

MTCC and Commissioning of ReadOut and Trigger off-chamber electronics

(Aachen, Bologna, Madrid, Padova, Torino)

- five DT workshops: (CDS agendas with transparencies)

Bologna, Jan 24

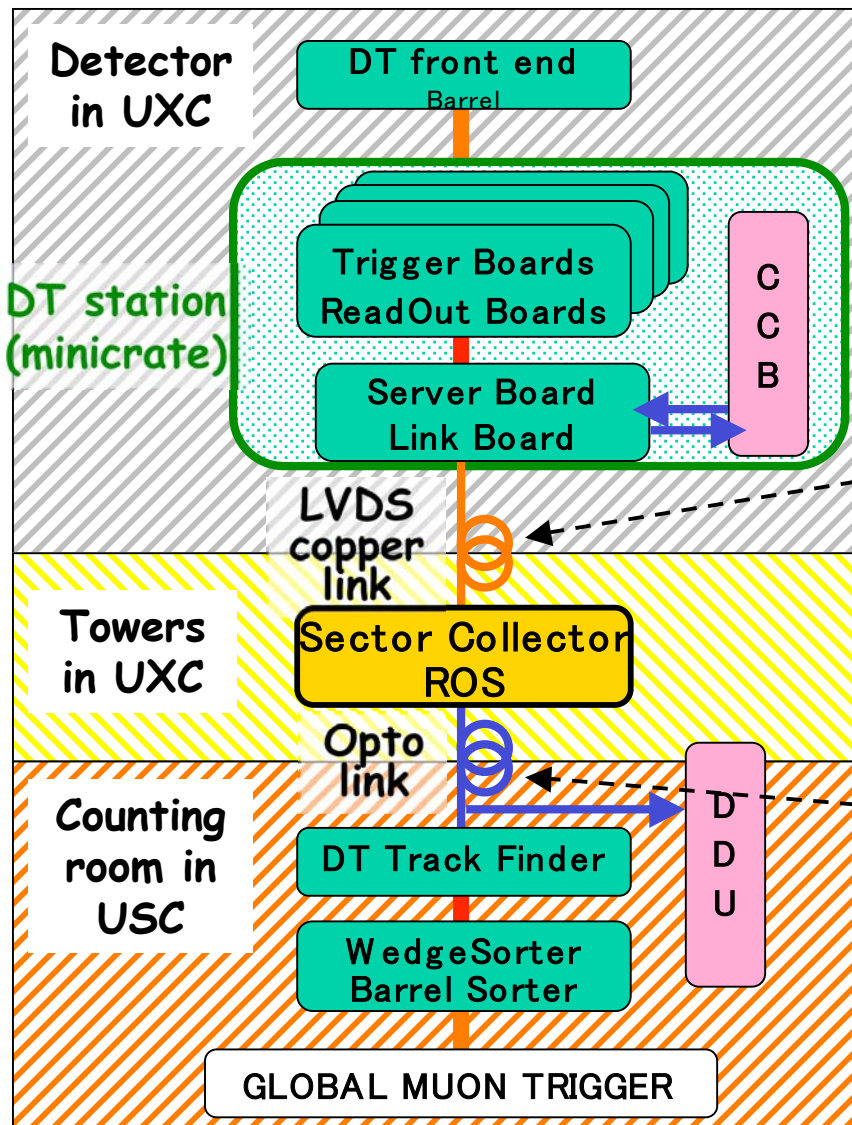
Padova, Apr 4

Bologna, May 27

Padova, Sep 9

Madrid, Oct 28

- next in Legnaro (Jan 13)



LVDS links:

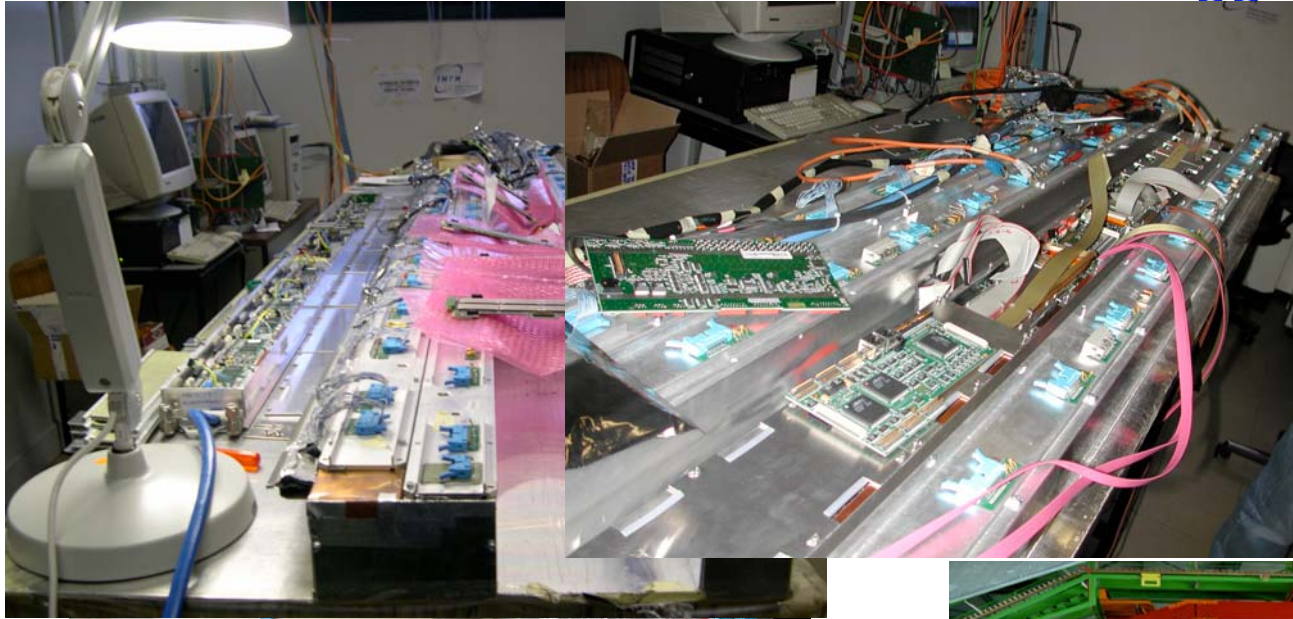
- 4 Ethernet cables/minicrate FTP cat.6
- TX rate @ 480 Mbps (< 50 m), with *National Semicond.* chipset:
 - a) serializer 10-1 DS92LV1021 (8 IC/link)
 - b) cable equalizer CLC014 (8 IC/link)
 - c) deserial. 1-10 DS92LV1212A (8 IC/link)

Opto links:

- 6 multimodal fibers (*Ericsson*)/SC (< 100 m)
- TX rate @ 1.6 Gbps, with *GOL* serializer (32 bits @ 40 MHz), and *Honeywell* opto-ICs:
 - a) VCSEL trasmitter HFE4190-541
 - b) Pin Diode receiver HFD3180-102

