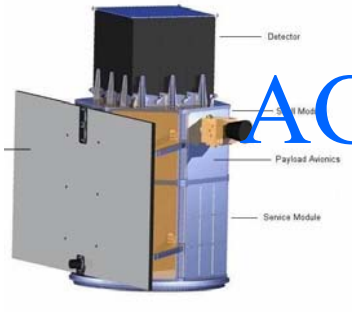
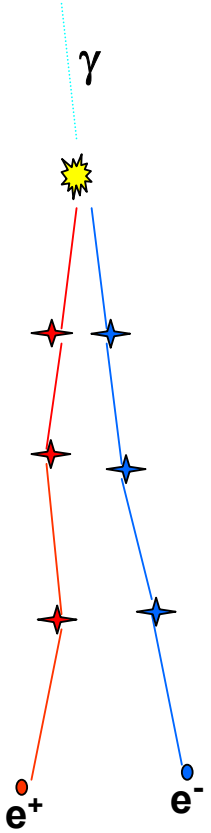


AGILE GSE for the calibration of the AGILE Payload at BTF-LNF

M.Trifoglio, INAF IASF Sezione di Bologna

on behalf of:



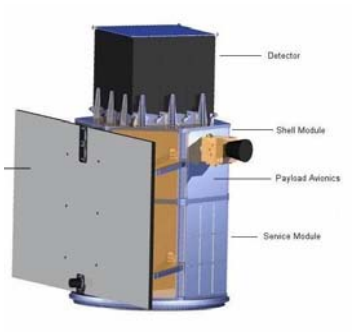
SC & MGSE:

- **Andrea Bulgarelli, Fulvio Gianotti** (s/w design and development), INAF IASF - Bo
- **Alessandro Traci, Alessandro Mauri** (MGSE h/w design and development) INAF IASF – Bo

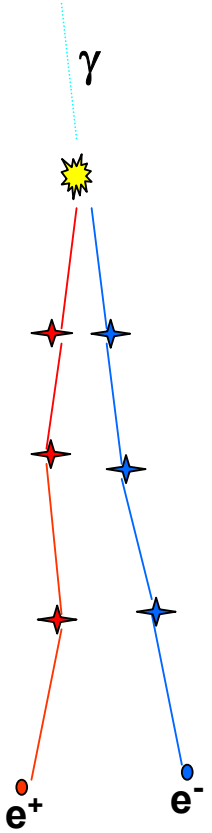
OBT reconstruction for PTS:

- **Tom Frøysland** (h/w design and development) INFN – Tor Vergata

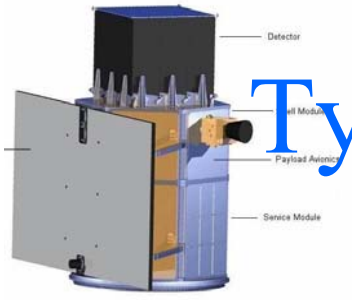
EGSE & Cooling System: **Alenia**



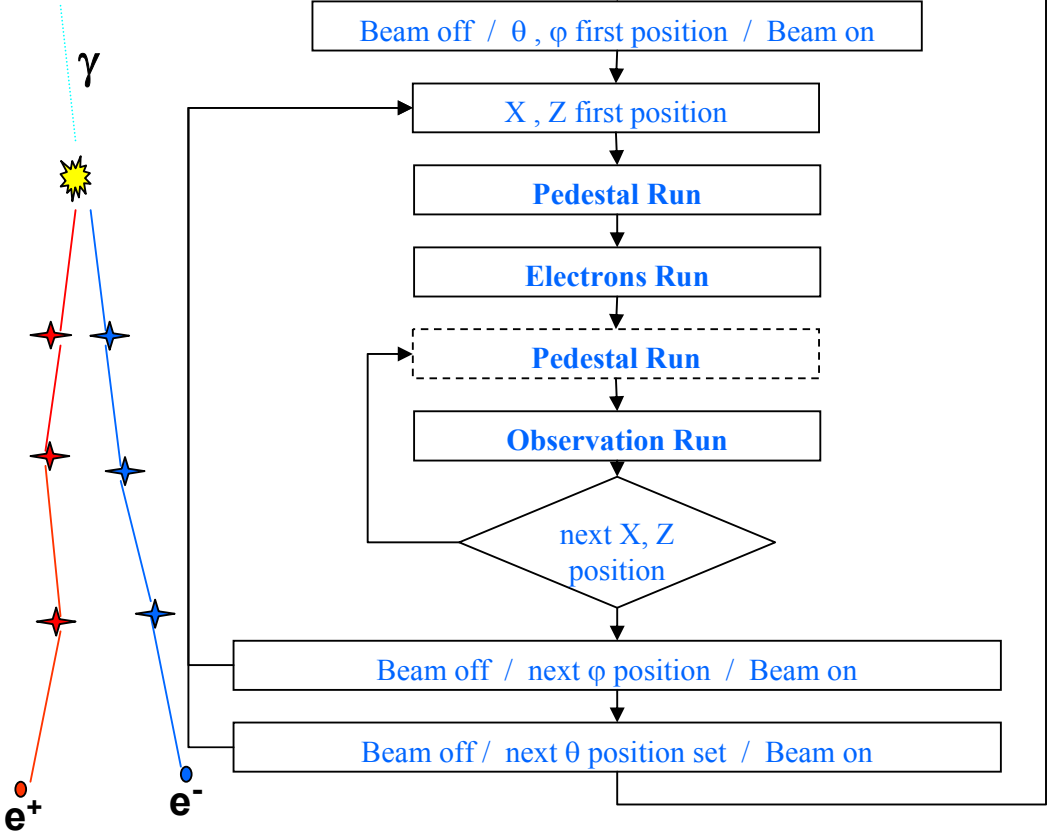
Contents

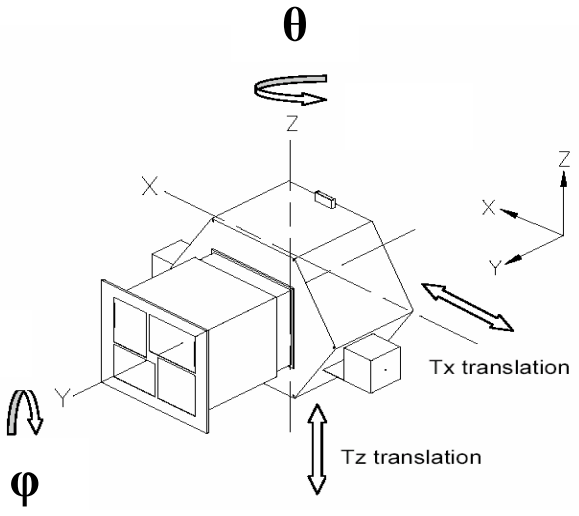


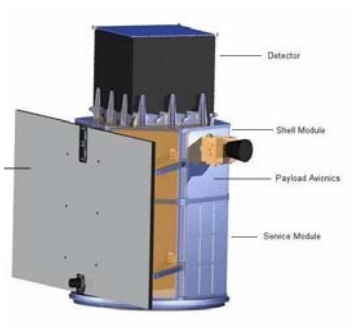
- Typical Agile Calibration Session
- Requirements on the AGILE MGSE and EGSE
- Agile MGSE Items
- Payload installation
- Agile EGSE Items
- Overall setup
- EGSE Data Flow



