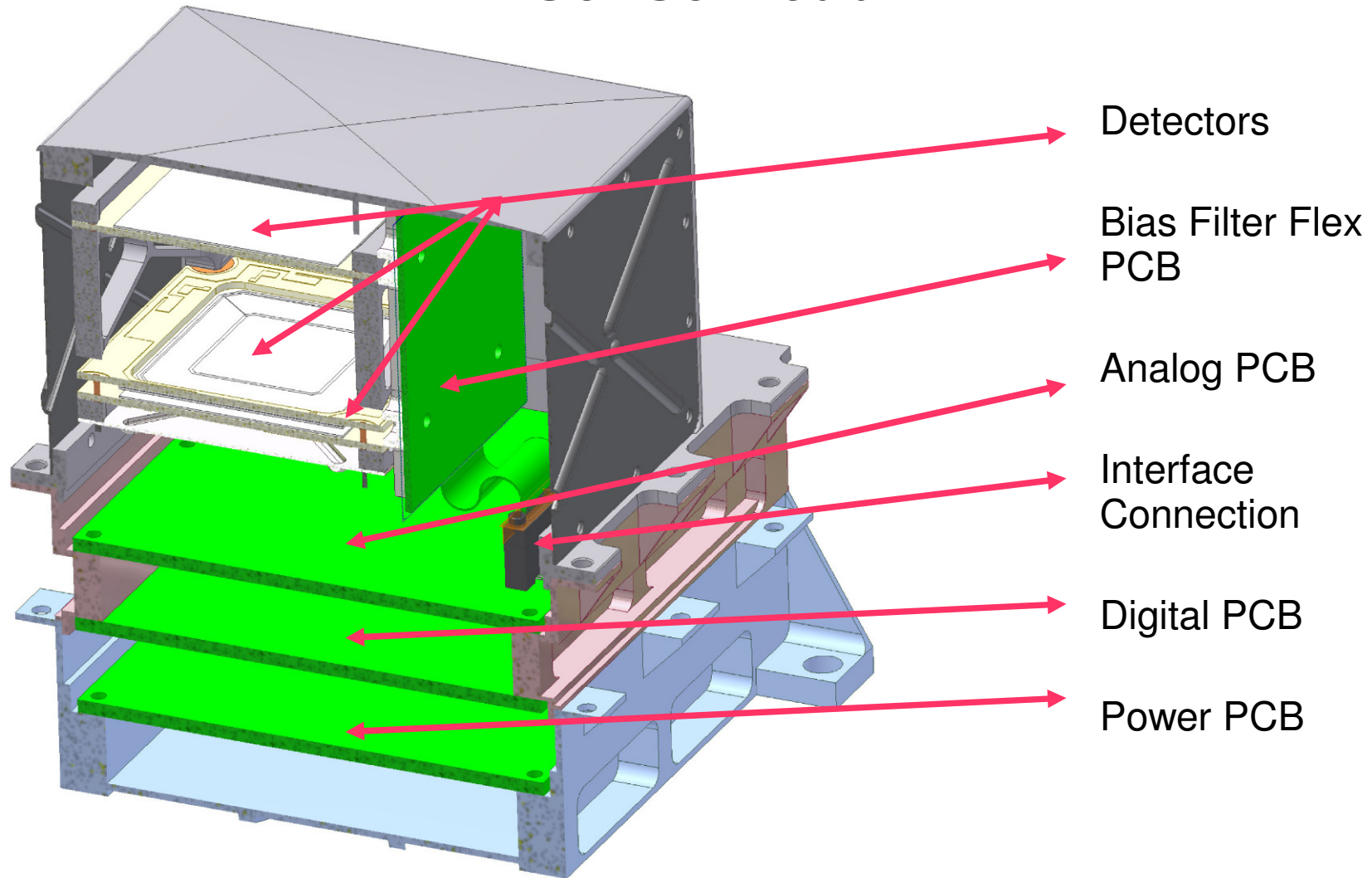# Exomars
Ionizing Radiation Sensor (IRAS)
PDR

