

AMS TRD Meeting

TRD Integration Status Report

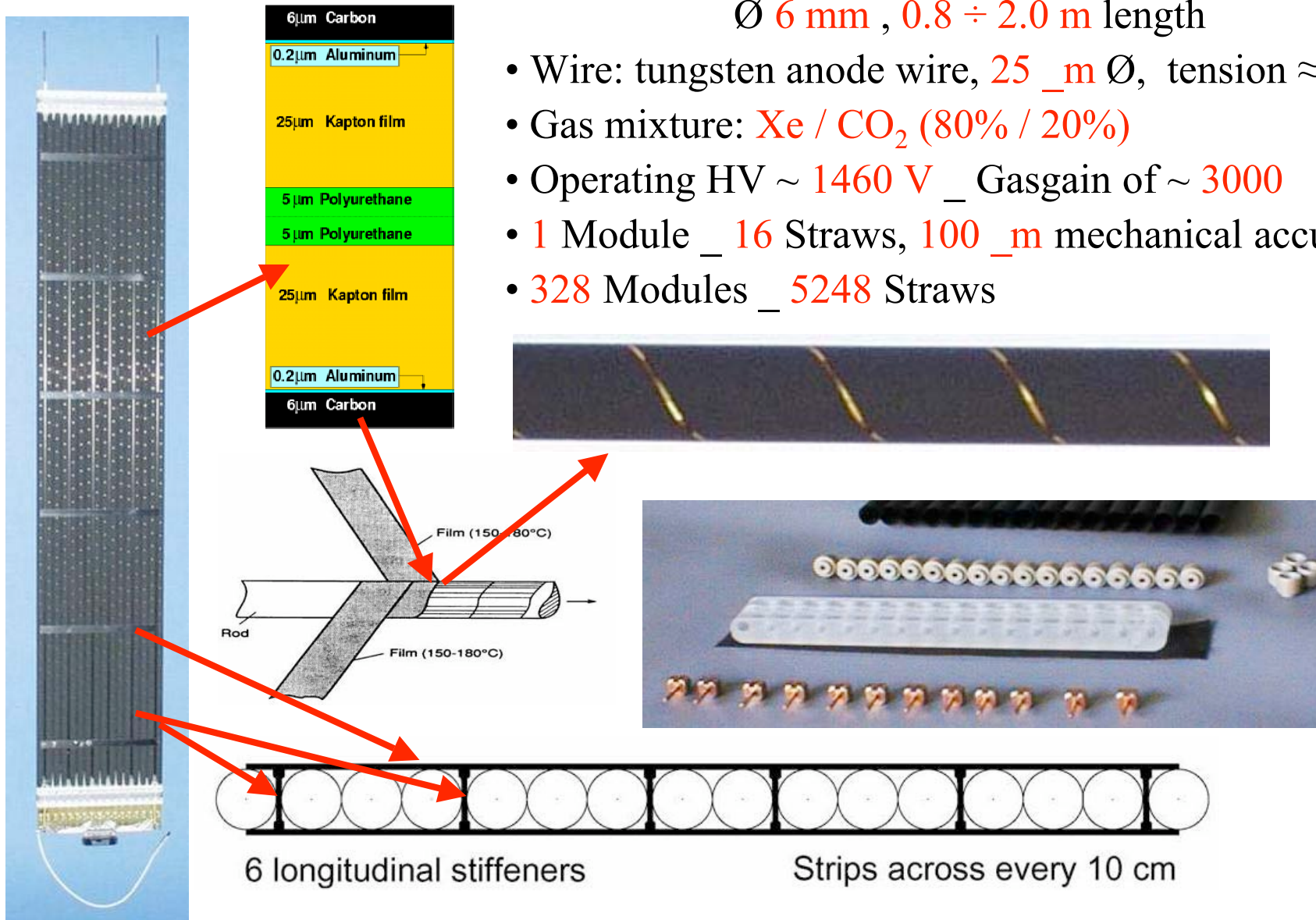


Th. Kirn, F. Dömmecke, F. Gillessen, M. Wlochal
I. Phys. Institute B, RWTH Aachen
Rome, 19th October 2005

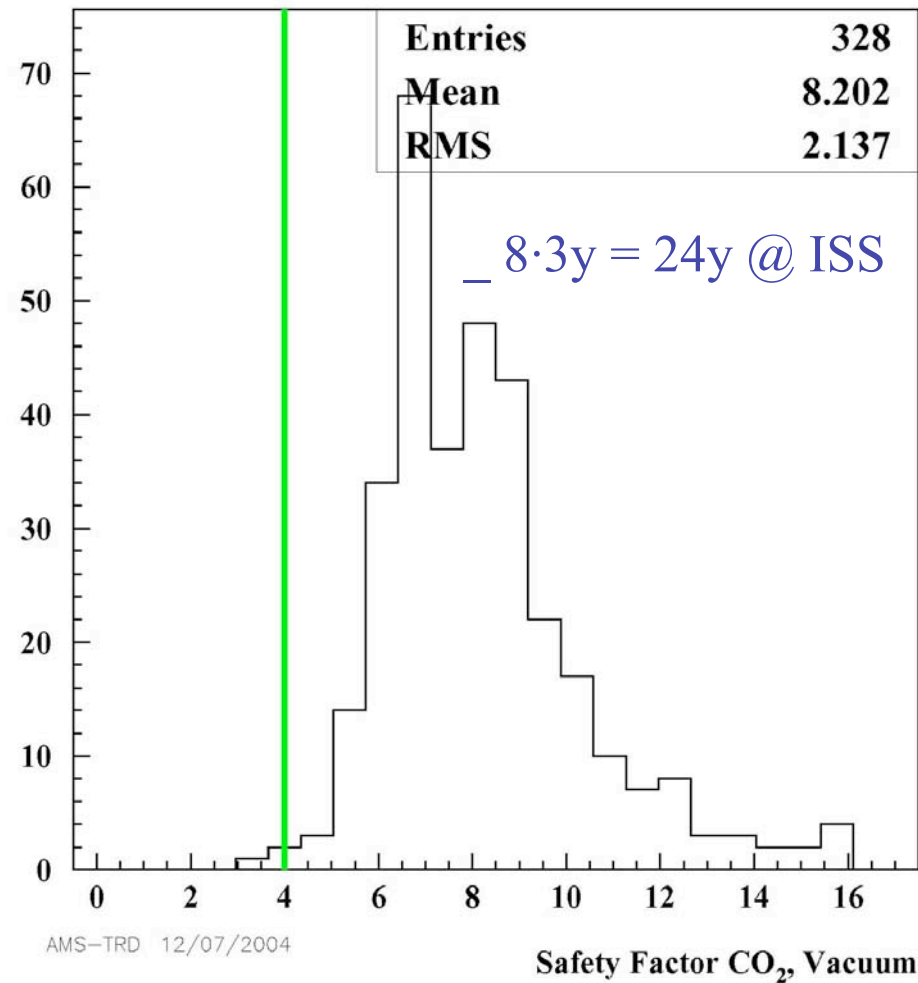
Straw Module

Straw tube proportional counter modules:

- Straw tubes: $72\ \mu\text{m}$ multilayer aluminium kapton foil, $\text{Ø } 6\ \text{mm}$, $0.8 \div 2.0\ \text{m}$ length
- Wire: tungsten anode wire, $25\ \mu\text{m}$ Ø , tension $\approx 100\ \text{g}$
- Gas mixture: Xe / CO_2 (80% / 20%)
- Operating HV $\sim 1460\ \text{V}$ _ Gasgain of ~ 3000
- 1 Module _ 16 Straws, $100\ \mu\text{m}$ mechanical accuracy
- 328 Modules _ 5248 Straws



TRD: Flight Module Gastightness



CO₂ Leaktest in Vacuum

1m_{CH} = 16 straws of 1m [+2 endpcs]

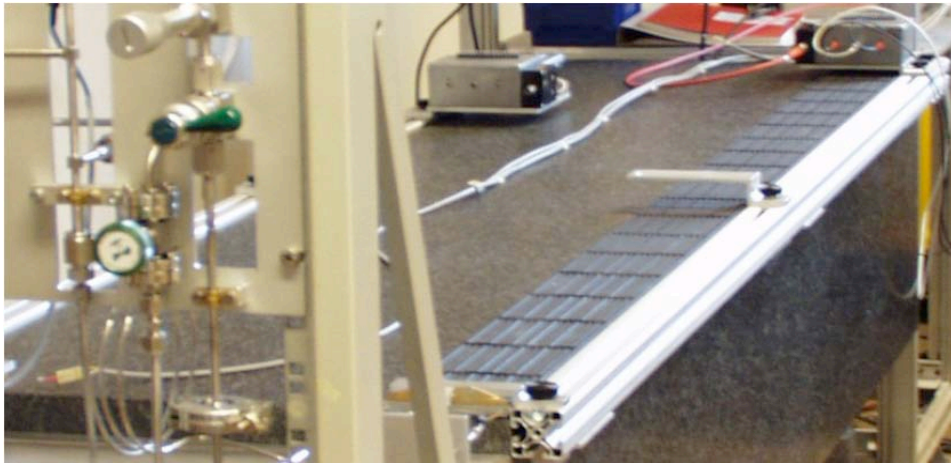
Straws @ 1bar:

$1.85 \cdot 10^{-5}$ l mbar/s/m_{CH} _ SF 13.7

Typ. Module [1.5m]:

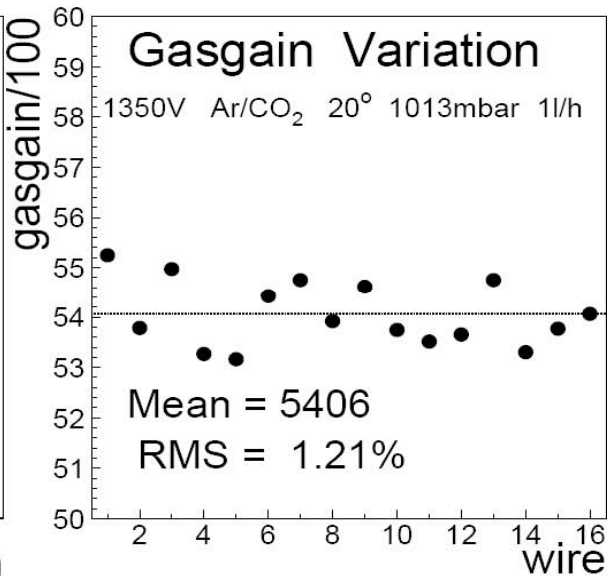
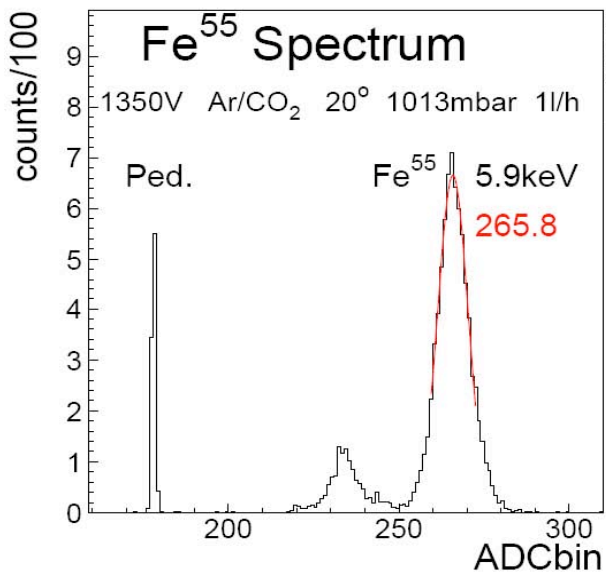
$3.1 \cdot 10^{-5}$ l mbar/s/m_{CH} _ SF 8.2