Typical Agile Calibration Session

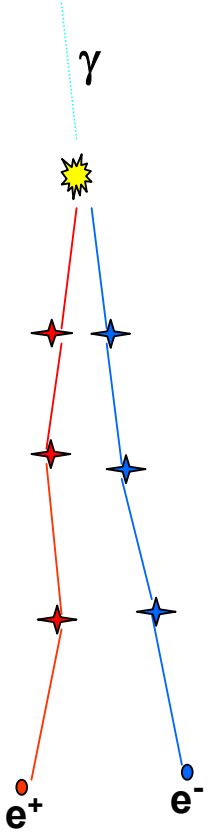




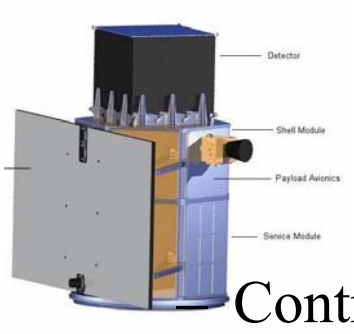


Requirements on the AGILE MGSE

(in red those specific for the BTF)



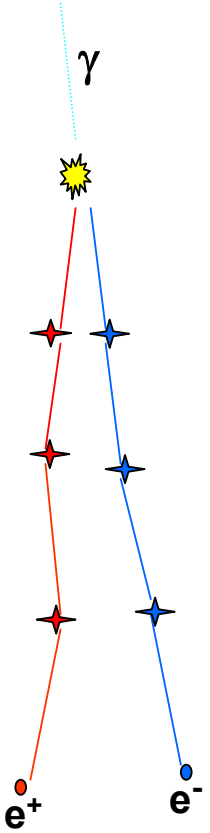
- Control of the Payload environment (cleanliness, temperature, humidity)
- Move the IPL (200 kg) from its transportation trolley (and vice versa)
- Position the IPL in front of the beam by means of X-Z translations and Θ, Φ rotations

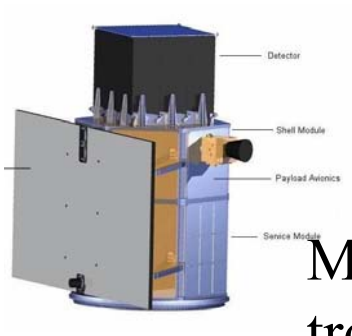


AGILE MGSE items
(in red those specific for the BTF)

Control of the Payload environment (cleanliness, temperature, humidity)

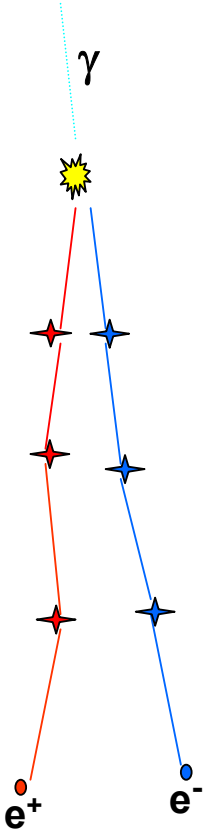
➔ **Cooling System (Laben)** + **Filter Unit + IPL Cover (IASF-Bo)**



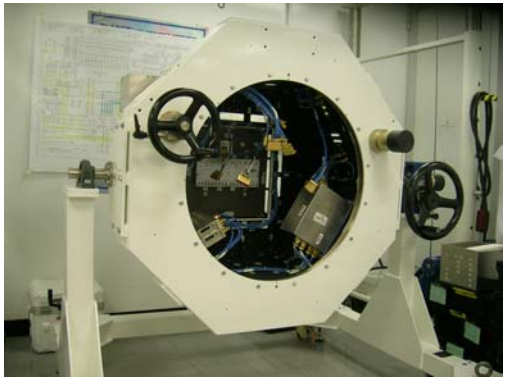


AGILE MGSE items
(in red those specific for the BTF)

MGSE to move the IPL (200 kg) from its transportation trolley to the Calibration MGSE positioned in front of the Beam (and vice versa) ➔ **AIV MGSE (IASF-Bo)**

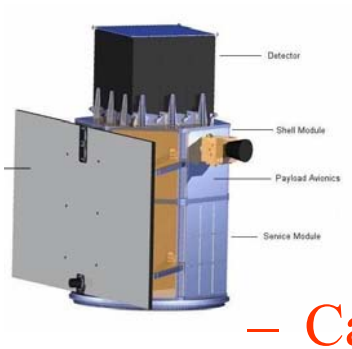


Already used for the IPL Assembly Integration and Verification activities at Alenia



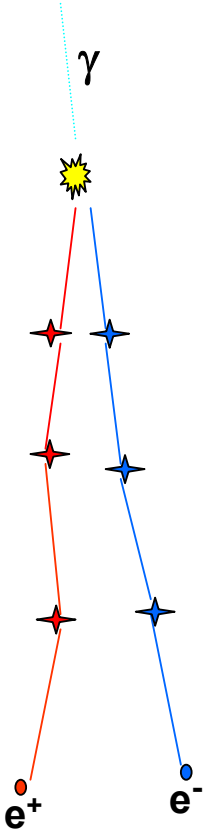
… and designed to be re-used for mechanical handling at BTF

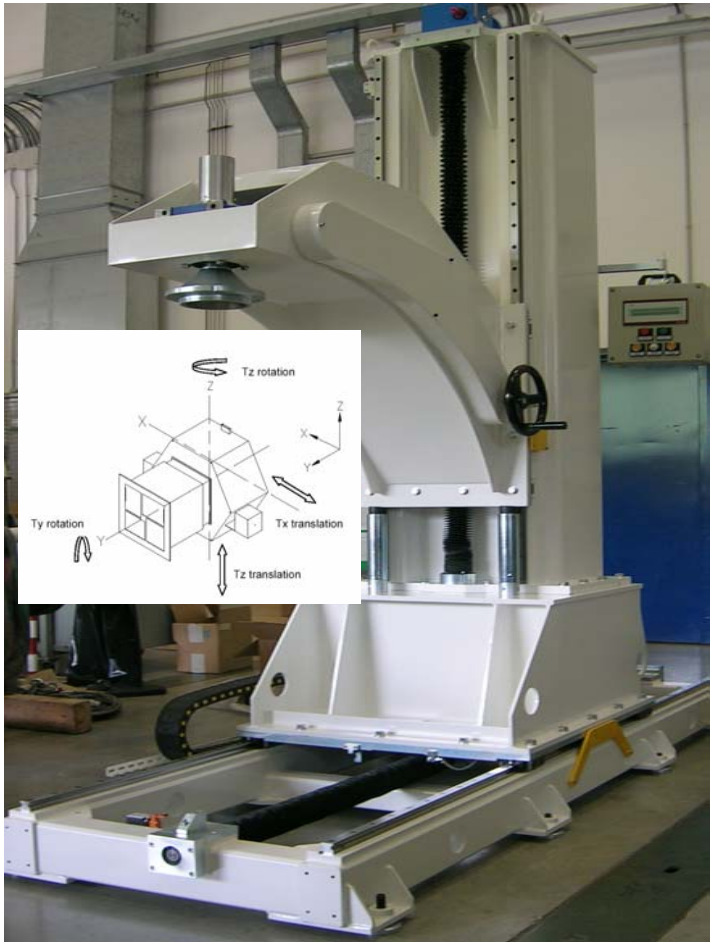
AGILE MGSE items
(in red those specific for the BTF)