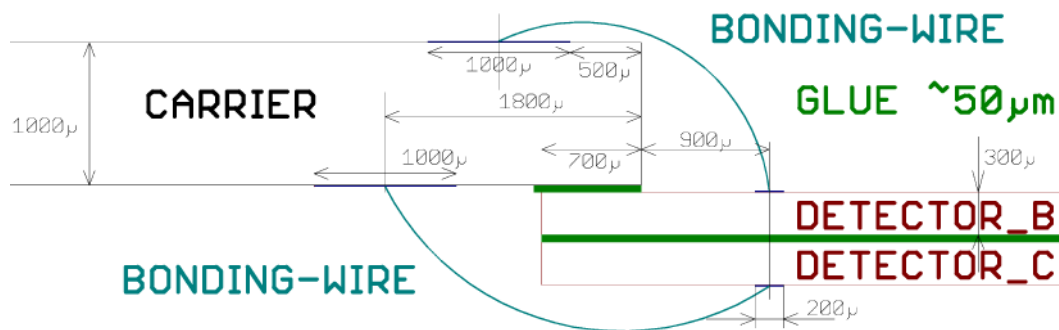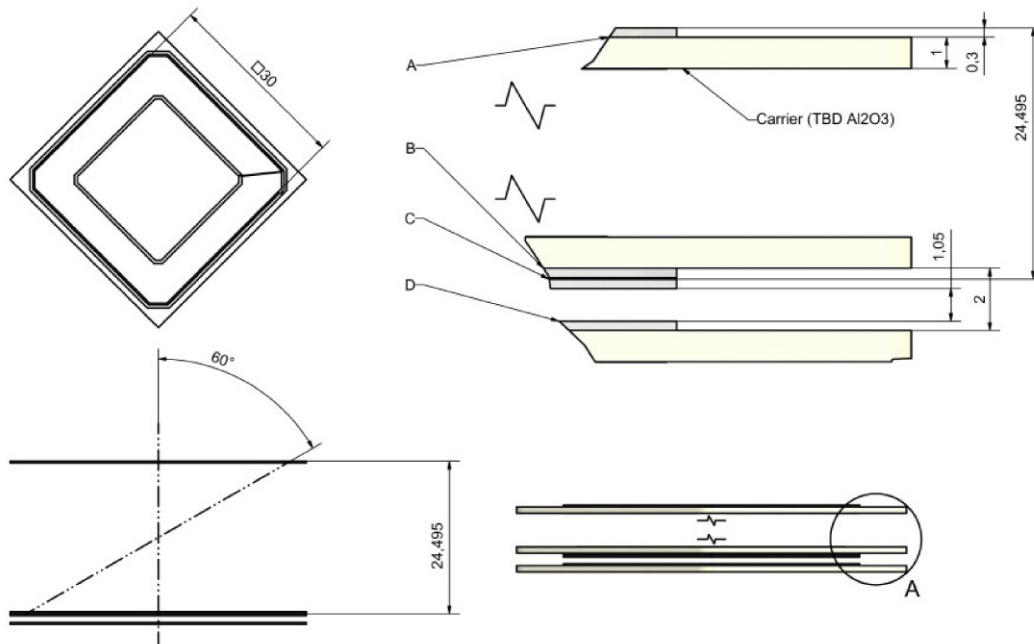## Electronic Interface and GSE Description

Author:

Bjoern Schuster
Electrical Engineer
IEAP – ET CAU-Kiel Germany

Sensorhead

Detectors

Bias Filter Flex PCB
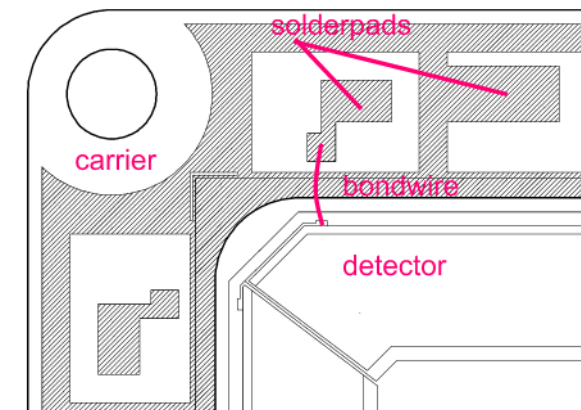
Analog PCB

Interface Connection
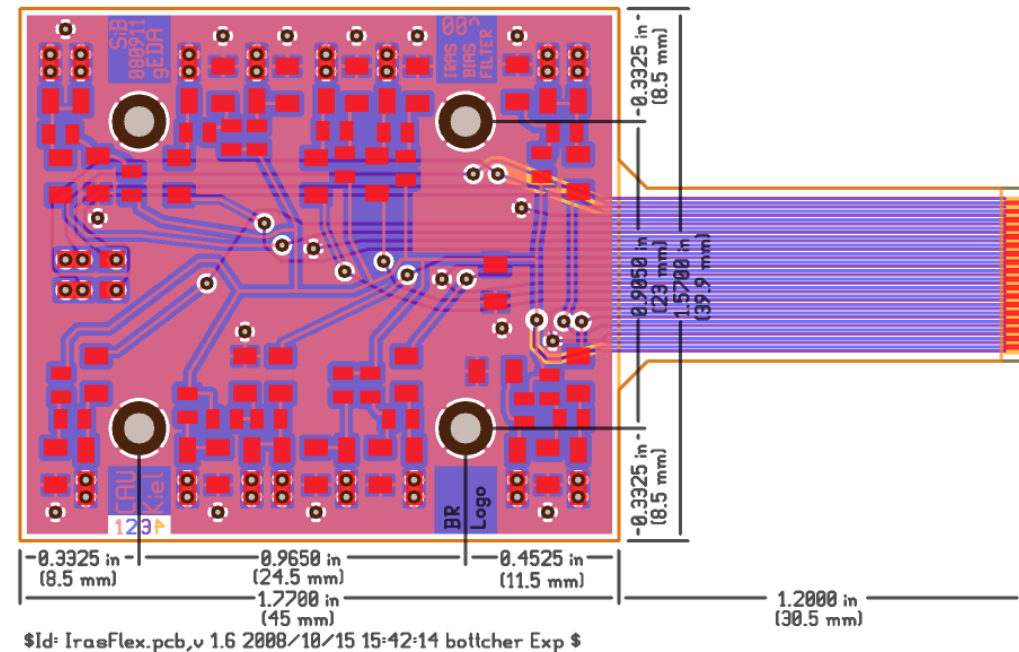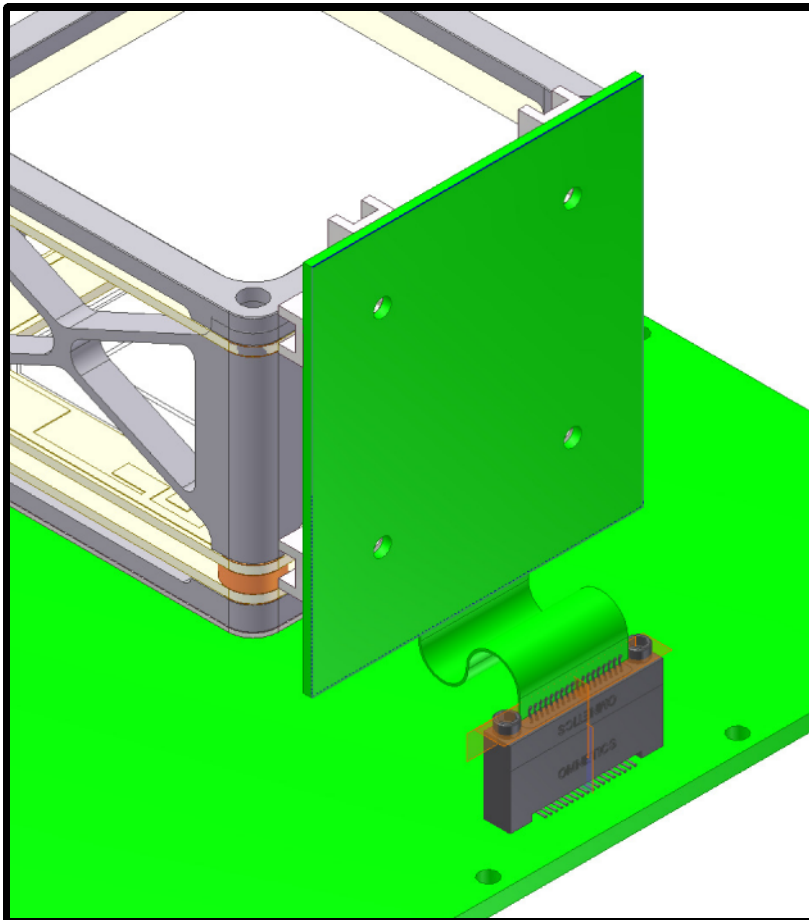
Digital PCB