Minicrates (1)

on-chamber minicrate contains RO and trigger electronics



logistics:
CIEMAT
Legnaro
Bologna
CERN ISR
SX5 Cessy



Minicrates (2)

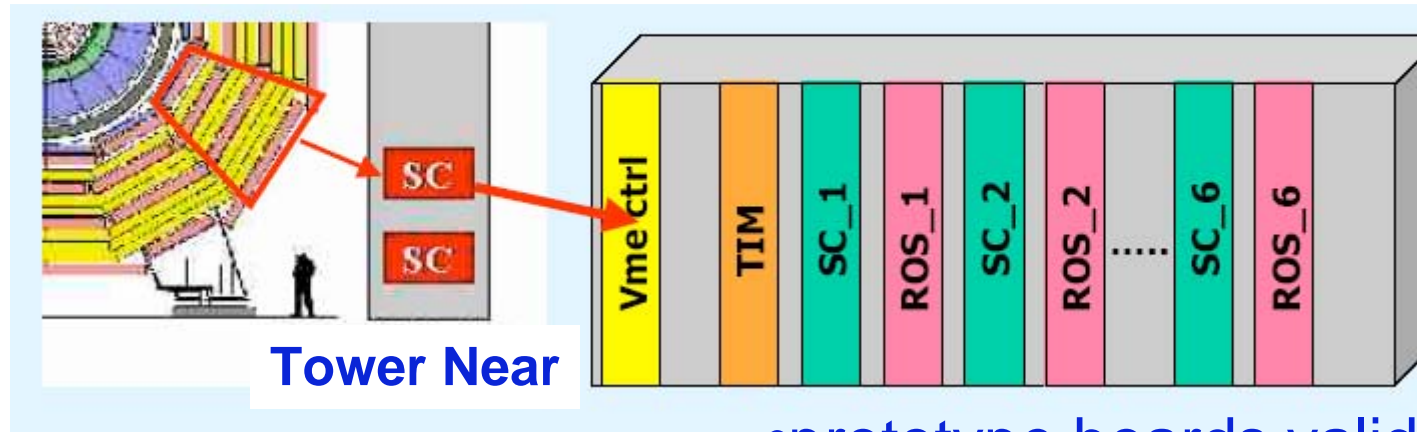
Fully Assembled 160 MCs / (250+spares)

Careful tests at each step of MC assembly and installation

- ROBs stand-alone test in CIEMAT
- TRBs+ROBs+ Link&Control test in Legnaro&Bologna
 - JTAG boundary scan
 - Parallel Interface
 - TTC,CCB links
 - 40MHz emulation
 - test pulser
- coupling to DT chamber FEBs @CERN ISR
 - full test
- install chamber in CMS @SX5
 - full test → DT MC commissioned
 - YB+2 S2-6,8-12 completed
 - YB+1 all installed, 50% commissioned

Sector Collector (1)

Two Sector Collector crates in Tower Near (bottom) contain the RO and Trigger sector boards for an entire wheel

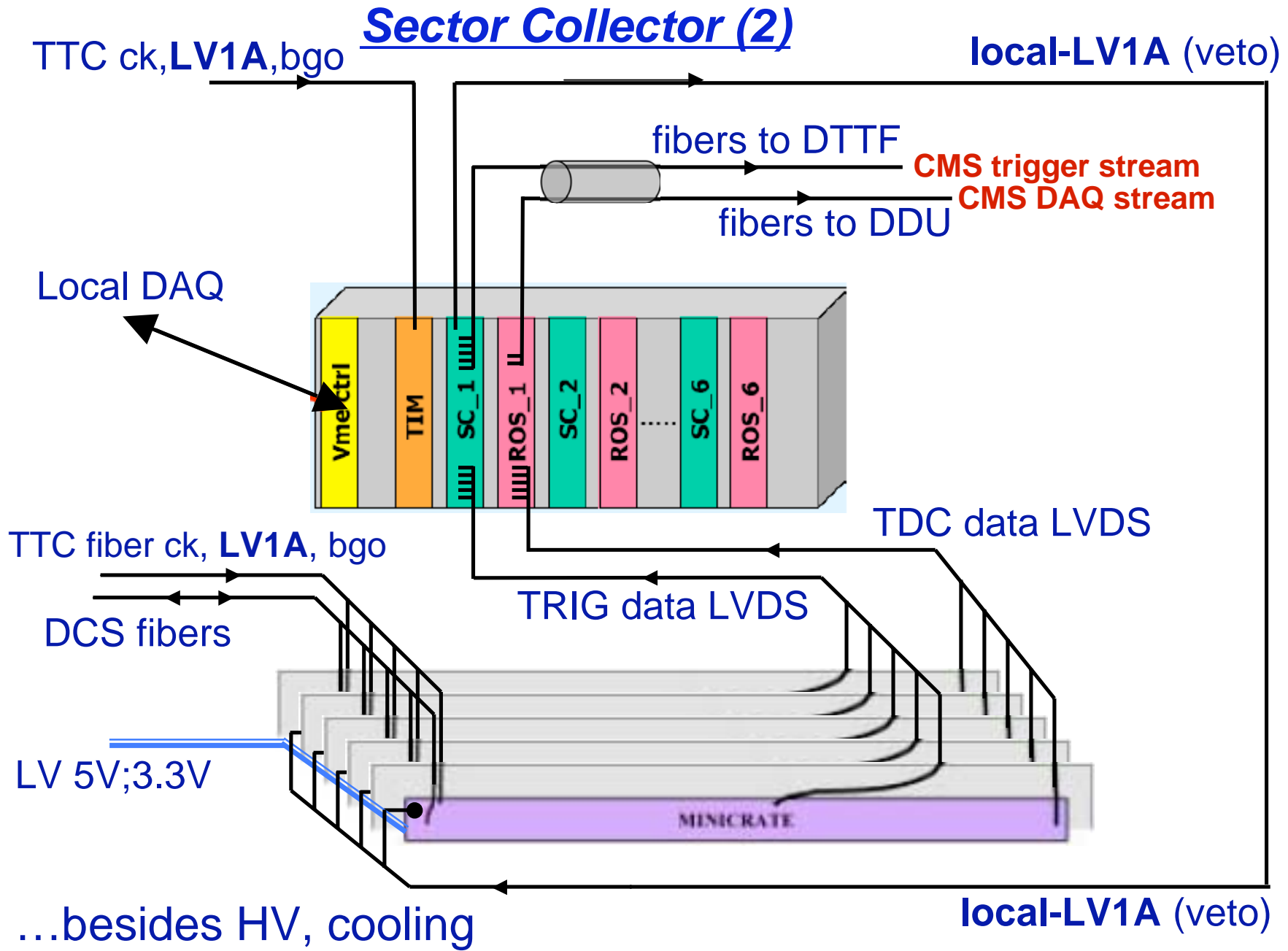


logistics:
CIEMAT (crate&RO)
Bologna (trig)
Legnaro (TTC,DAQ,DCS)
Cessy SX5

- prototype boards validated in 2004 bunched-beam test and used in all 6 test-stands for MC assembly and commissioning