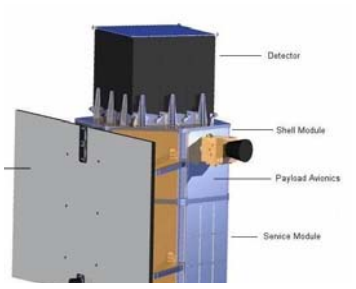


– Calibration MGSE movements to position the IPL in front of the beam by means of X-Z translations and Θ, Φ rotations

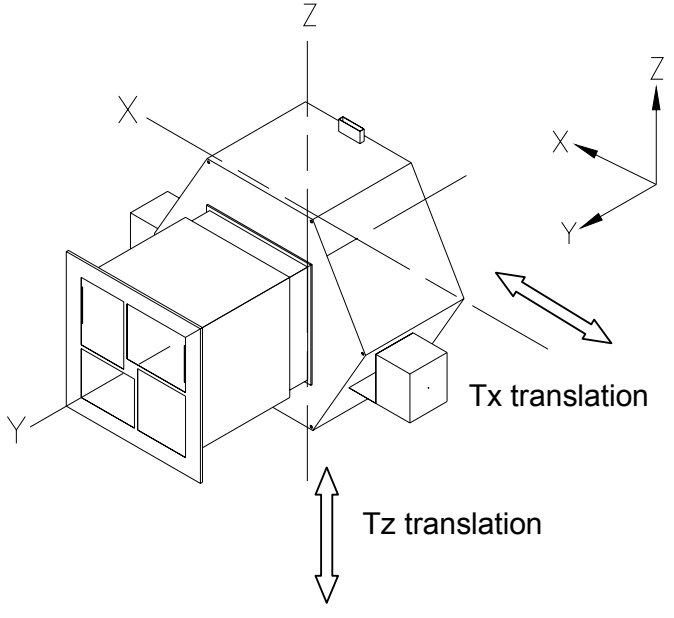
➔ **Calibration MGSE (IASF-Bo)**



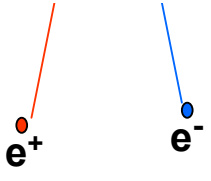


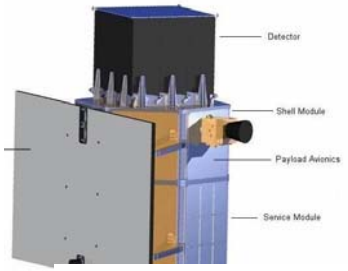


Calibration MGSE:
Tx/Tz Translation Stage Performance

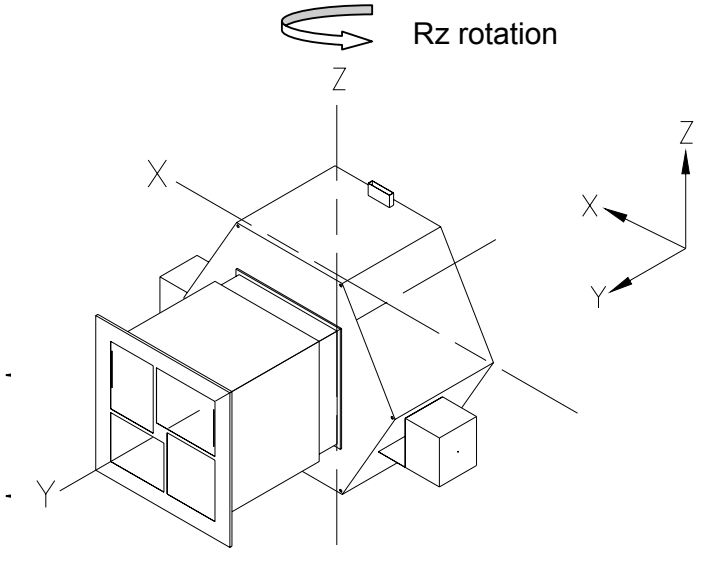


- **Calibration only**
- **motorized**
- **translation range**: [0,1338] / [0,800] mm
- **minimal incremental motion**: 0.5 mm
- **absolute accuracy**: ±0.7 mm over the whole range
- **bi-directional repeatability**: ±1mm over the whole range
- **speed**: 0-600 mm/min
- **accel.**: 0,15 m/s^2
- **display resolution**: 0,1 mm
- **display format**: mm ±nnn.n (e.g. +160.6)

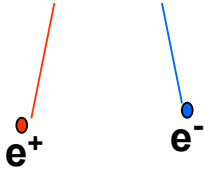


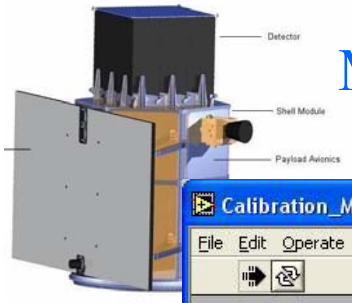


Calibration MGSE: Rz Rotation Stage Performances

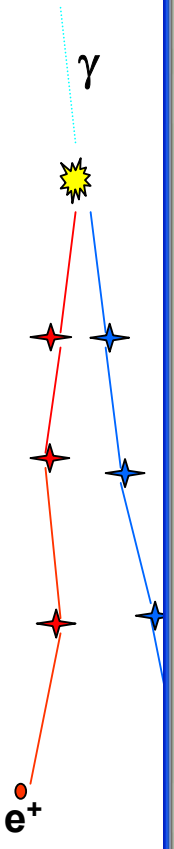


- **Calibration MGSE only**
- **manual**
- **reduction**: max 63:1 (irreversible)
- **range**: [0º, +180º]
- **minimal incremental motion**: 0.5º
- **absolute accuracy**: ±1º
- **bi-directional repeatability**: ±1º
- **display resolution**: 0.1º
- **display format**: decimal degrees ±ggg.d (e.g. +160.6)





MGSE Computer GUI for the remote commanding of X-Z translations of the IPL in front of the beam



Calibration_MGSE_1.3.vi

File Edit Operate Tools Window Help

MOTOR'S POWER
ON OFF
DRIVER'S RESET
X Local Reset
Z Local Reset
LOCAL REMOTE
EMERGENCY
Extra Corsa X FW
Extra Corsa X BW
Extra Corsa Z FW
Extra Corsa Z BW

BOARD Initialize
START Monitoring
START LOG
CURRENT POS. TARGET POS.
Cur-RZ (Degree) 0.0
Target-RZ 0
Cur-RY (Degree) 0.0
Target-RY 0
HOME + INDEX X Axes
HOME + INDEX Z Axes

