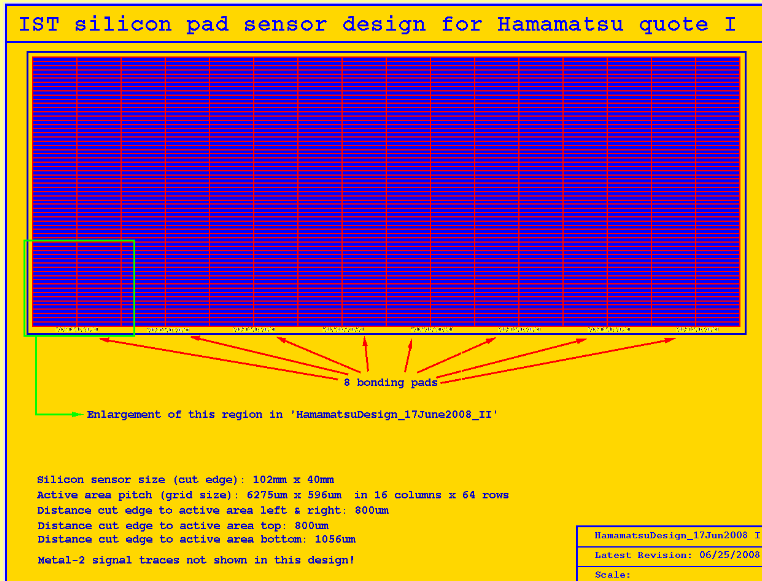
IST report, plans and schedule

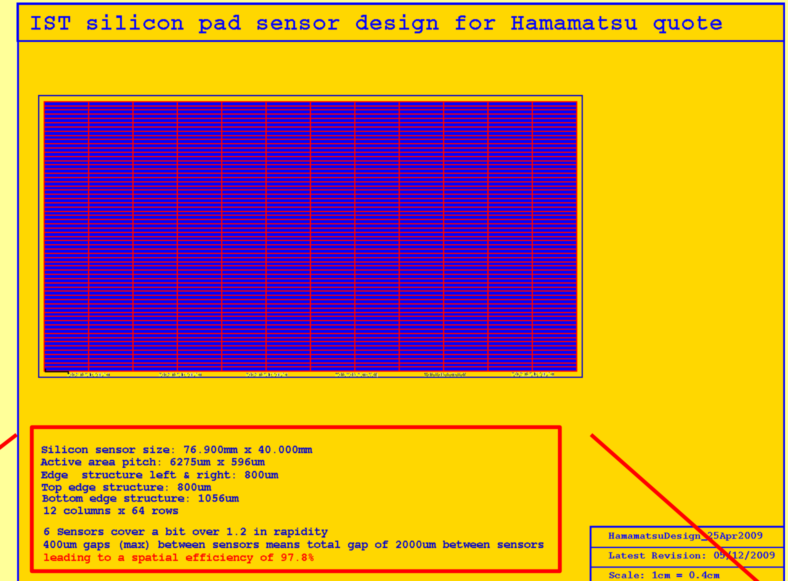
- Sensors
- Readout chips
- Wire bonding
- Hybrid/cable
- Readout systems
- Mechanical support
- Cooling system
- Short Term Schedules

HFT bi-monthly meeting
LBNL, May 11, 2010

Gerrit van Nieuwenhuizen

Sensors

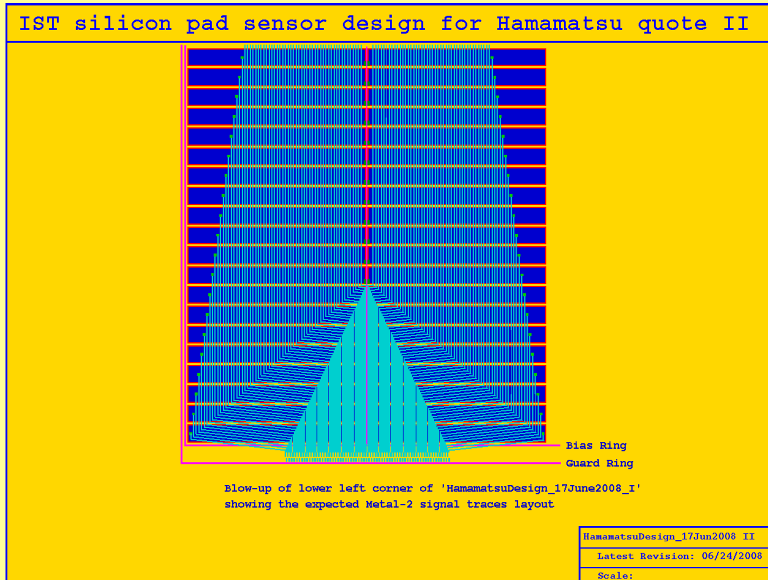




2008 **2009**

Silicon sensor size: 76.900mm x 40.000mm
Active area pitch: 6275um x 596um
Edge structure left & right: 800um
Top edge structure: 800um
Bottom edge structure: 1056um
12 columns x 64 rows

6 Sensors cover a bit over 1.2 in rapidity
400um gaps (max) between sensors means total gap of 2000um between sensors
leading to a spatial efficiency of 97.8%



Request for prototype quotation will go out as soon as funding schedule available

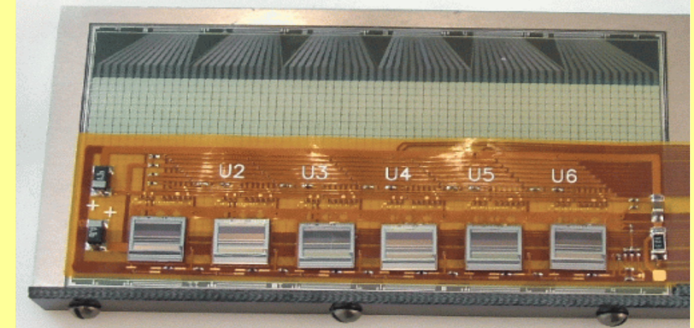
Expect FY10 funds in July???