TRD: Fe⁵⁵ - Gasgain Flight Modules

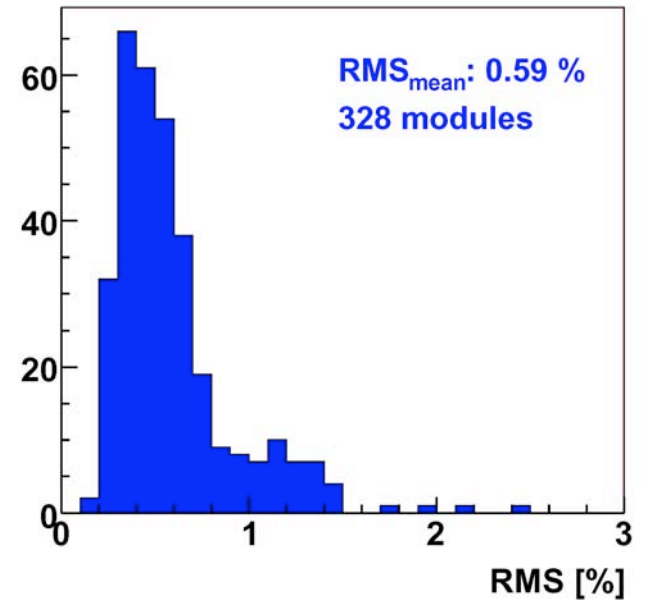


Ch160 on Nomex Shim 0.6mm Gain 6098 RMS 150

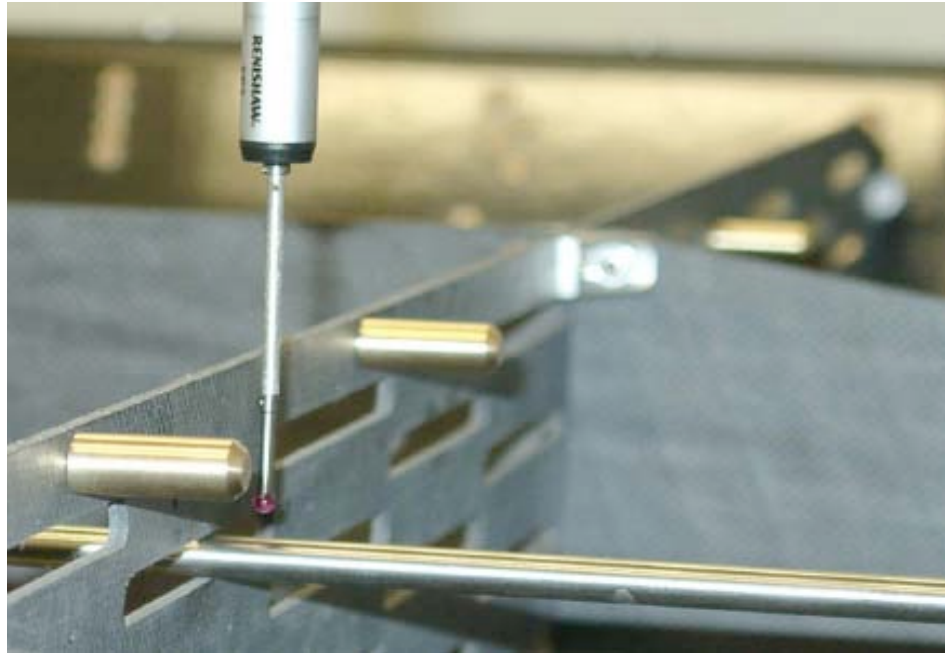
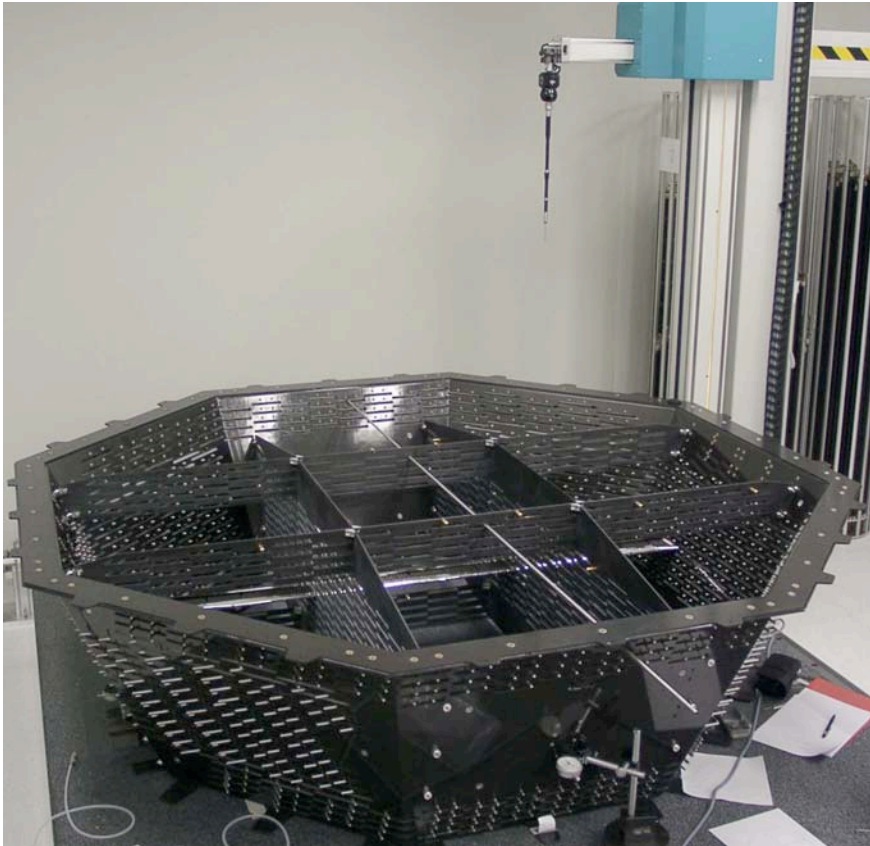
	0.1	0.3	0.5	0.7	0.9	1.1	1.3	1.5	1.7	1.9m	Straw
1	3.2	1.5	4.2	1.8	5.7	7.1	5.2	4.2	0.2	-0.9	1
2	0.1	-0.1	0.2	1.0	4.1	3.8	2.9	1.8	-1.2	-2.4	2
3	-2.0	-0.7	0.2	0.5	0.1	3.2	4.2	-0.6	-2.9	-3.8	3
4	-2.6	-1.3	-2.1	0.4	0.6	2.5	2.8	-0.6	-2.8	-4.6	4
5	-2.9	-3.3	-1.4	-1.1	0.8	3.2	1.7	0.7	-3.0	-3.7	5
6	-3.7	-1.4	-4.0	-1.2	-0.9	1.4	2.8	-0.6	-1.9	-4.7	6
7	-1.9	-2.6	-1.1	-2.1	0.7	2.7	1.9	0.6	-2.9	-3.0	7
8	-2.4	-0.5	-1.0	0.8	1.1	2.3	2.1	-0.6	-2.0	-3.6	8
9	0.6	-1.0	1.0	0.4	5.8	5.6	1.6	2.8	-1.1	-1.1	9
10	-0.1	-1.2	0.3	0.5	2.8	3.6	0.9	0.8	-1.4	-2.7	10
11	-2.1	-0.6	-1.4	-1.0	0.4	1.6	2.1	-1.7	-3.6	-4.4	11
12	-2.3	-1.7	-0.5	-1.5	1.3	2.0	-0.1	-0.3	-4.8	-5.0	12
13	-2.1	-0.3	-0.6	0.7	2.2	1.9	3.4	0.4	-3.1	-5.1	13
14	-0.7	-1.4	0.8	-1.1	1.9	4.2	1.7	0.5	-3.0	-3.1	14
15	-1.6	-0.1	-2.1	1.8	2.6	2.2	2.7	1.0	-0.7	-2.9	15
16	-1.9	1.3	-0.7	2.4	1.6	3.1	4.5	1.6	-0.6	-4.2	16