Z Axis H/W Status

Bit		Bit	
0	Run/Stop	8	Velocity Threshold
1	Profile Complete	9	Position Brkpt
2	Motor Off	10	Home Found
3	Following Error	11	Index Found
4	Limit Switch	12	High Speed Capture
5	Home Switch	13	Reverse Direction
6	SW Limit Switch	14	Blend Complete
	Reserved	15	Move Complete

X Axis H/W Status

Bit		Bit	
0	Run/Stop	8	Velocity Threshold
1	Profile Complete	9	Position Brkpt
2	Motor Off	10	Home Found
3	Following Error	11	Index Found
4	Limit Switch	12	High Speed Capture
5	Home Switch	13	Reverse Direction
6	SW Limit Switch	14	Blend Complete
7	Reserved	15	Move Complete

LOAD Conf File
LOAD Conf LINE
MOVEMENT Completed

Line # X Position Z Position RZ-Theta RY-Phi
1 362.8 -554.7 0 0

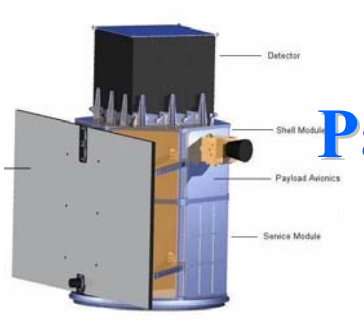
#	X	Z	RZ	RY
1	362.80	-554.70	0.00	0.00
2	268.20	-649.30	0.00	0.00
3	457.40	-649.30	0.00	0.00
4	457.40	-460.10	0.00	0.00
5	268.20	-460.10	0.00	0.00

KILL X
HALT X
STOP X
START X
STOP ALL
START ALL
Relative
Absolute
Target X Position (mm) 362.80
Current X Position(mm) 362.80
CONFIGURATION FILE
C:\MGSE\CONF\MGSE_Fronte_Piano_In_Asse.con.txt
0 100 200 300 400 500 600 700 800 900 1000 1100 1200 1300 1414

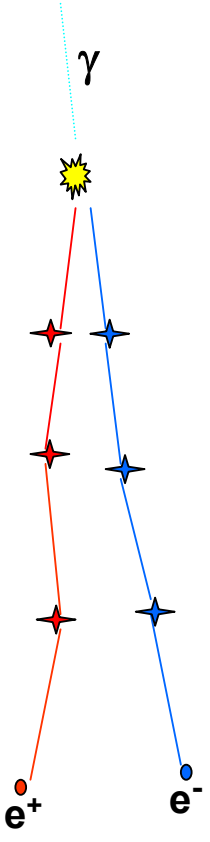
Current Z Position (mm) -554.70
0 -50 -100 -150 -200 -250 -300 -350 -400 -450 -500 -550 -600 -650 -700 -750 -800 -850 -899
Z Target Position (mm) -554.70
Relative
Absolute
START Z
KILL Z
HALT Z
STOP Z
Z Velocity 1500 1000 2000 500 2500 3000 0

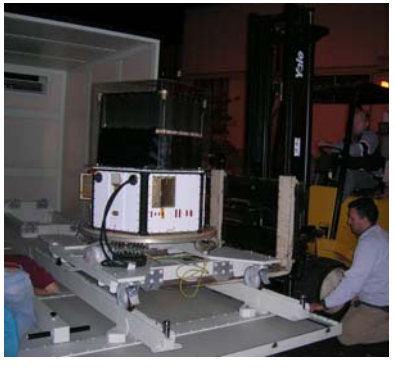
Calibration MGSE
Control Panel

X Velocity 1500 1000 2000 500 2500 3000 0

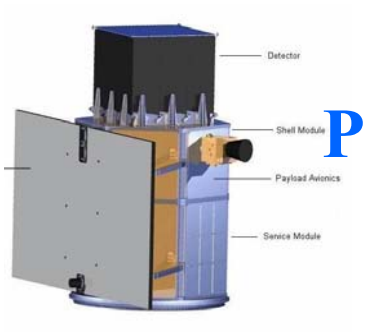


Payload installation at BTF: first day (2/11/2005)



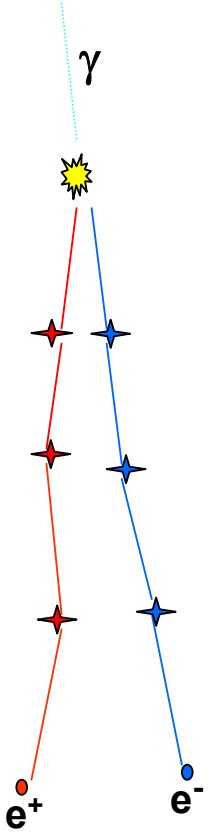


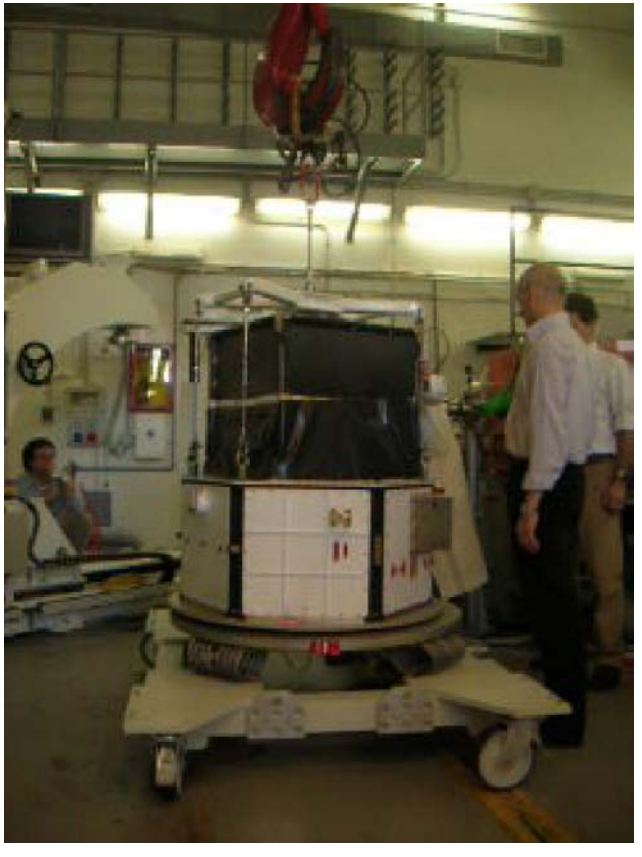
AGILE IPL on its transportation trolley is ready to be mounted on Calibration MGSE positioned in front of the Beam

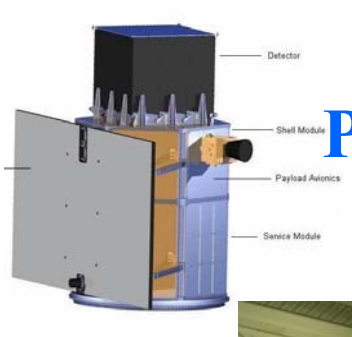


Payload installation at BTF: 2nd day (3/11/2005)

