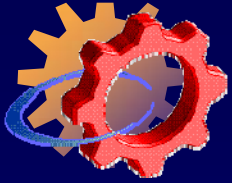


Beam Position Monitor for FP420

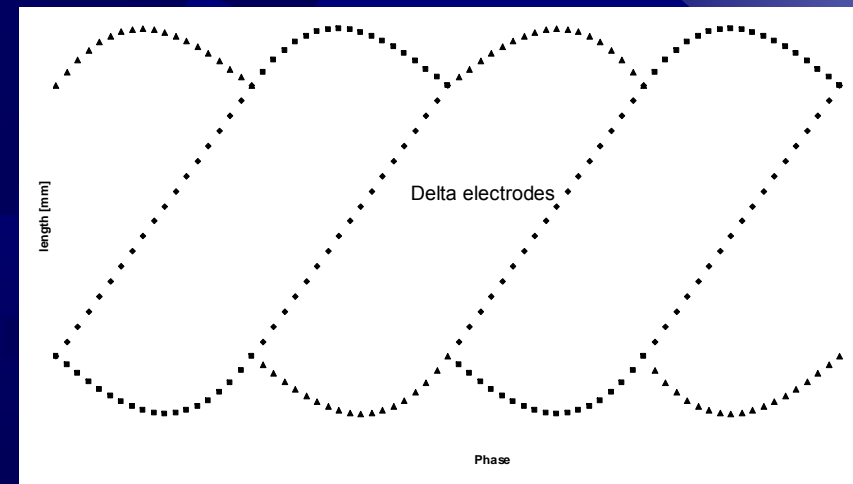
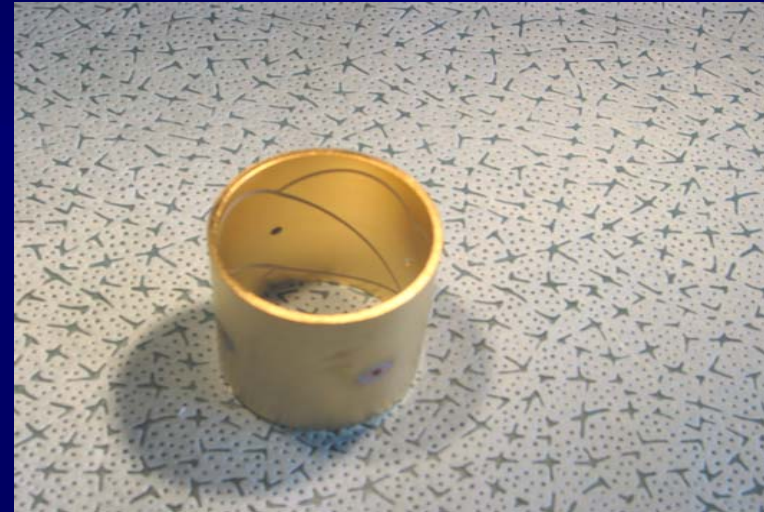
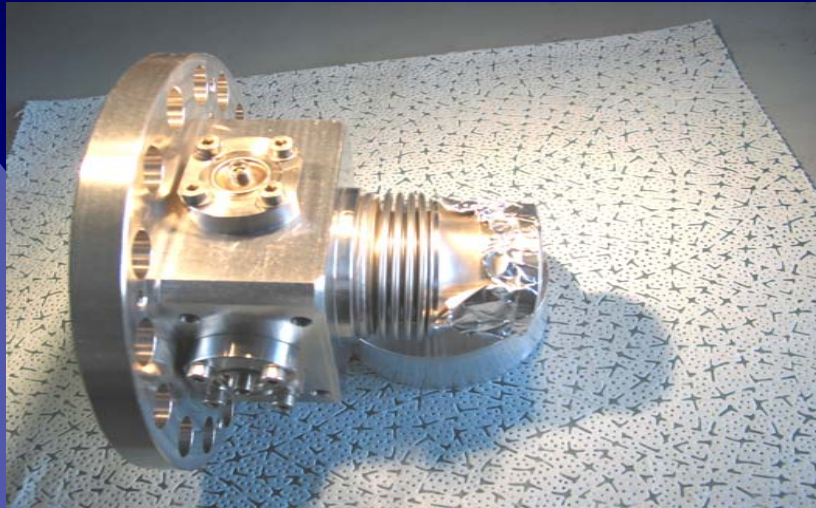
Integration in alignment test-
bench

