

# Management & Technical Status

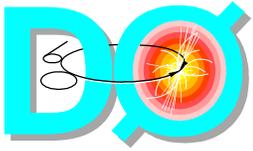
H.Weerts

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Introduction/overview

Management & organization

Technical status of detector  
in numbers & graphical form



## Introduction/overview

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Yesterday D0 elected new spokespersons:  
H.Weerts & J.Womersley

DoE reviews:

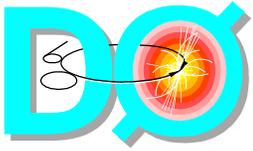
March 1997 ----- January 1998, baselined here  
August 1998, mini-review ----- June 1999

**In your folders:**

Project Management Plan from January 1998  
review.

Cost estimate: on Web was June 99; current one  
in folder is revised, more by Tuts.

Schedule: baseline is in folder; current one will be  
used during this review( we are tracking the  
schedule).



## Introduction/overview

Brief summary of responses to June 1999 review

### Recommendations

### D0 Response

New set of milestones

~200 internal milestones  
91 DoE reportable ones

Staff production efforts

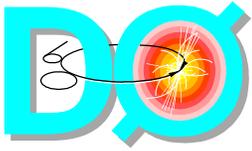
Done, added about 15  
techs & visitor support

Reevaluate schedule

Developed realistic  
schedule; input in Lab  
for Run II schedule



To Technical Overview



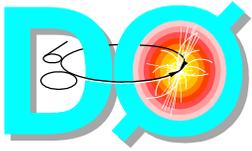
# WBS summary

- 1 DOØ Upgrade Detector
    - 1.1 Tracking Detectors
      - 1.1.1 Silicon Tracker
      - 1.1.2 Fiber Tracker
      - 1.1.3 Central Preshower Detector
      - 1.1.4 Forward Preshower Detector
      - 1.1.5 Tracking Electronics
    - 1.2 Calorimeter
      - 1.2.1 Front-end Electronics
      - 1.2.2 Intercryostat Detectors
    - 1.3 Muon Detectors
      - 1.3.1 Cosmic Ray Scintillator
      - 1.3.2 Central Trigger Detectors
      - 1.3.3 Forward Trigger Detectors
      - 1.3.4 Forward Tracking Detectors
      - 1.3.5 Front-end Electronics
    - 1.4 Trigger
      - 1.4.1 Framework
      - 1.4.2 Luminosity Monitor
      - 1.4.3 Level 1
      - 1.4.4 Level 2
      - 1.4.5 Level 3
    - 1.5 Online Computing
      - 1.5.1 Online Equipment
      - 1.5.2 Level 1 and 2
      - 1.5.3 Level 3
      - 1.5.4 Configuration and Run Control
      - 1.5.5 Data Logging
      - 1.5.6 Control/Monitoring
      - 1.5.7 DAQ Monitoring
      - 1.5.8 Event Monitoring
      - 1.5.9 Calibration
      - 1.5.10 Accelerator Interface
  - 2 Detector R&D
  - 3 AIP Project
    - 3.1 Solenoid
      - 3.1.1 Solenoid
        - 3.1.1.1 Management/EDIA
        - 3.1.1.2 Superconducting Solenoid
        - 3.1.1.3 Fermilab Cryo, PS, etc.
        - 3.1.1.4 LHe Refrigeration System
        - 3.1.1.5 Accelerator Machine Modifications
        - 3.1.1.6 Accelerator Services Modifications
- 4 Project Support
  - 4.1 Project Management
  - 4.2 Fermilab Technical Support

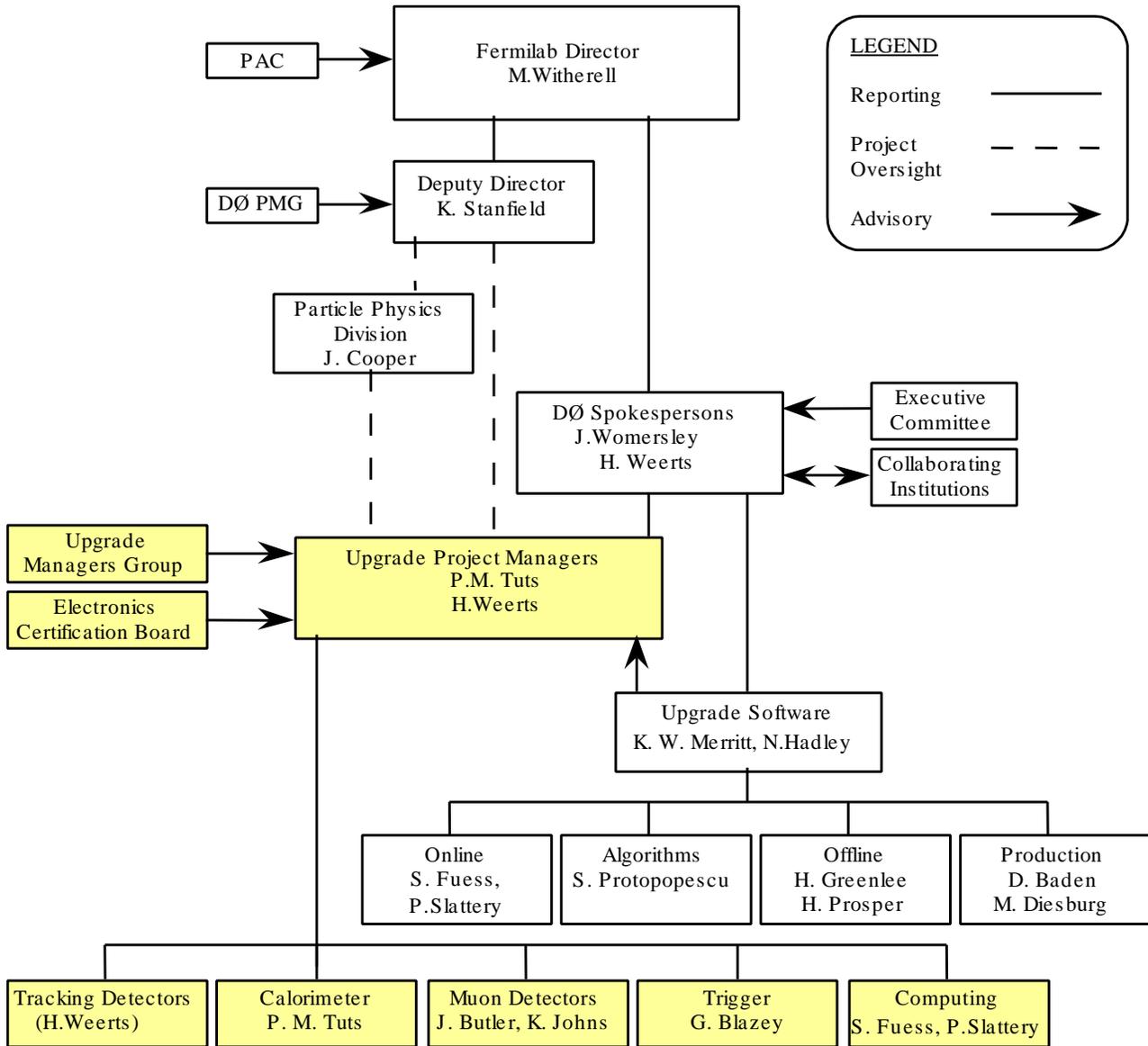
Offline Computing NOT  
Part of Detector Upgrade  
Project

Includes Muon  
Shielding and  
Beam Pipe

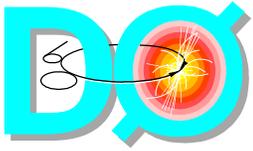
← Funded differently



# DØ reporting structure



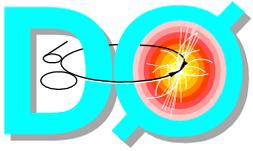
**DØ Upgrade Project Organization**



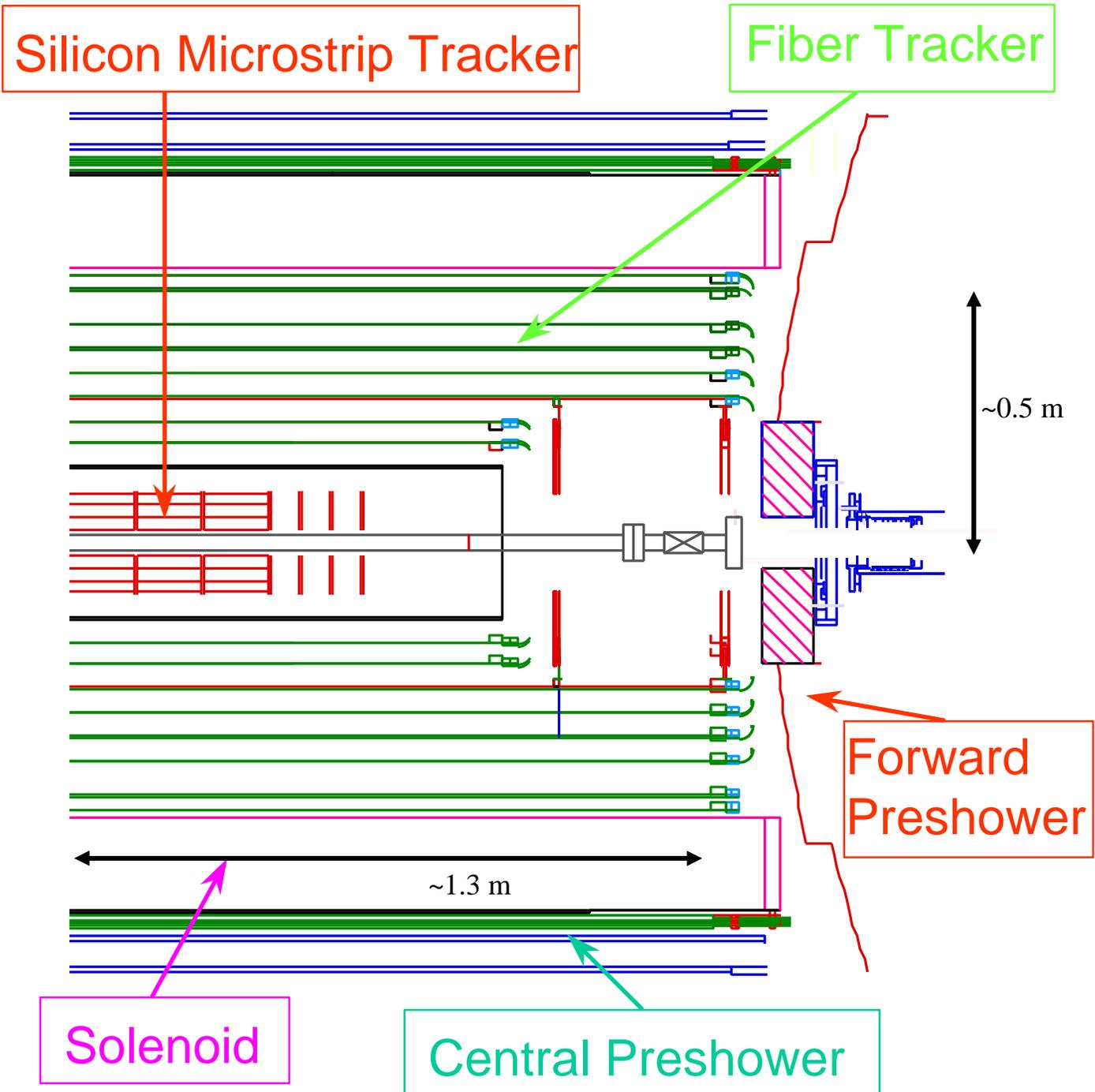
## Notes on organization chart

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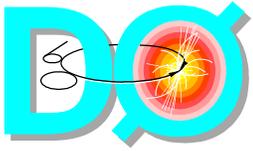
- ◆ Silicon and Fibers “Level 2” projects.
- ◆ Installation/commissioning historically within each subproject.
- ◆ Now have coordinators for these activities, but no separate WBS structure
- ◆ Tuts & Weerts divided responsibilities:
  - ◆ Tuts: Calorimeter, Trigger, Online
  - ◆ Weerts: Tracking, Muon