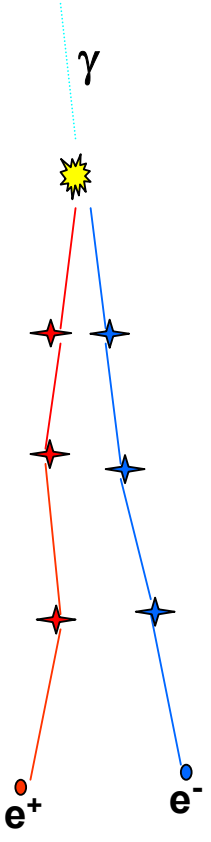
AGILE IPL is moved from its transportation trolley to the AIV MGSE (3/11/2005)

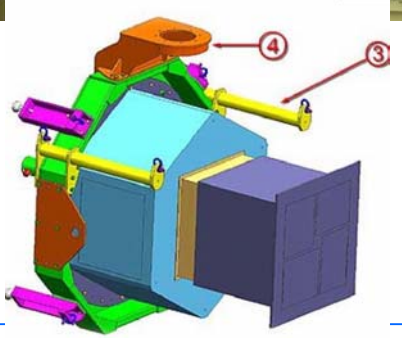


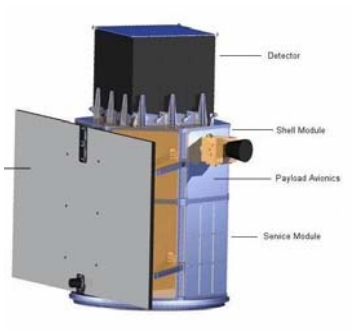




Payload installation at BTF: 2nd day (3/11/2005)

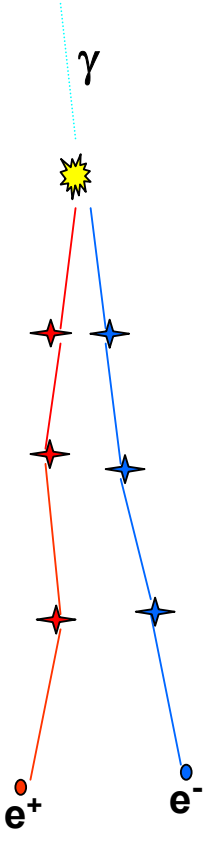


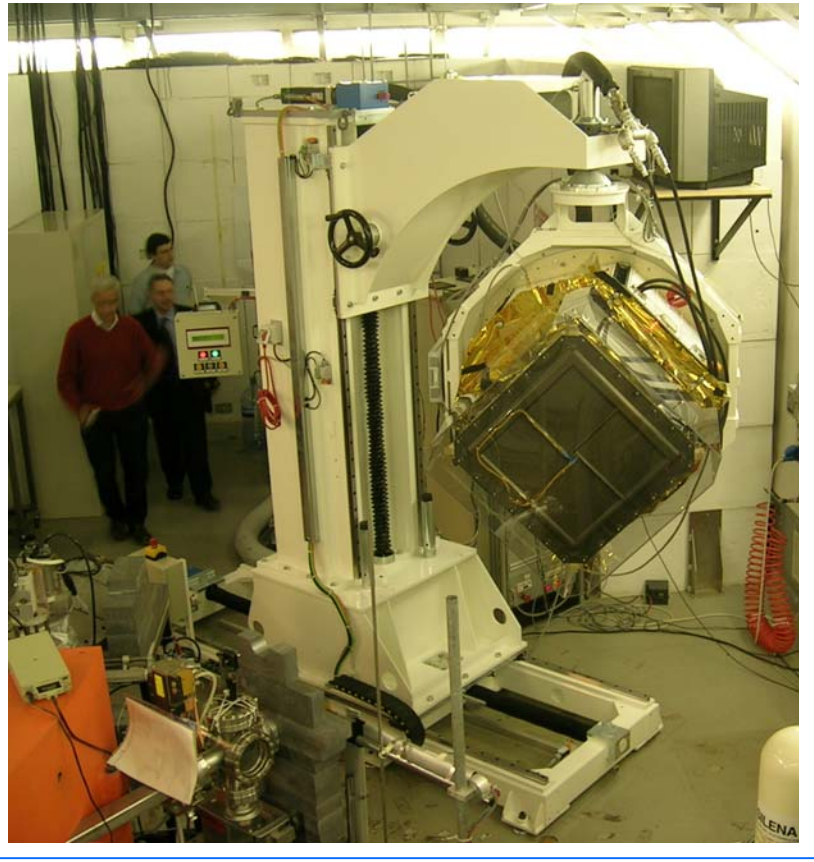


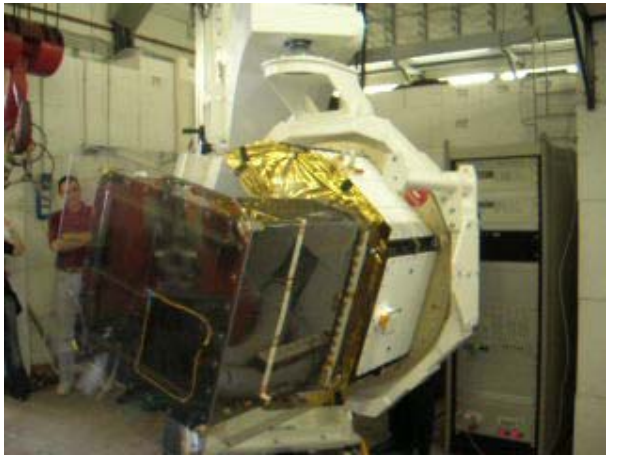


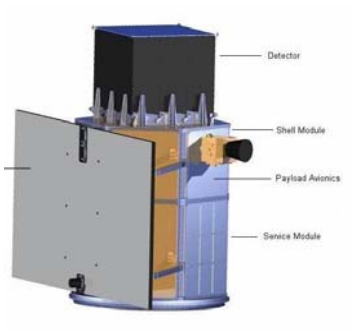
AGILE Mechanical setup at BTF

Final configuration with the AGILE IPL mounted on the MGSE and interfaced with the cooling and cleanliness system

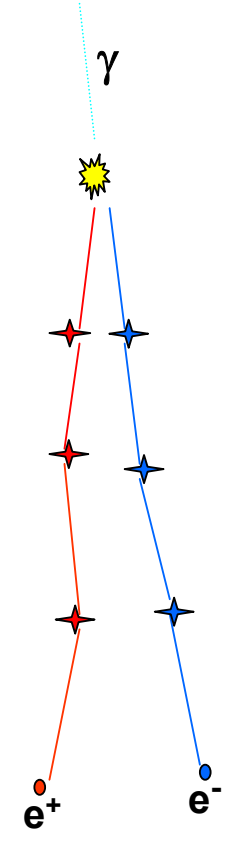




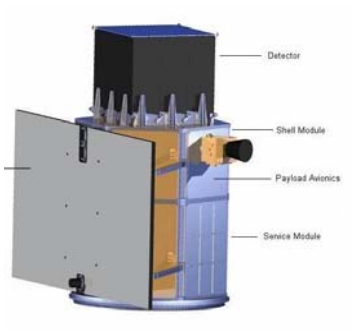




Requirements on the AGILE EGSE
(in red those specific for the BTF)