HH 18-05-06



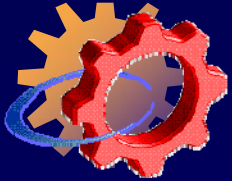
Electrostatic PU

Courtesy L. Soby



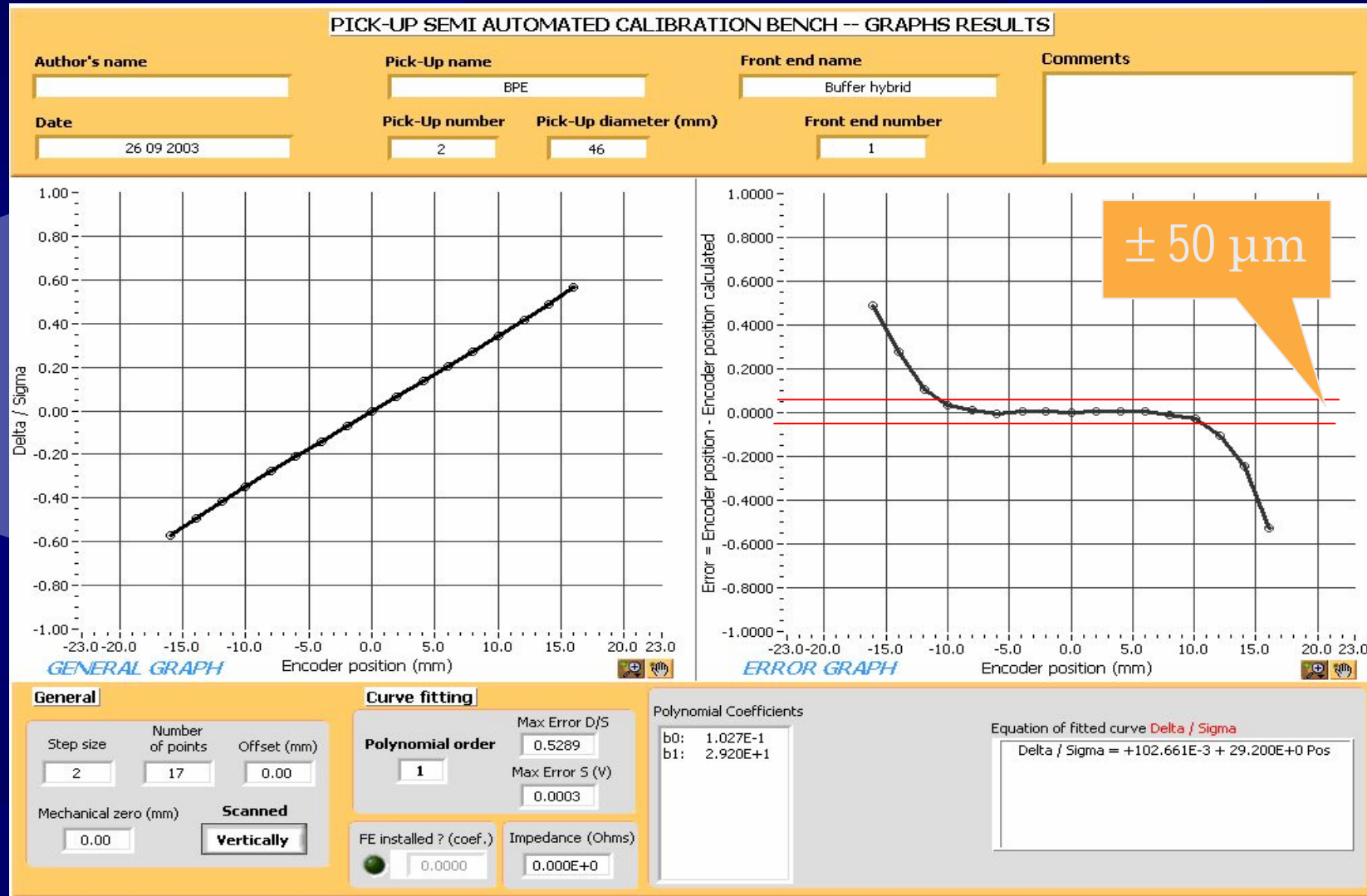
18-May-06

D. Swoboda @ FP420 HH