- pre-production crates and boards being delivered. They will be used in MTCC

- final production after MTCC



ID	Task Name
1	YB+2 S10,11 chambers commissioned --- DONE
2	YB+1 S10 chambers commissioned --- DONE
3	YB+2 S10,11 cabled
4	YB+1 S10 cabled
5	test LV
6	HV
7	cooling
8	gas
9	<u>SECTOR COMMISSIONING</u>
10	second ROS8 in VME crate of commissioning set-up
11	DAQ synch with 4 chambers
12	data display
13	<u>SECTOR TEST local mode</u>
14	Sector Collector Crate In CIEMAT --- DONE
15	TIM In CIEMAT --- DONE
16	ROS 25 In CIEMAT
17	move 1st Sector Collector crate to Legnaro
18	DAQ, DCS, data monitor in Legnaro
19	trigger Sector Collector in Bologna
20	test ROS-trigger Sector Collector in Legnaro
21	lower racks at CERN
22	move set-up at CERN
23	Sector synchronisation and local cosmics data taking
24	<u>SECTOR TEST regional mode</u>
25	DTTF crate and DTF boards
26	Integration with Wedge and Barrel Sorters at CERN
27	test SectColl-DTTF optical transmission at CERN
28	Integration with LTC
29	TTC system at cem (cabling, fanout)
30	regional trigger / DAQ Integration
31	synchronization / LV1A distribution
32	<u>3-SECTOR TEST</u>
33	3 ROS25, 3TrigSectColl, 3DTTF
34	move 2nd sector collector crate to Legnaro
35	DAQ 2ROS/2TrigSectColl in same crate (i.e. wheel)
36	???move 3rd sector collector crate to Legnaro
37	DAQ with 2 Sector Collector crates (i.e. 2 wheels)
38	move 2nd sector collector crate to CERN
39	3 sector synch & cosmics trigger logic
40	<u>FED integration</u>
41	DDU
42	test ROS-DDU optotransmission in Torino (& Legnaro?)
43	DDU Integration tests at Legnaro
44	DDU Integration at CERN

✓eek

MTCC test workplan

- DT MTCC project ramp-up in steps:

Sector Commissioning

- goal: autotrigger on one chamber and acquire data from 4 chambers, DAQ synchronisation, first look at cosmics traversing a sector

- note: chamber commissioning electronics

•Sector Test –local mode

- goal: final tower electronics, local autotrigger logic with 4(5) chambers, read ROS25 with local DAQ (no FED)

