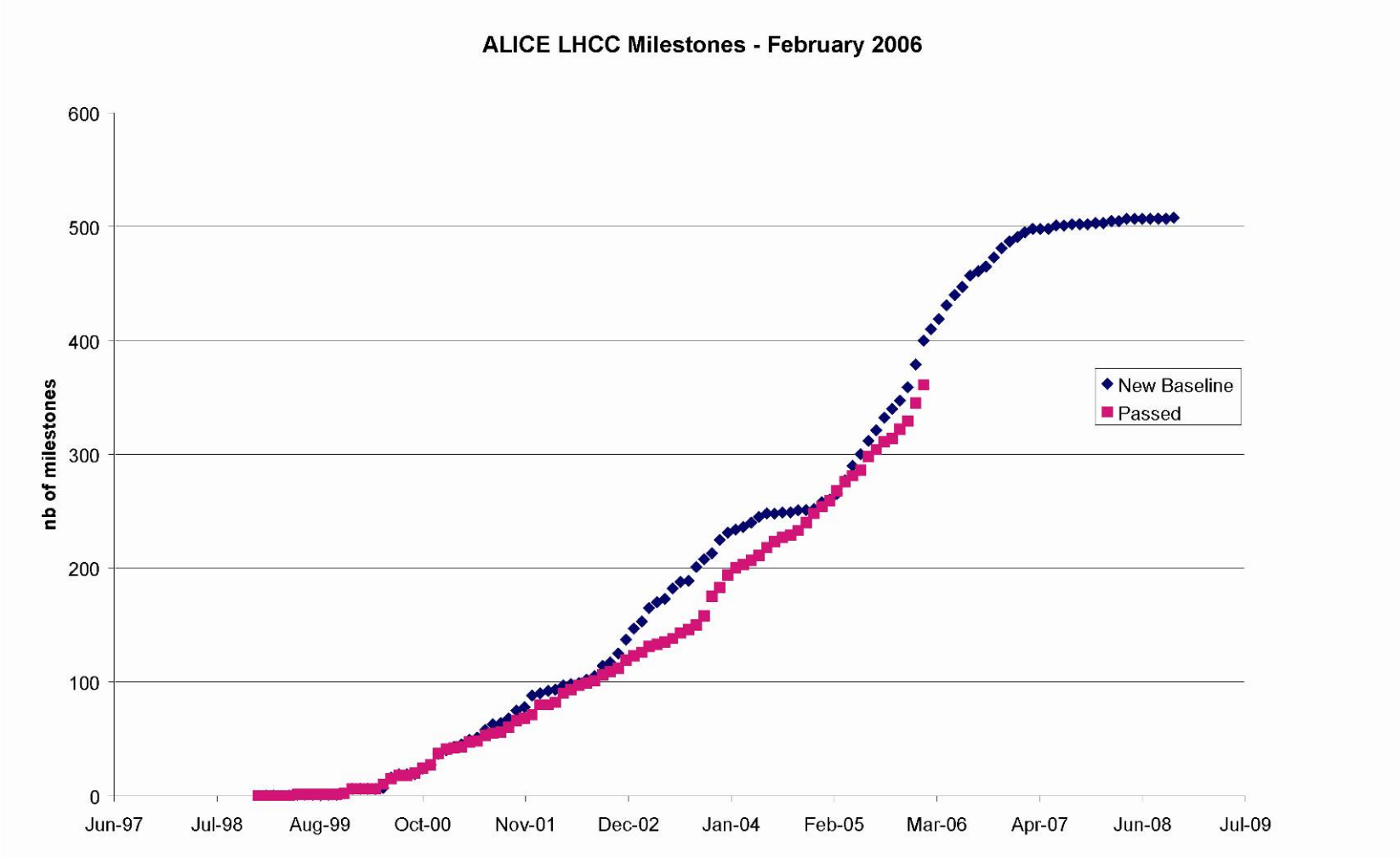


V0A

PMD supermodule



Milestones


ALICE LHCC Milestones - February 2006
nb of milestones
600
500
400
300
200
100
0
Jun-97
Jul-98
Aug-99
Oct-00
Nov-01
Dec-02
Jan-04
Feb-05
Mar-06
Apr-07
Jun-08
Jul-09
New Baseline
Passed

Summary

- Major Milestones
  - ⇨ positive review at DOE on US participation in ALICE
  - ⇨ large structures completed
  - ⇨ ITS assembly under way
  - ⇨ TPC start of commissioning

- Major Problems remaining or new
  - ⇨ very tight **schedule for ITS**
    - ✪ SSD & SDD micro-cable production, module & ladder assembly
    - ✪ SPD accidents
  - ⇨ delay in **Muon electronics**
  - ⇨ **PHOS financing** (Japan/Russia)
  - ⇨ **Computing resources** (no definite news since last RRB)