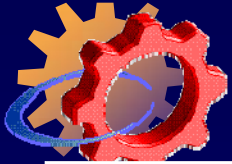
Electrostatic PU

Courtesy L. Soby



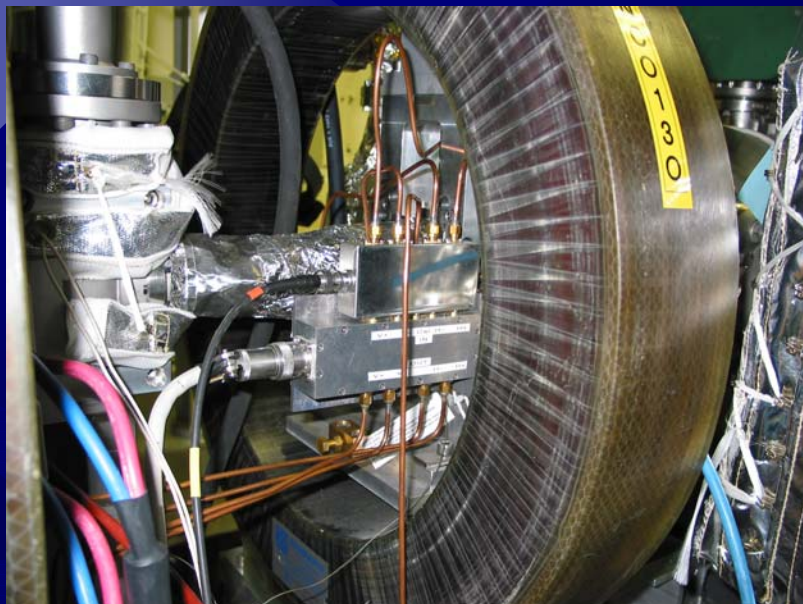
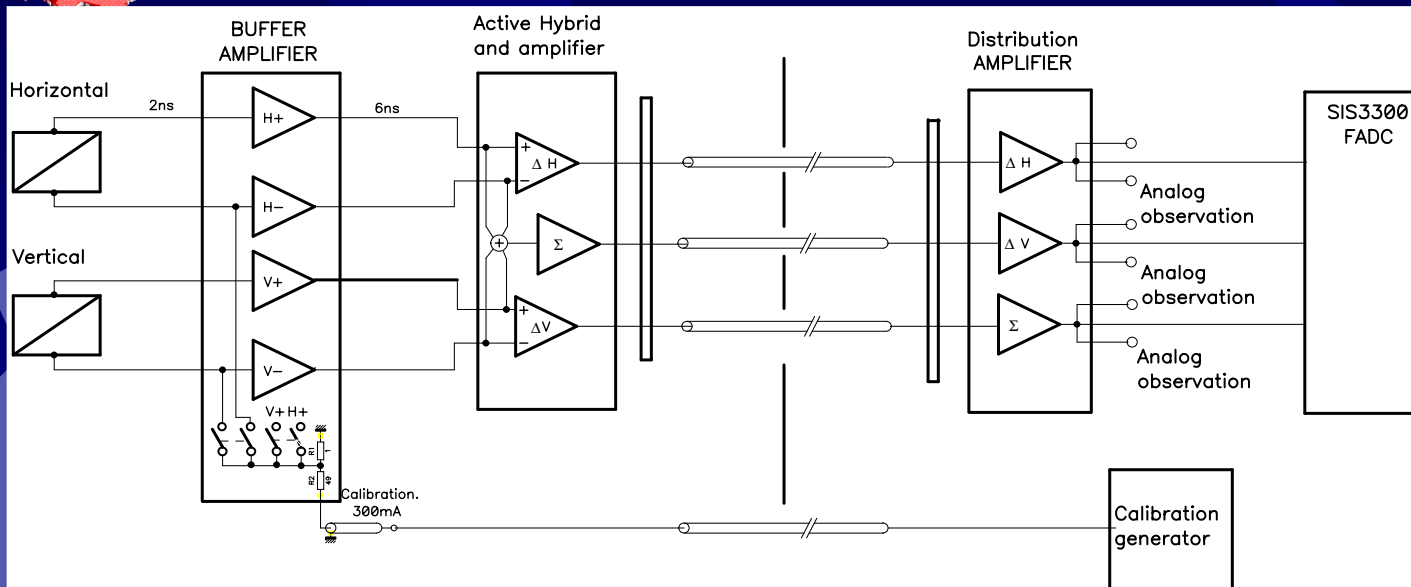
18-May-06