# Tracking System Overview



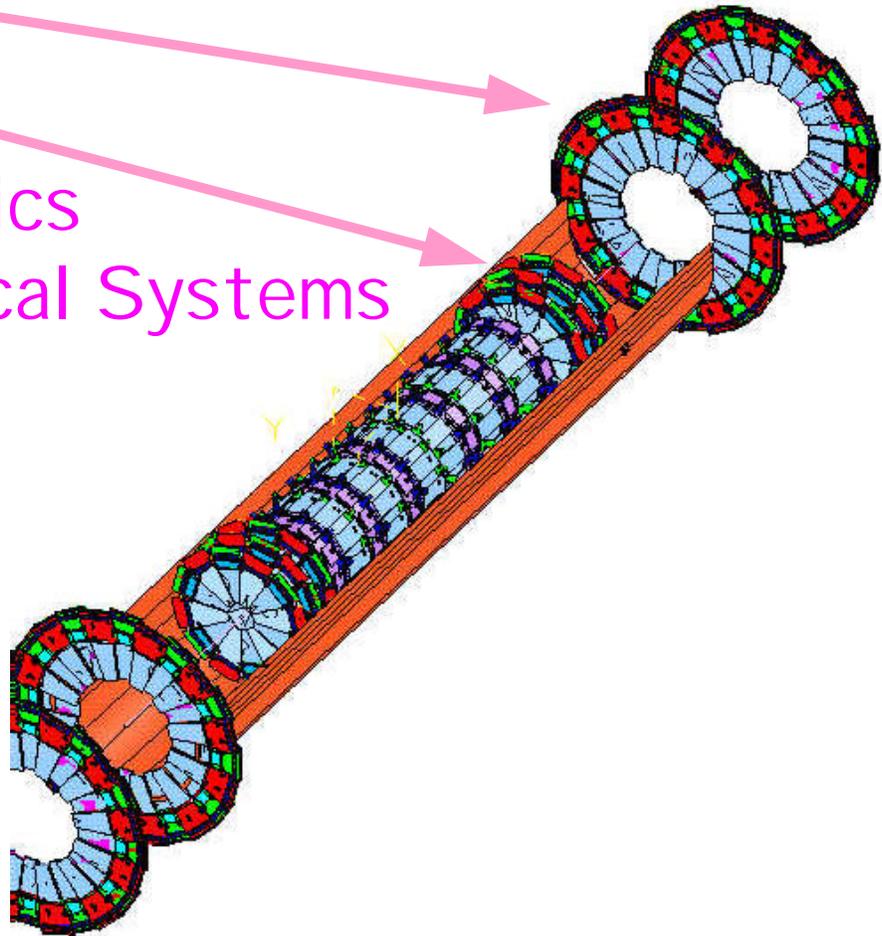
*All detectors in this volume use **SVX II** readout*

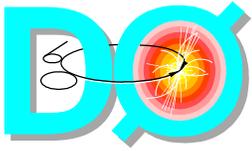


## DO SMT overview

### Major SMT Subsystems

- Single Sided Ladder (3 chip)
- Double Sided 2<sup>0</sup> Ladder (9 chip)
- Double Sided 90<sup>0</sup> Ladder (6 chip)
- H Disk
- F Disk
- Electronics
- Mechanical Systems





# Silicon Status

In production on nearly all aspects



design      prototype      Production      Manpower  
Physicists: large influx  
Technical: ramping up

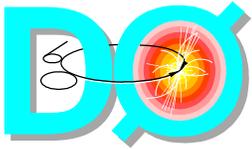
NON- Issues:

*Delivery of sensors from Micron/Eurisys*

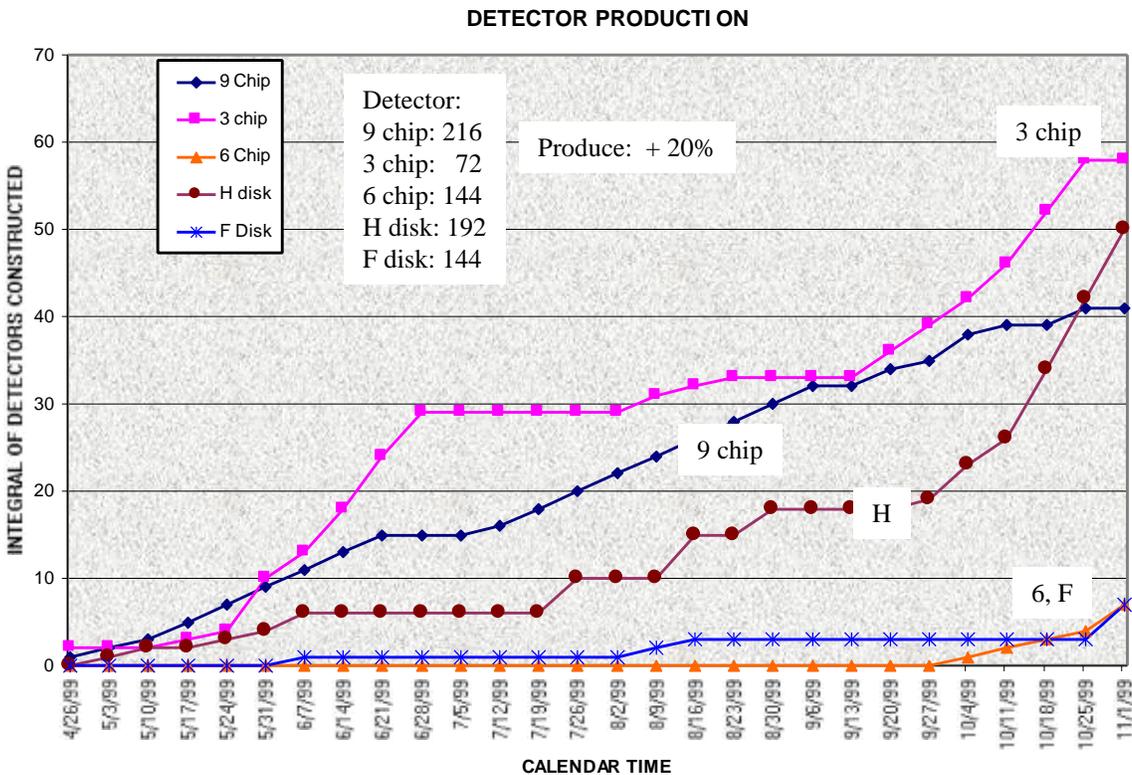
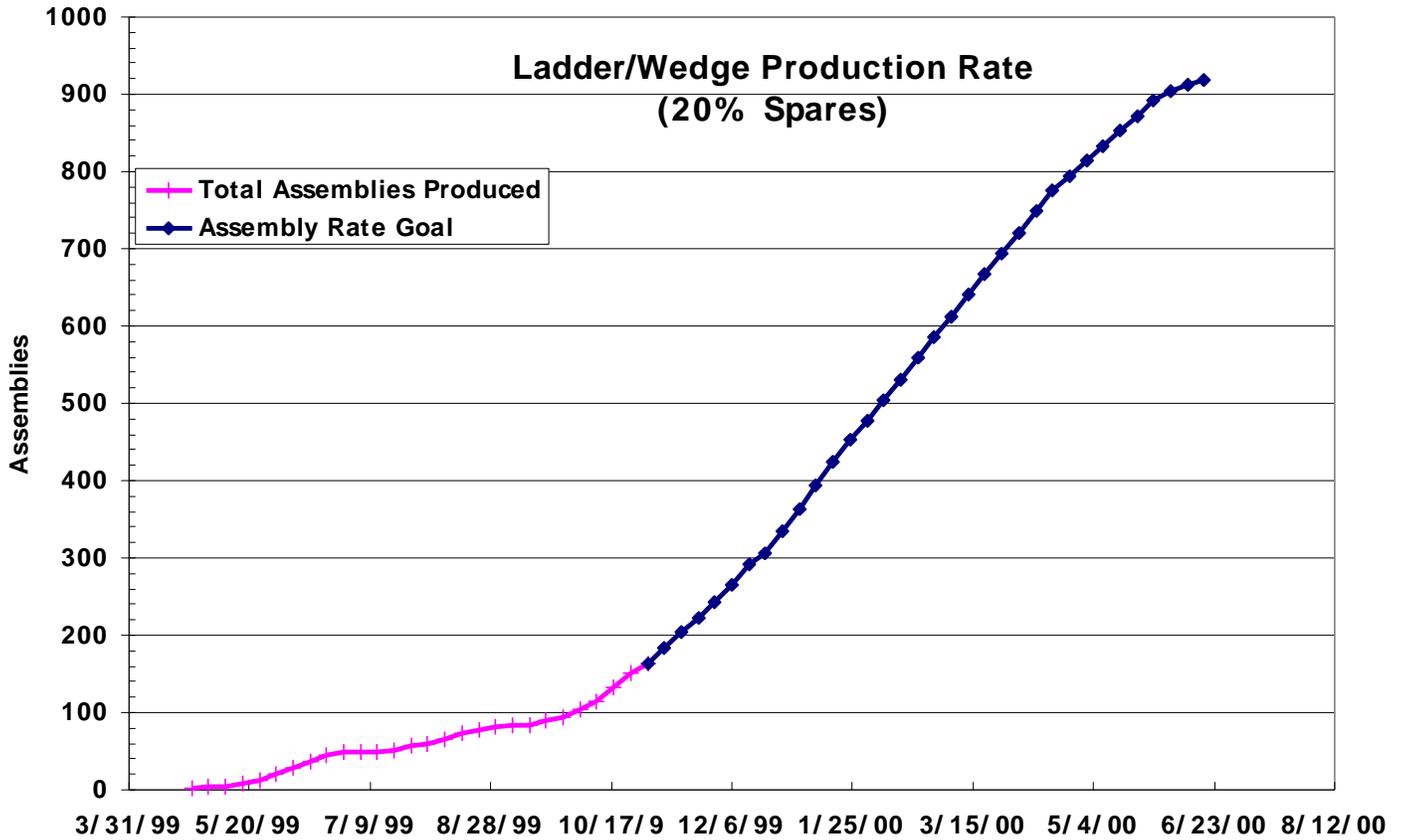
Concerns:

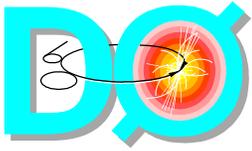
**I mprove production yield of good detectors**

Silicon detector @D0: Sept-18-2000



# DOSMT ladder/detector production





# Fiber Tracker Overview

## ● Scint Fibers

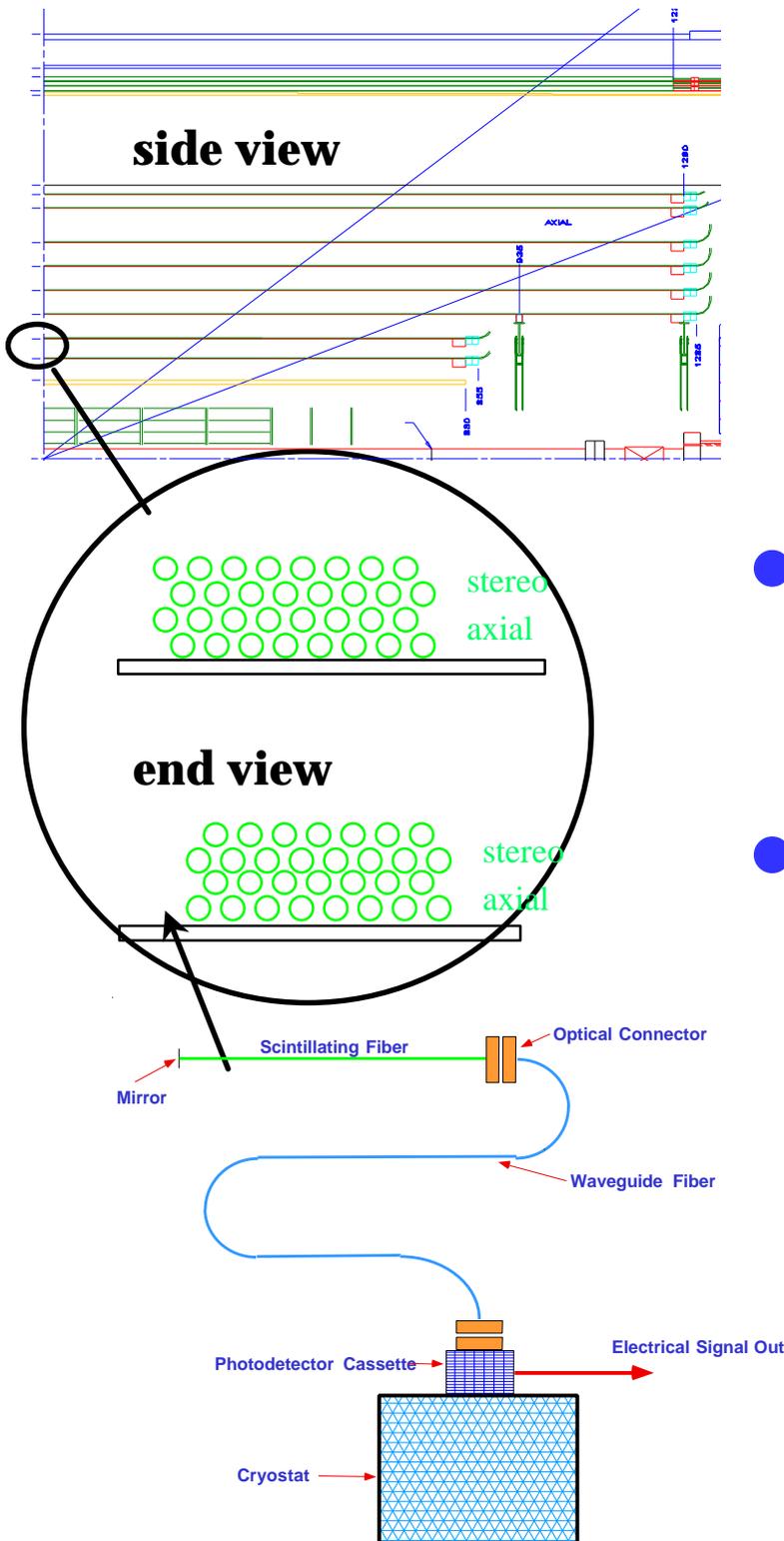
- ◆ 830 $\mu\text{m}$   $\varnothing$ , multiclاد
- ◆ 1.6-2.5m active length
- ◆ 10m clear waveguide to photodetector
- ◆ rad hard (100 krad) (10yr @ 20cm @ $10^{32}$ )

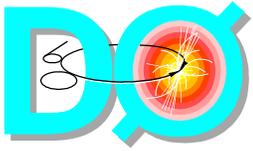
## ● Fiber Ribbons

- ◆ 8 axial doublets
- ◆ 8 stereo doublets (3 $^\circ$  pitch)

## ● Readout

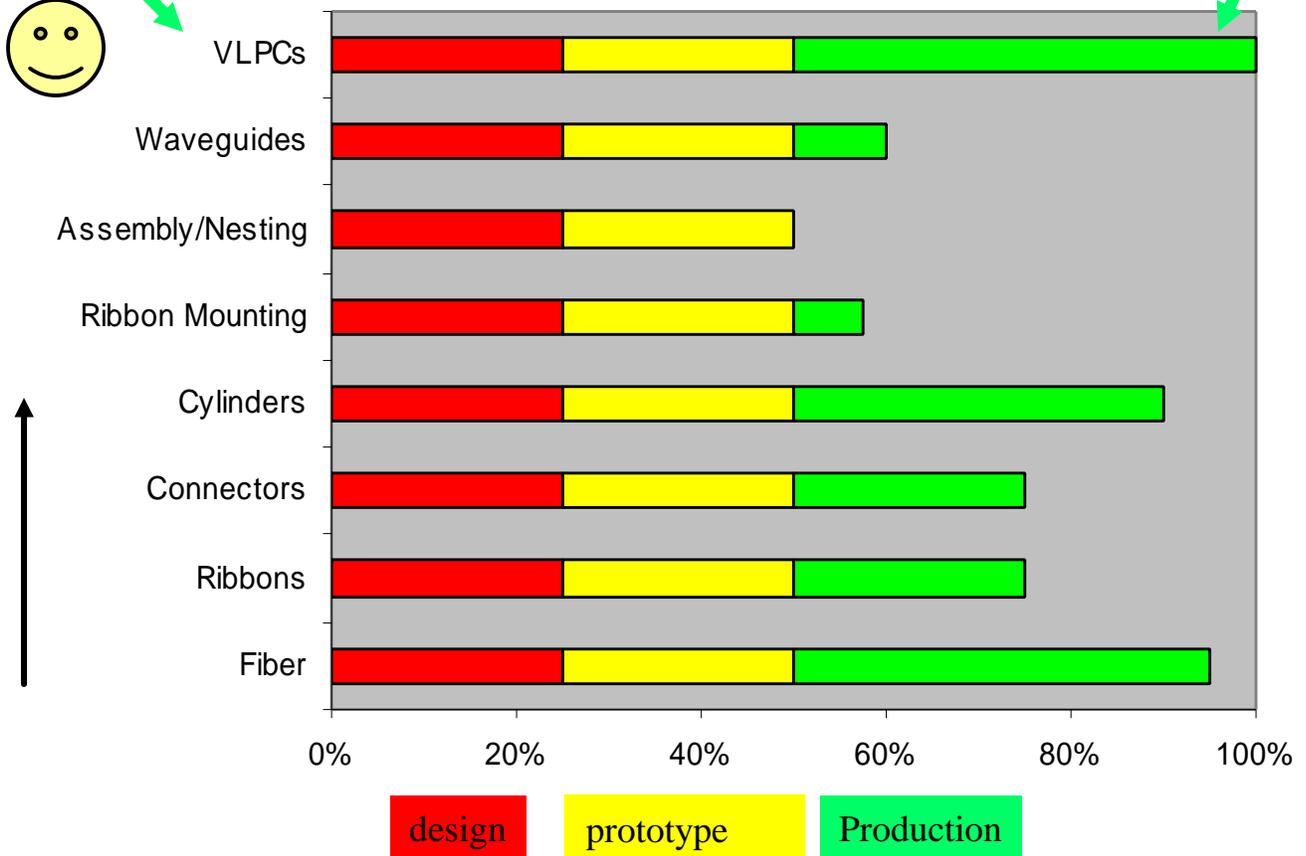
- ◆ 77,000 channels
- ◆ VLPC readout
- ◆ run at low temp (9  $^\circ\text{K}$ )
- ◆ fast pickoff for trigger
- ◆ SVXII readout