 Gerrit van Nieuwenhuizen

APV25-S1 readout chips

8 wafers procured = enuf chips
1 wafer diced (5-10 working days)

6 chips mounted, chips work but I2C is
not working, so very useful for tests

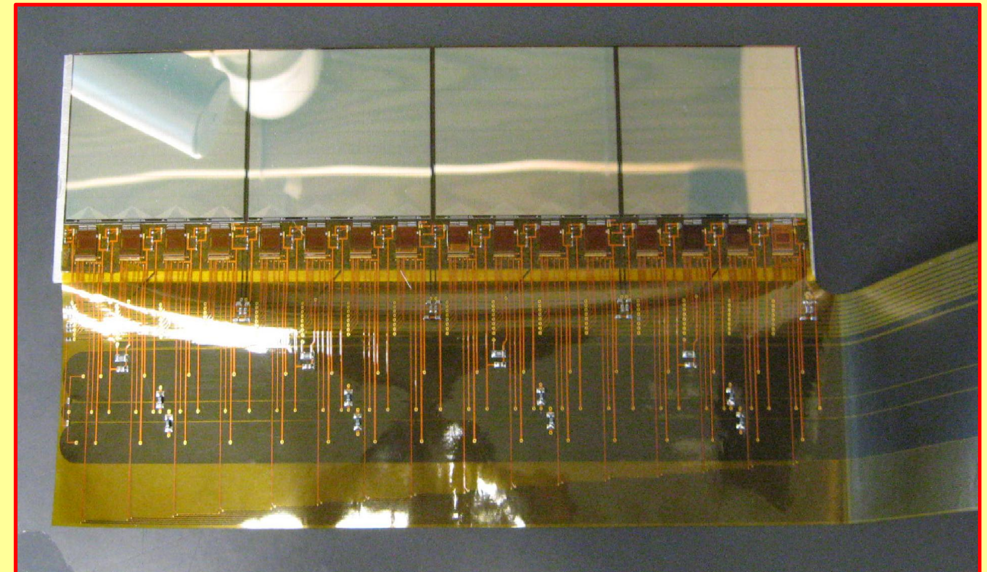


2 x 16 chips mounted on 2, more than fullscale, prototypes

1 prototype partially bonded

Testing still hampered by
reluctant readout system

I'd like to wait with further
dicing until more test
result are available



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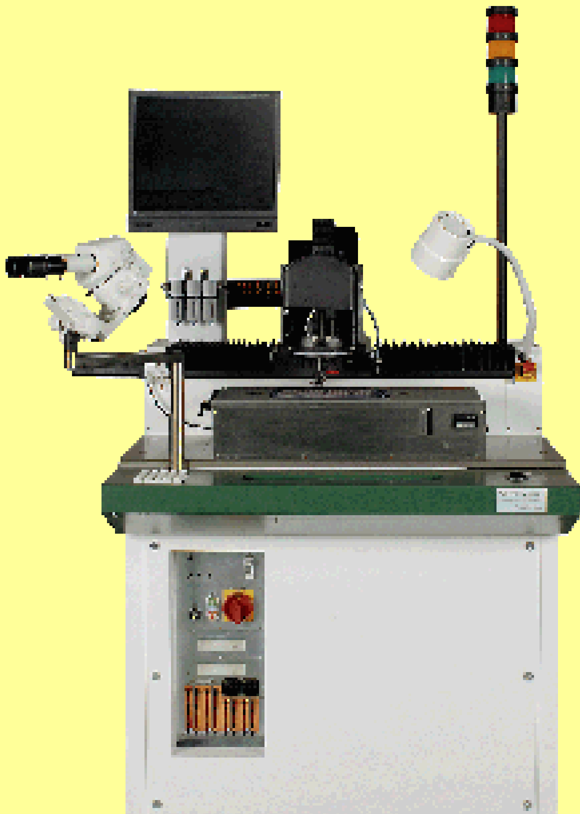
Wire bonding



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Bonding of prototypes is taking place at BNL

Production bonding will take place at BNL
- needs to be scheduled carefully
- will be supervised by Don Pinelli
- we will supply a person to do the bonding

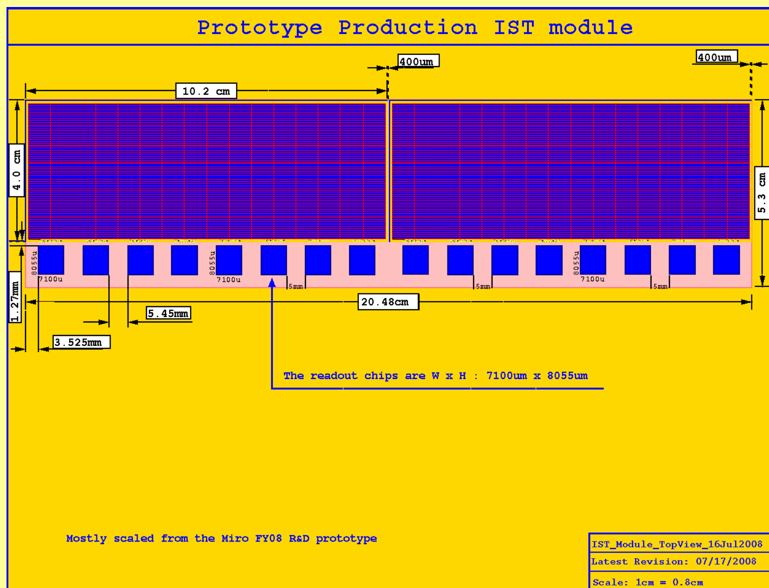
1 IST prototype was partially bonded (¼) in a few hours with 25 mil wire