D. Swoboda @ FP420 HH



Electrostatic PU

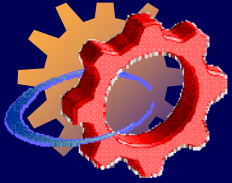
Courtesy L. Soby



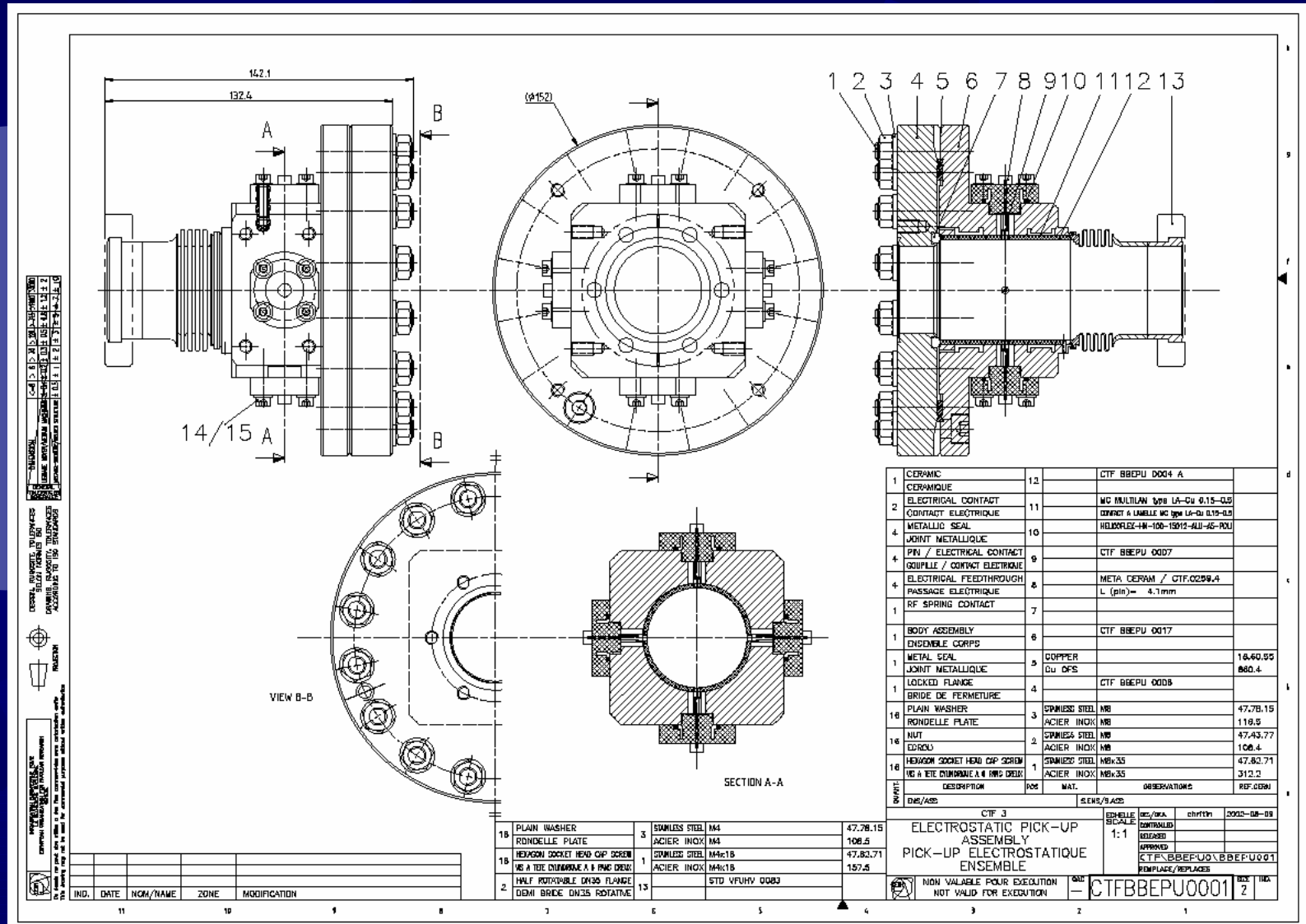
18-May-06

D. Swoboda © FP420 III

Transverse sensitivity	$\Delta = \Sigma @ \sim 10\text{mm}$
Resolution	0.1mm
Relative precision ($\pm 10\text{mm}$)	0.2%
Longitudinal coupling impedance	0.17 / 1.7 ohm
Resolution	1.2mA / 1.2mA
Absolute precision (I)	$\sim 1\%$
Low frequency cut off	1kHz
High frequency cut off	200MHz
Calibration	Yes
ID / Length	46mm / 130mm
Number of feedthroughs	4
Flange types	DN40CF / DN100CF
Max. bake-out temperature	130 °C