# Fiber tracker status

Cylinder 3 completed in beginning of September

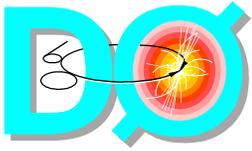


## Issues:

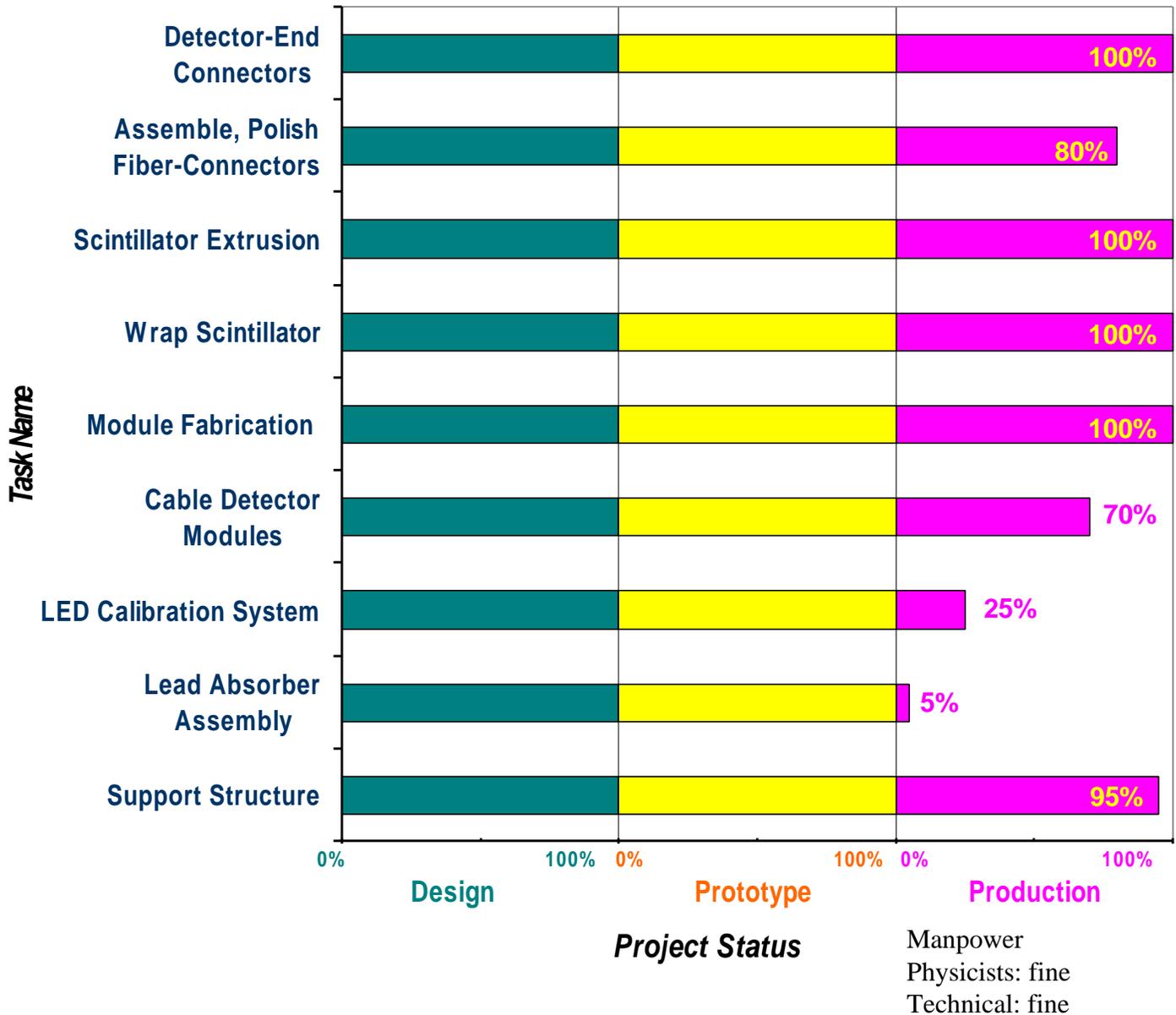
- Start production of ribbon mounting again*
- Start VLPC cassette production*
- Flex circuits for VLPC remain critical*

Manpower  
 Physicists: need more  
 Technical: assigned, but  
 Connector & alignment problem

Assembly completed: May-4-2000



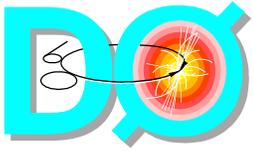
# Forward Preshower Status: November, 1999



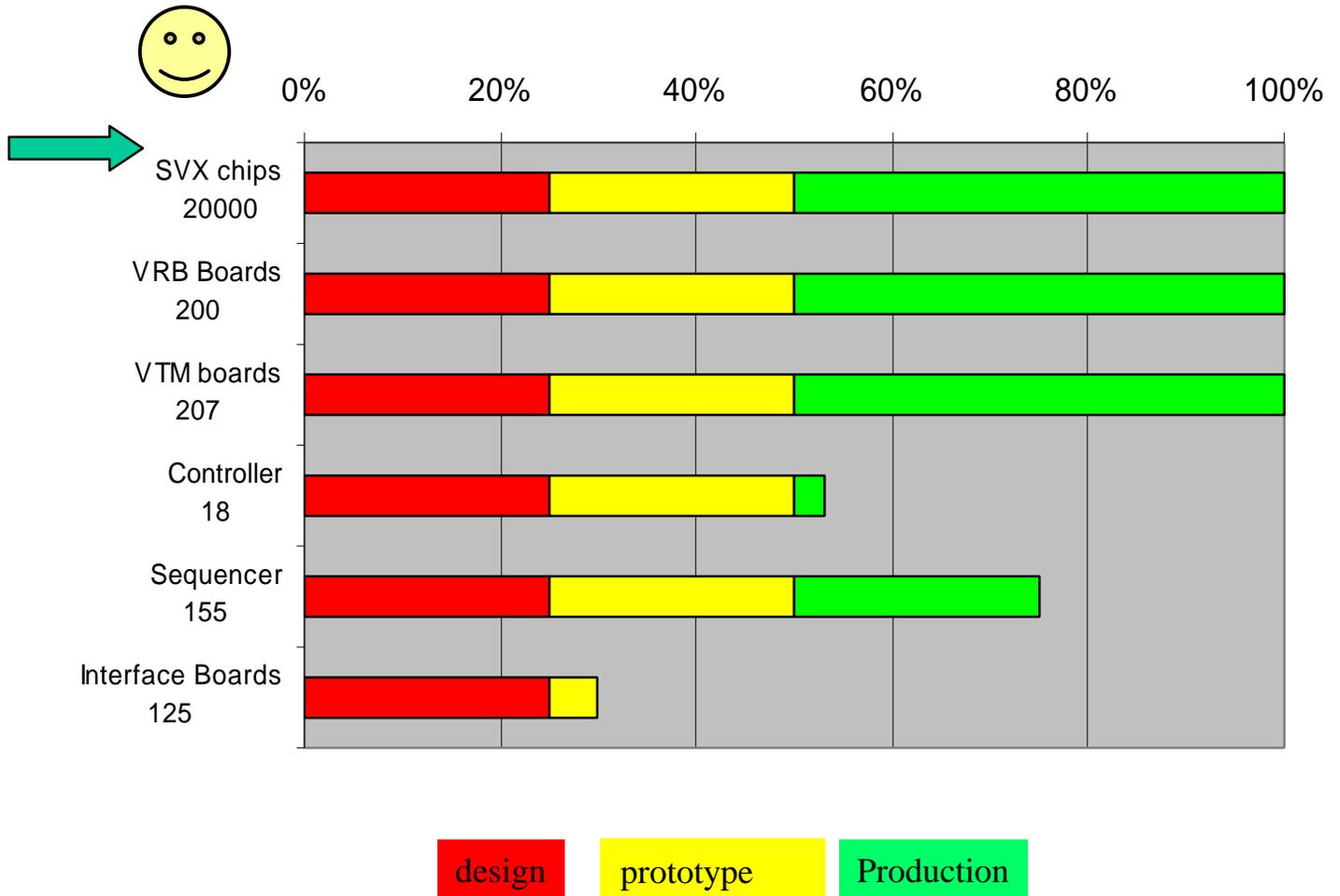
**FPS – South Installed at Fermilab: February 15, 2000**