- note: TTC system as in commissioning set-up

•Sector Test –regional mode

- goal: provide trigger to CMS, integrate regional trigger, use final TTC system

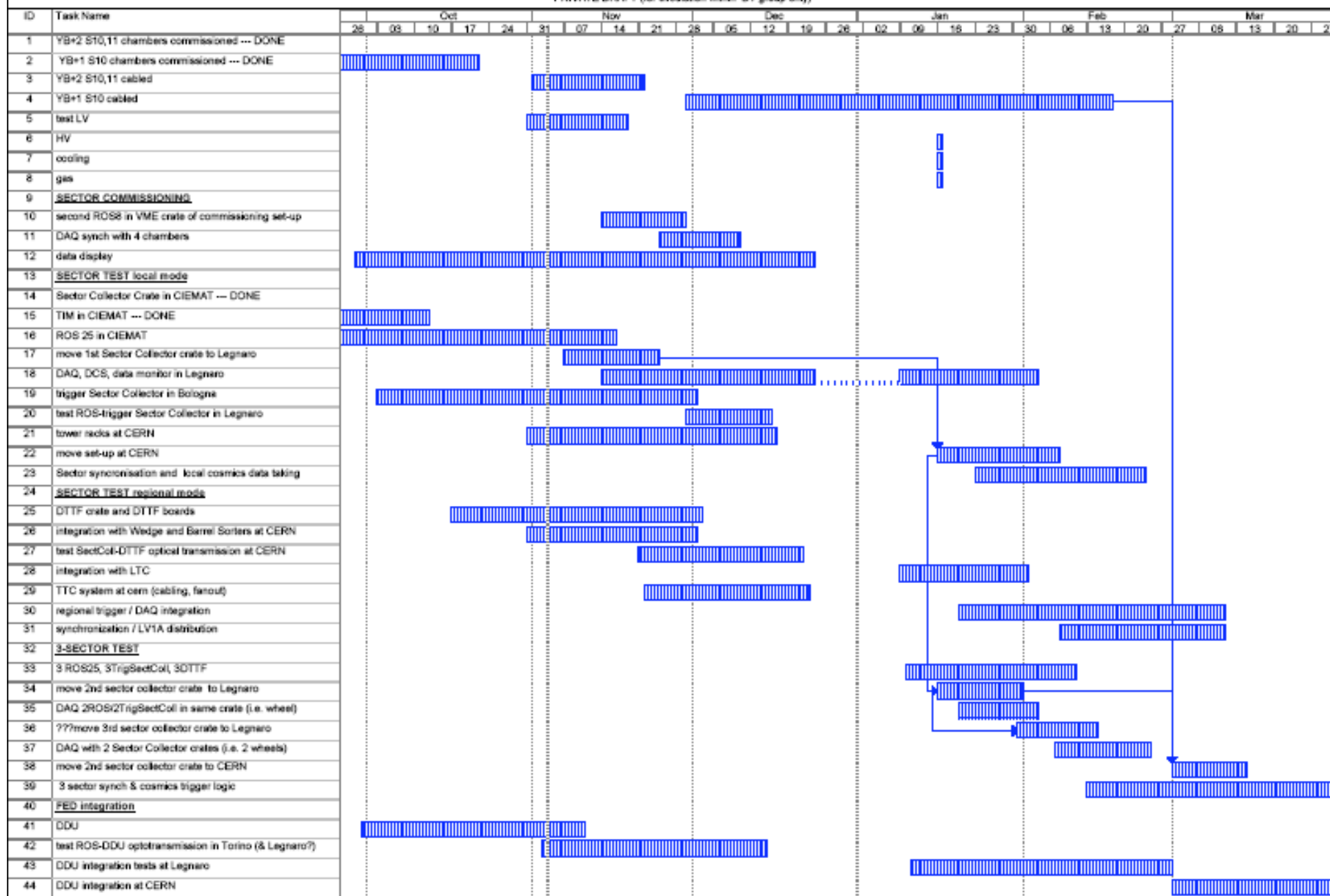
•3-Sector Test

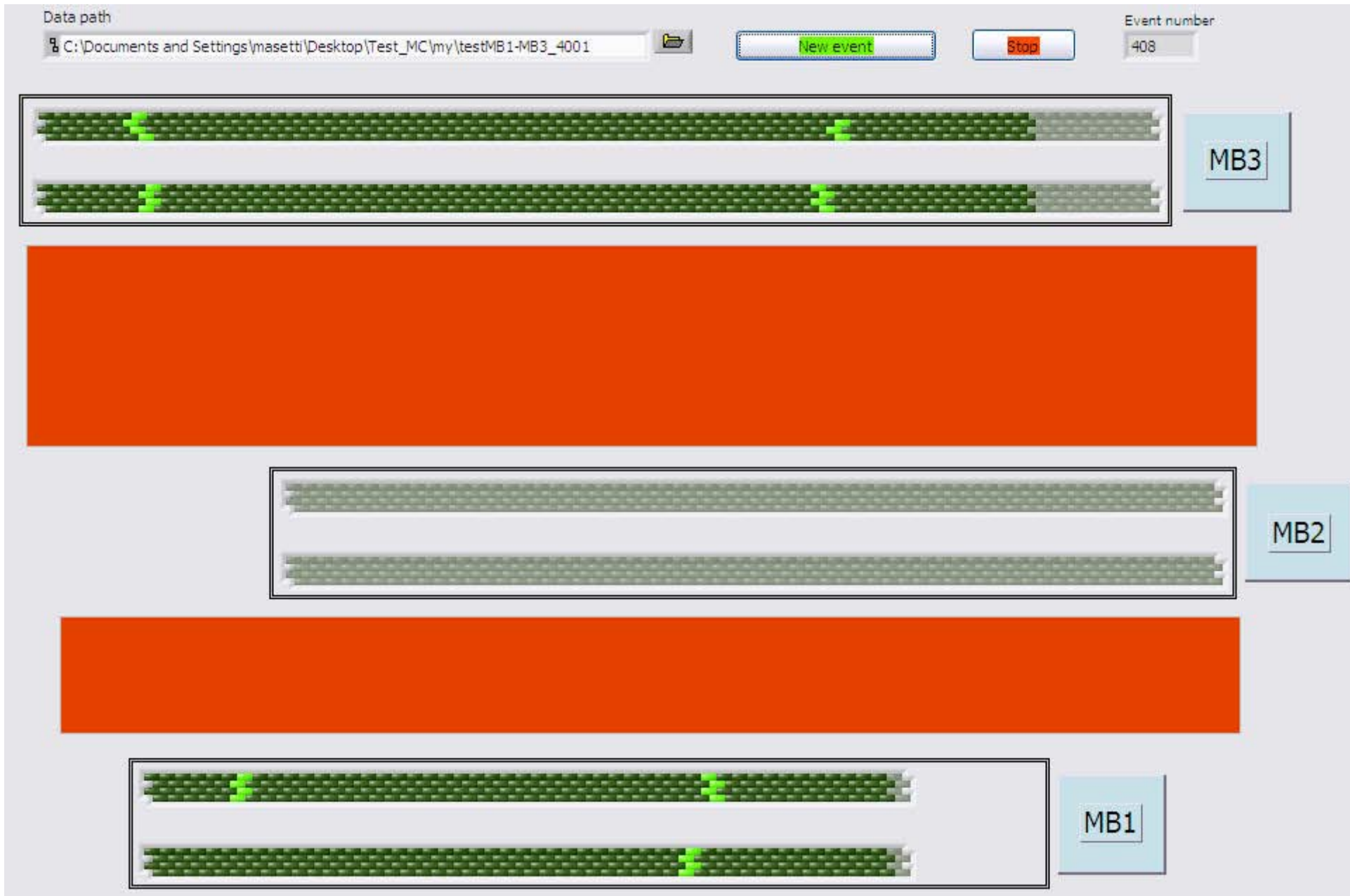
- goal: cosmics trigger with three sectors