RMS gasgain

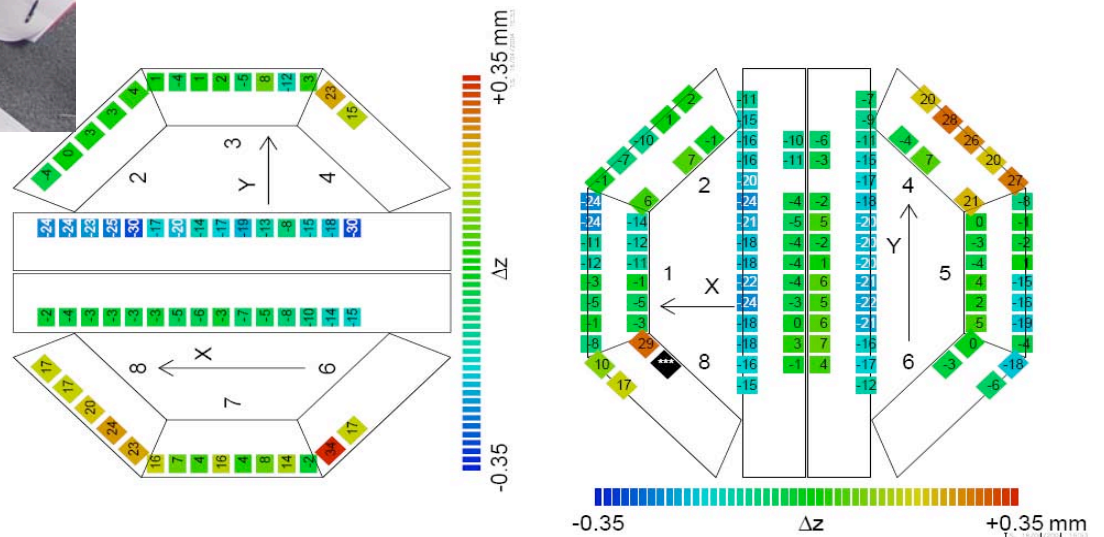


TRD: Octagon Structure: 3D-Measurement

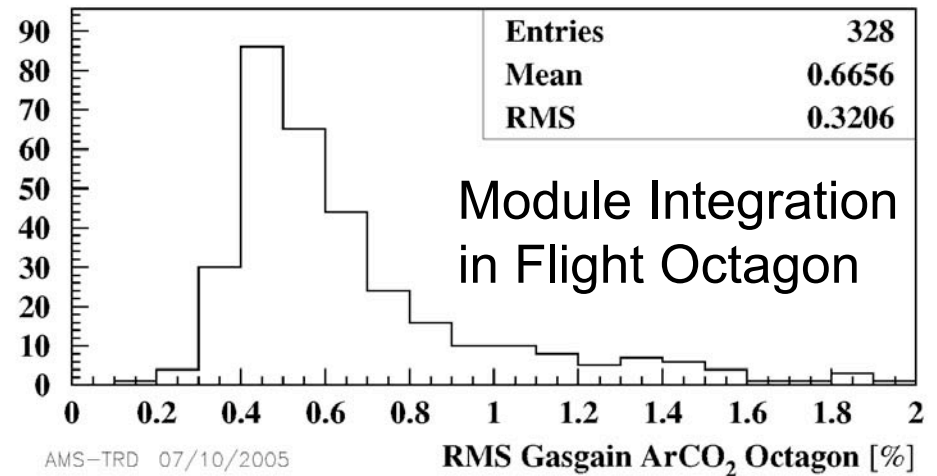
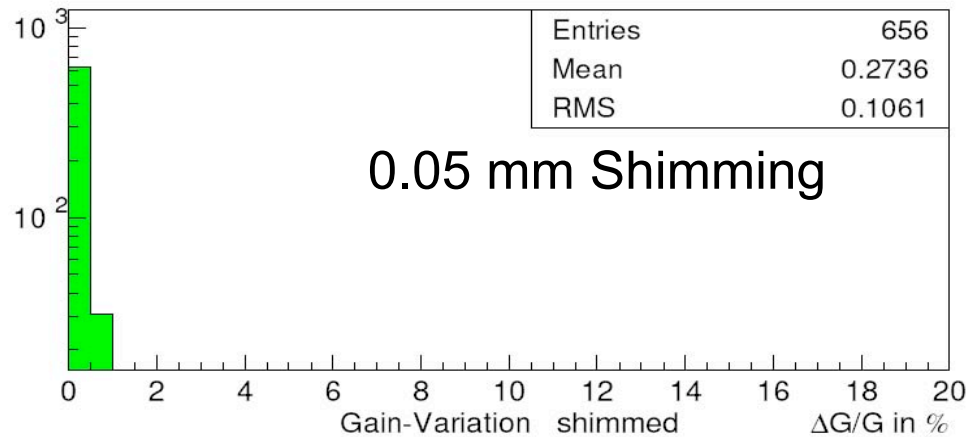
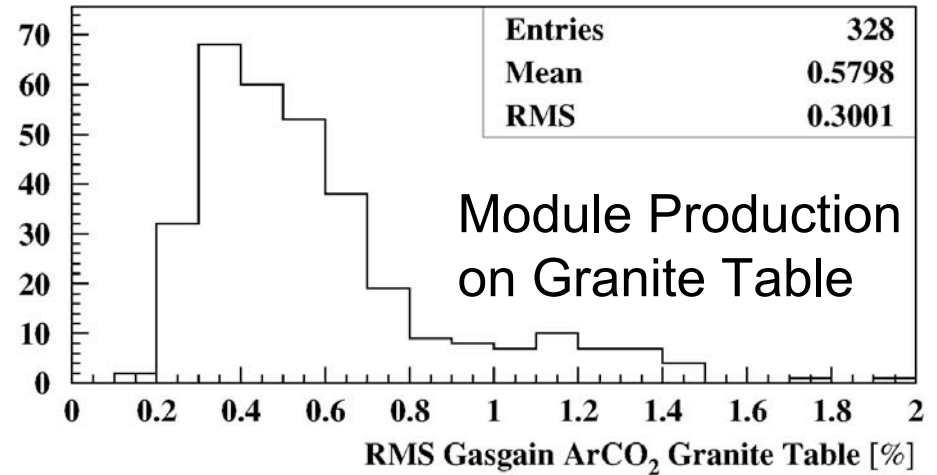
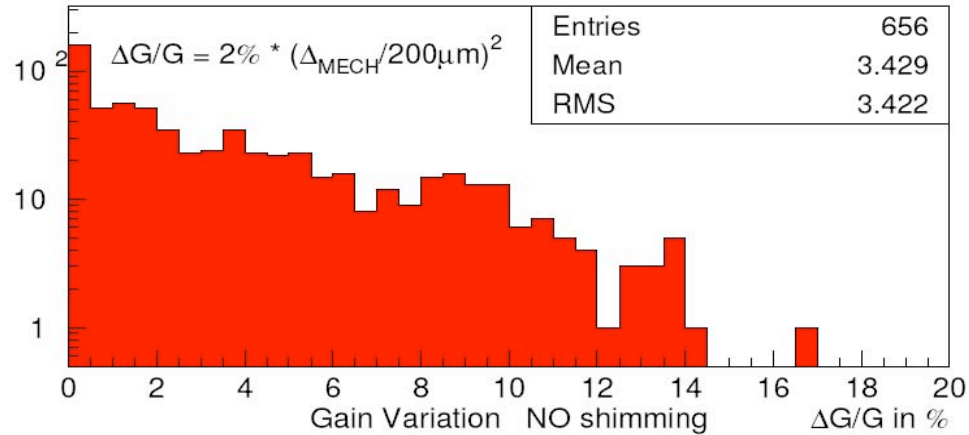
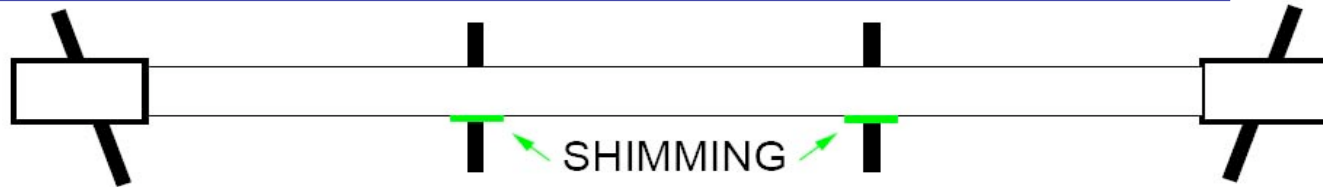


Upper and lower 4 layers _ B

Middle 12 layers _ B



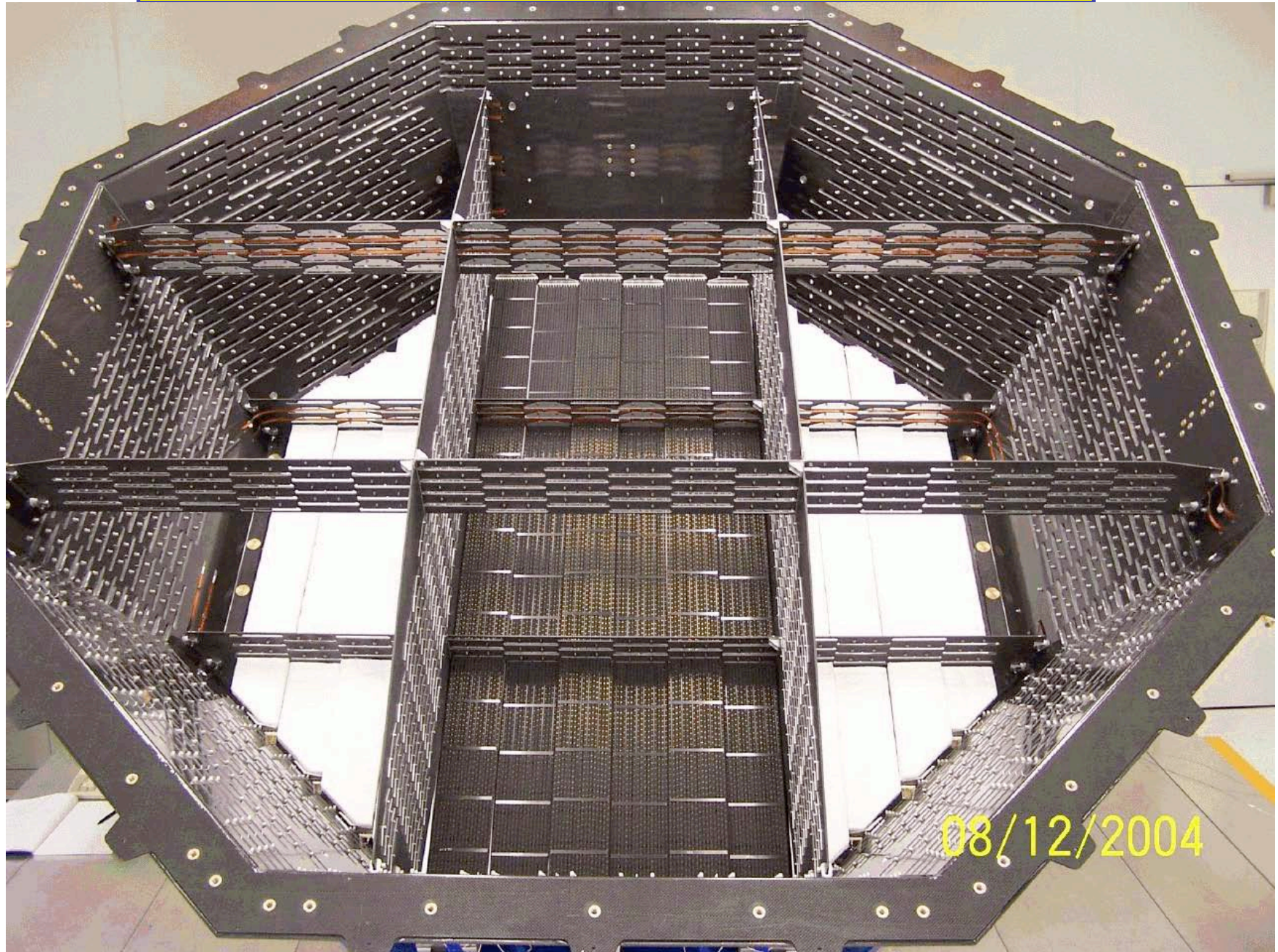
TRD: Flight Modules Gasgain Homogeneity



AMS-TRD 07/10/2005

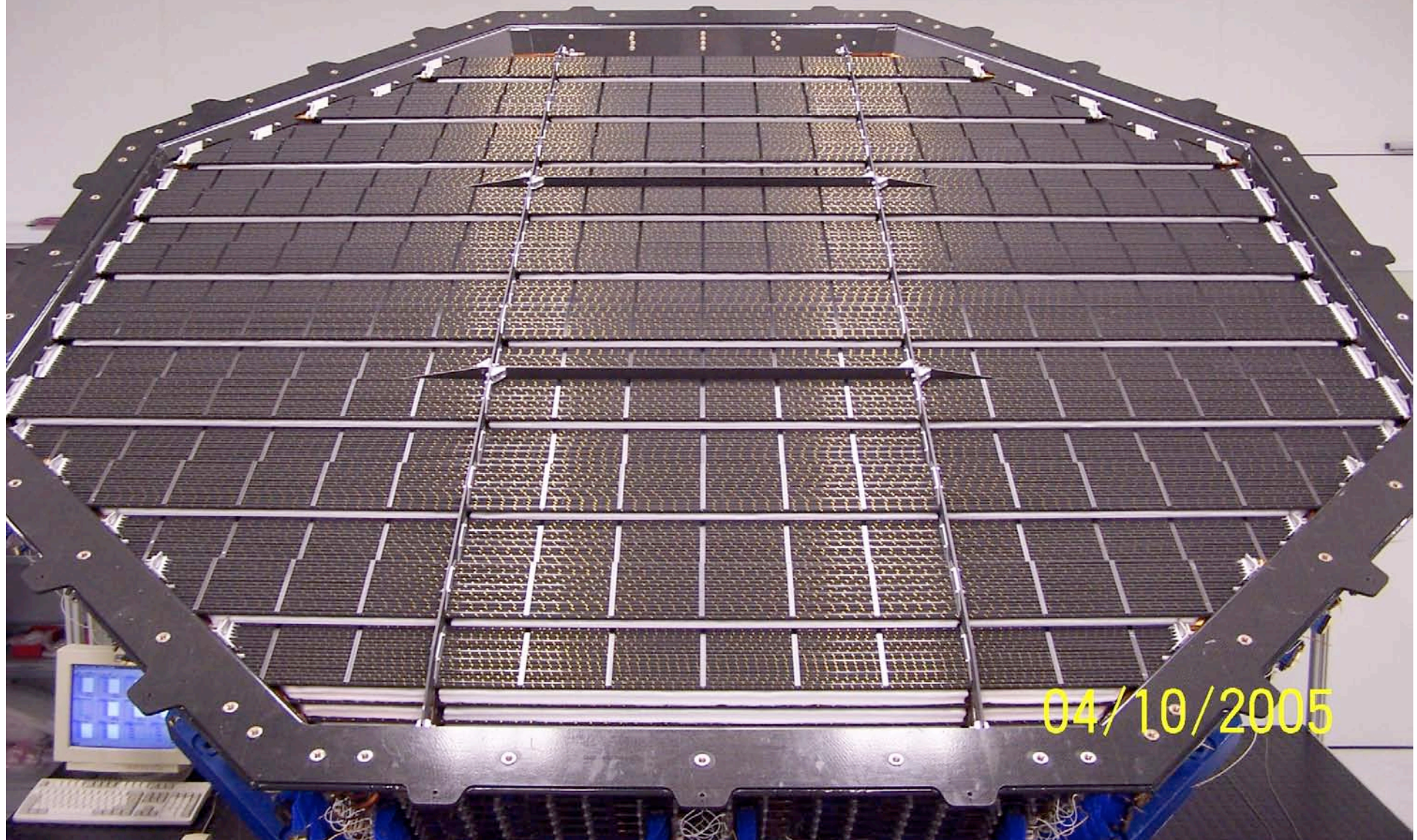
$$\text{Grms}_{OCT}^2 = \text{Grms}_{GRT}^2 + \text{Grms}_{SHM}^2$$