25 mil is too thick and current tools are too wide to comfortably bond the APV chip

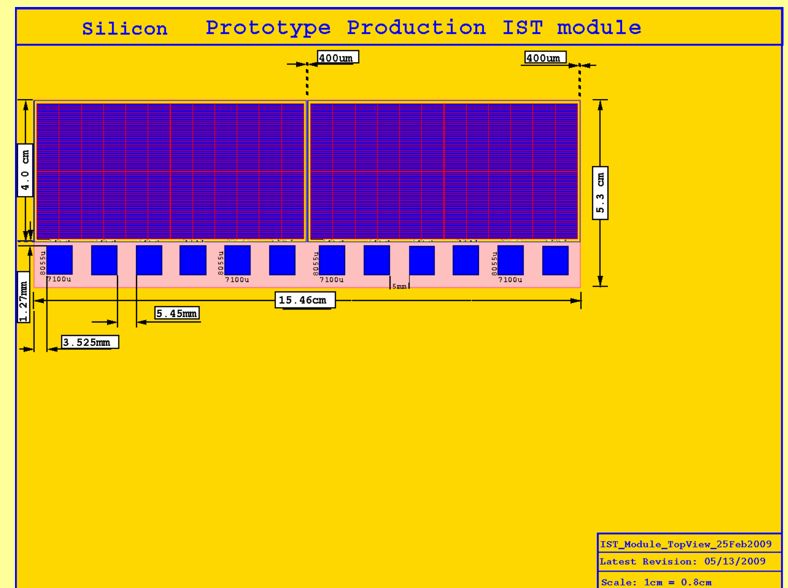
New tools and wire are available but using them was delayed by recalibrating machine

Don Pinelli will bond 1 full prototype this week

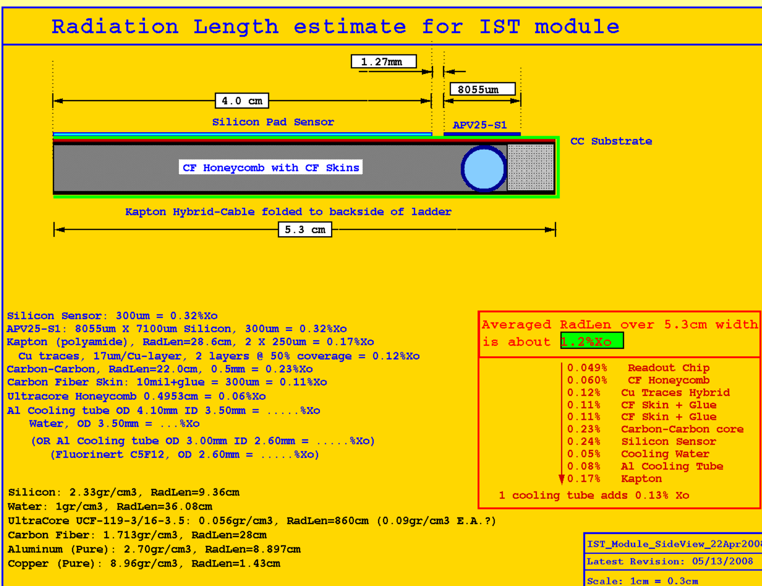
Kapton hybrids



2008



2009



Shorter sensors → shorter hybrids

12 chips → less dissipation (~ 4 Watt)

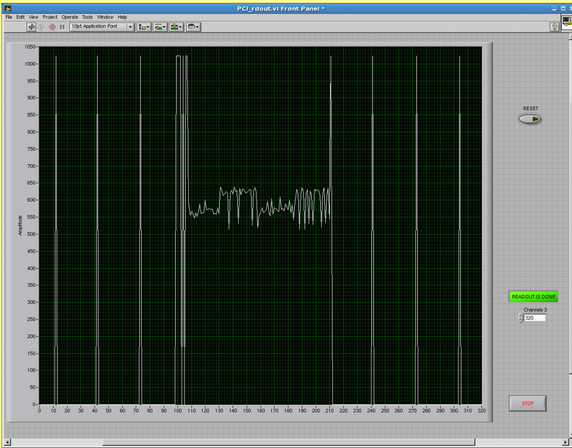
→ better matched to readout

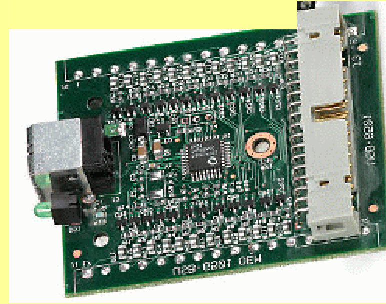
Shorter flex cables

Ben Buck and I will sit together tomorrow for the redesign, Gerard will check too