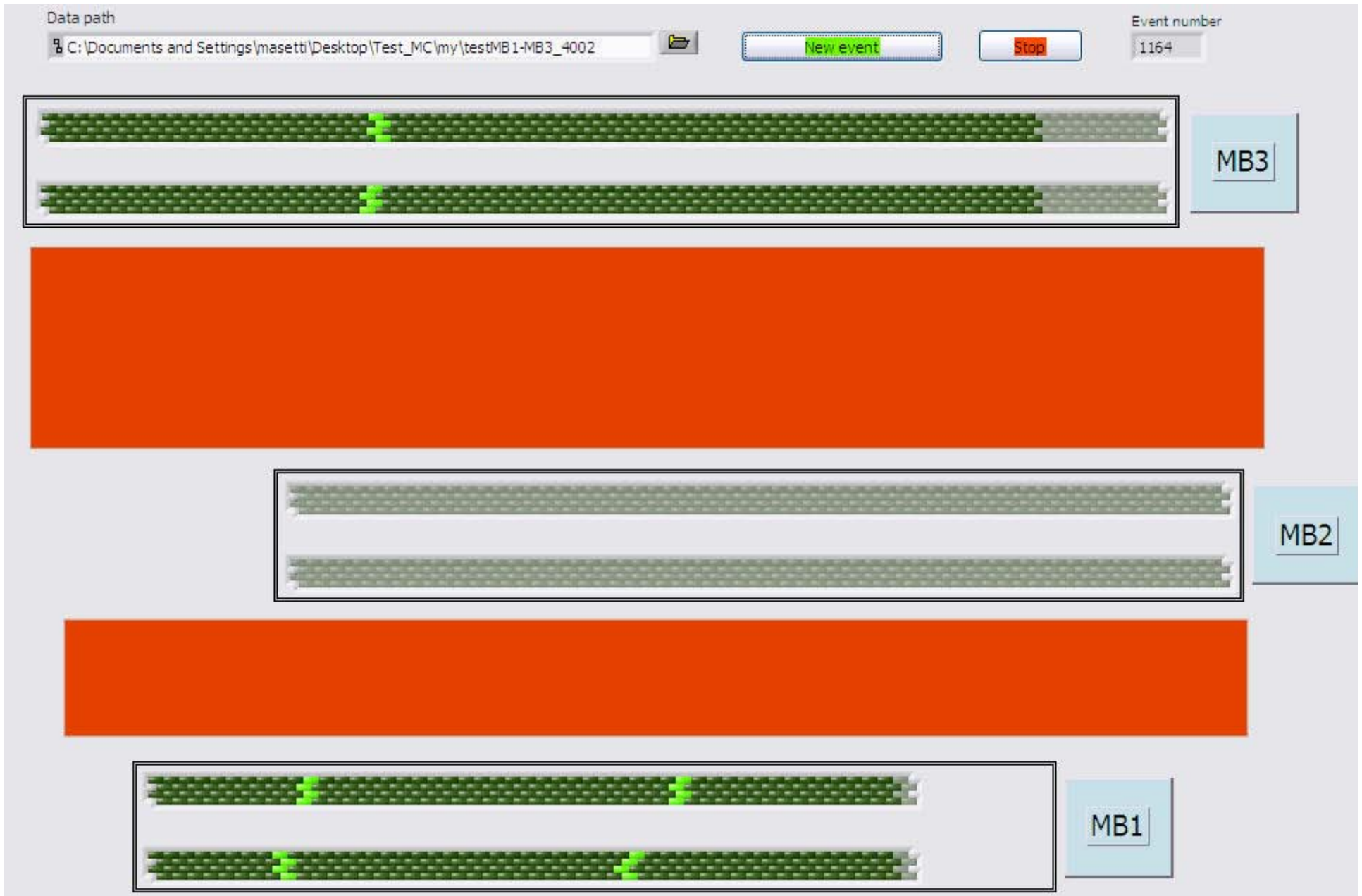
•FED Integration

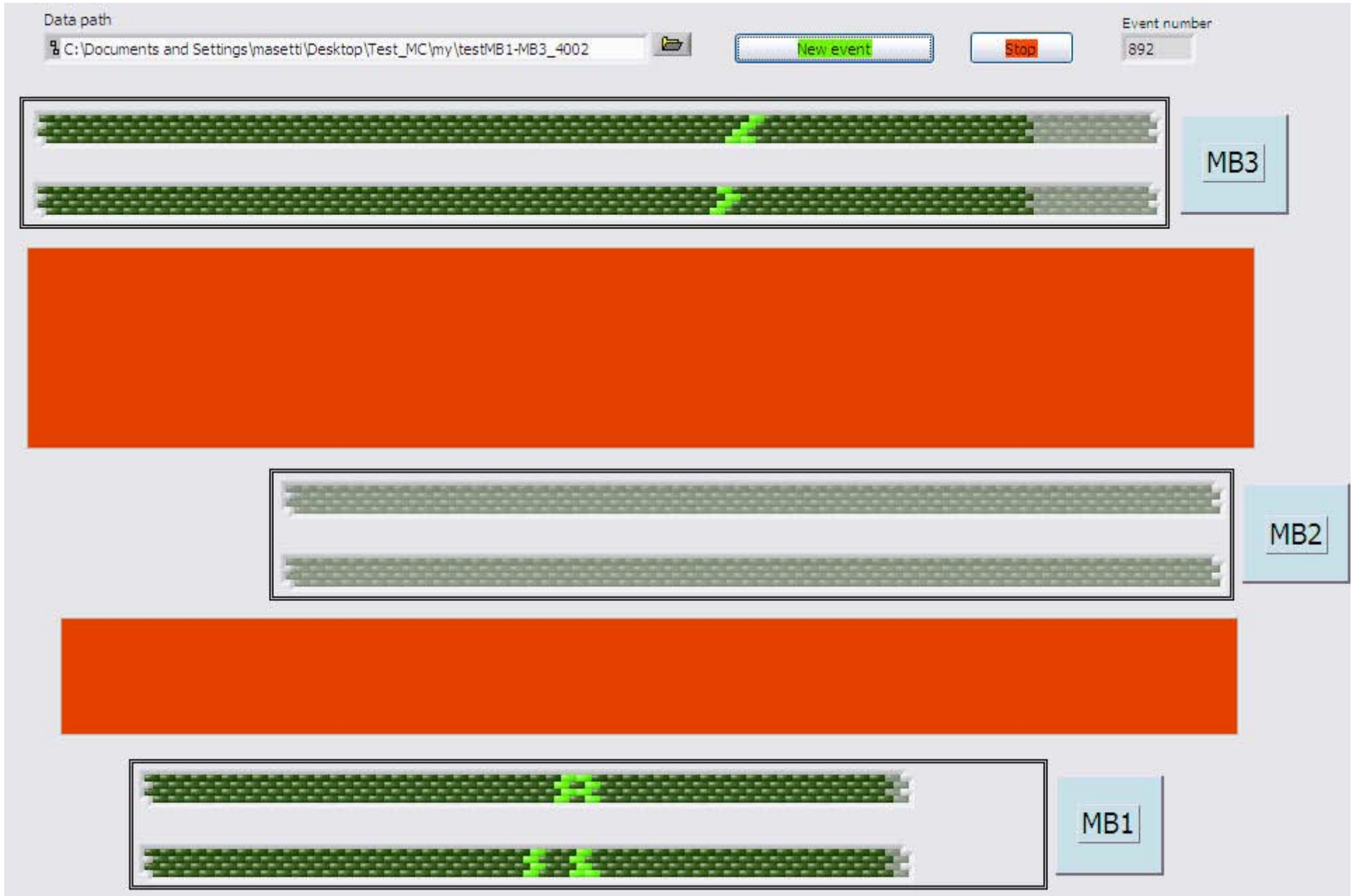
- goal: data flow from ROS through DDU to global DAQ