**FPS – North Installed at Fermilab: March 14, 2000**

**Project on-schedule, no items on critical path.**



# Silicon + Fiber tracker Electronics

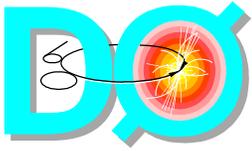


Manpower  
Physicists: sufficient  
Technical: sufficient

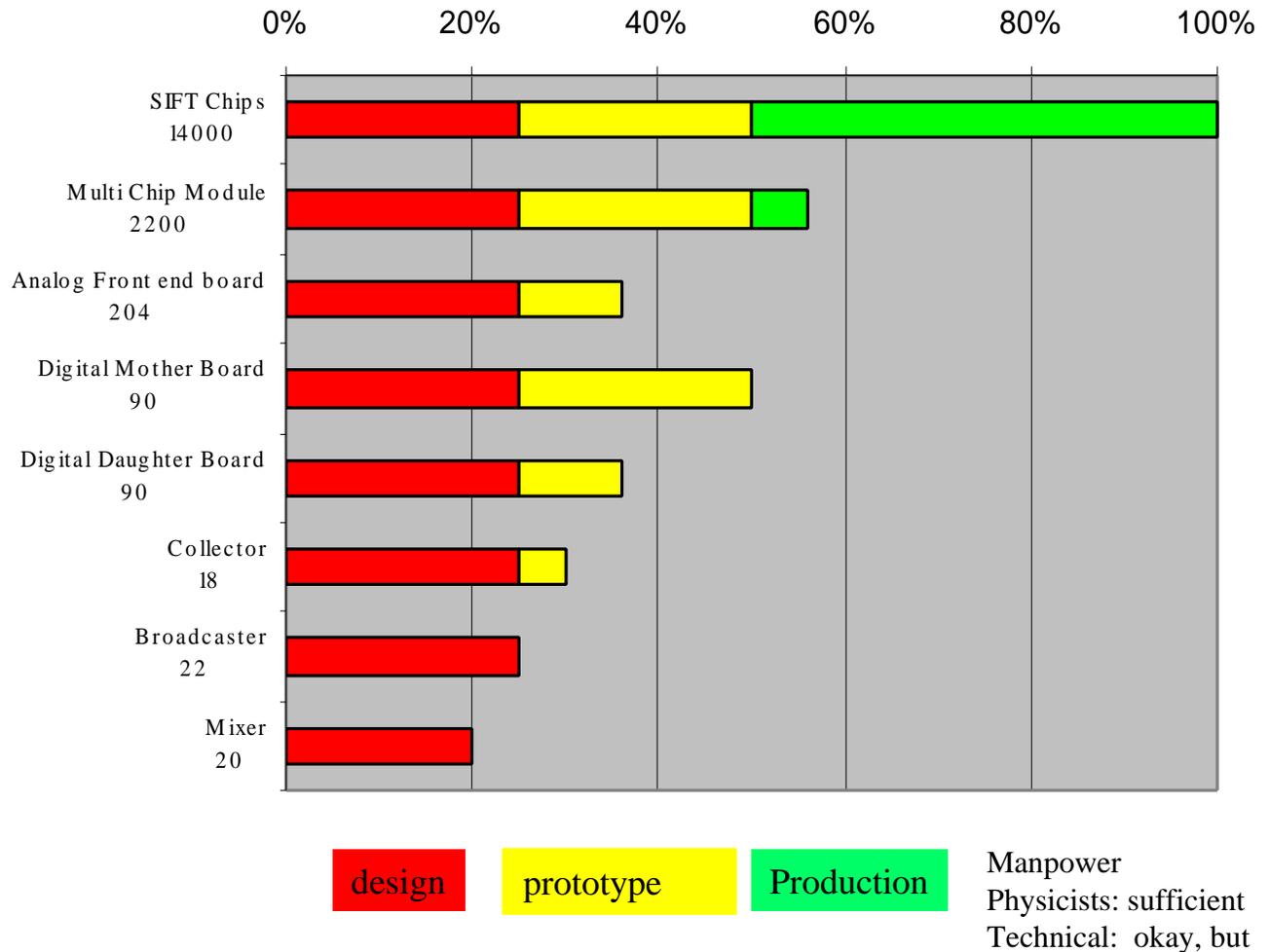


SVX II chips & HDI 's  
enable to start  
production and testing

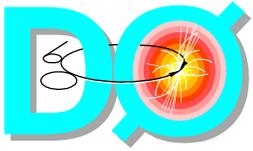
*Silicon*



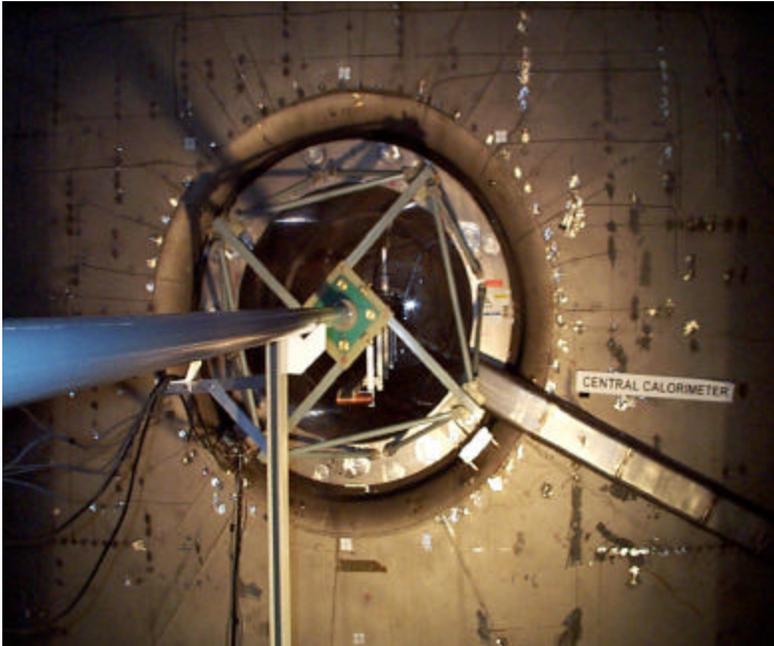
# Fiber Tracker Electronics



Includes parts of the Level 1 tracking trigger



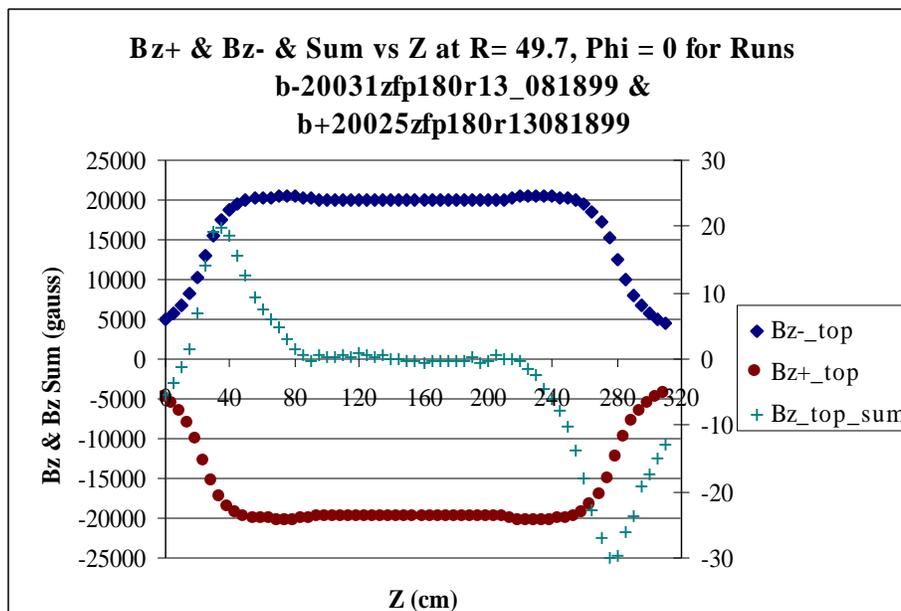
# Solenoid & Field Mapper in Bore of Central Calorimeter

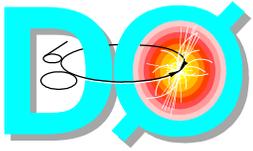


Central Preshower installed on solenoid

- Precision mapping of field Summer 1999
- Analysis ongoing

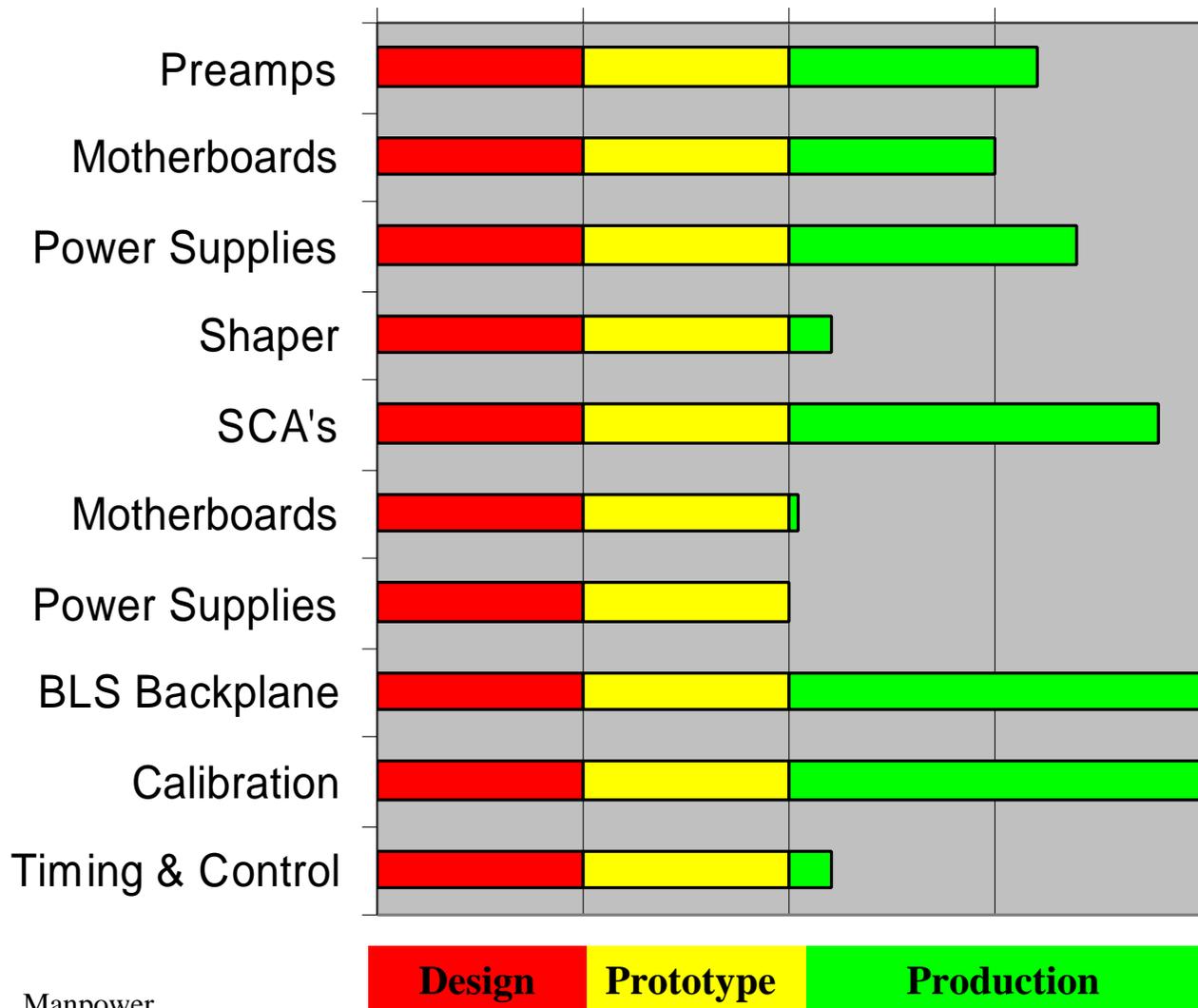
Manpower  
Physicists: fine  
Technical: fine





# Calorimeter Electronics Status

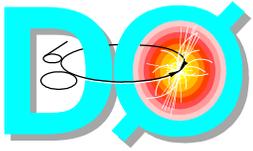
- Replace 60k channels of preamp, SCA, shaper, calibration, and power supplies