TRD: Flight Module Integration Status



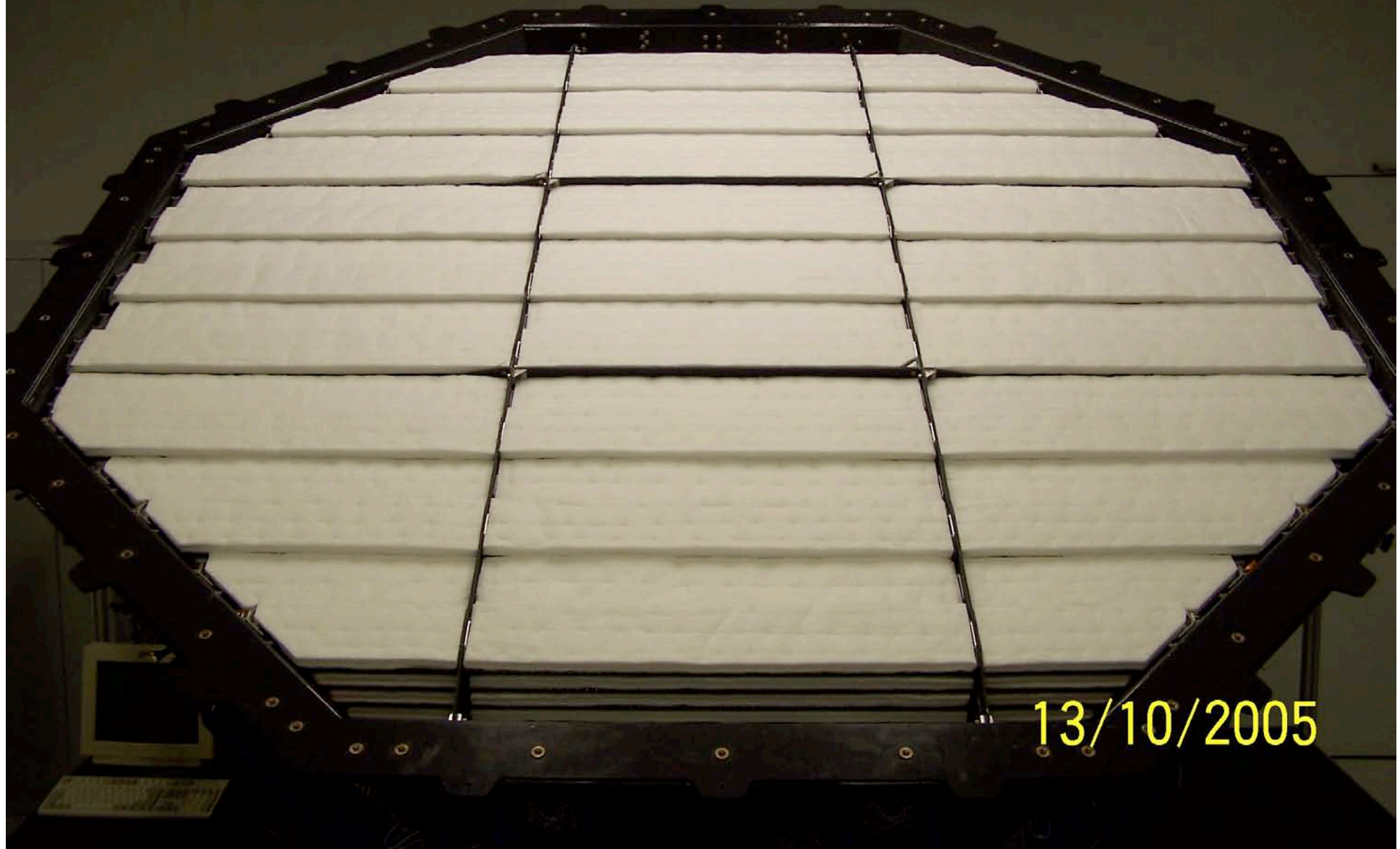
08/12/2004

TRD: Flight Module Integration Status



04/10/2005

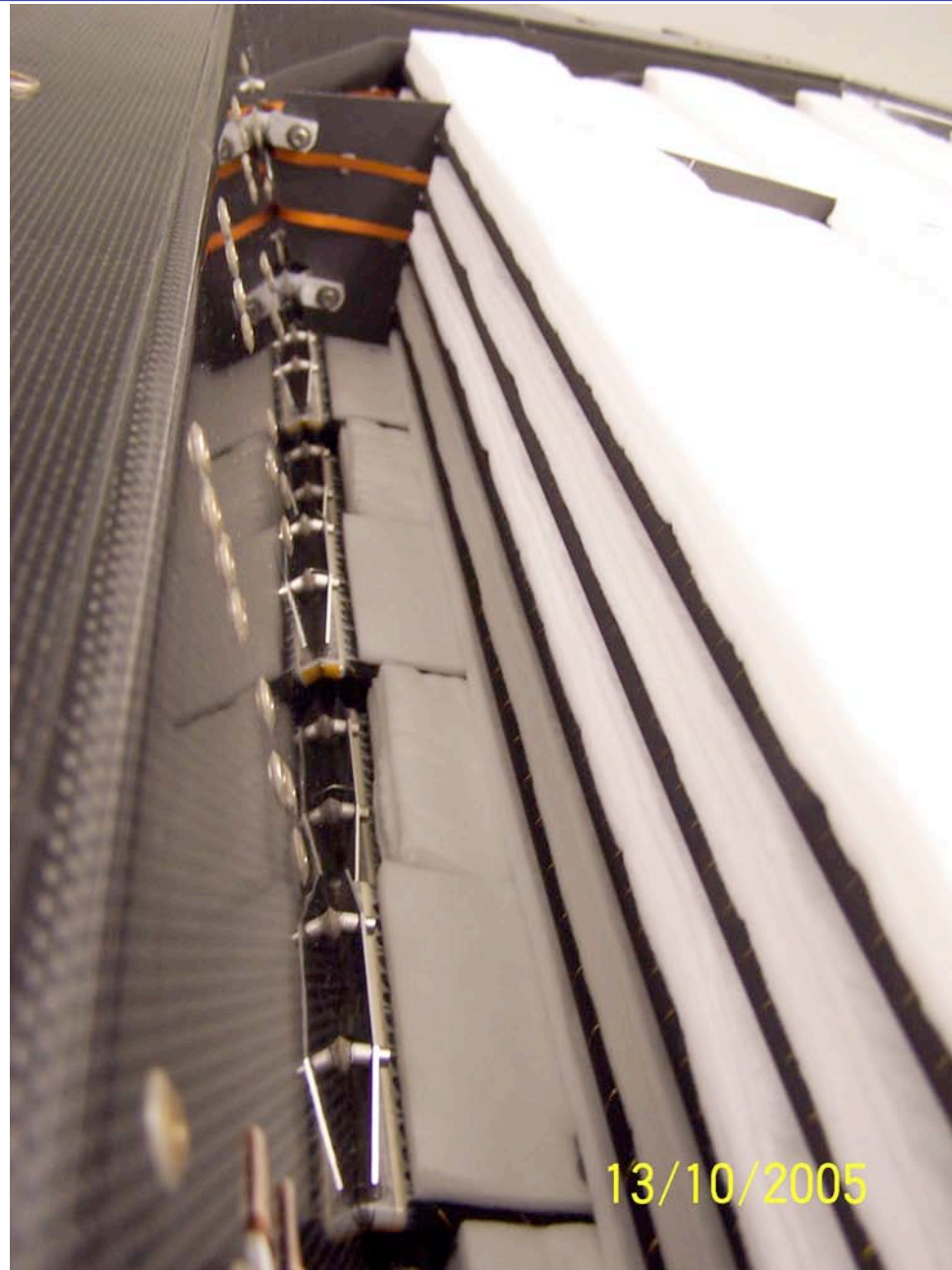
TRD: Flight Module Integration Status



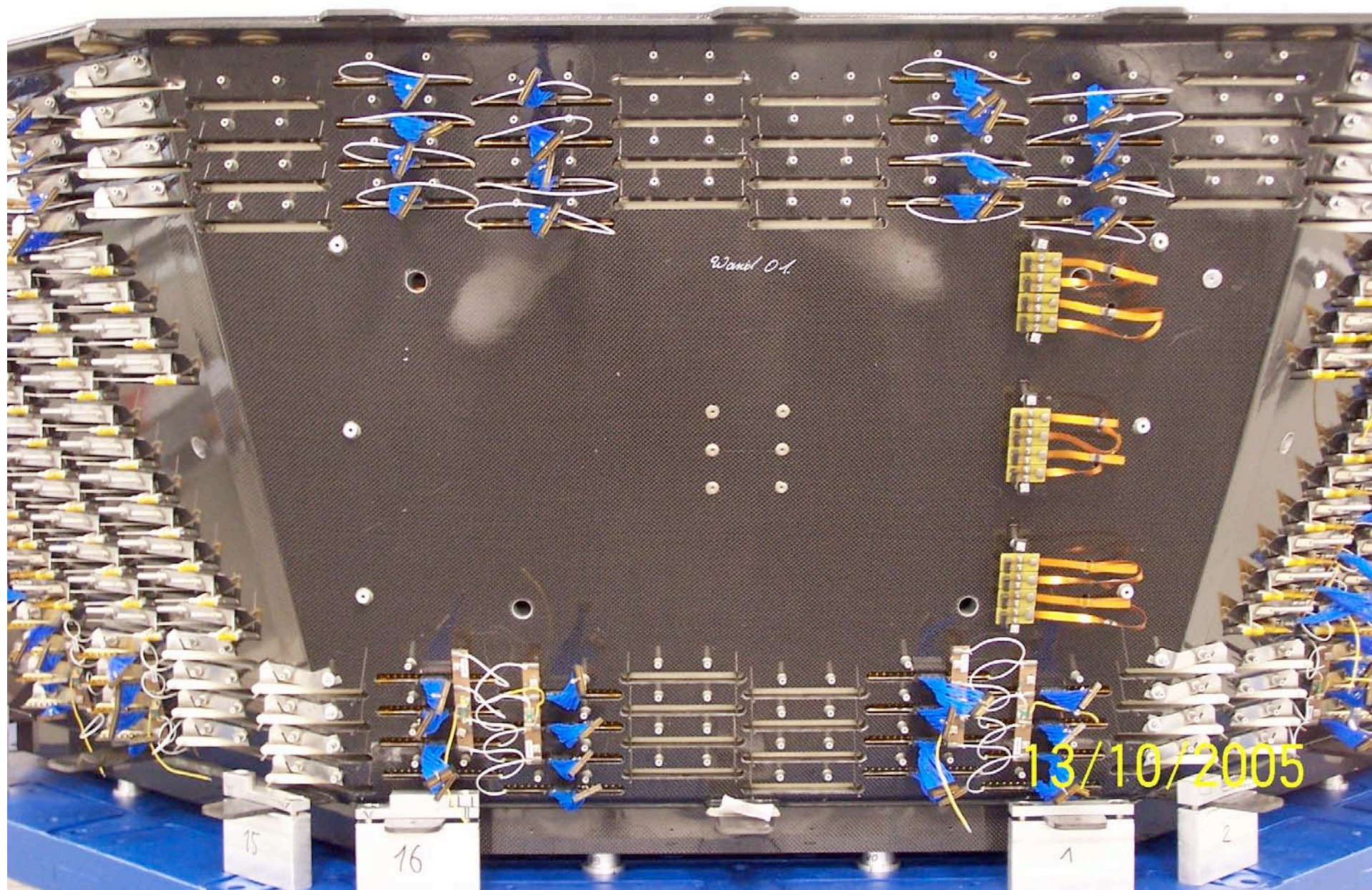
TRD: Flight Module Integration Status