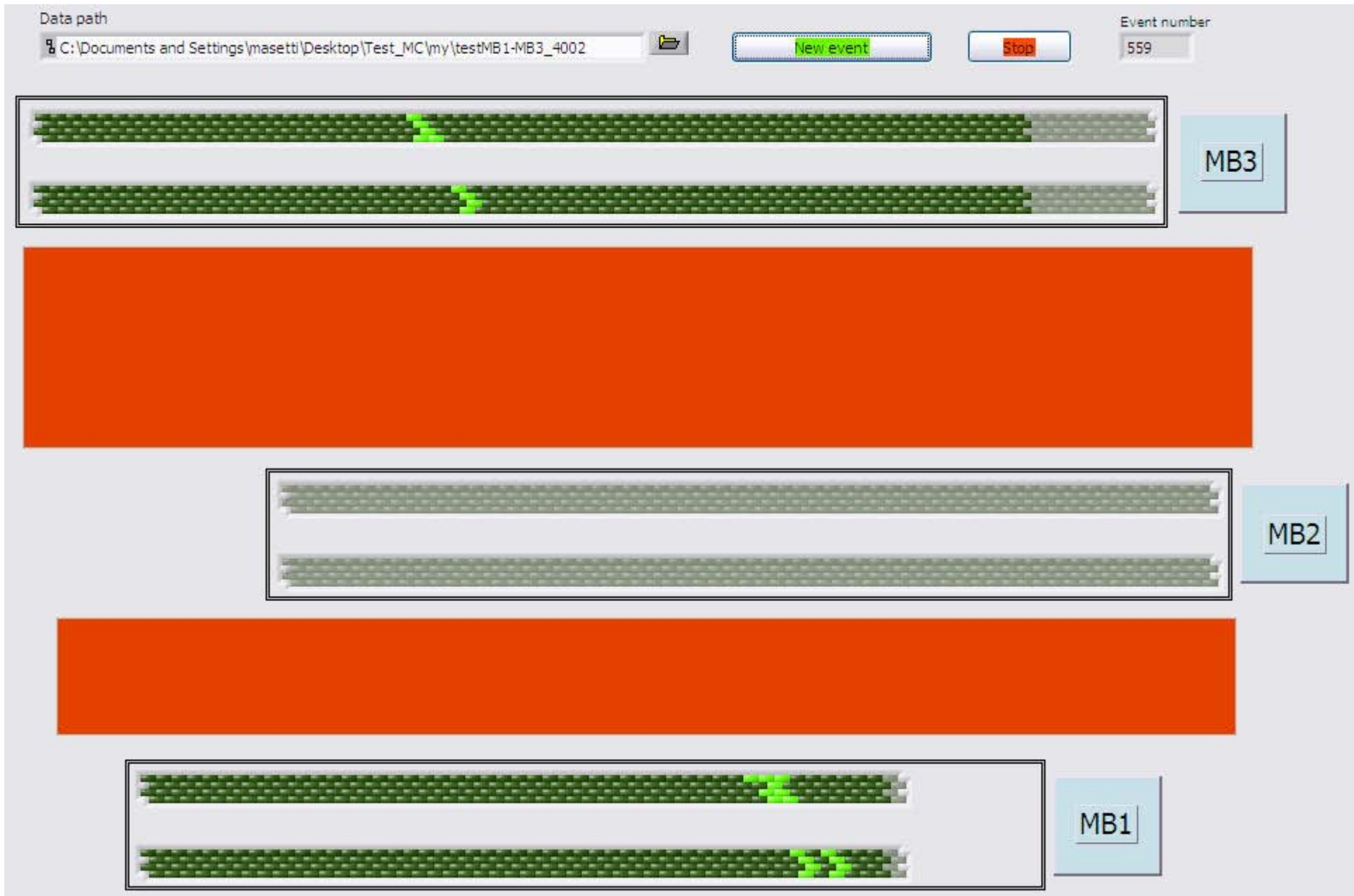
PRIVATE DRAFT (for circulation within DT group only)

