

# EIRSAT-1

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2019 PhD Supervisor: Assoc. Prof Sheila McBreen

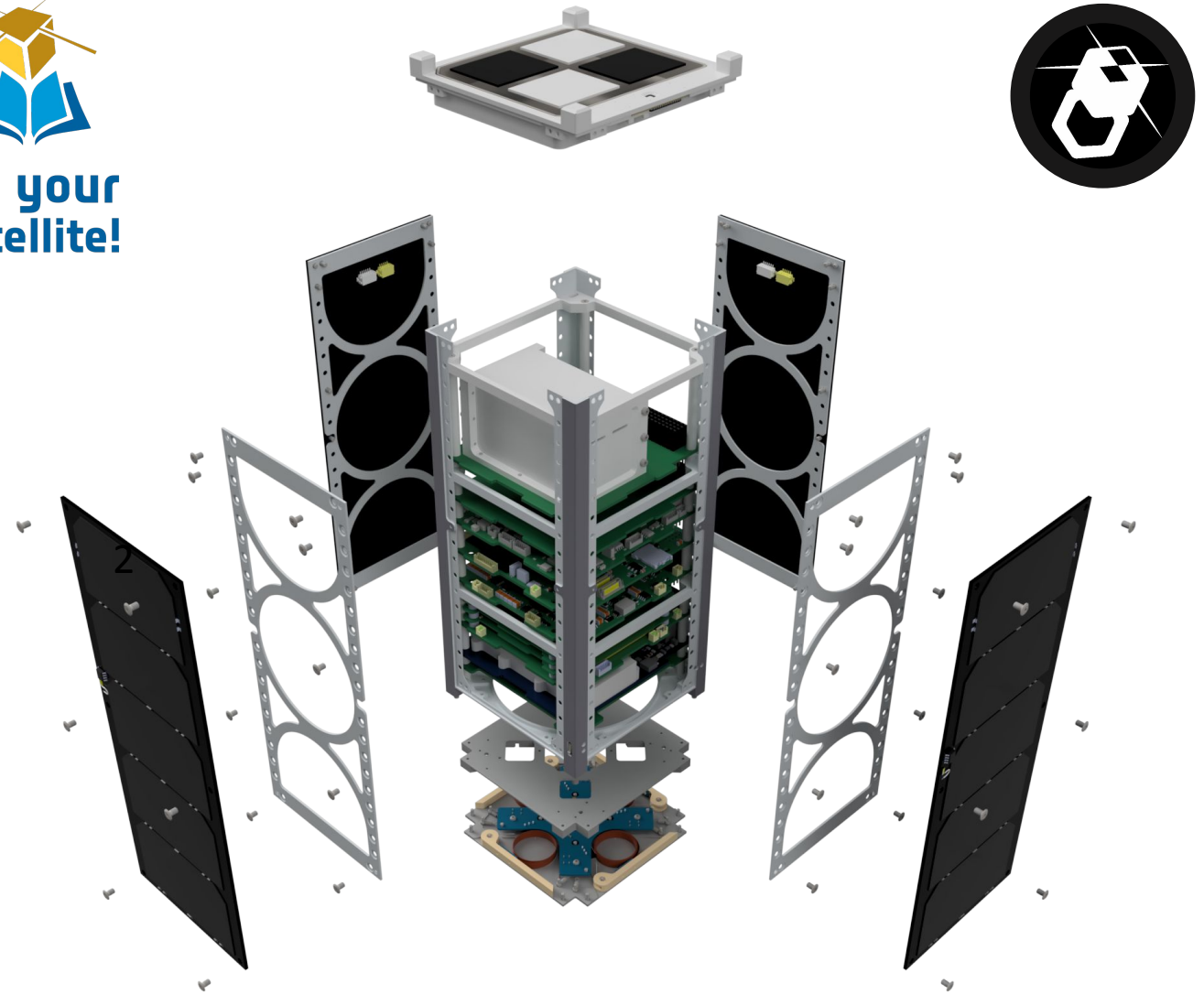
Current MSc Student in UCD

Starting PhD in gamma-ray astronomy in UCD, Sept 2019

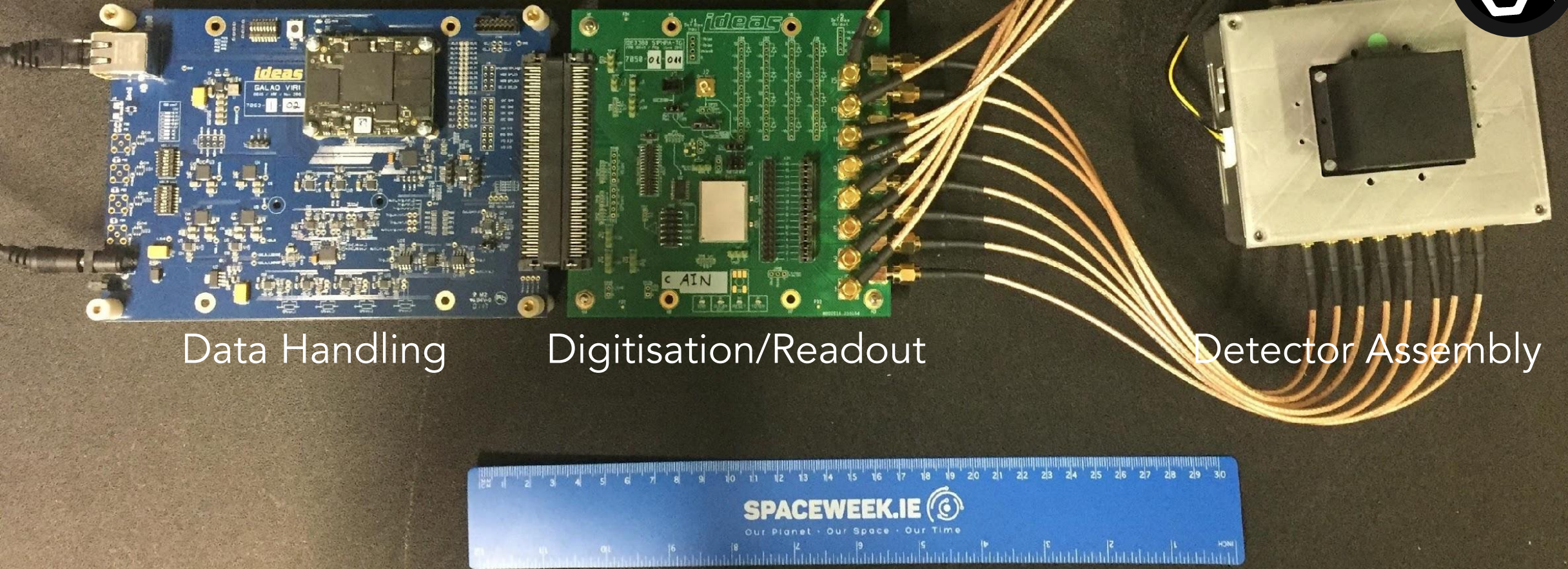


# EIRSAT-1

- 2U Cubesat – 10cm x 10cm x 20cm
- We have 3 experiments – each incorporating **Irish** technologies
- **GMOD** – a gamma-ray detector based on design developed at UCD under contract to ESA
- **EMOD** – to provide in-orbit testing of Irish company ENBIO's SolarBlack and SolarWhite thermal coatings
- **WBC** – Wave Based Control is an attitude control algorithm developed at UCD