Power PCB

Detectors

- A and D detector glued on a ceramic carrier
- B and C detector glued on the ohmic side to each other and to carrier
- Manufactured and bonded by CANBERRA
- Detector signals connect via coax cable from the carrier to the filter PCB

Carrier (TBD Al2O3)

BONDING-WIRE

GLUE ~50µm

CARRIER

BONDING-WIRE

DETECTOR_B
DETECTOR_C

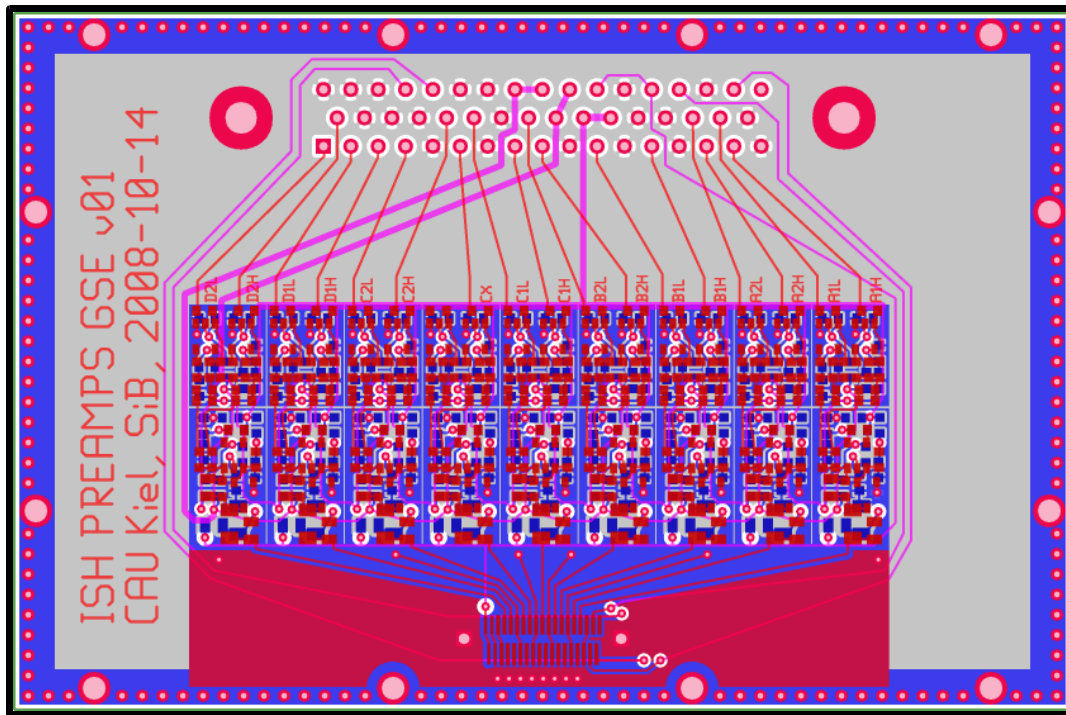solderpads

carrier

bondwire

detector

Bias Filter Flex PCB

- Coax cable from detector to PCB
- Interface connection with Bi-Lobe connector from OMNETICS on flex PCB to analog PCB
- PCB build by Brockstedt, MIL-PRF-31032 certified boardhouse in Kiel