Production expected in July 2010

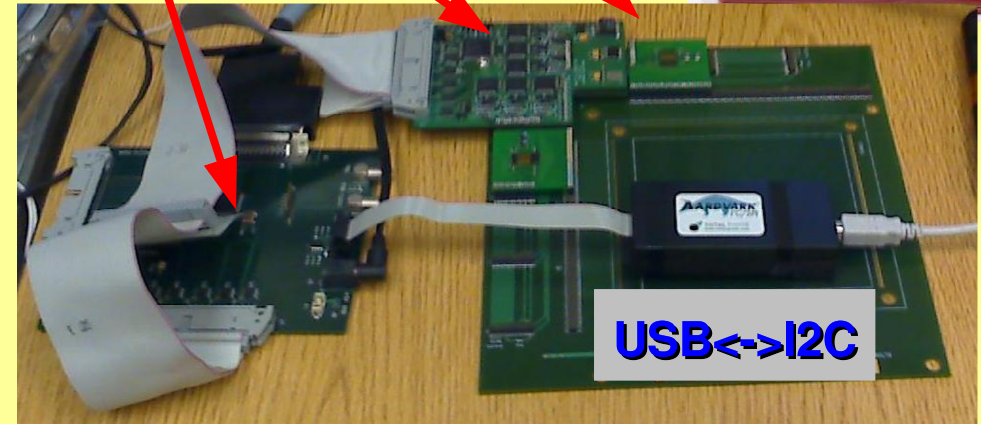
Test readout system

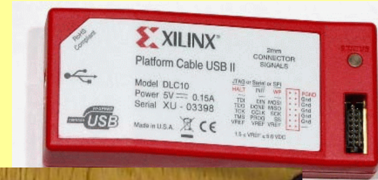




USB<->DIO

FPGA_CU GEM_CU APV





Using Ben Buck's new firmware which works with Ben's slow LabView program

FPGA_CU had to be replaced because I blew it up

Currently using a DaqMxBase C program to talk to readout system, handshaking seems to be working but no data readout (although visible at APV level) plus some other mysteries

We'll check again against Ben's setup tomorrow

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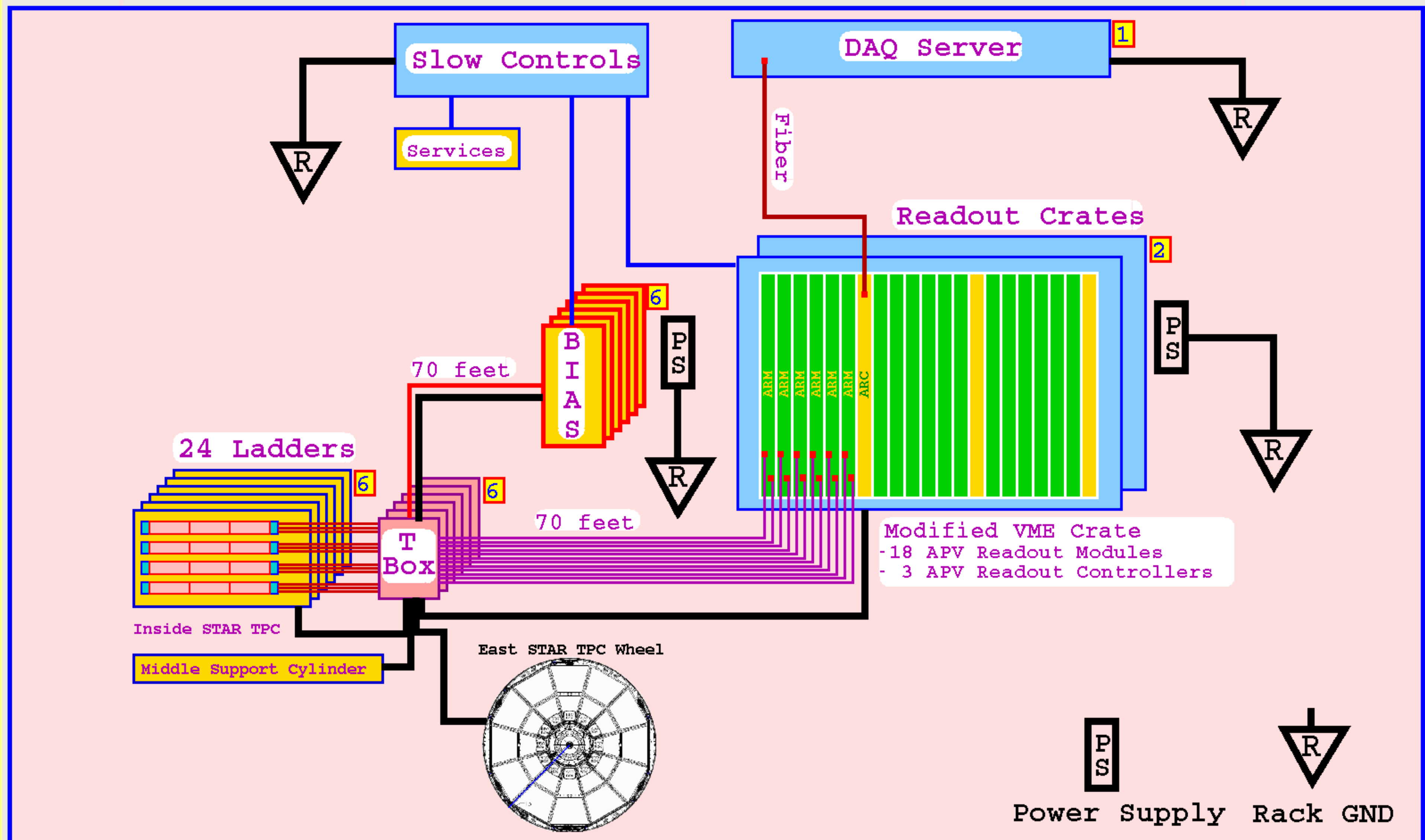
Production readout system



Grounding scheme determined
First prototypes of ARM/ARC system ready May/June 2010.