13/10/2005

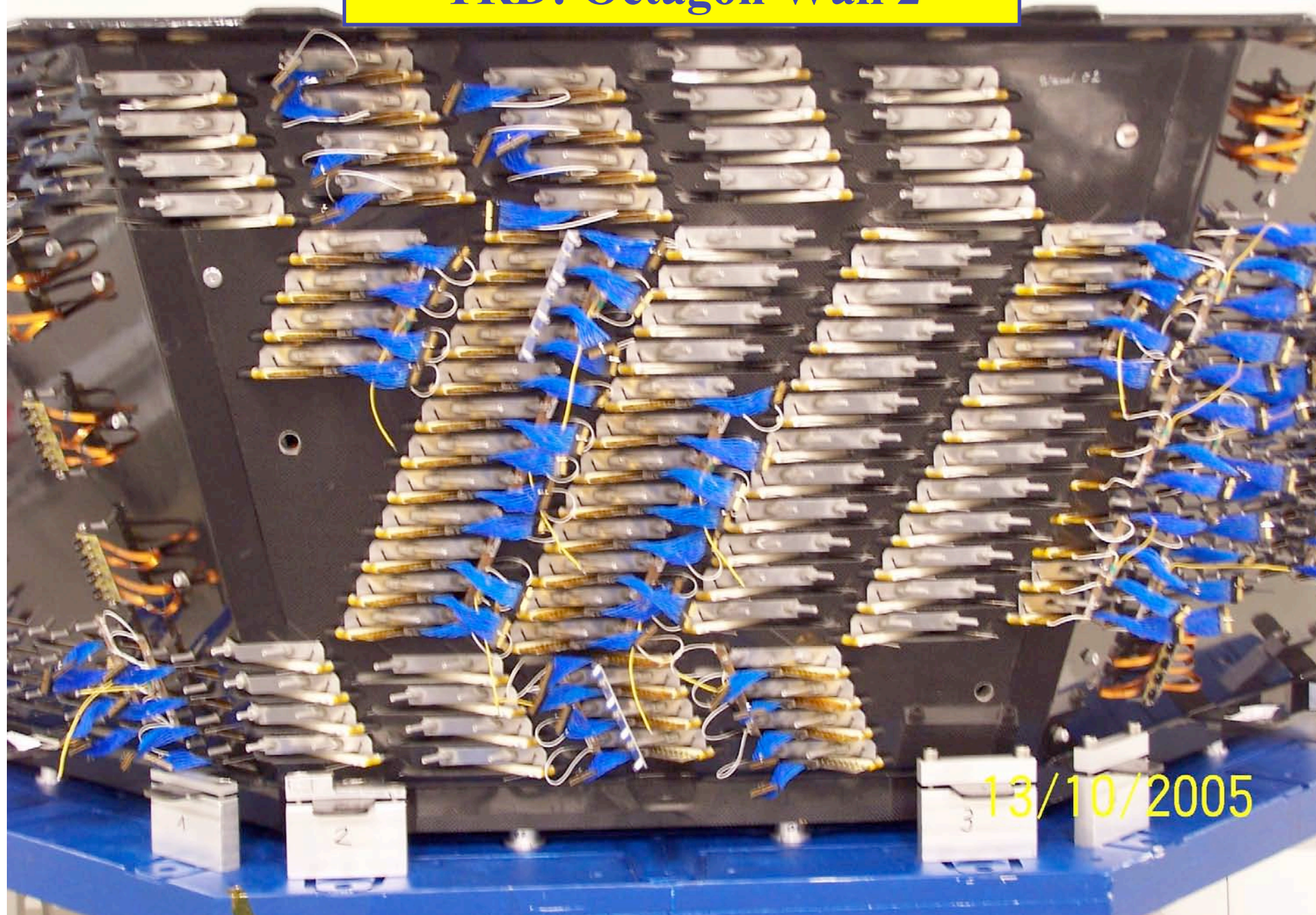
TRD: Flight Module Integration Status



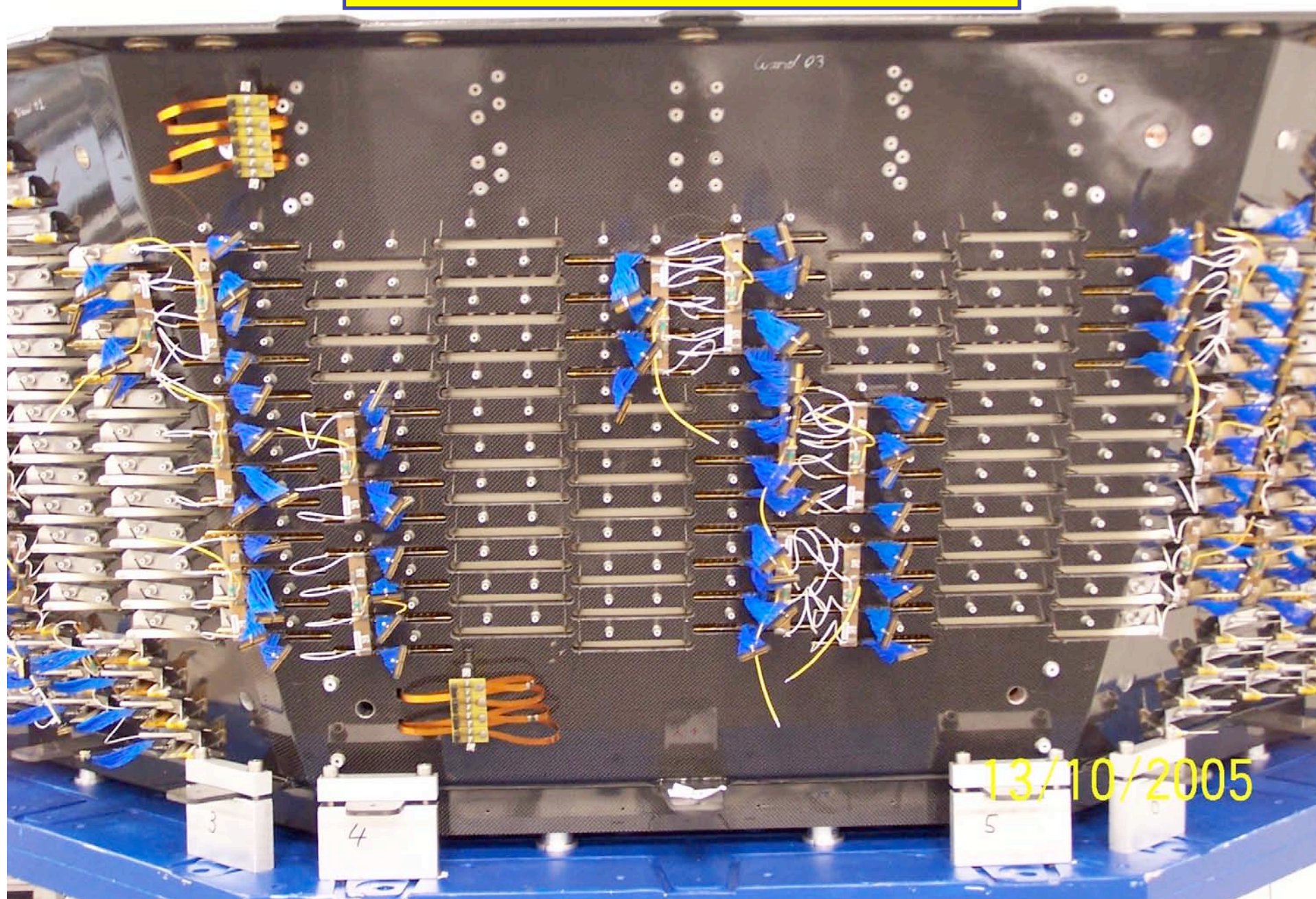
TRD: Octagon Wall 1



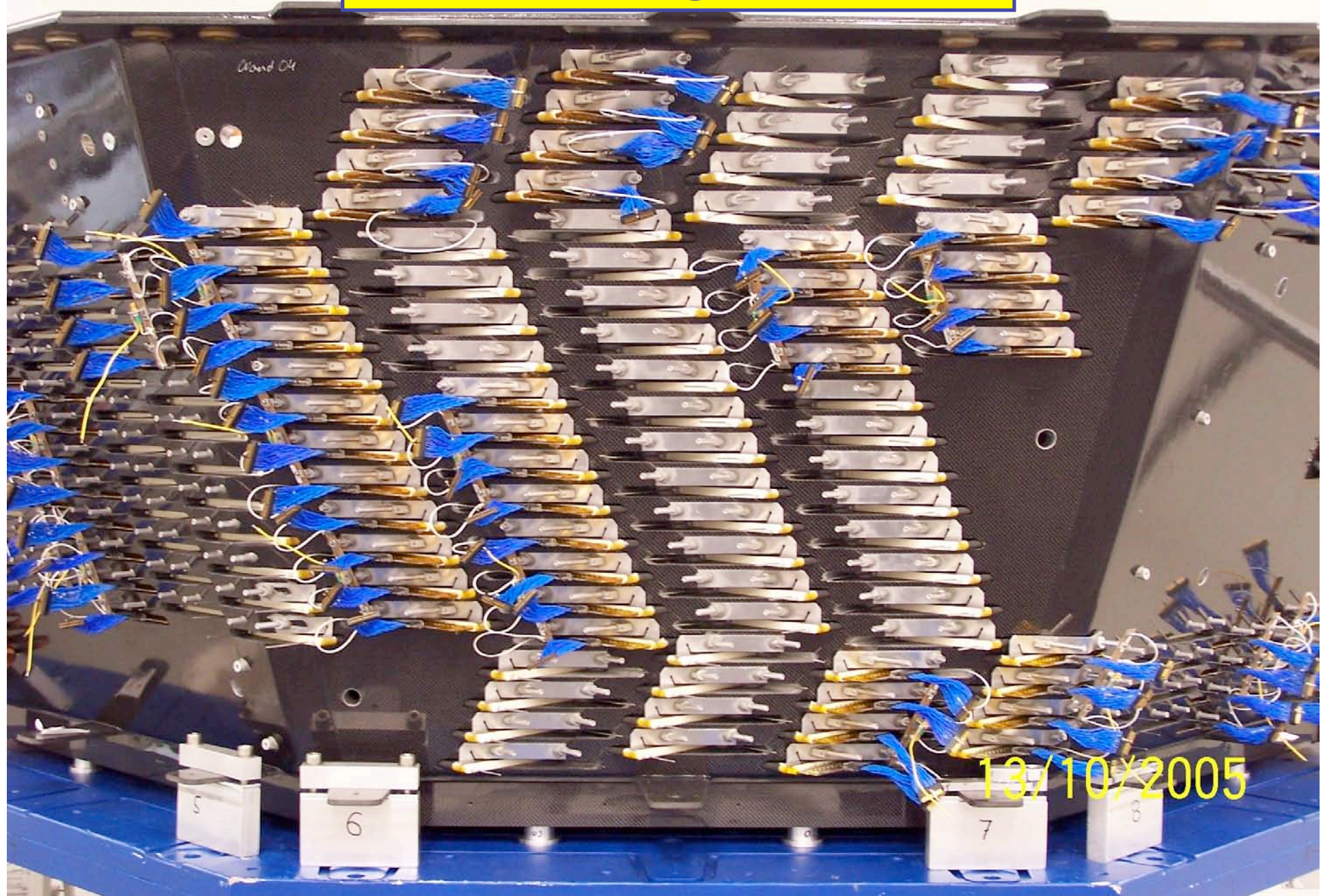
TRD: Octagon Wall 2



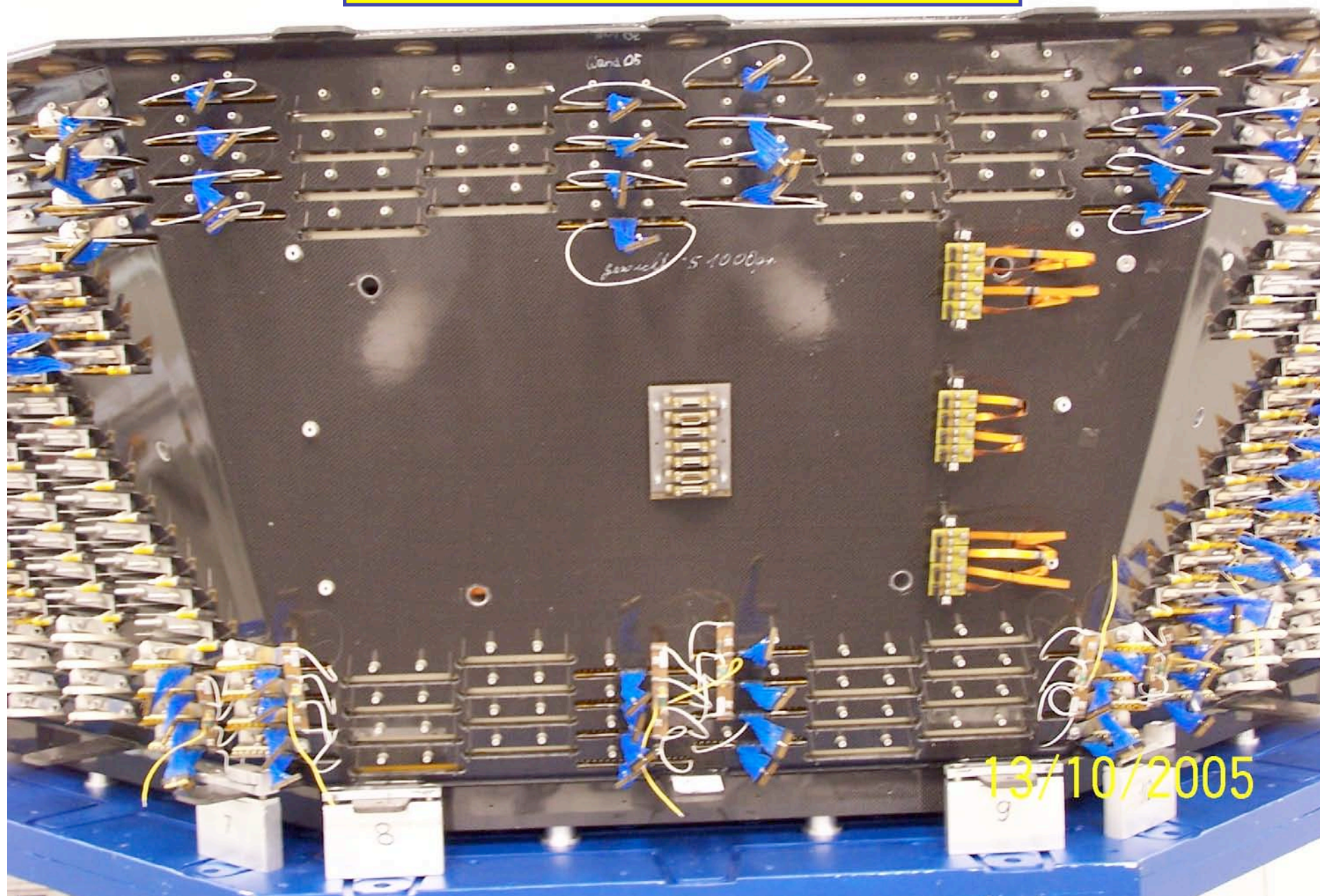
TRD: Octagon Wall 3