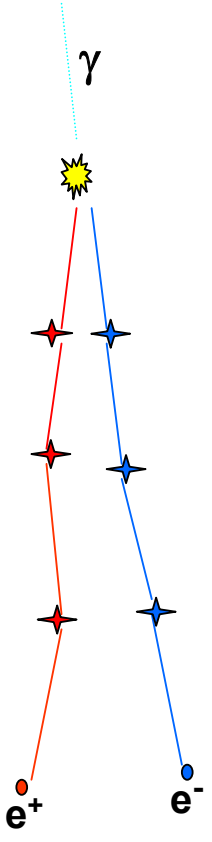
- OBT reconstruction for PTS time tagging
- Bus Simulation (Bus OBDH and power), IPL commanding and health monitoring
- On-line acquisition, archiving, processing and Quick Look of the IPL TM Scientific ratemeters and event data
- On-line PTS data analysis, monitoring and archiving of the Photo Tagging System data



AGILE EGSE items

OBT reconstruction for PTS time tagging

➔ VME Board (INFN)



us PPS

ST trigger → OBT PL

Beam trigger → Time tag BTF

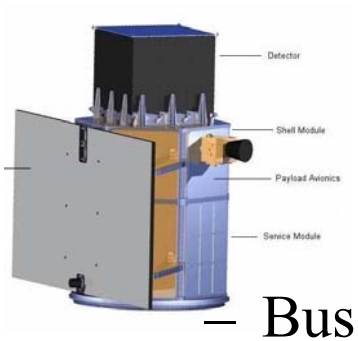
	OBT	Data
Event 1		
Event 2		
Event 3		
Event 4		
...		

	TT BTF	Energy
Event 1		
Event 2		
Event 3		
Event 4		
...		

S/W: Compare **OBT** with **TT BTF**

	Tagged OBT	Data	Energy
Event a			
Event b			
Event c			
Event d			
...			

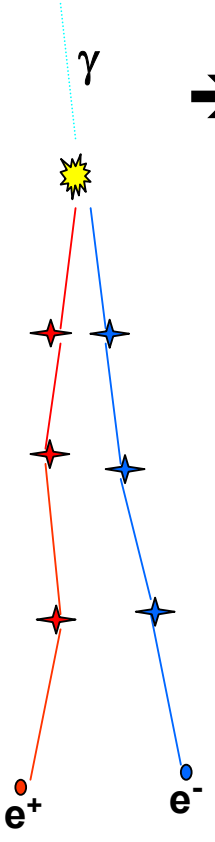
Only events that are tagged in both **PL** and **BTF** (OBT PL = TT BTF)