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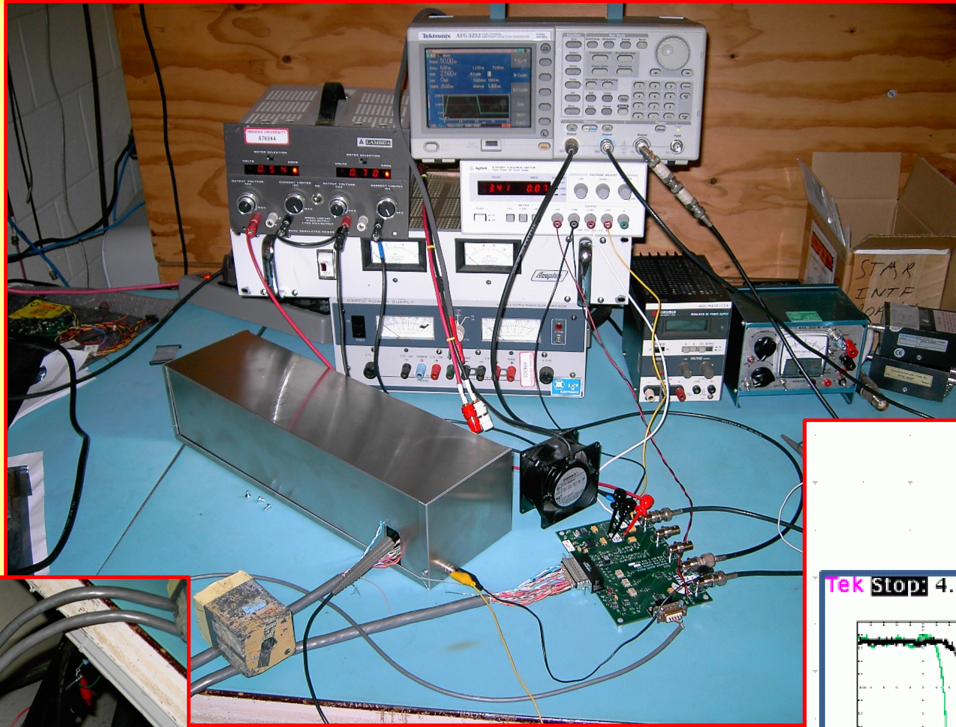
Test pre-prototype readout system

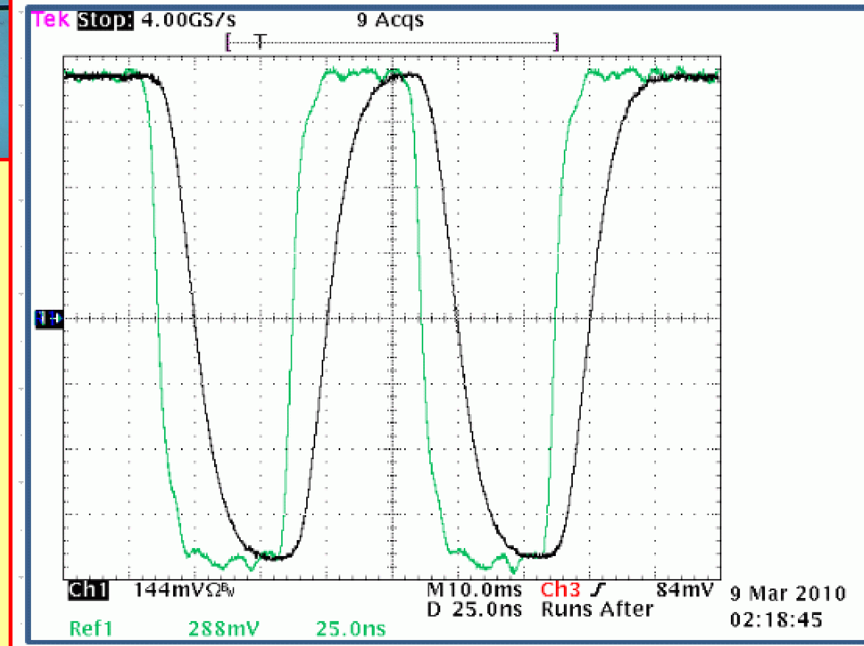


'VME' crates

110 ft of cable!

Green: raw cable RX output including reflections and clock crosstalk

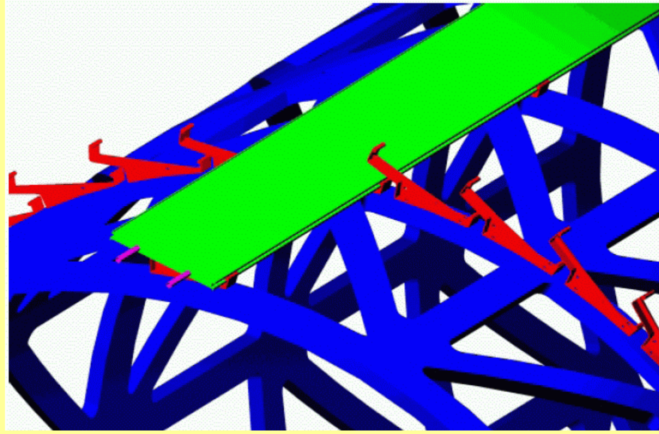
Black: Filtered signal ready for A/D converter