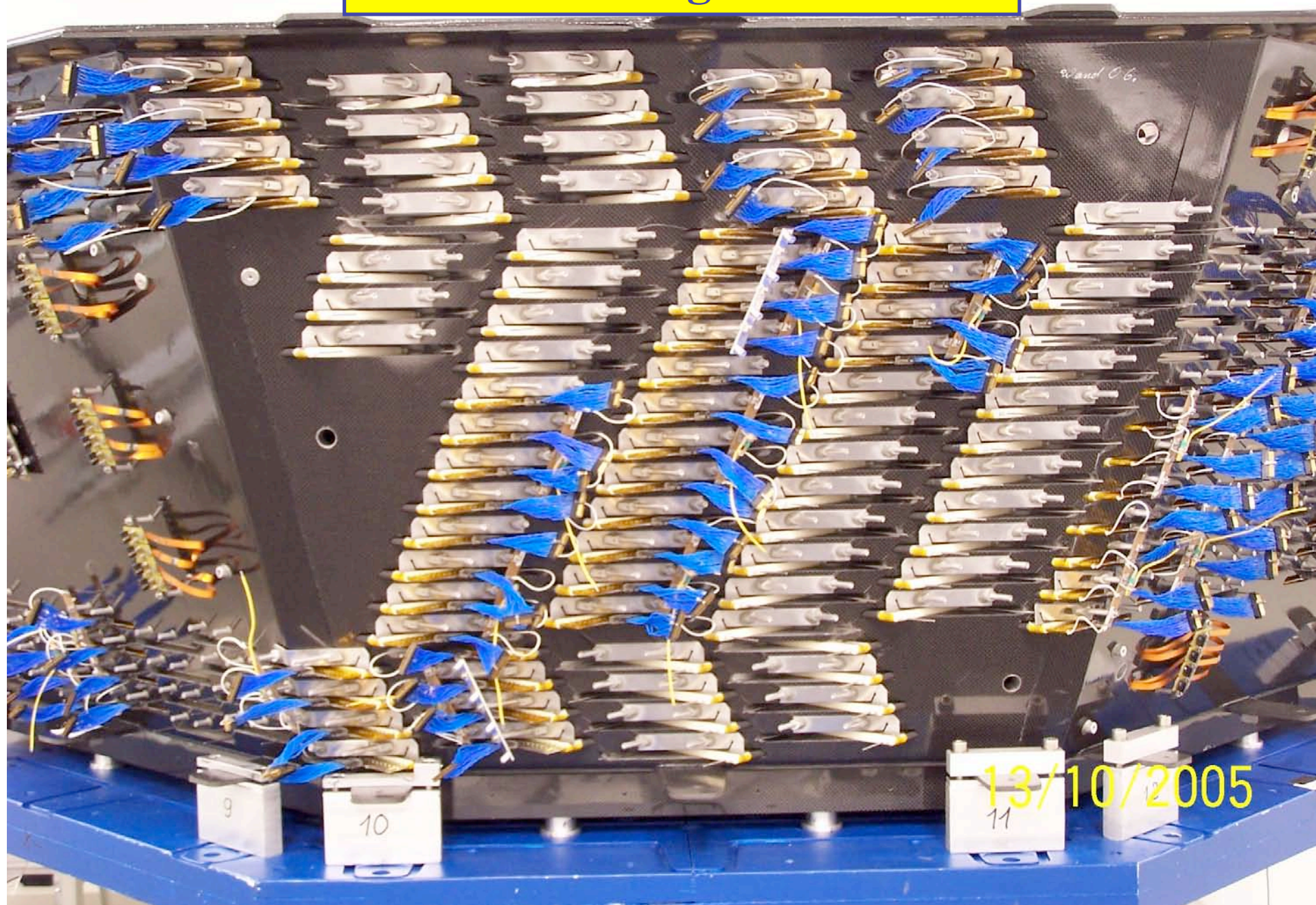
TRD: Octagon Wall 4



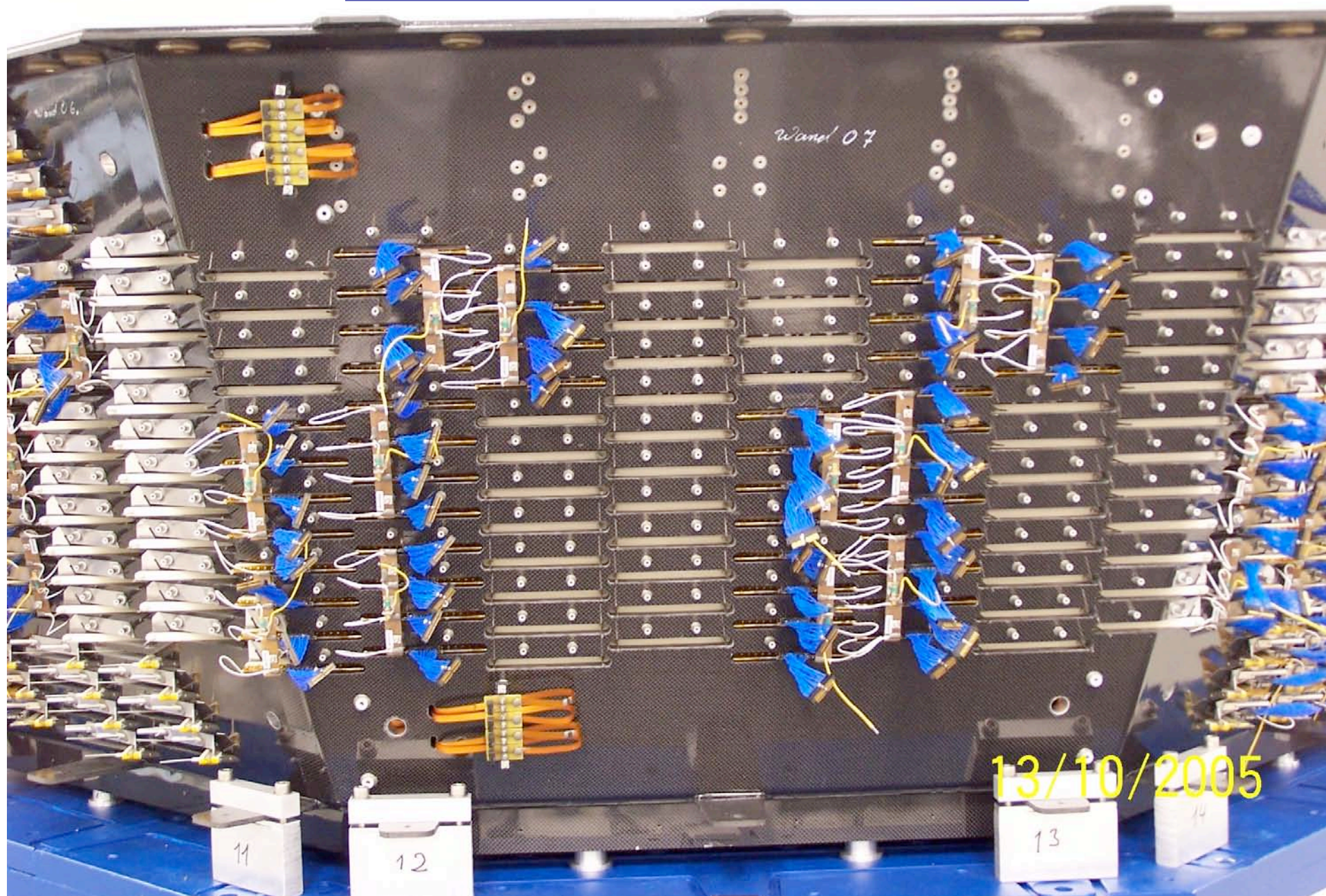
TRD: Octagon Wall 5



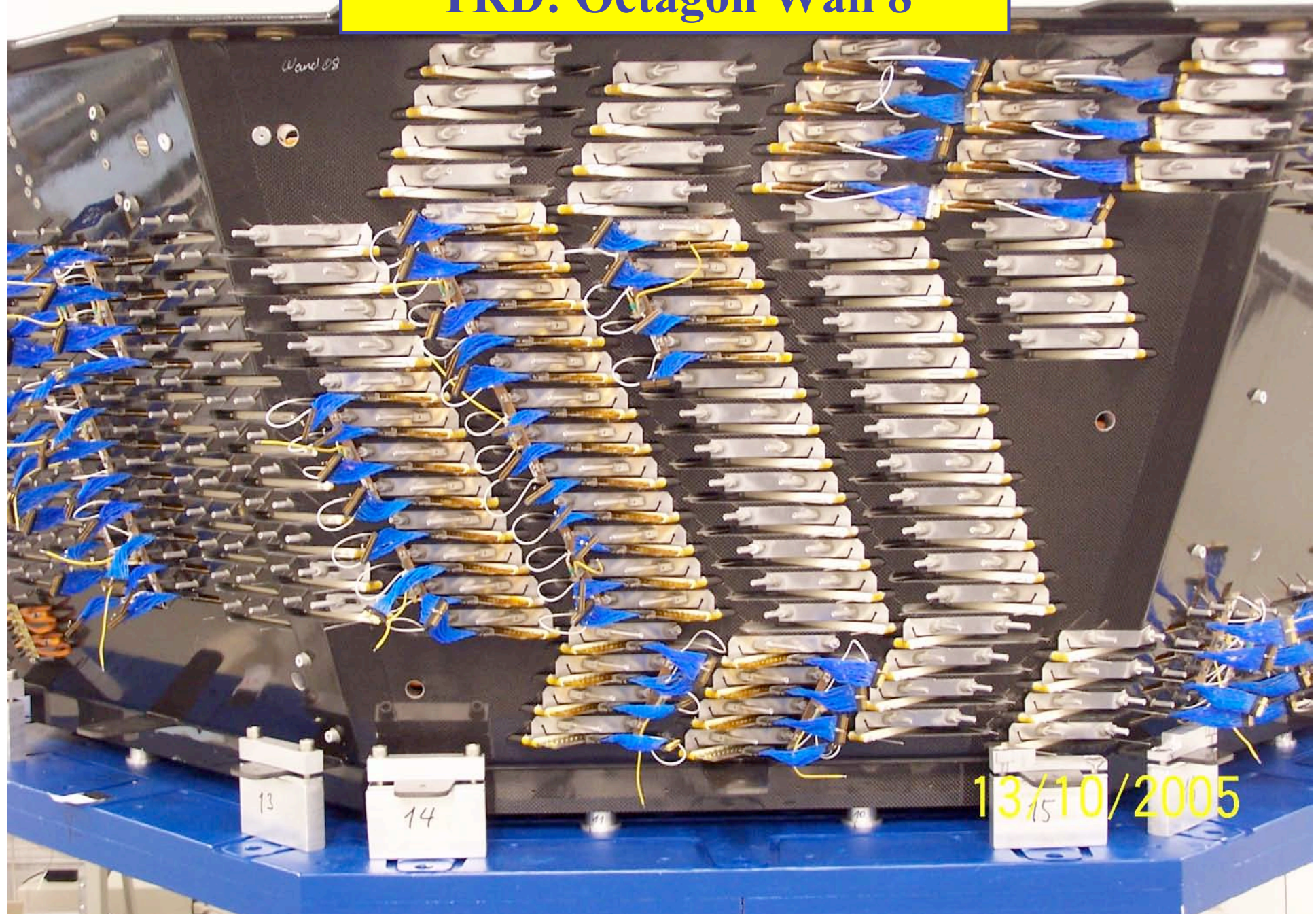
TRD: Octagon Wall 6



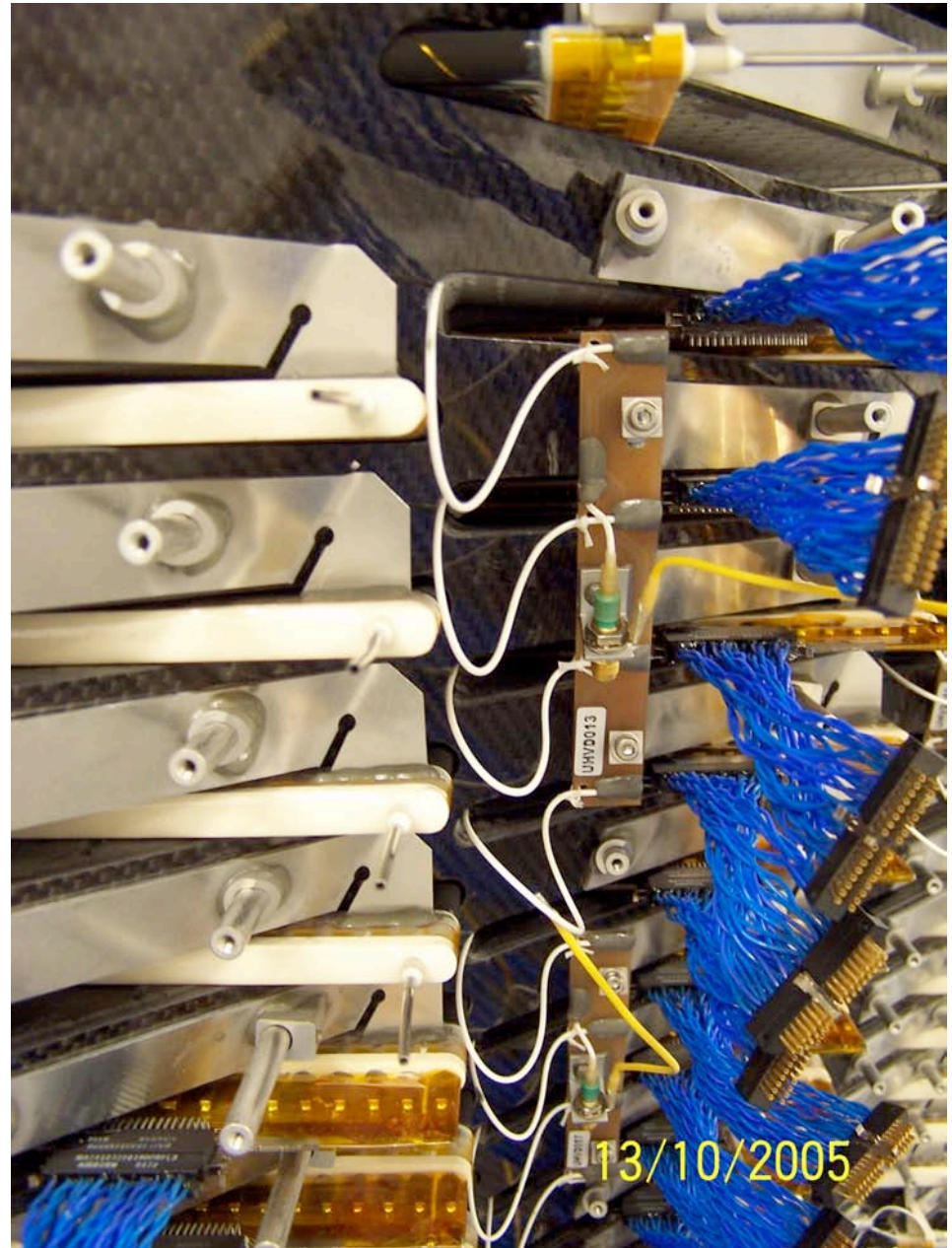
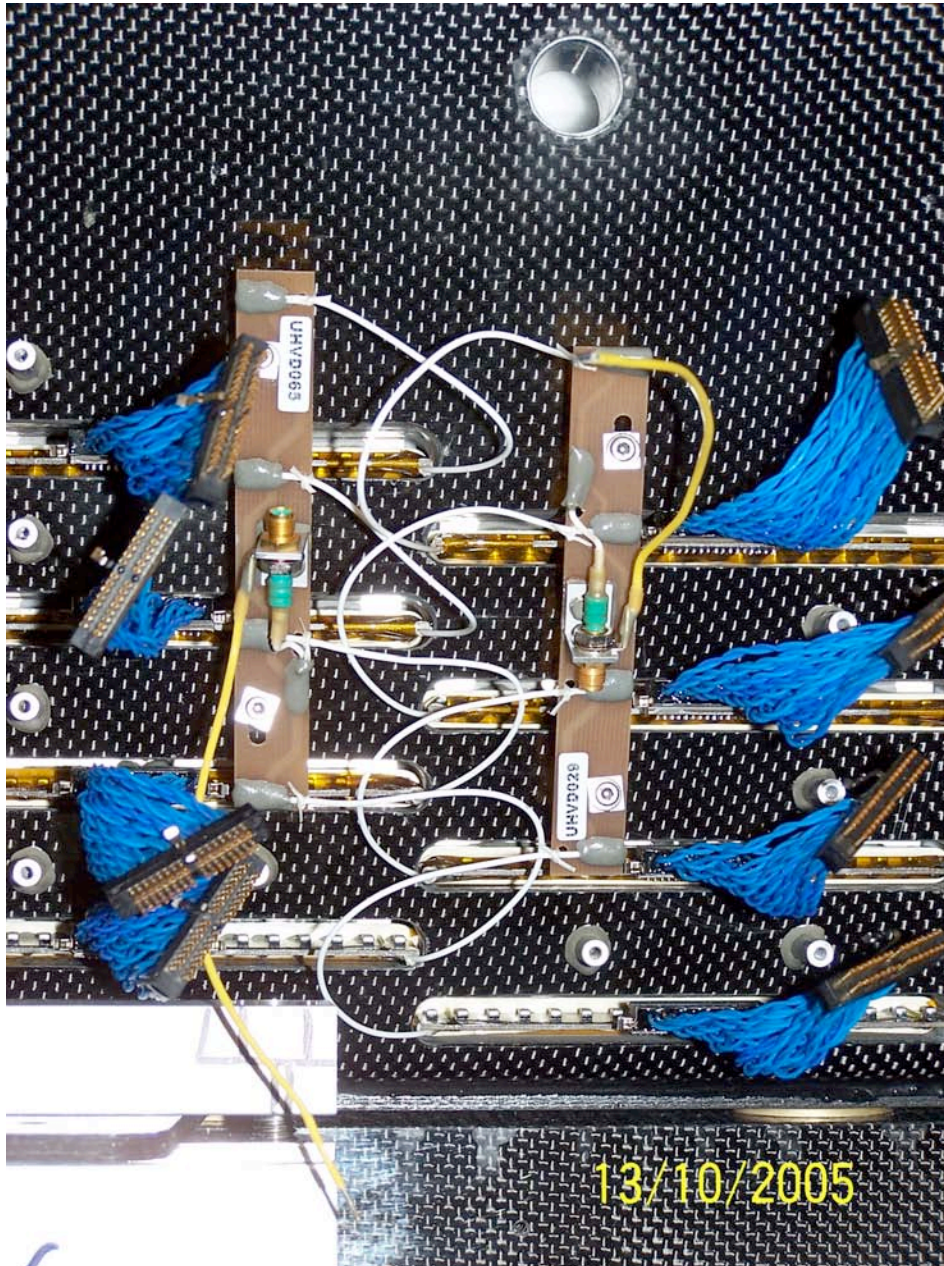
TRD: Octagon Wall 7



TRD: Octagon Wall 8