Fabrication finish: September-1-2000

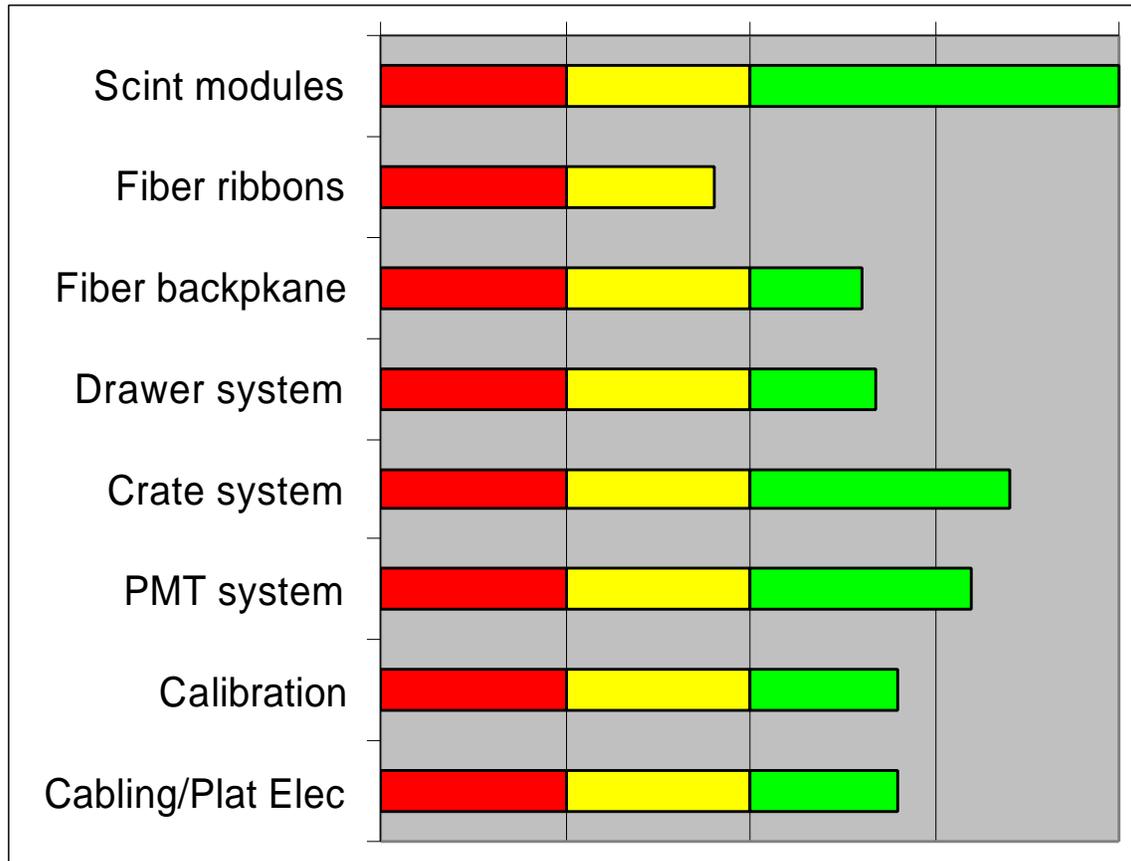
CC, ECN, ECS cryostats

last ECS: finish recabling: Jan-9-2001



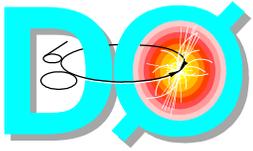
# Inter Cryostat Detector (ICD)

Being built at UT Arlington

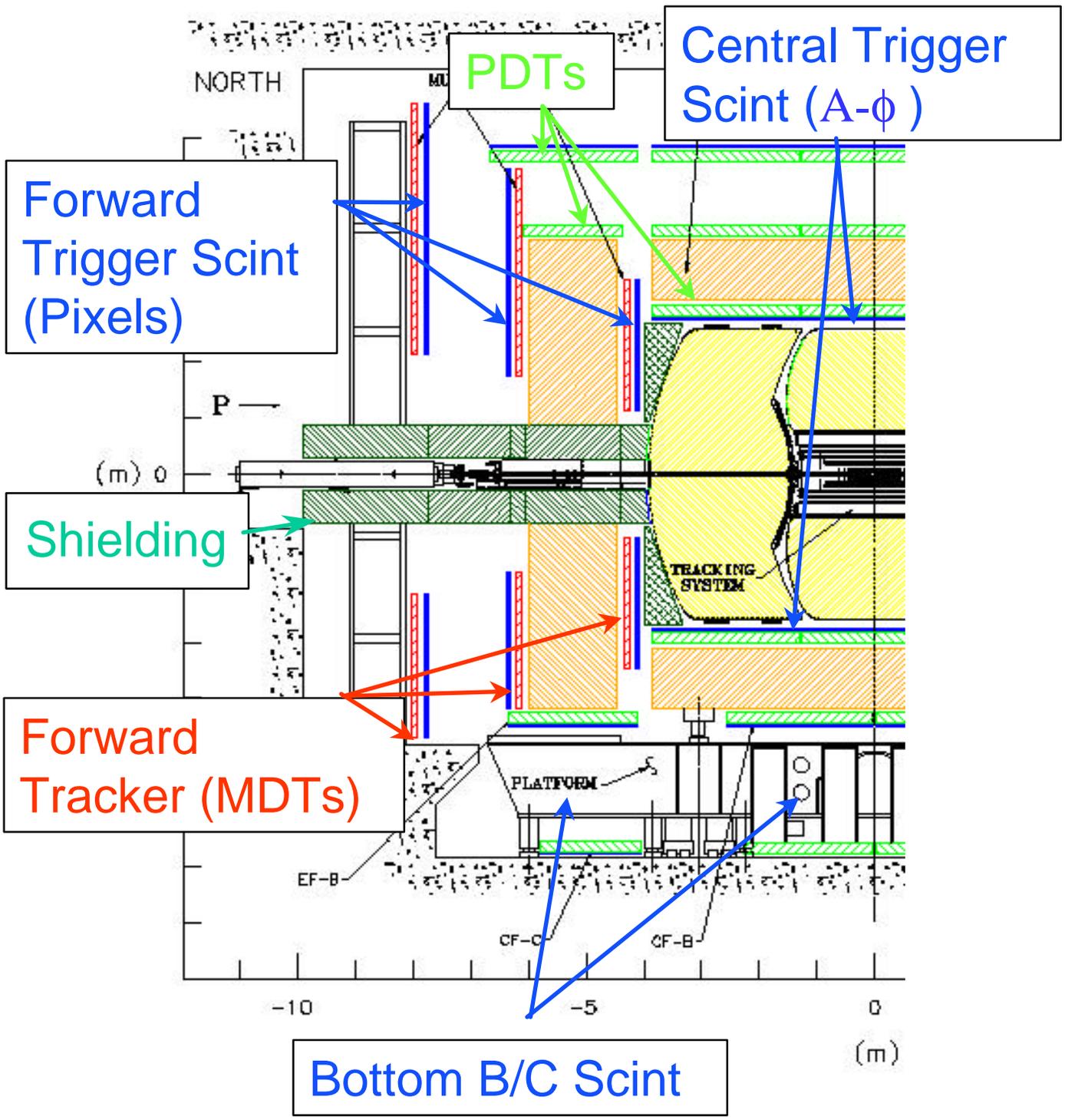


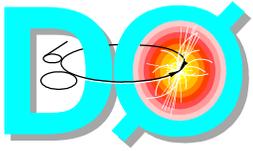
Manpower  
Physicists: fine  
Technical: fine

Jan-25-2000: North & South ICD installed  
Jan-11-2000: North hooked up  
Nov-9-2000: South hooked up