GSE - Analog IRAS preamp PCB

Connection to DIRENA GSE via 50 Pin Sub-D

- PCB with preamps and shapers
- nine detector channels required only
- IRAS preamp PCB has the same form factor and hole pattern as the subsequent analog PCB
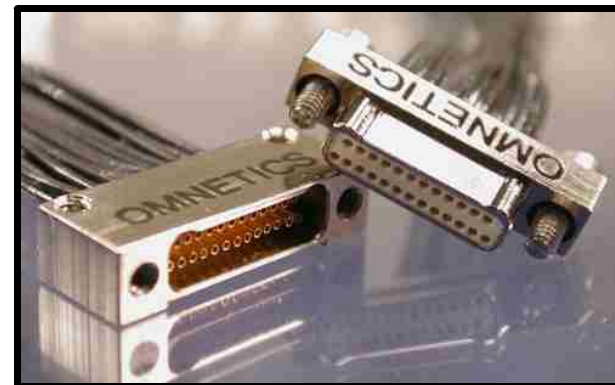
Connection to bias filter flex board via Bi-Lobe Connector from OMNETICS

GSE BOX - Analog IRAS preamp PCB with MSL detectors

Connection to DIRENA GSE

MSL detectors

Bias Filter Flex PCB

GSE analog IRAS preamp PCB

Interface connector by OMNETICS
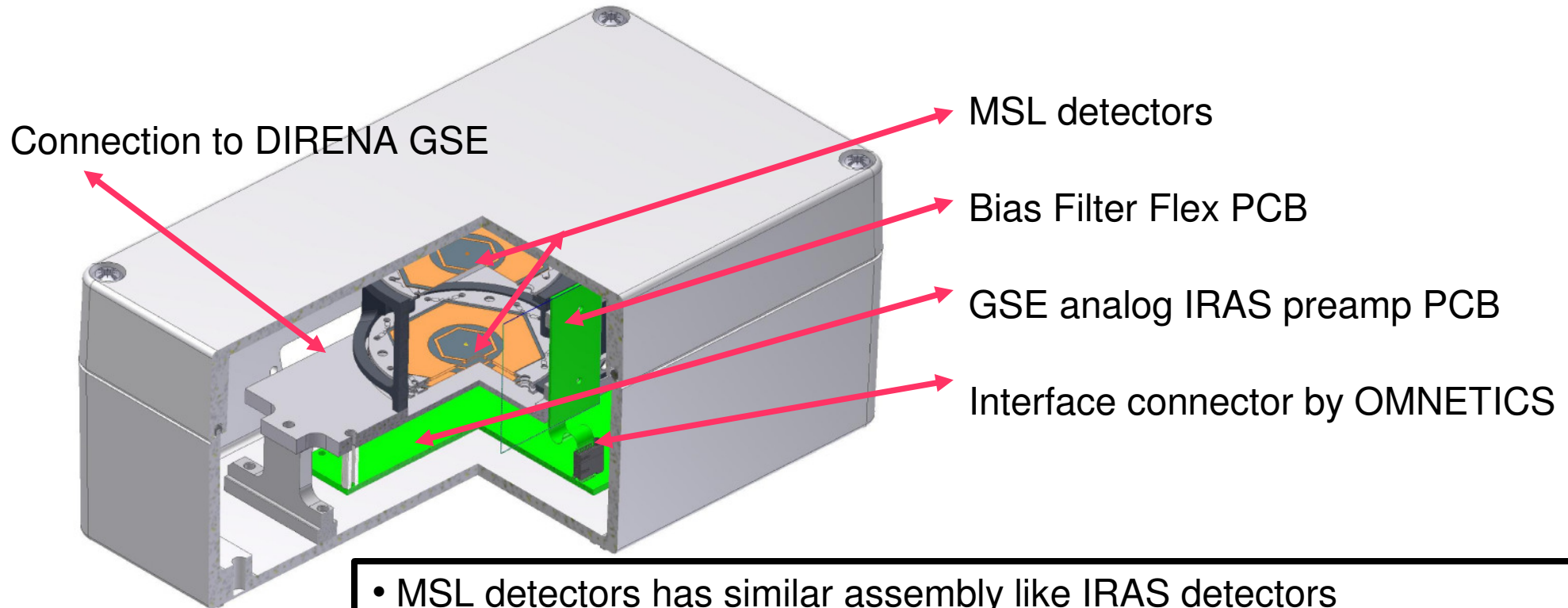
- MSL detectors has similar assembly like IRAS detectors
- GSE BOX ready-made Q4/2008
- Optimal condition to test AMDL's analog PCB with IRAS like detectors at interface connector
- Allows VHDL software development with real detector signal, while manufacturing of IRAS detectors is still in process