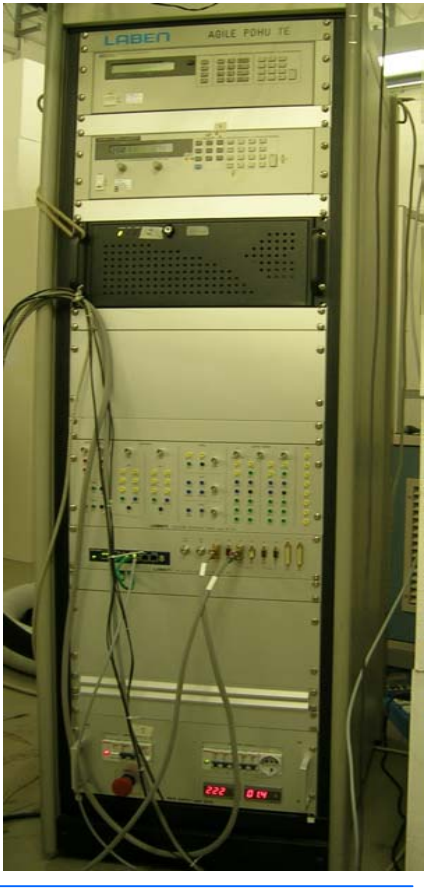


AGILE EGSE items

- Bus Simulation (Bus OBDH and power), IPL commanding and health monitoring

➔ **EGSE FEE + EGSE CCOE (Laben)**



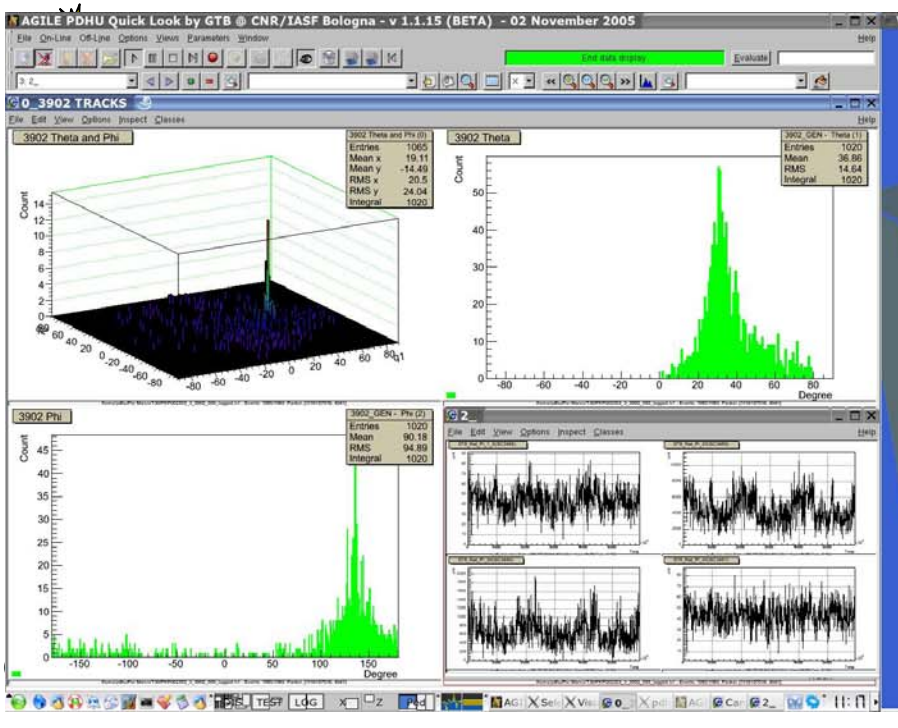


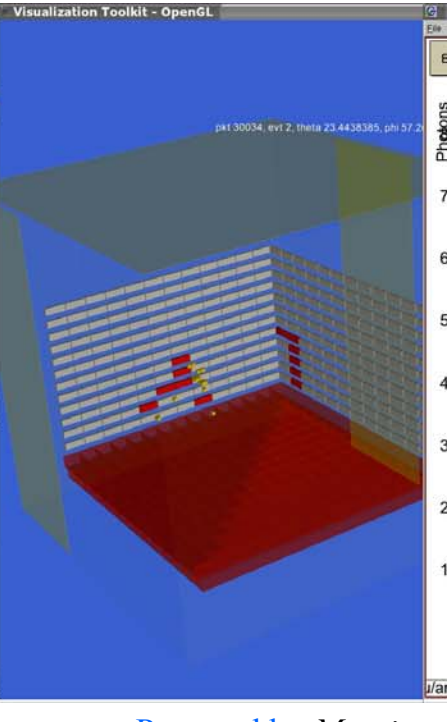
AGILE EGSE items

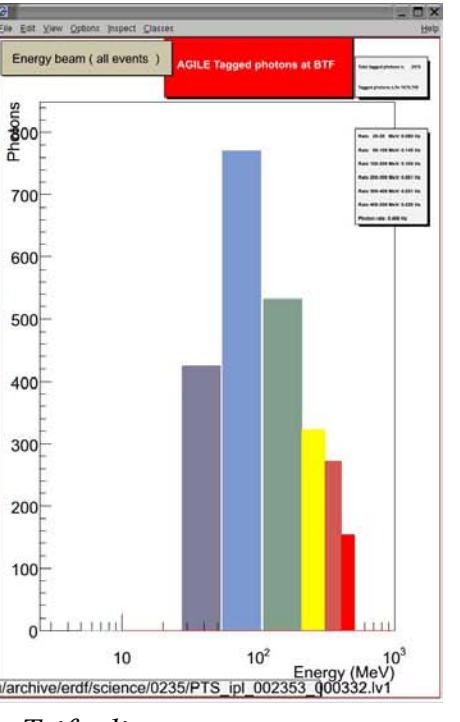
(in red those specific for the BTF)

- On-line acquisition, archiving, processing and Quick Look of the IPL TM Scientific ratemeters and event data ➔ **SC (IASF-Bo)**
- On-line PTS data analysis for photon energy reconstruction ➔sw from **Univ. Insubria-Como, INFN-Trieste** on SC
- Quick Look on energy histogram of PTS events ➔ **SC (IASF-Bo)**

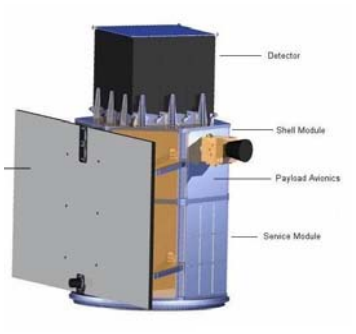
γ

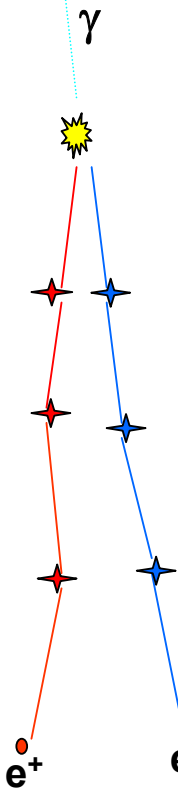






Science Console Architecture



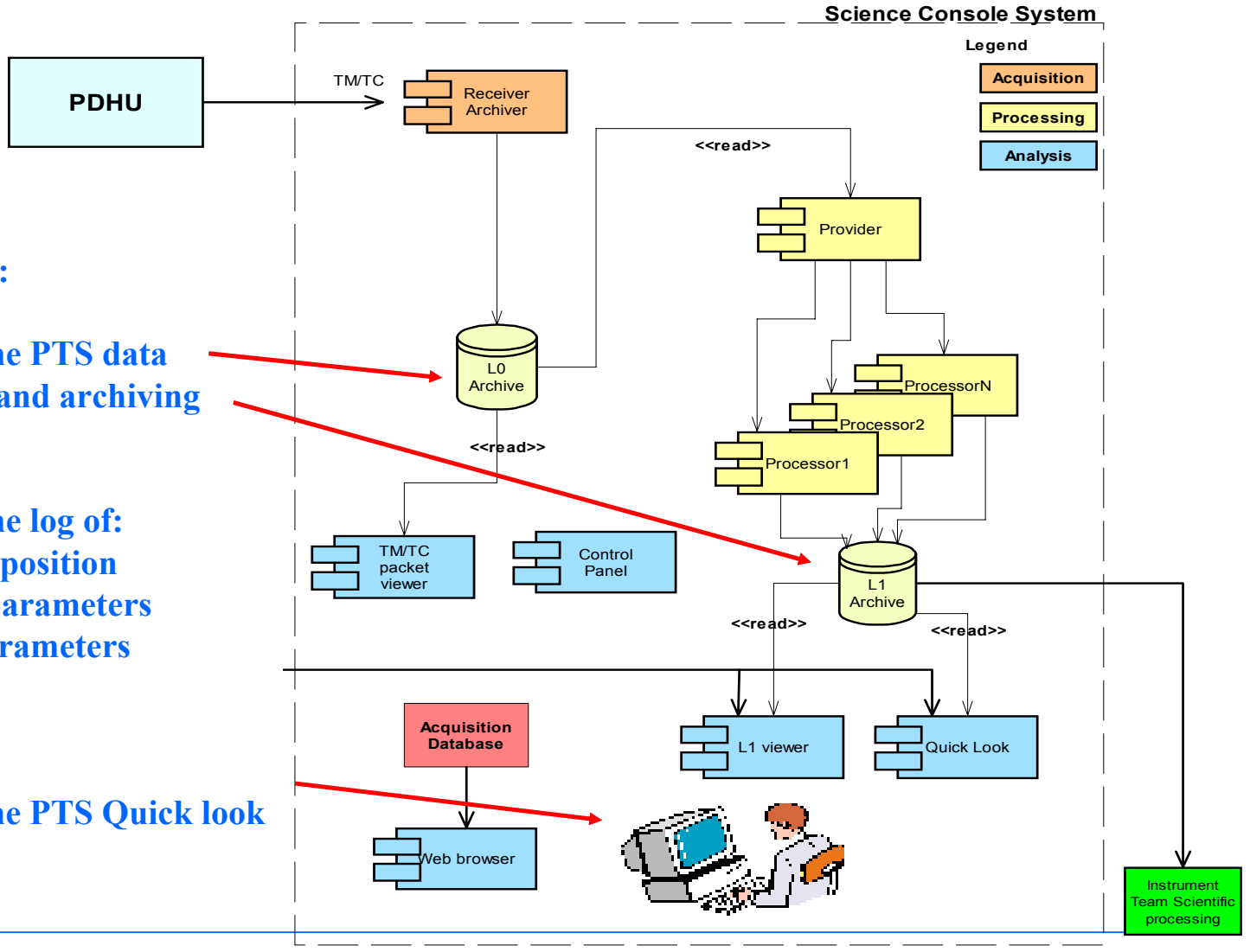


For BTF:

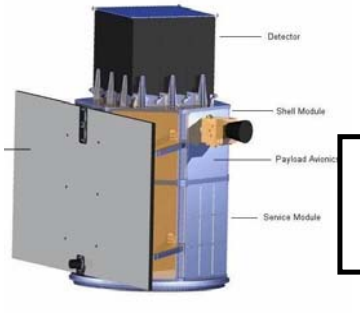
Added the PTS data analysis and archiving

Added the log of:
- **MGSE position**
- **Beam parameters**
- **PTS parameters**

Added the PTS Quick look



Overall setup at BTF



Laben IPL EGSE CCOE

EGSE LAN Switch

IPL Science Console PC

BTF LAN Switch

EGSE LAN Switch

Air Filter Unit

MGSE Remote Console

MGSE Computer and Local Console

MGSE Control Rack

Laben IPL EGSE FEE

Cooling System

PTS TE Console

PTS TE

OBT Reconstr.