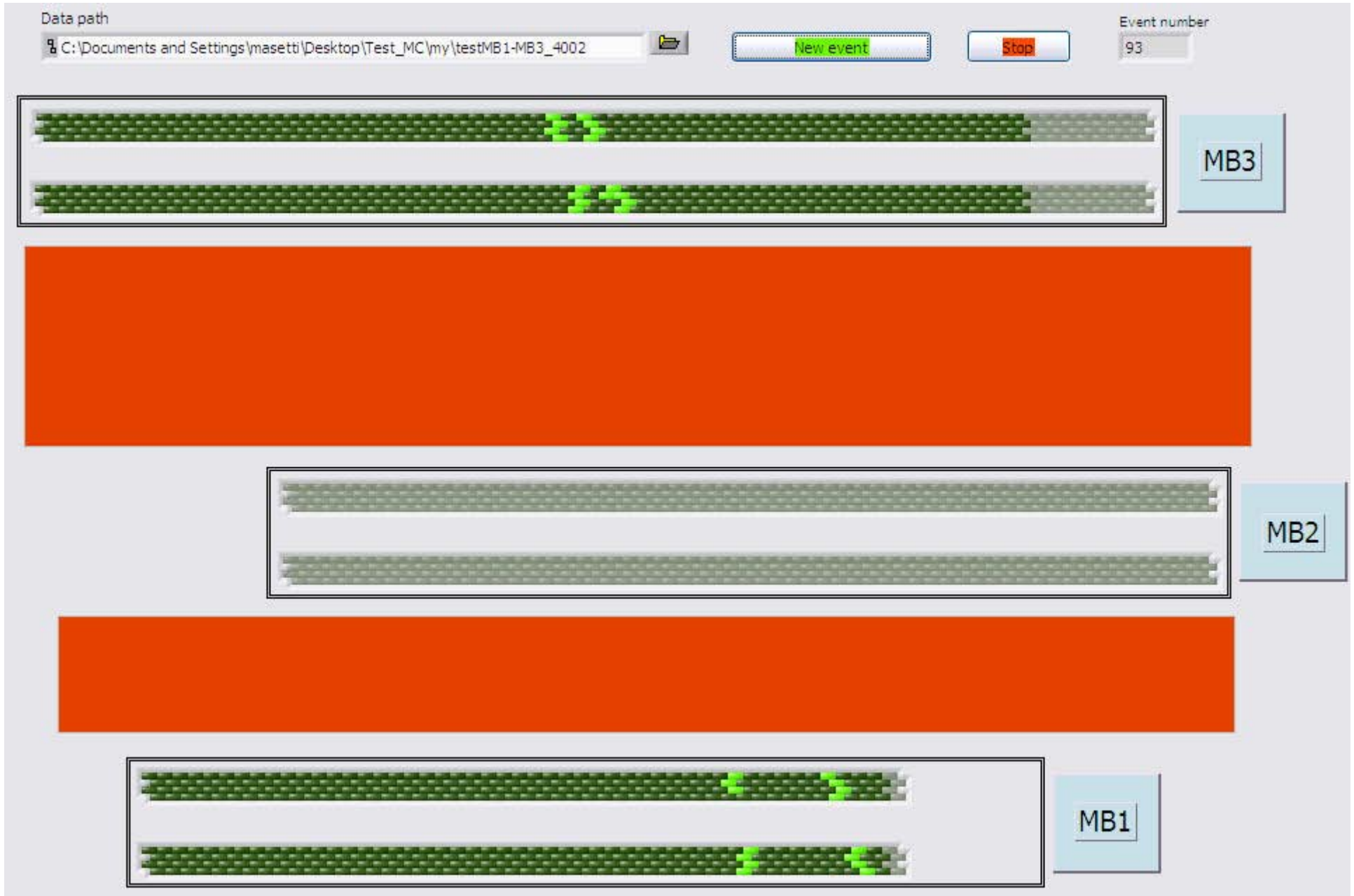


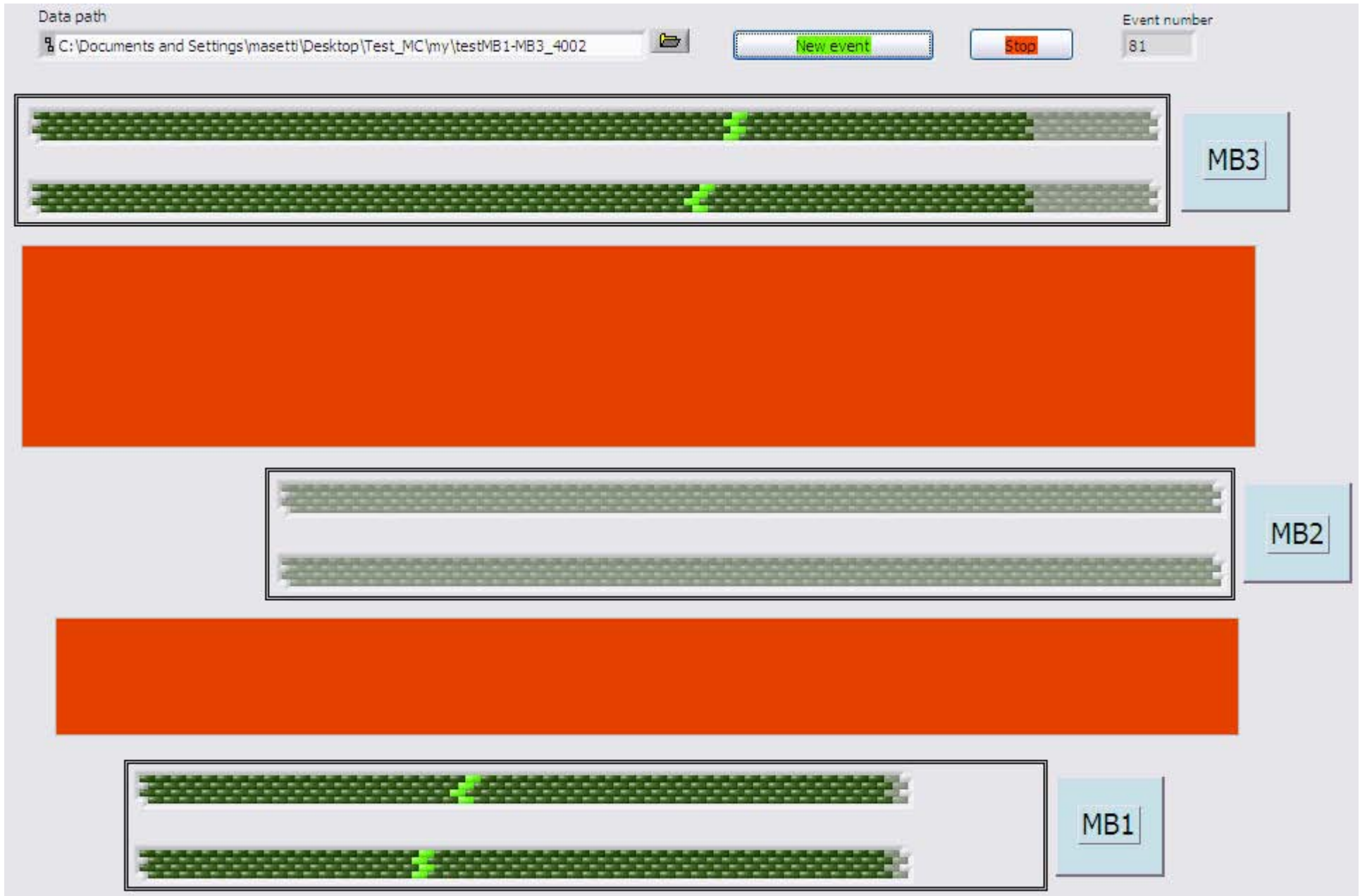


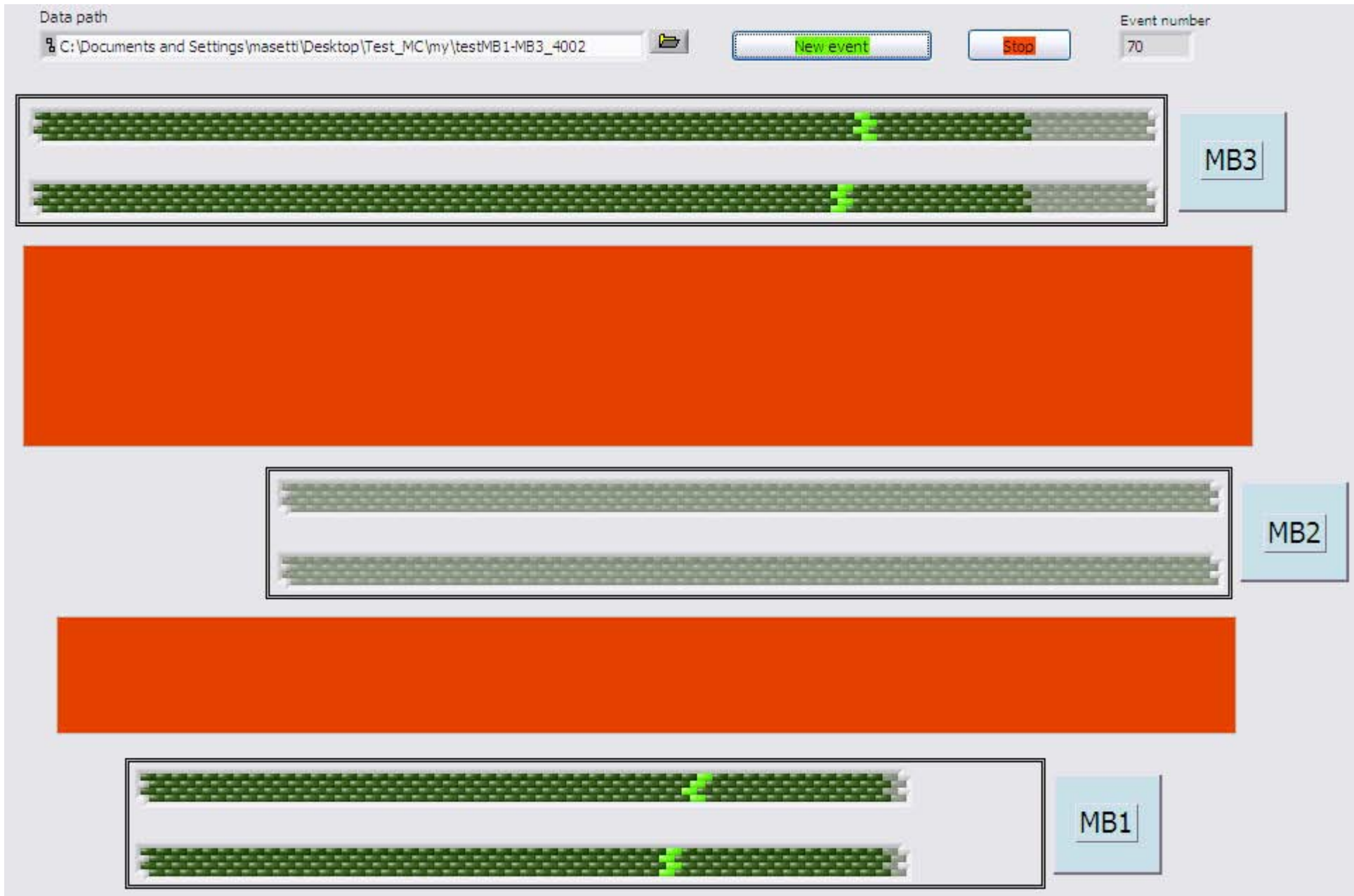


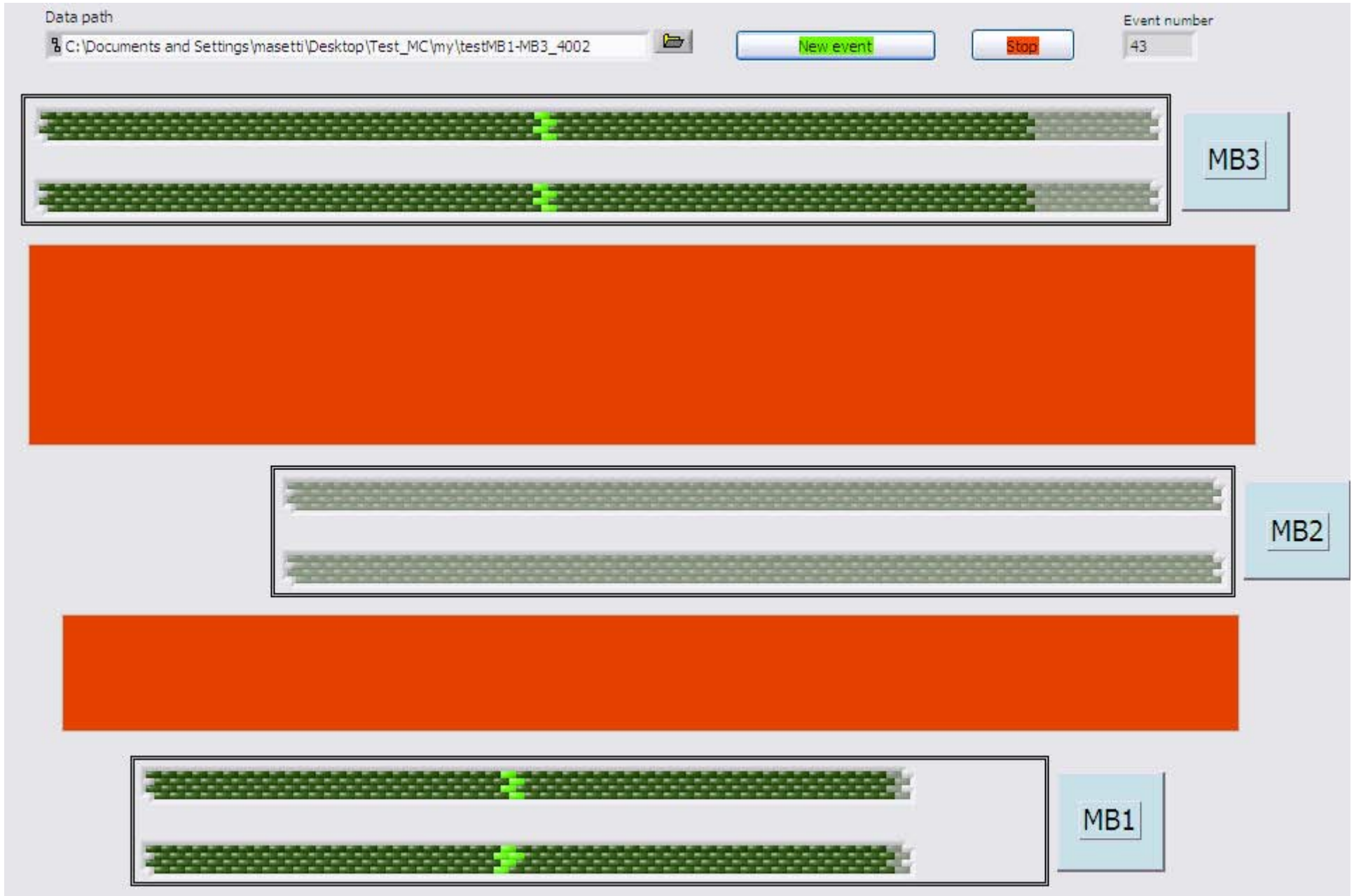












SECTOR COMMISSIONING: need for Dec 12

Hyp: S10 YB+1		Hyp: S10 YB+2	
WHAT	WHO	WHAT	WHO
Status of chamber commissioning	Enrico Conti		
		power to tower racks	Carlos Willmott Shabbir Akhtar
		Tower HV patch pannel	Enrico Borsato
custom HV	Marina Giunta	CMS HV	Enrico Borsato Paolo Giacomelli Marina Giunta
custom LV + cables	Franco Gonella, MDV	CMS LV	Matteo Pegoraro Paolo Giacomelli Marina Giunta
		Easy system cabling (AC/DC, 48V, control)	???
test-stand (chamb.commis.t.s.) on MB1	team on duty Dec12 (Jesus Puerta Parenti) Marco Zanetti Franco Gonella	test-stand (cabling test sys) + upgrade (PC DAQ with trigger board, SBS VME-PCI interface)	Franco Gonella Nicola Toniolo
		test-stand cabling extensions to MB1 tower connectors (2 RO, 2trig, 1 TTC, 1 DCS)	Franco Gonella
Fibres for MB2,3,4(1): 3 TTC, 3 MU-ST adapt, 3 attenuators	Franco Gonella MDV	Fibres extensions for MB2,3,4(1): 3 TTC, 3 attenuators	Franco Gonella