# Existing Detector



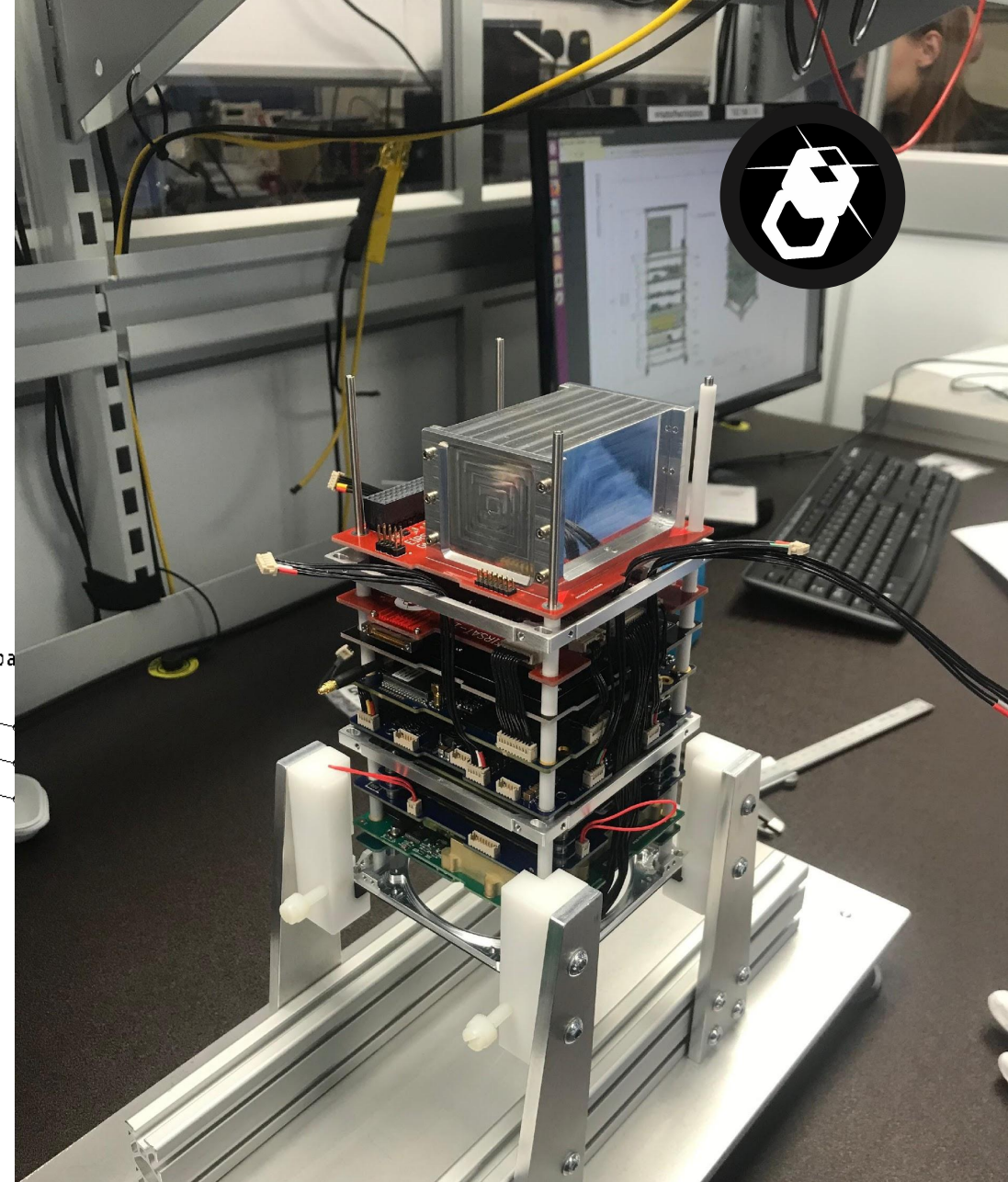
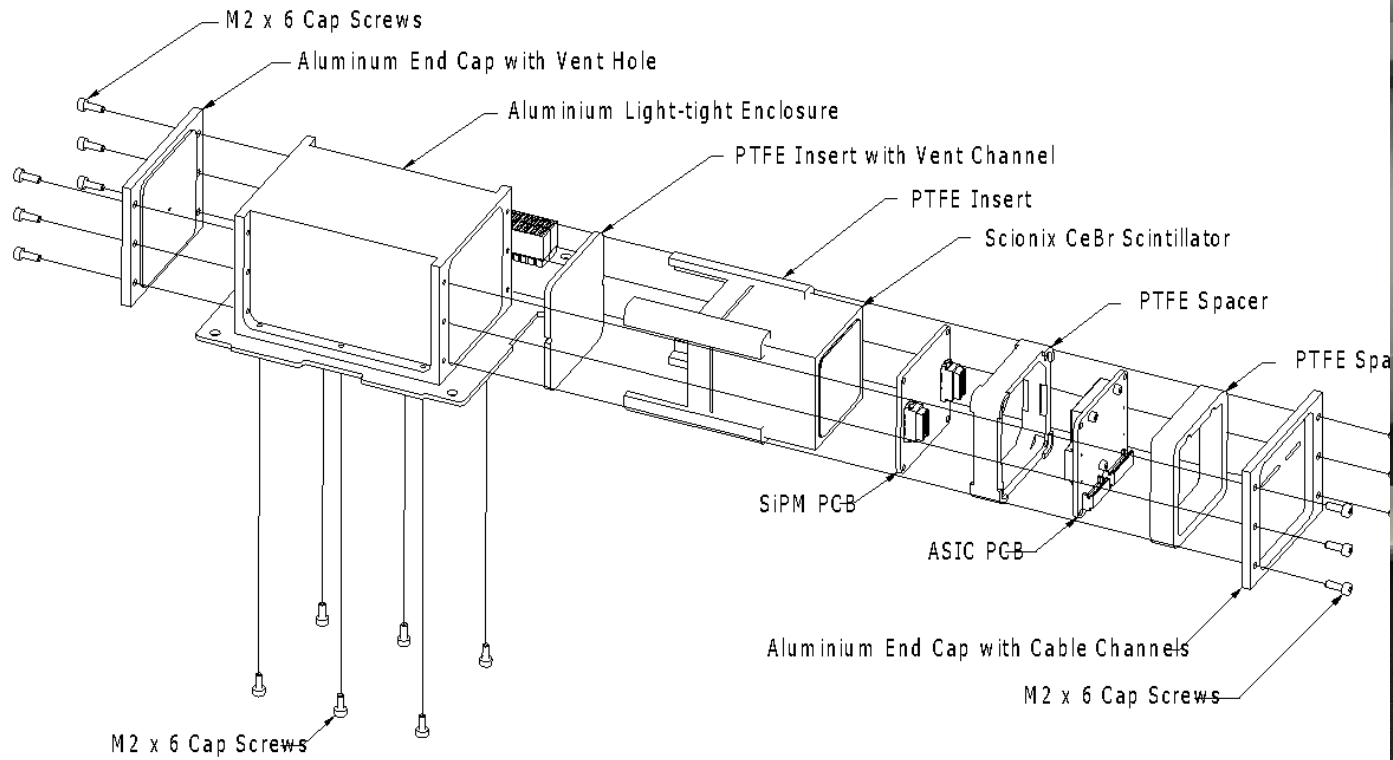
Data Handling