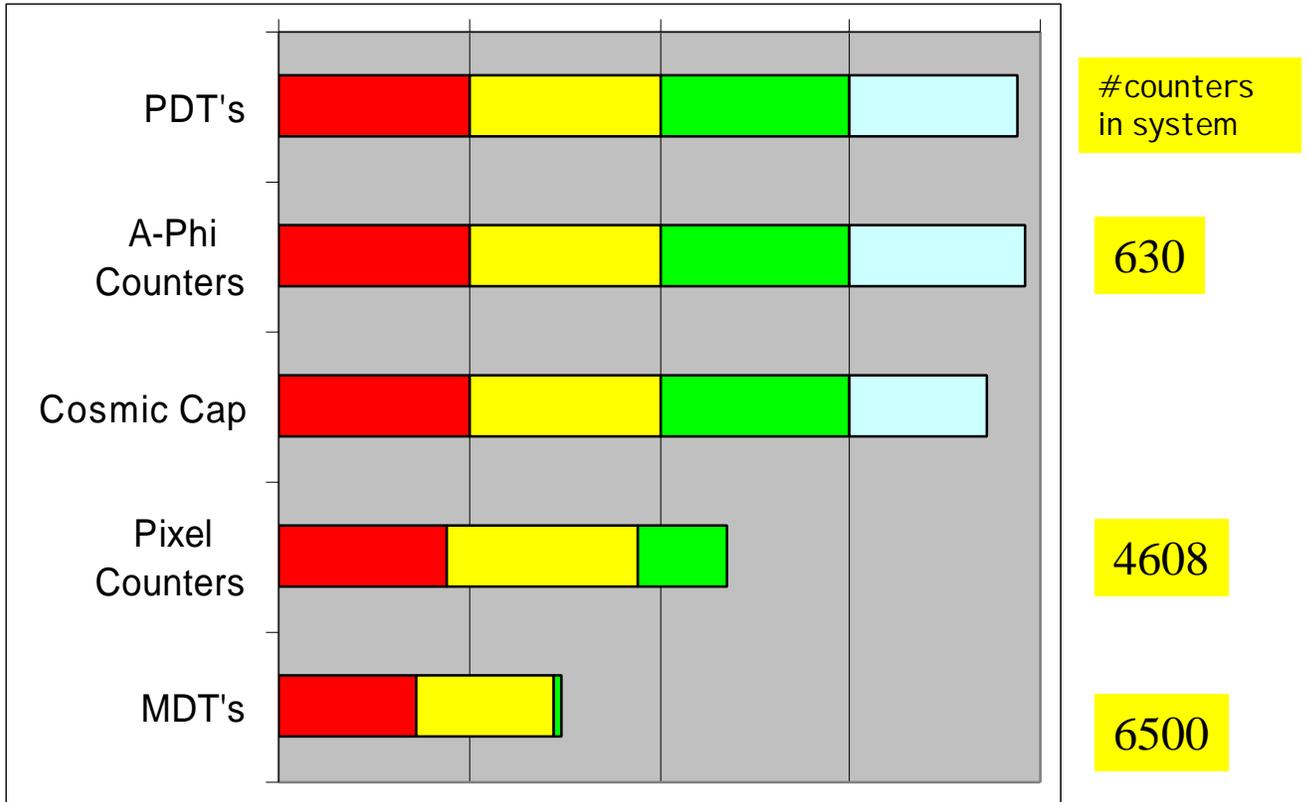


# Muon Detector Upgrade





# Muon detector status



Manpower

Physicists: okay, visitors

Technical: ramping up

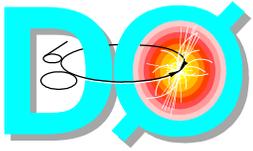


Central muon: complete & driving commissioning

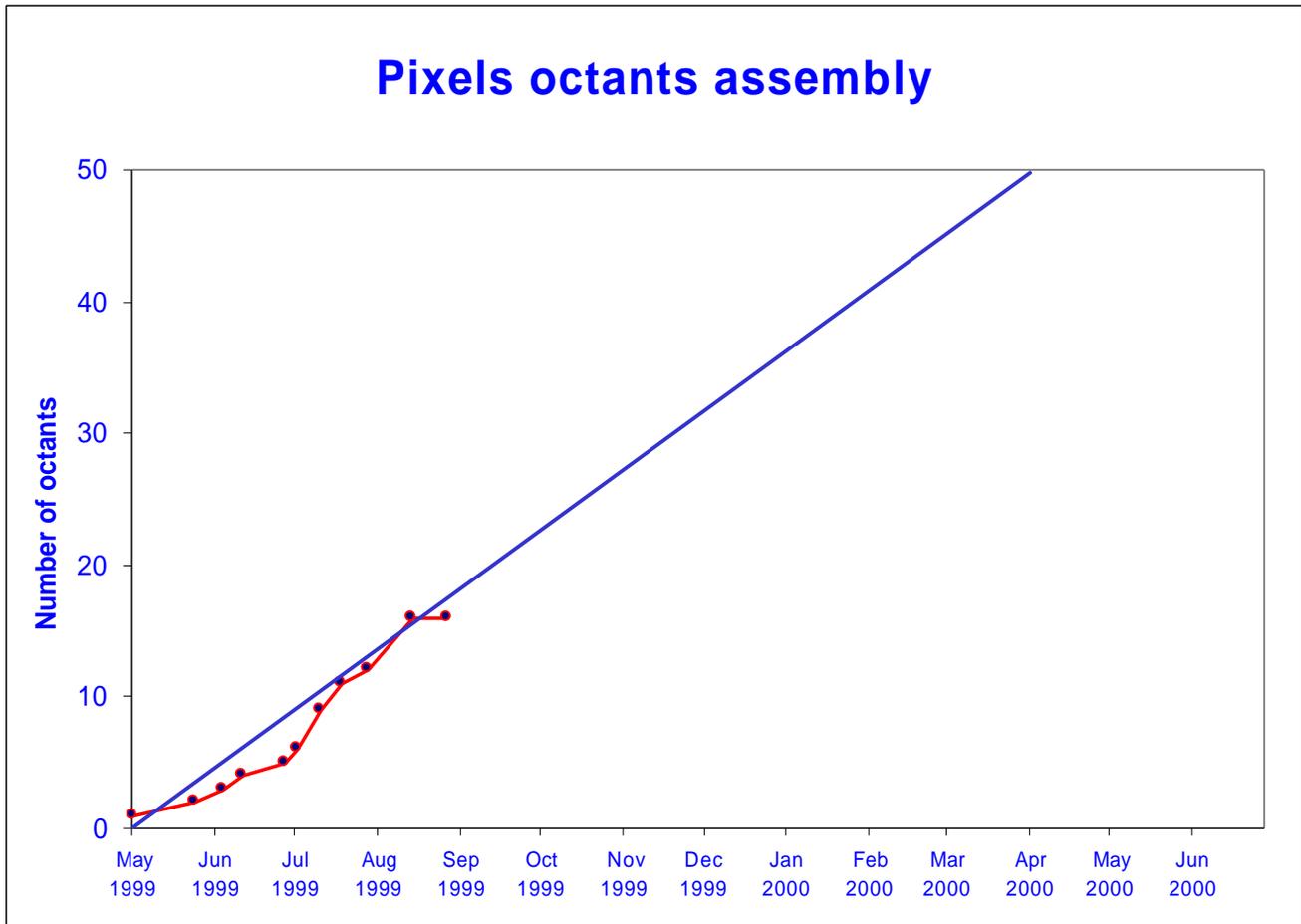
Forward muon: concerns

- MDT production at Dubna fine
- Assembly into octants:
  - pixel octants production okay
  - MDT octant starting slowly

Assembly completed forward muon: Jul-14-2000

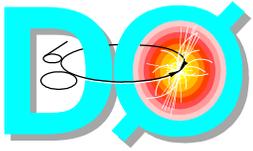


# Pixel octant assembly rate



Assembly complete: April-4-2000

*On track.*



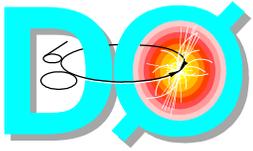
# Forward Muon Trigger Pixel octant from A Layer