BTF LAN Switch

MGSE Positioning Device

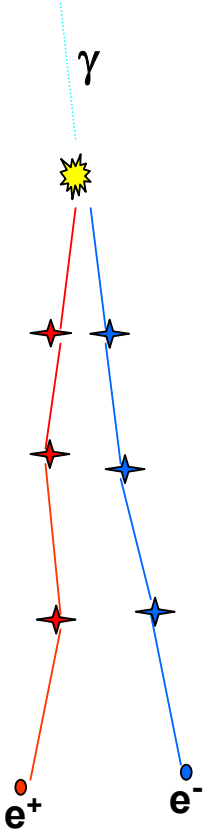
IPL

BTF Consoles

BTF Surveillance Monitors

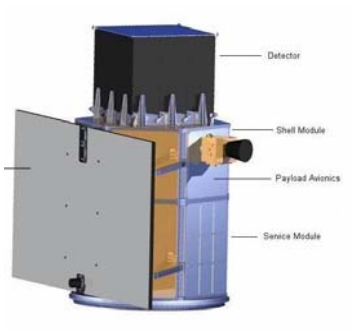
Tagging Detector

Beam

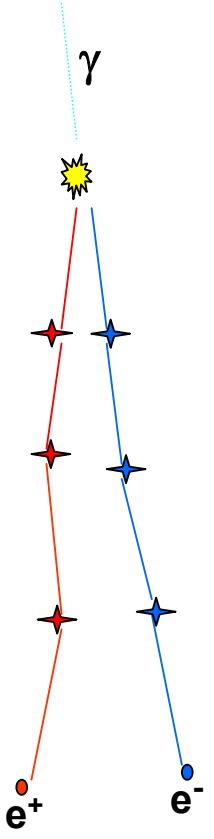


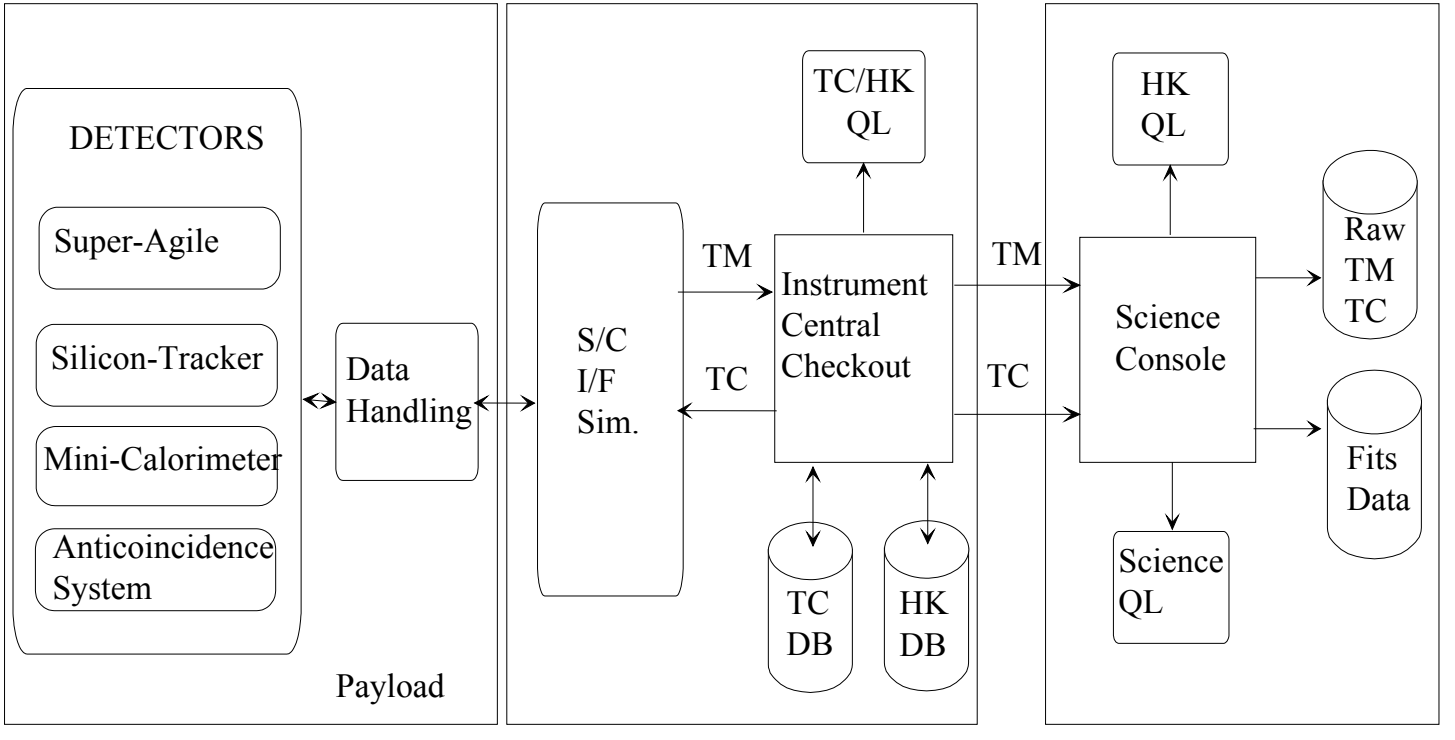
Control and User Area

Beam Area

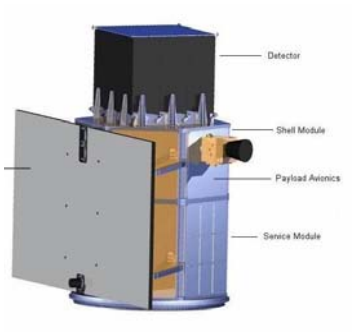


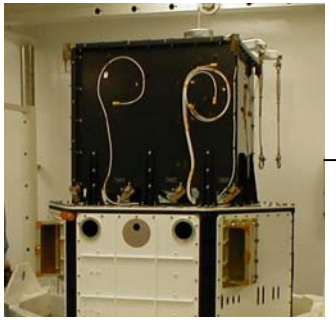
EGSE DataFlow:
IPL Commanding, control and data archiving

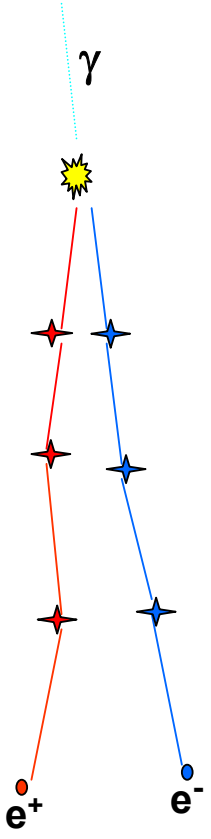




EGSE Data Flow: Science Console archiving







Science Console)

PTS DAQ

L0/L1/Log

Ncftp trasfer

Data Server (@IASF-Bo)

Data Base

L0/L1/Log

Archive Management System (AMS)

DVD