DIRENA GSE
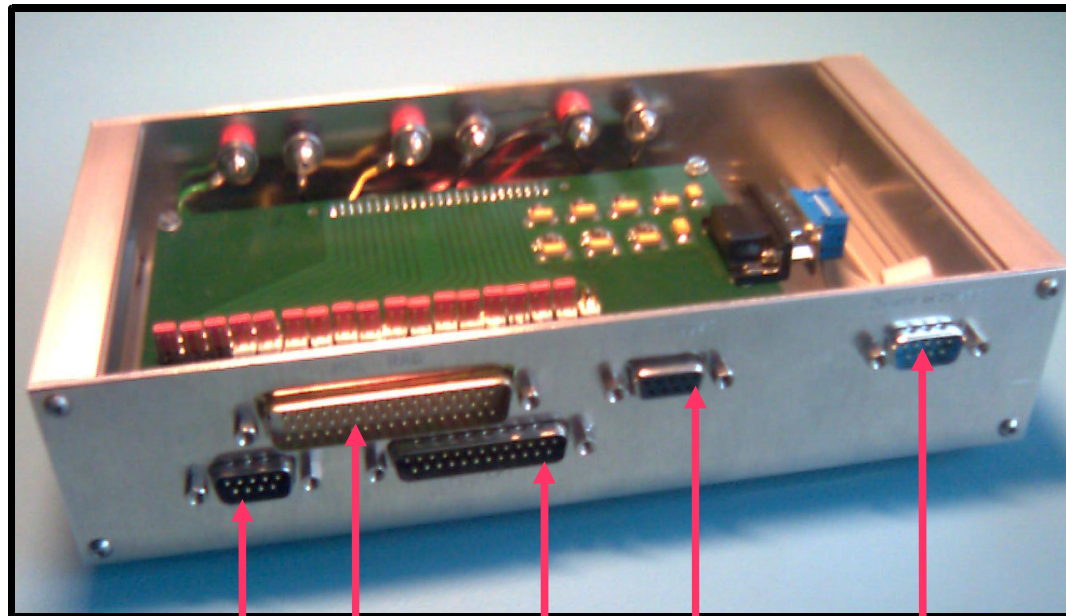
- Up to 18 analog input channels
- External Trigger input
- Adjustable gain preamplifier
- Serial 12 bit ADCs and FPGA