Digitisation/Readout

Detector Assembly

- Develop an improved, compact, space flight ready version of this detector and fly detector on EIRSAT-1 CubeSat

# GMOD Physical Design



# Thank you!



## Questions?

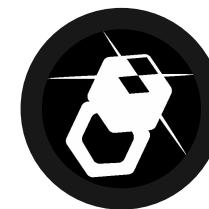
@EIRSAT1  
eirsat1.ie



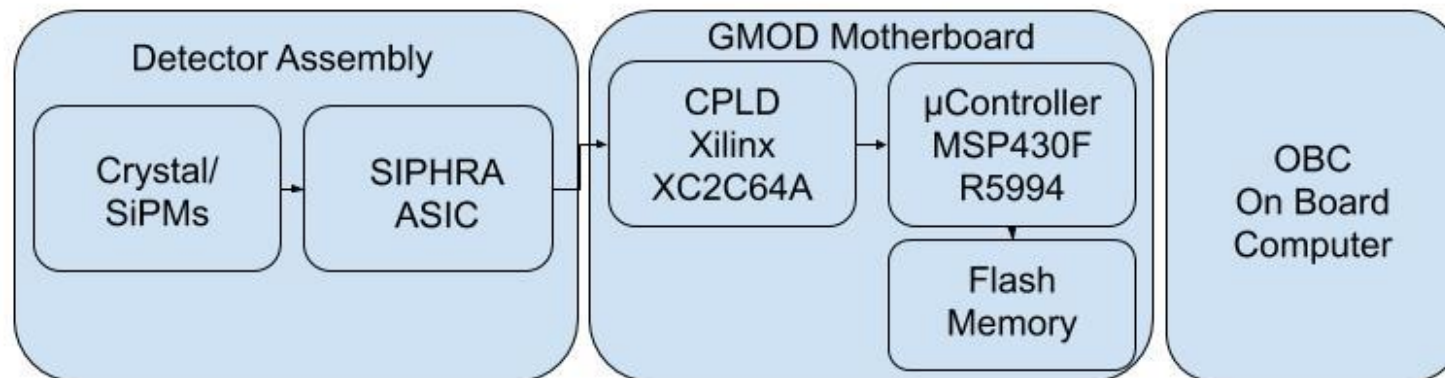
**fly your  
satellite!**

# Back Up

# GMOD Software Overview



- Data flow after an event detected
  - Gamma-ray triggers SIPHRA readout
  - SIPHRA reads out channels (temp, sum ch, ch1..ch16)
  - CPLD reformats this into a processed packet > sends to MSP
  - MSP applies timestamp for TTEs (sum channel TTE and 16 channel TTE)
  - MSP stores TTEs in flash memory pages (256Bytes - 20/6 event TTEs)
  - OBC polls MSP for TTEs, MSP serves OBC TTEs via I2C



# GMOD Component Procurement Status



Item	Design Status	Build Status	Comments
Motherboard	DM2	1× Complete	Currently installed in EIRSAT-1 EQM
CeBr Crystal	N/A	1× In Stock	
SiPM PCB			Flight Quality PCBs manufactured from Litho Circuits, currently with Realtime for population
SiPMs	N/A	16× with Realtime	No conformal coating to be used
Optical Interface	N/A	In Stock	Eljen EJ-560
Detector Housing		2× Complete	2× Housings and all mechanical components complete
SIPHRA PCB	Final Version Complete		Need to finish design modifications for BGA socket
BGA Socket	N/A	1× In Stock	Yamaichi BGA Socket
SIPHRA	N/A		Have been offered 2 BGA chips from IDEAS