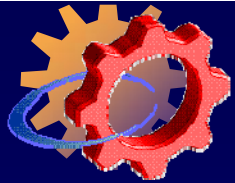


Test PU Mechanics

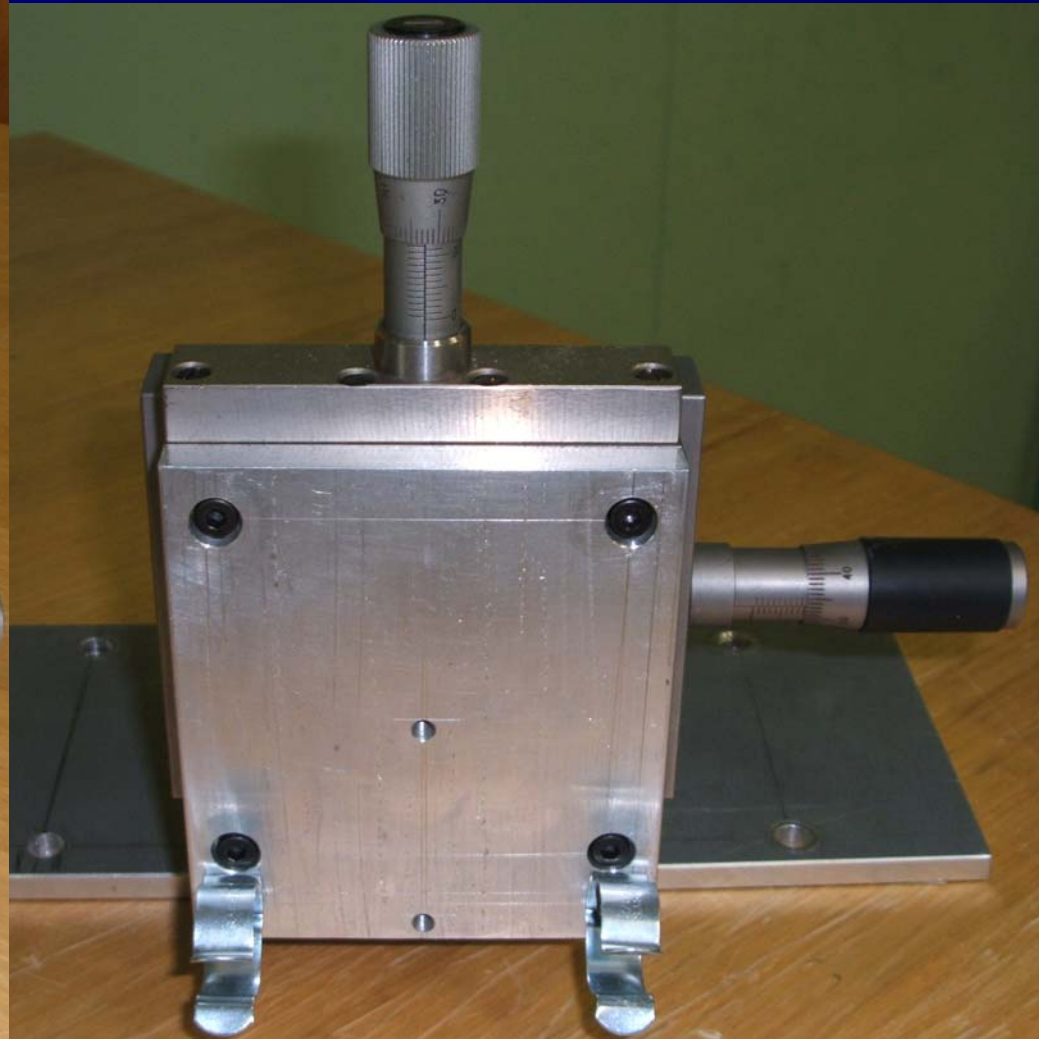
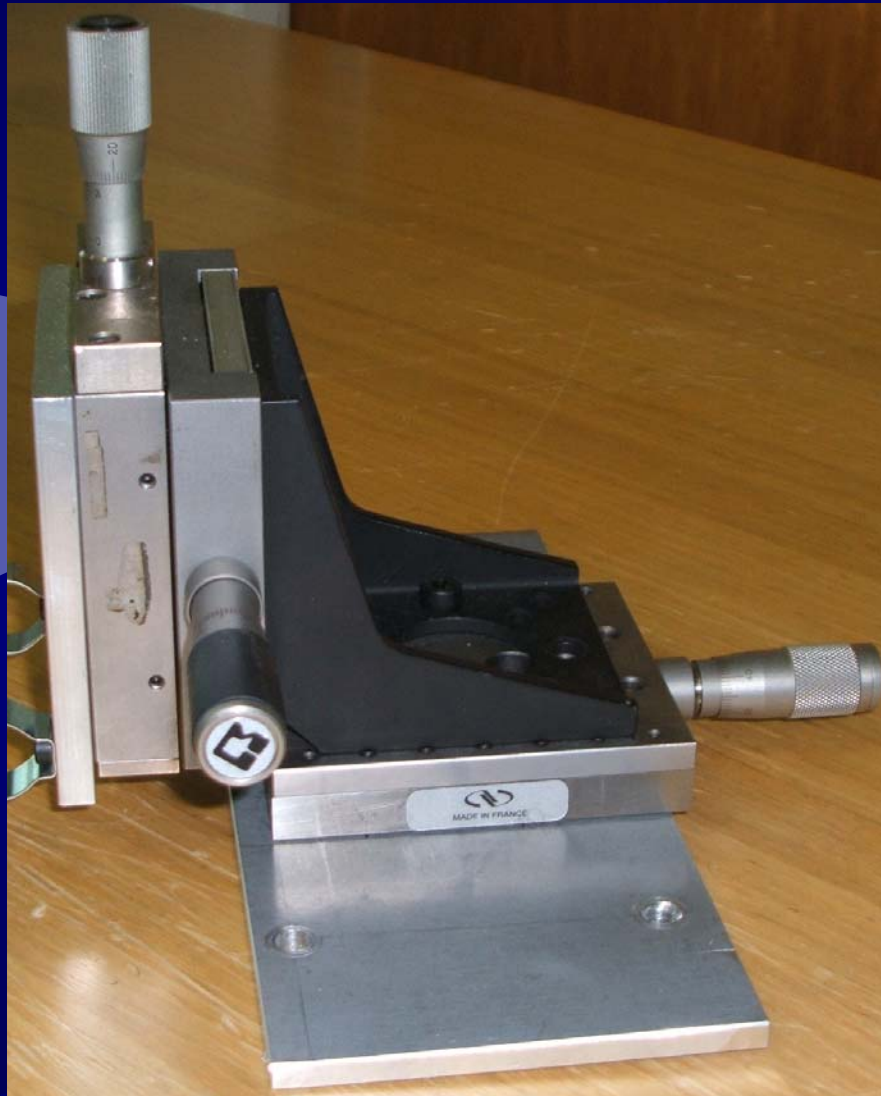