RO cables (2)	MDV, Franco Gonella	RO cables extensions (2)	Franco Gonella
common items:			
portable PC and RS232 (or 485) connection for configuring MB2,3,4(1)	Franco Gonella Ric Travaglini(?)		
second ROS8 board	Cristina Fernandez		
configure DAQ	Nicola Toniolo Sandro Ventura		
event display	Gianni Masetti		

Sector Collector production and commissioning

Boards final production after MTCC?
TOO LATE!

The workplan for MTCC naturally extend into the mass production and commissioning phases:

- Sector Collector crate in CIEMAT +ROS+TIM
- Trig SC in Bologna
- Assemble SC system and test in Legnaro
- Connect to cabled wheels in Cessy SX5 and test

DT DDU/FED

Contact persons: Vincenzo Monaco (monaco@to.infn.it)
Giulio Dellacasa (gdellaca@to.infn.it)

Final system: 1 VME 64x crate with 5 boards (1 per DT wheel)

Status: 2 pre-production boards under test/debug

Plans: **Nov-Dec 05** – Local tests of pre-production boards in Torino.

Q1 06 – DAQ tests at 904.

DT local DAQ tests in Legnaro.

Firmware optimization.

Q2 06 - Final production.

Q2/Q3 06 - Tests of the final boards (Torino, Legnaro, 904)

Q3 06 – Installation and integration at P5.