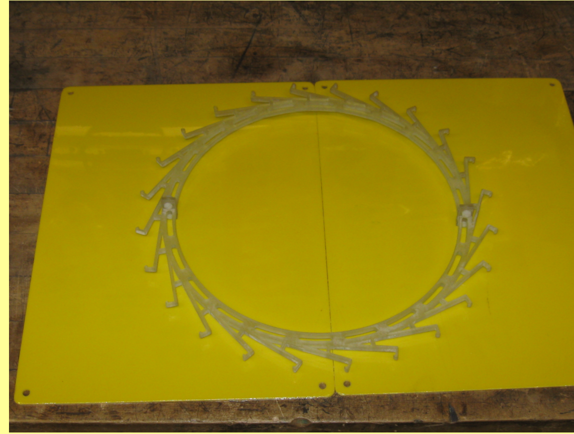


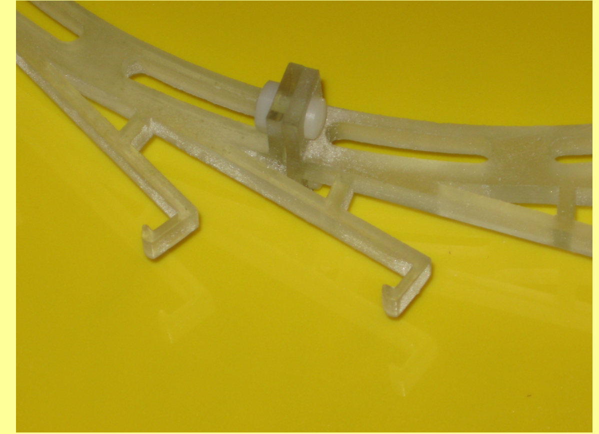
Prototype readout tested with long cable by Gerard Visser