18-May-06

D. Swoboda @ FP420 HH

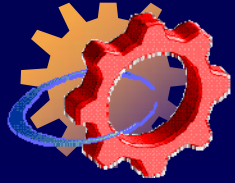


Micro Positioner



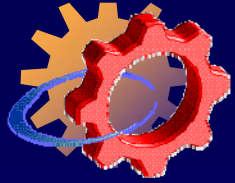
18-May-06

D. Swoboda @ FP420 HH



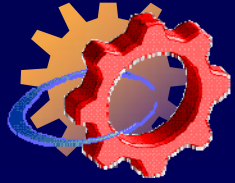
PU layout

- ★ PU electrodes are outside vac pipe aperture.
 - ✱ No impact on acceptance.
- ★ Custom design & manufacturing required.
- ★ New design → ~ 4 – 6 months
- ★ Manufacturing → ~ 3 – 6 months
 - ✱ No iteration (prototype)



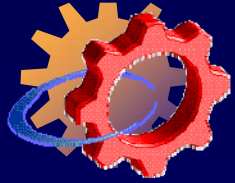
PU DAQ chain

- ★ FEE, i.e high impedance to 50 ohm buffers
- ★ Needed: RO chain
 - > 12 bit FADC
 - software for position calculations
 - difference over sum, multiplied by a scaling factor and offset subtraction
(LabView)?