Lab F production facility

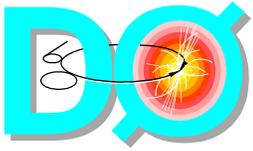
Cabled octant, no pixels yet

*Need to build 48 octants (6 layers); 4608 counters*

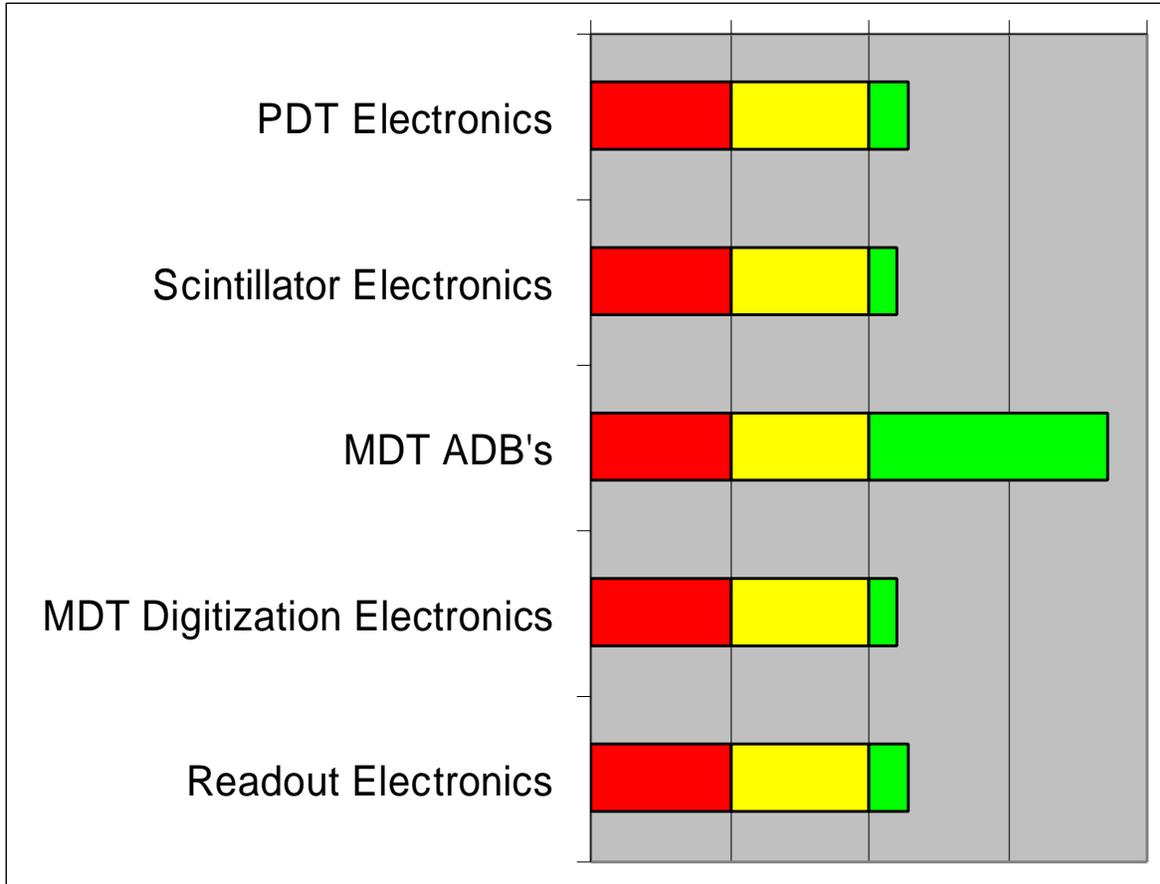


## MDT A layer octant.

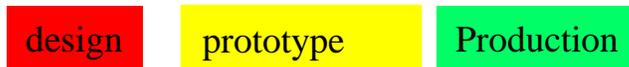




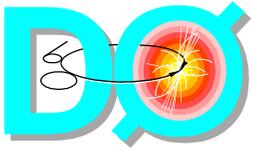
# Muon electronics



Manpower  
Physicists: fine  
Technical: fine

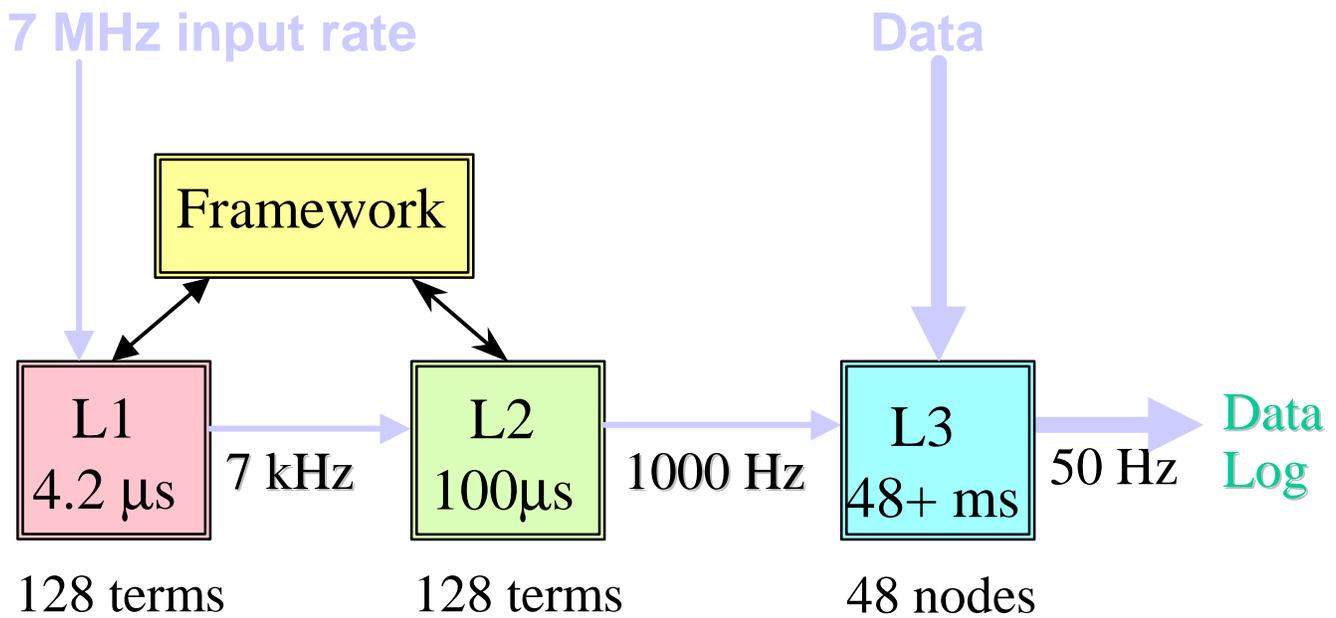


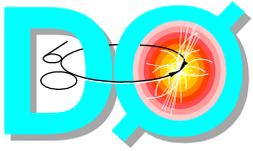
On schedule and below budget



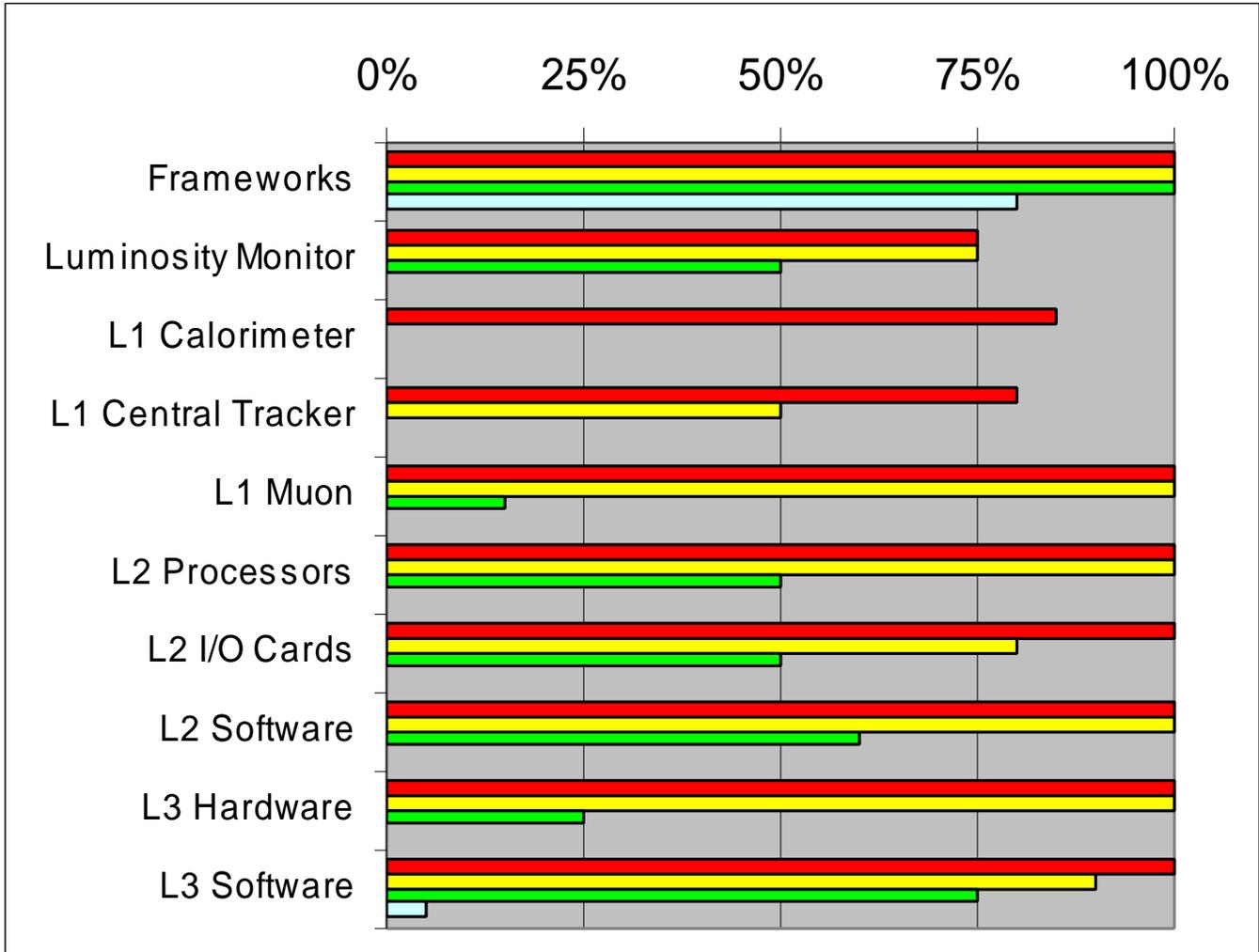
# Trigger Overview

For  $L=2 \times 10^{32} \text{ cm}^{-2} \text{ s}^{-1}$  ( Bunch Crossings at 132 ns; Deadtime:  $< 5\%$  ) :

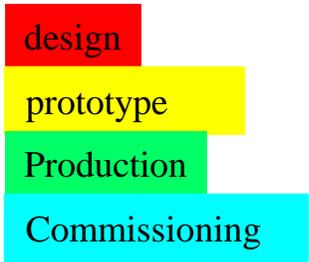




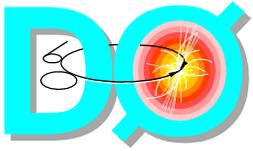
# Trigger Status



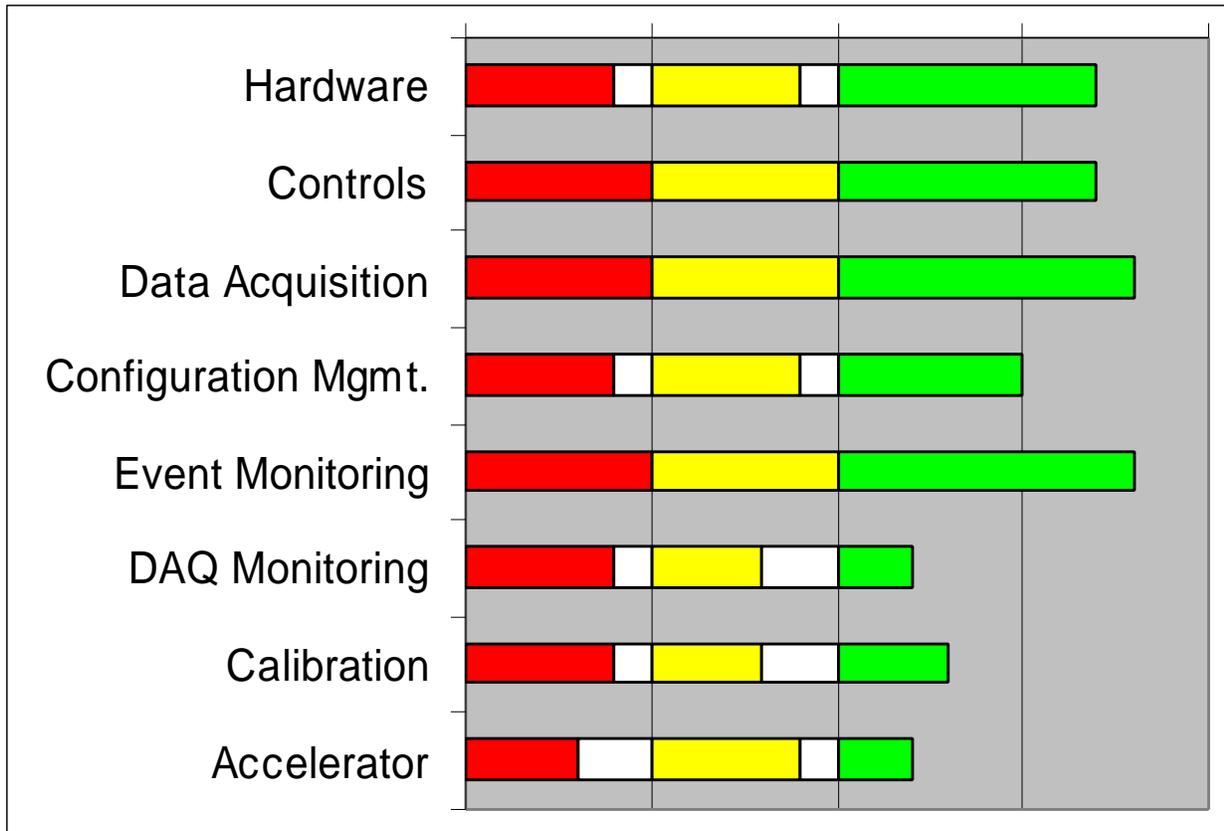
Manpower  
Physicists: some more needed  
Technical: fine



Not a critical path item for detector completion



# Online status



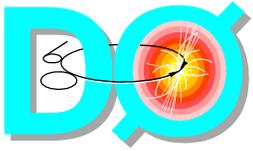
Manpower  
Physicists: sufficient  
Technical: okay

design      prototype      Production

Already used in commissioning of detector.

Critical pieces are in use:

- Controls
- DAQ & Event Monitoring



# Installation & Commissioning

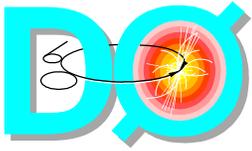
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- **Installation has started already**
  - ◆ more details from J.Kotcher
- **Commissioning**
  - ◆ starting with central muon system
  - ◆ tracker front end being installed @ D0
  - ◆ in assembly areas
    - ◆ silicon 10% test
    - ◆ cosmic ray test fiber tracker
  - ◆ developing schedule ( Kotcher)

Manpower

Physicists: more needed

Technical: needed



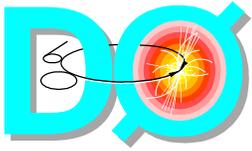
## Beyond the Baseline Impact

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- **Silicon Track Trigger**

- ◆ completely funded by NSF + matching; important Run II physics
- ◆ built by BU, SUNY SB, Columbia, FSU
  - ◆ engineering separate/independent
  - ◆ physicists:
    - BU: Heintz & Narain
    - SUNY SB: Hobbs
    - Columbia: Evans
    - FSU: Wahl
  - ◆ no real impact on upgrade; encouragement because of NSF funding

Was Si, algorithms  
no upgrade  
overlap with L2 mu  
no upgrade

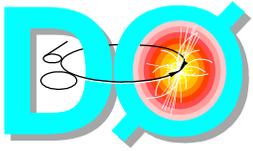


# Beyond the Baseline Impact

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- **Forward Proton Detector**

- ◆ Detector not in D0 hall
- ◆ Tevatron modifications progressing
- ◆ Roman pots built in Brazil, with parts purchased by NI KHEF & Brazil
  - ◆ engineering separate/independent
  - ◆ large Brazilian contribution; attracted new physicists; engineering from Brazil
  - ◆ Physicists:
    - A.Brandt, FNAL -> UTA
    - M.Martens, FNAL-BD
    - A.Santoro + Brazil **No upgrade overlap**
    - Prague group, minor
    - others driven by physics interests
  - ◆ no direct impact on upgrade
  - ◆ positive impact on interaction of D0 with BD



## Summary of status & issues

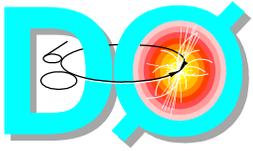
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No more “big” technical problems, just worries ( flex circuit, etc)

### Summary of issues:

- Restart/maintain production lines for Si, Fiber Tracker, forward muon ( muon assumes visitor support)
- monitor progress & identify problems early
- Rolled in & Ready: *Feb-2-2001* ==> realistic schedule & D0 committed to it

Not explicitly mentioning all the successes & progress, detectors/parts complete, electronics in hand & tested.



## Some general issues

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- Space problem at D0 developing (Lab is trying to help but)
- Visitors crucial in production lines, need funding