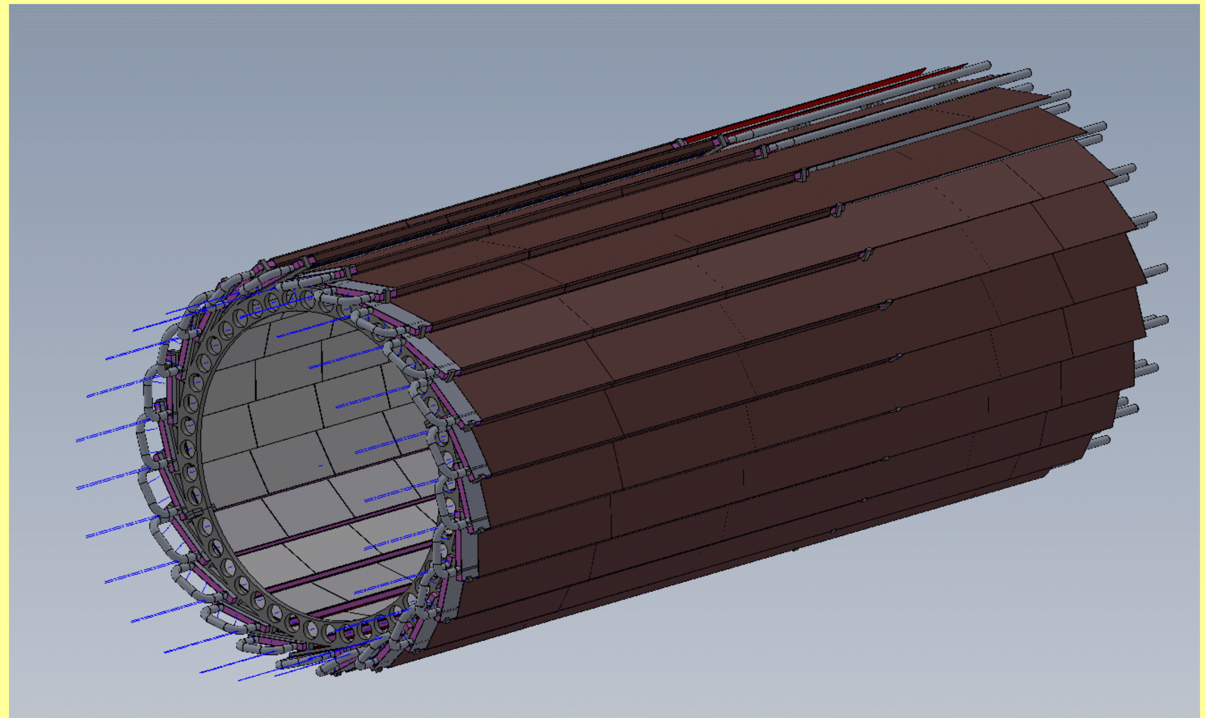
Gerrit van Nieuwenhuizen

Mechanical support system



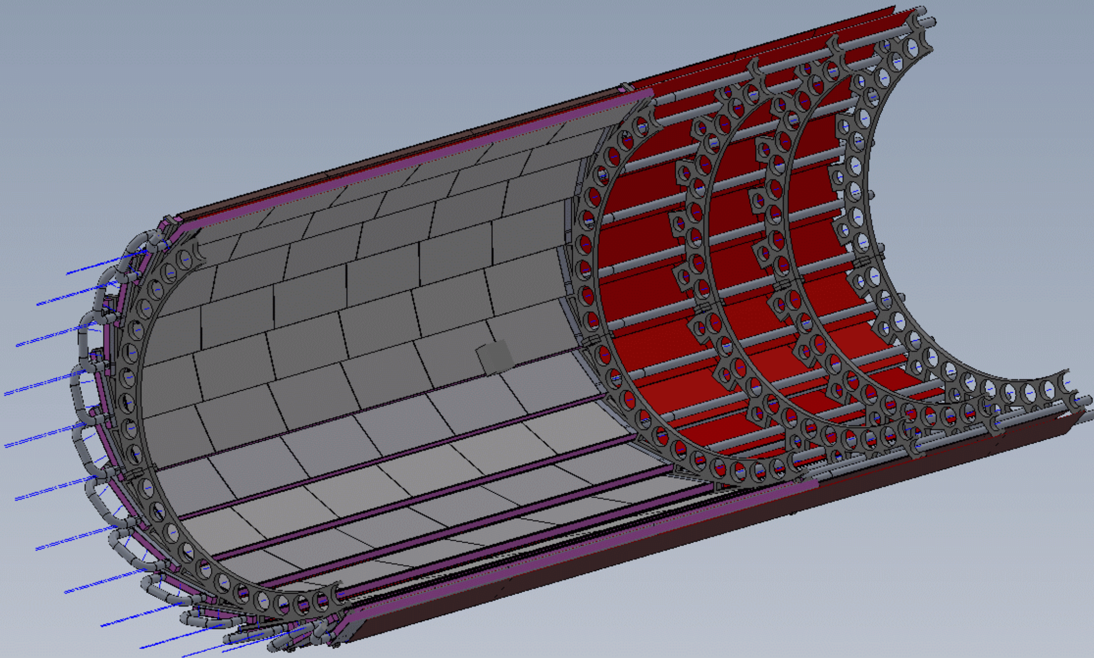




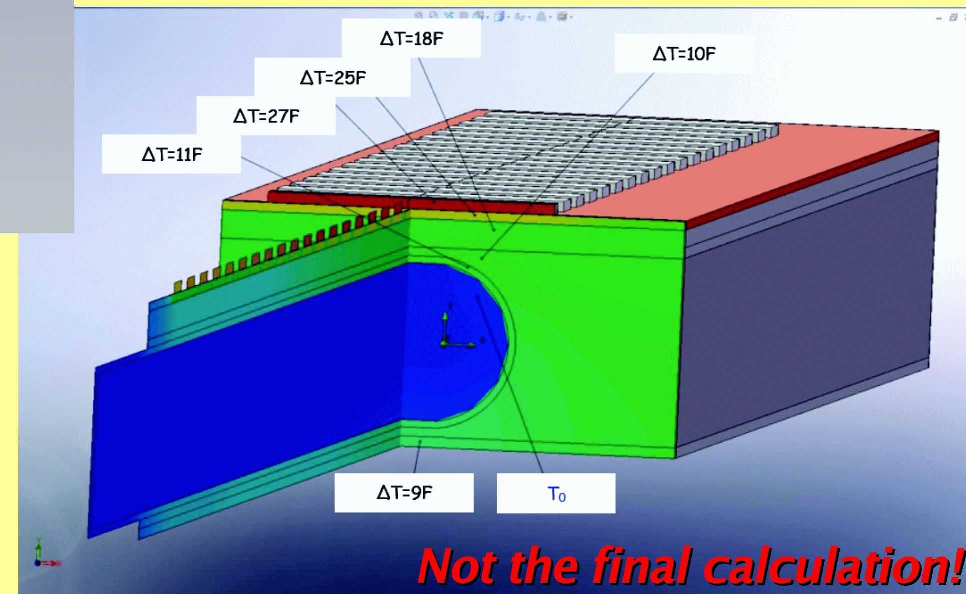


50 cm IST in SolidWorks
Clamping 'Crown' rapid prototype
Produce 50 cm ladder in August

Cooling system



Squashed cooling tubes
3 different length kapton hybrid/cables
Supports for connectors



FloWorks shows a rise from 21C to 32C for the APV chips
(Novec 7200 at 0.5 liter/minute, 1 cooling tube)

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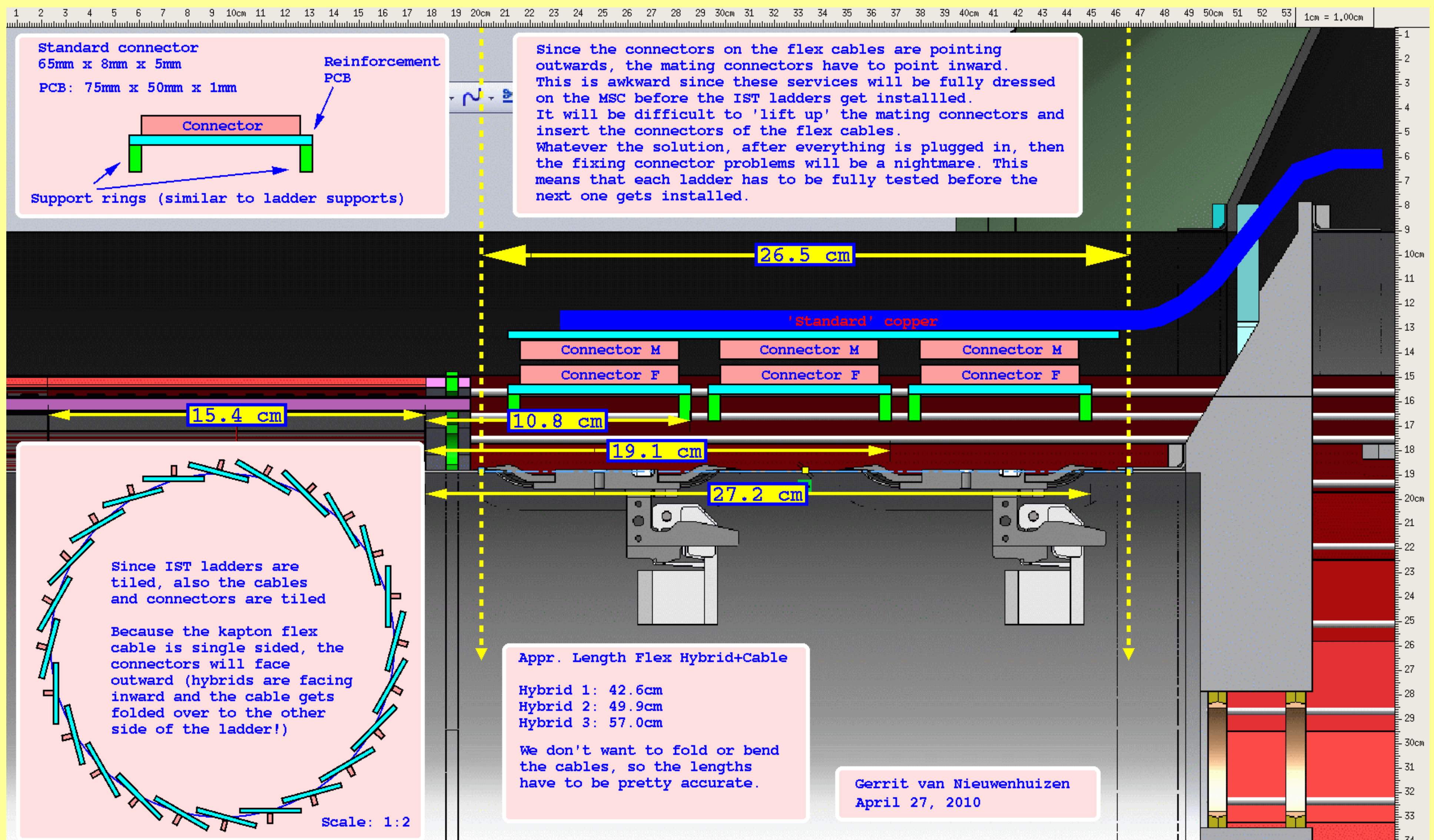
IST cable transitions