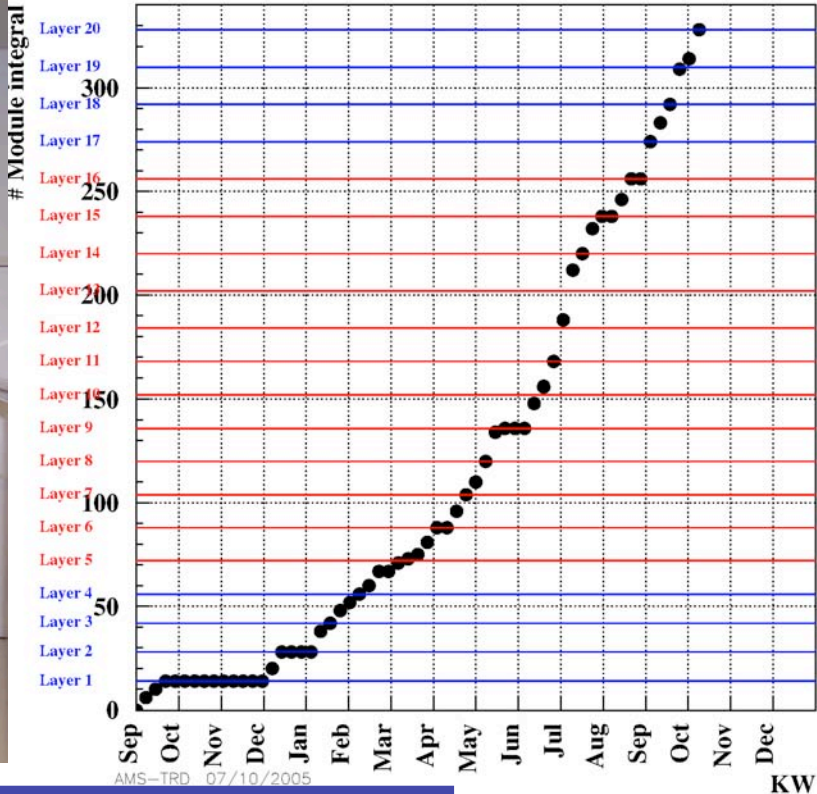
TRD: Integration Status



TRD: Flight Module Integration Status



Module-Octagon-Integration 04/05



- Module Integration ✓
- Dallas Sensors ✓
- UHVD Mounting
- Gas Interconnection Tubes Layer 1-16, Nov. 05
- UFE-Board Mounting Jan. 06
- April 06