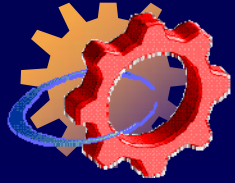
BPM status

- ✦ Calibration precision $\sim 100 \mu\text{m}$ in lab
- ✦ 2 PUs available
- ✦ Some electronics available
- ✦ Appl SW available (LabView)



Calibration requirements

- ✦ Fix simulation current track(s) in PCB machined w/reference face
- ✦ Need alignment and positioning system.
 - ✦ Encapsulate signal wire(s) in PCB
 - ✦ Several (3 +) wires in parallel grooves can be used to simulate beam displacement



What is the precision?

- ★ Beam center vs detector (bunch/bunch)

- ★ Alignment resolution $\sim 10 \mu\text{m}$; i.e.:

BPM

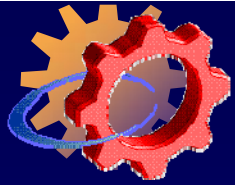
+ (BPM \rightarrow align. PU)

+ align. PU

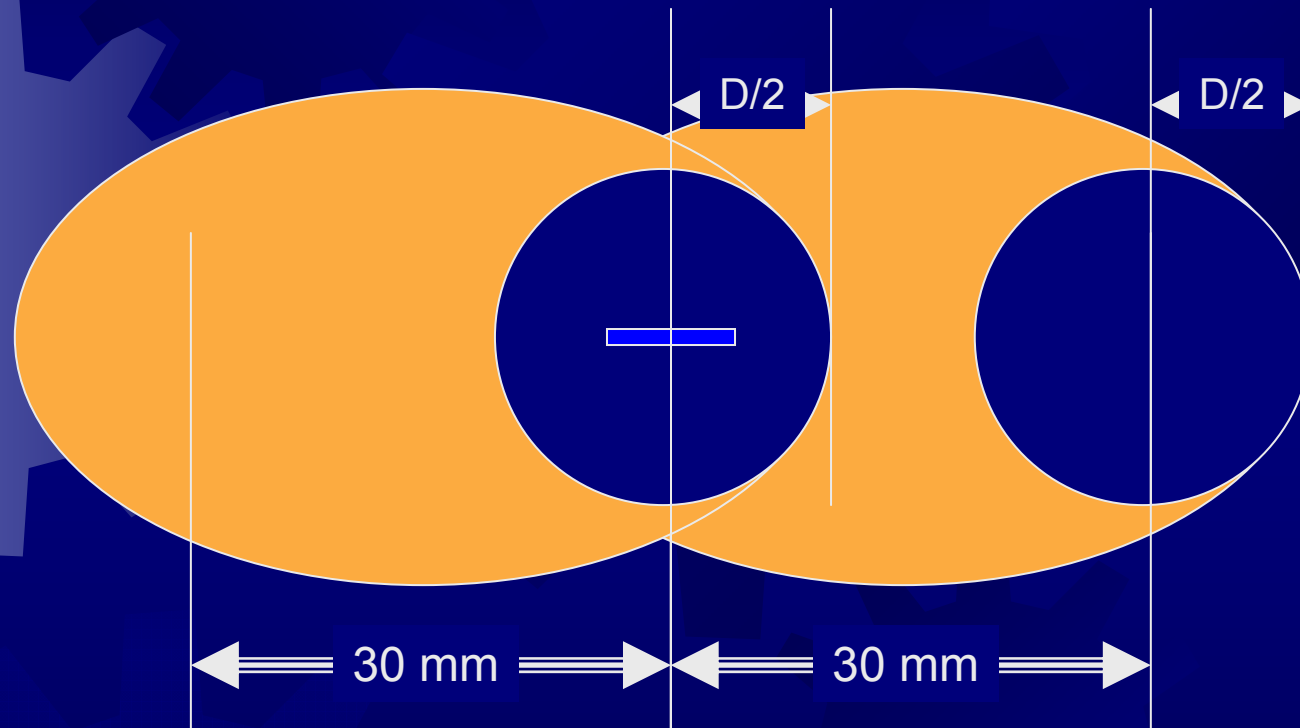
+ align. System

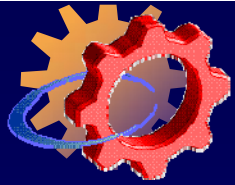
+ (align. PU \rightarrow detector)