Specially designed copper cable (~16kg/m)

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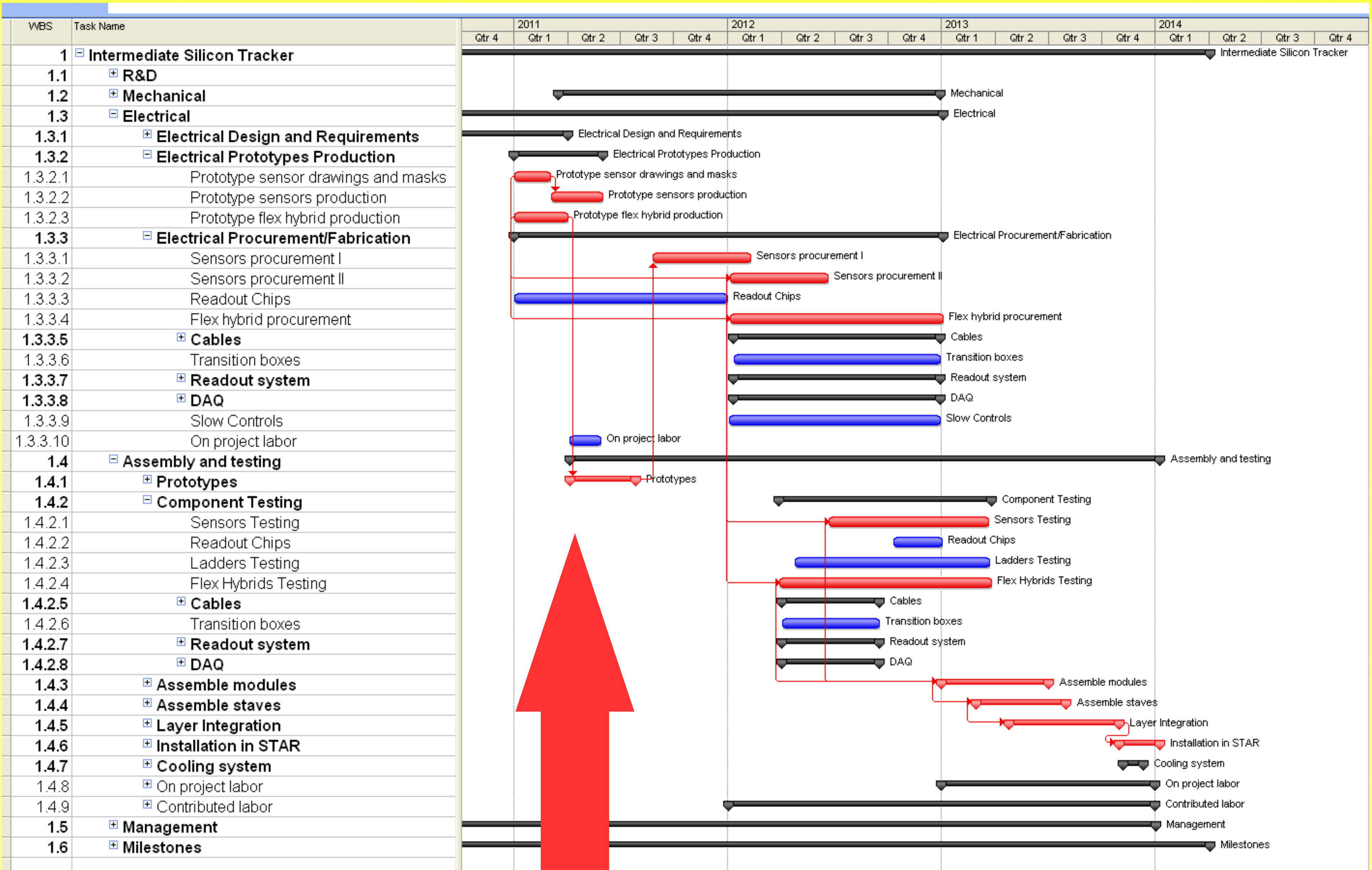
Schedules



Shortterm we are on track as long as the funding arrives as expected (what is holding up the bridge funding?)

Gerrit van Nieuwenhuizen

Concluding remarks

Sensor design will be finished before June

RFQ will go out to Hamatsu, June-July

Prototype production in Q1 FY2011

Waiting with dicing of more APV chips until test results are available

Wire bonding being set up at BNL

First full prototype bonding finished this week

Hybrid designs are being vetted

Shortened design finished before July

Prototype production July-August

Still smoothing out problems with test readout system

First prototypes of ARM/ARC in May/June

Mechanical engineering rebooting

Shorter design implemented + extra supports

Cooling calculations ongoing (2 vs 1 tube)