- electrically isolated data connection to PC
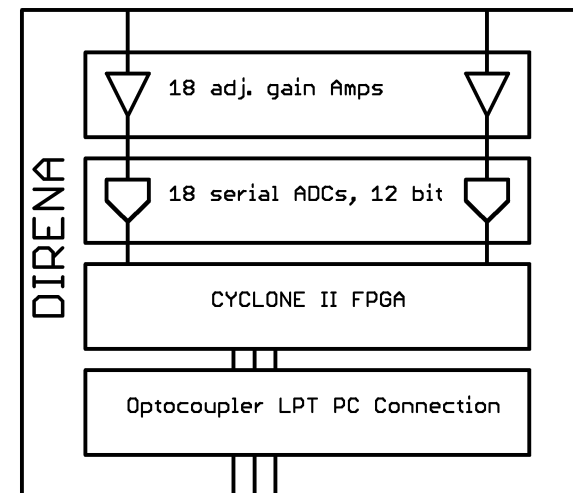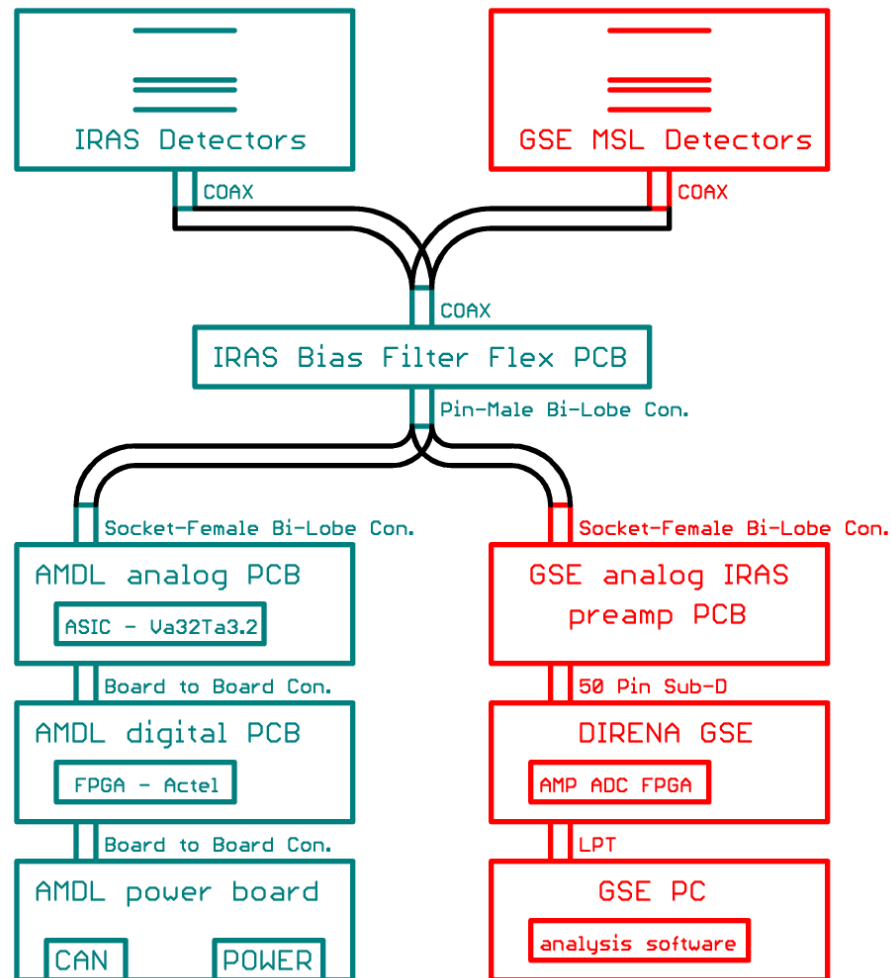- Successful, approved use as GSE in MSL project