= overall precision

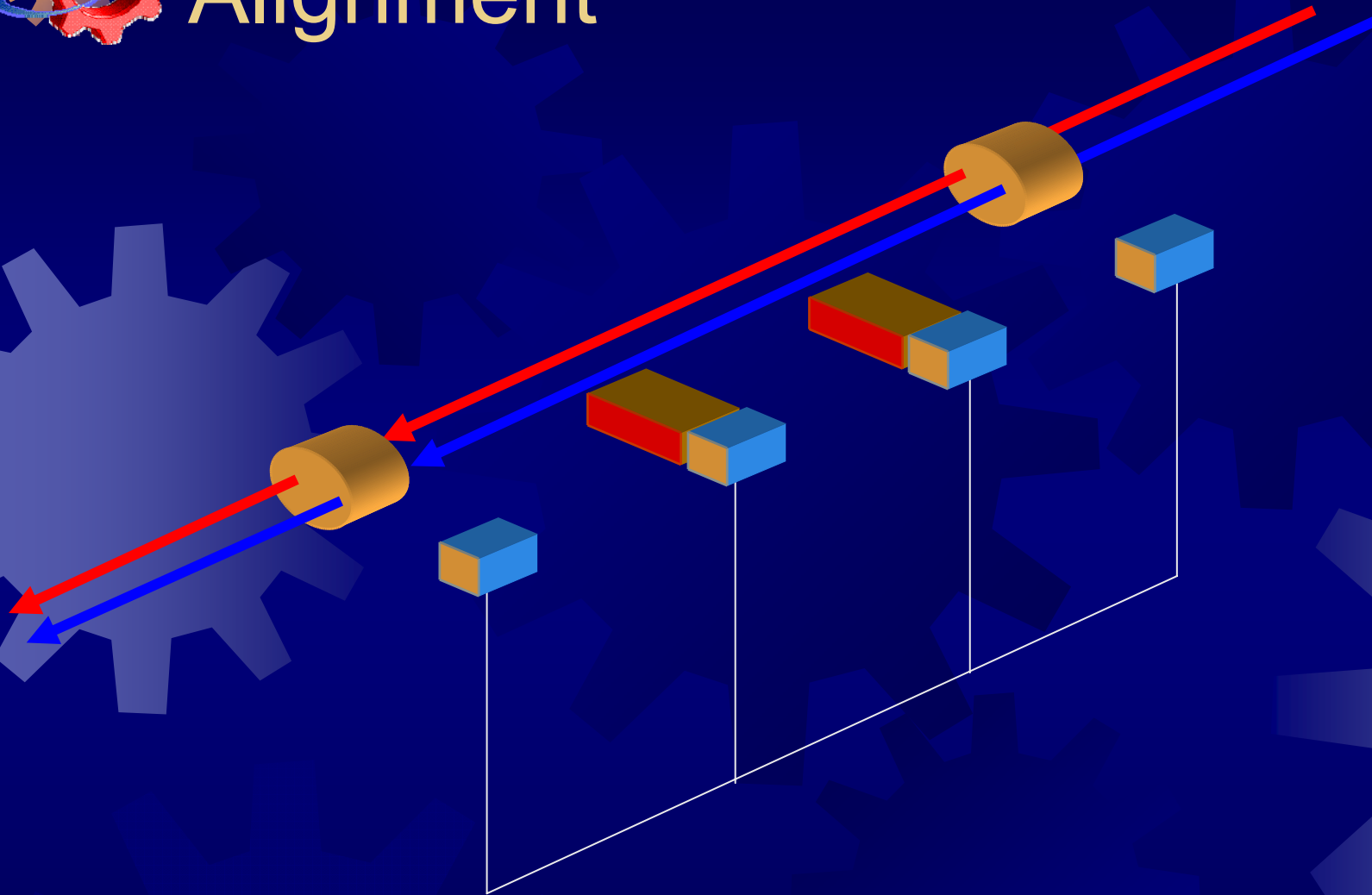


Aperture Requirement





Alignment



18-May-06

D. Swoboda @ FP420 HH