TRD: Longterm Test

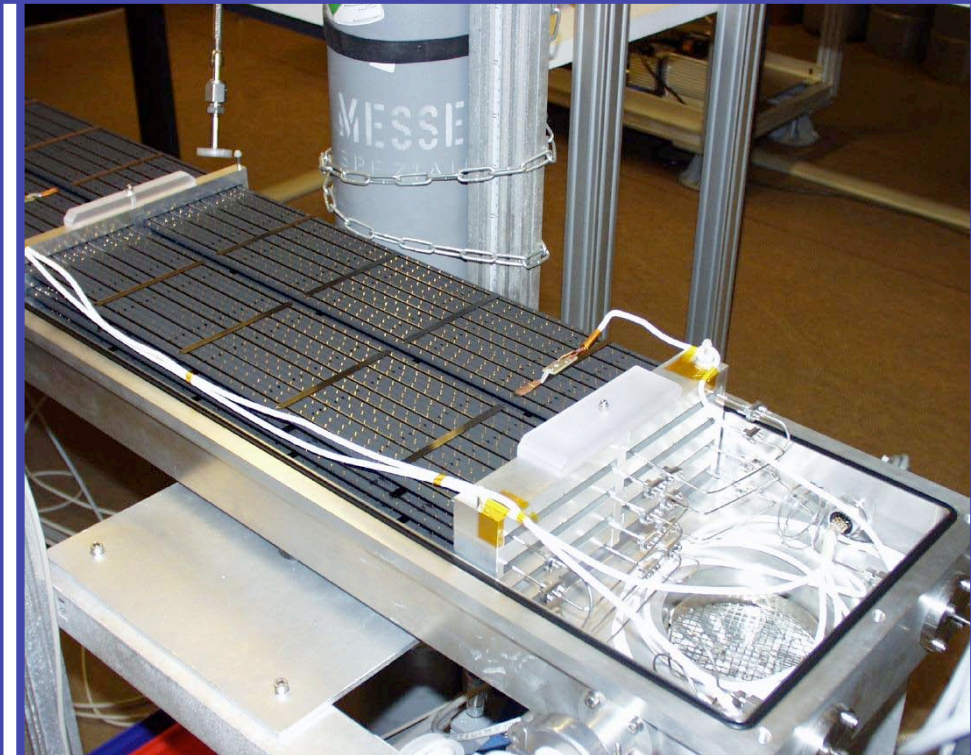
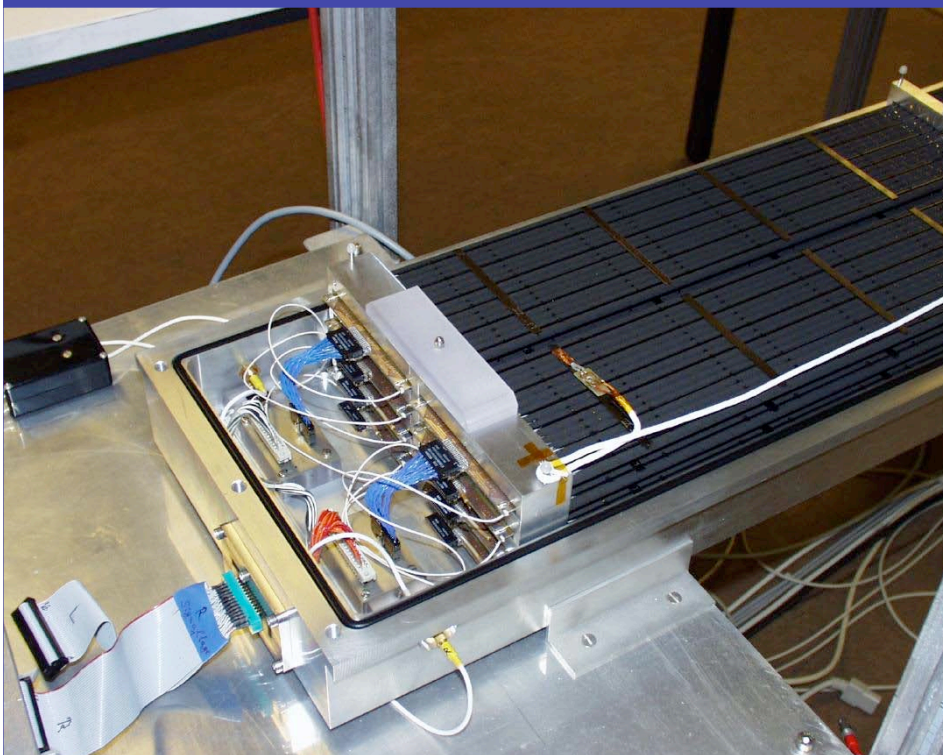
Stable Operation for 1 year

1 Gasgroup _ 8 Modules

Fe^{55} – Monitoring

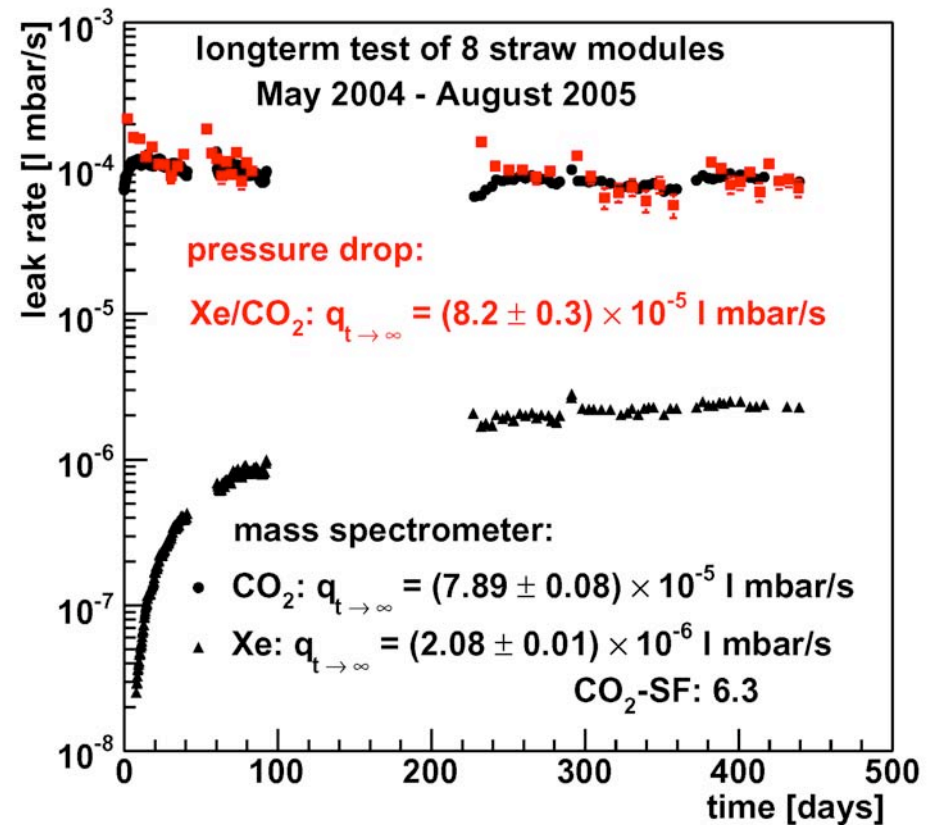
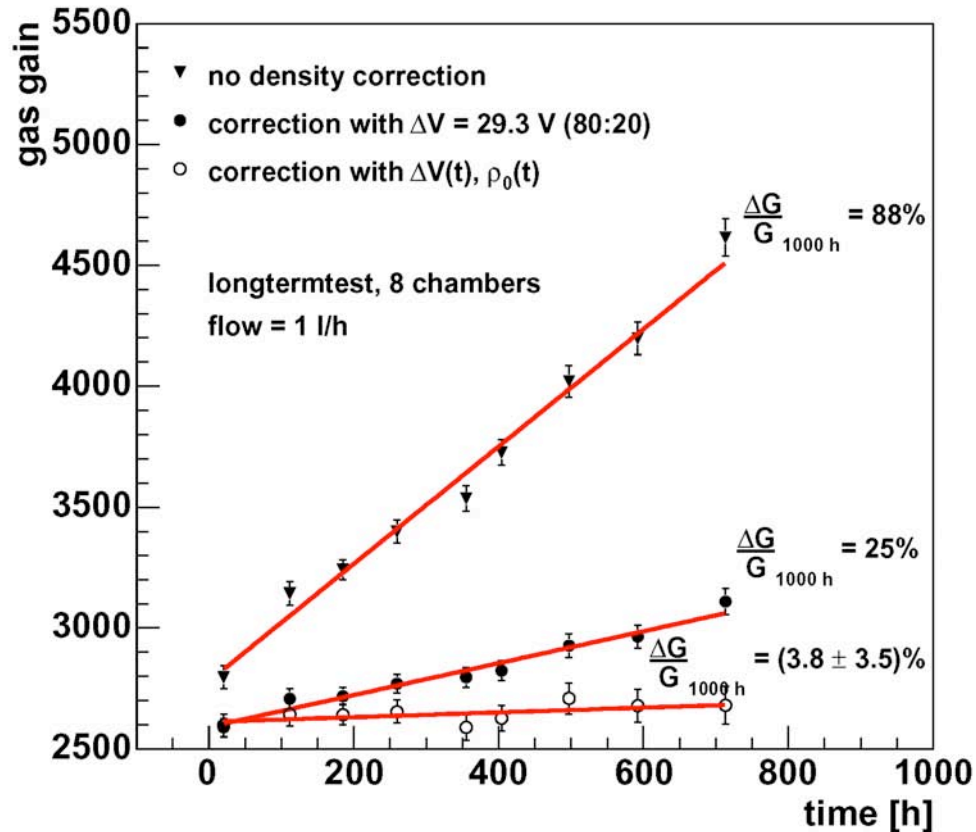
Pressure-Drop Measurements

Mass-Spectrometer Measurements



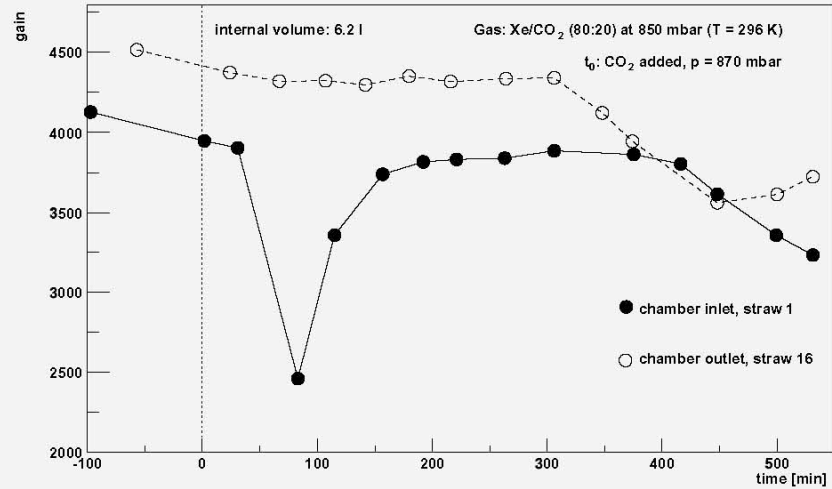
TRD: Longterm Test

Stable Operation for 1 year

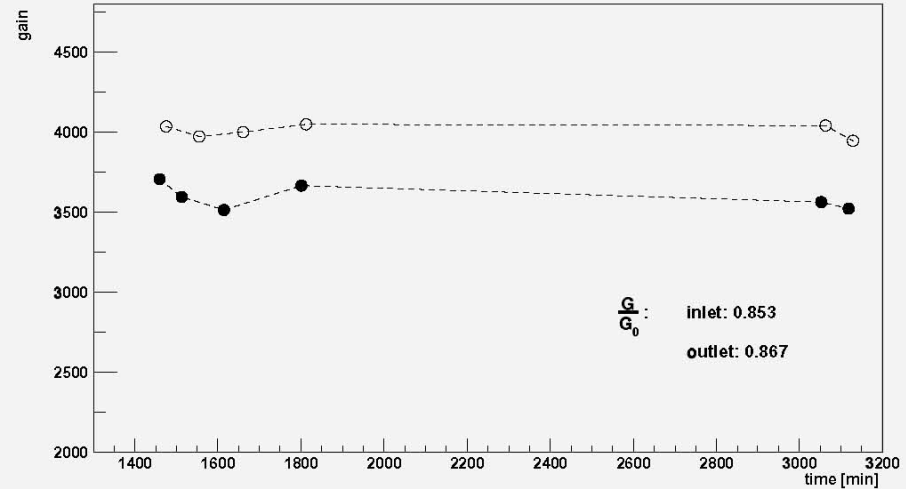


TRD: Longterm Test – Gas Refreshment

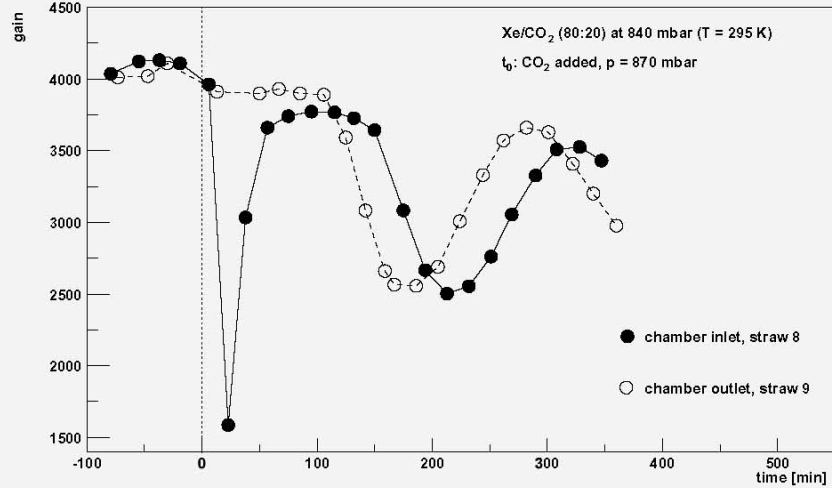
gas flow: 1 l/h



gas flow: 1 l/h



gas flow: 2 l/h



Jan Hattonbach, 01/2004