Power In
ADC, FPGA

Power in
preamps

18 adjustable inputs

Ext. trigger

Isolated PC connection

DIRENA

18 adj. gain Amps

18 serial ADCs, 12 bit

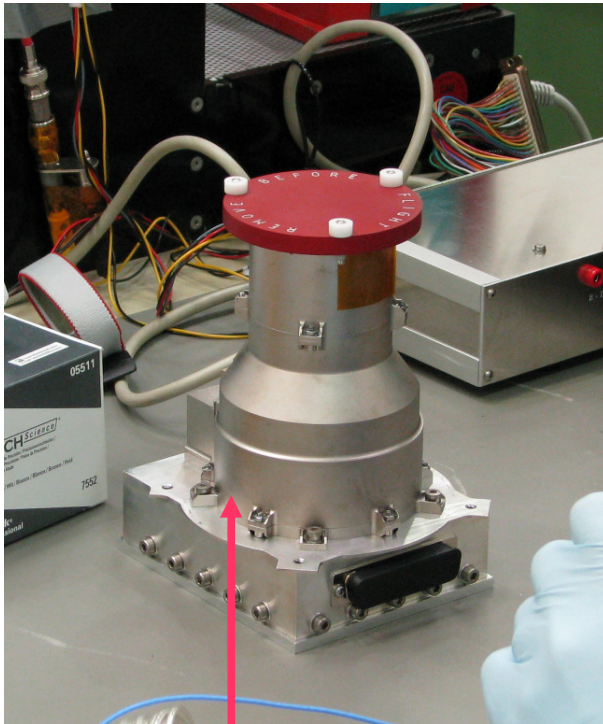CYCLONE II FPGA

Optocoupler LPT PC Connection

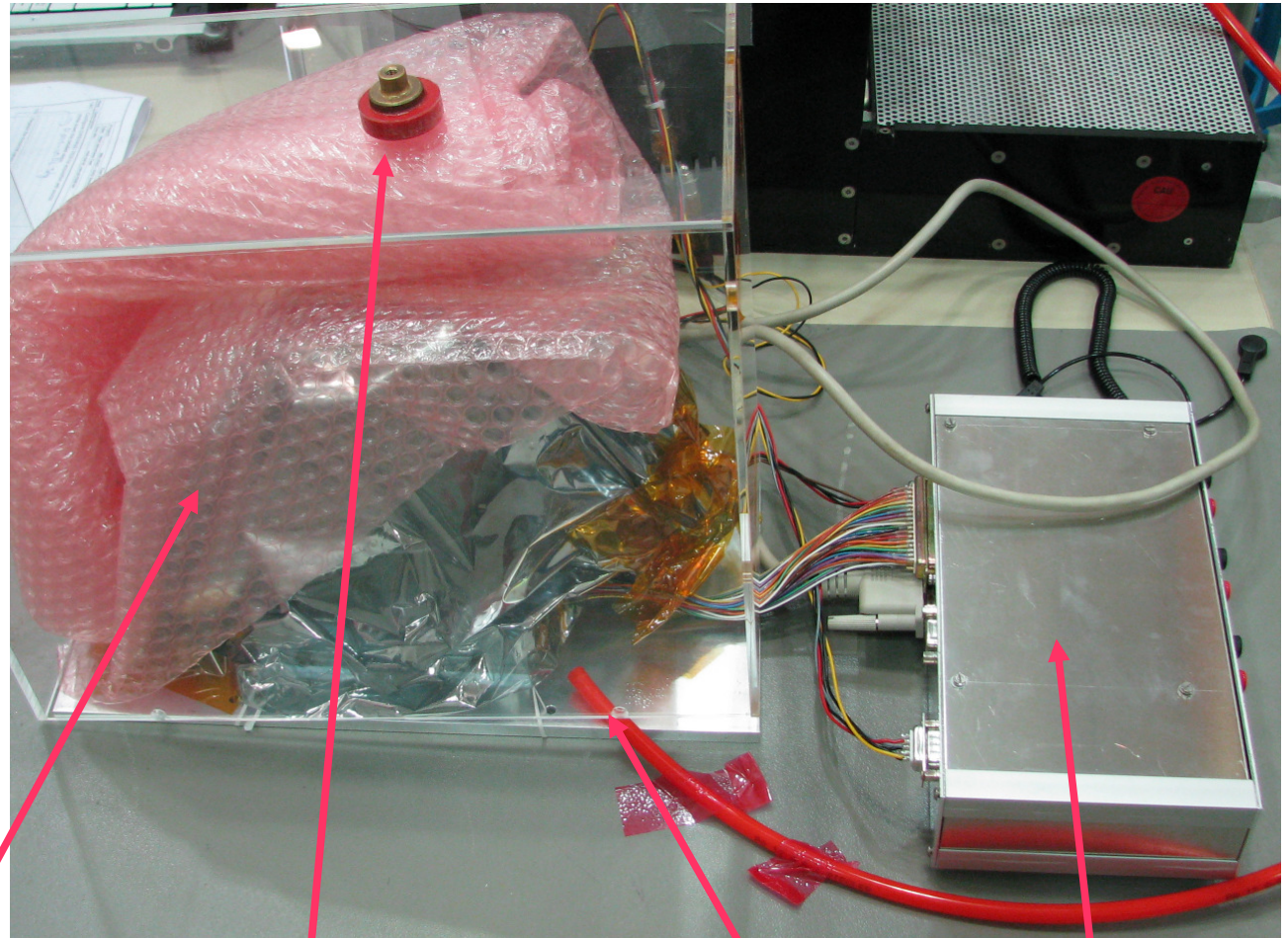# Block Diagram Electronic Connection and GSE

Optimal condition to test the detectors in his housing and flight EM

GSE DIRENA in action with MSL/RAD

RAD Flightmodel + under antistatic foil   Ionizing Source   Nitrogen purge   Direna