

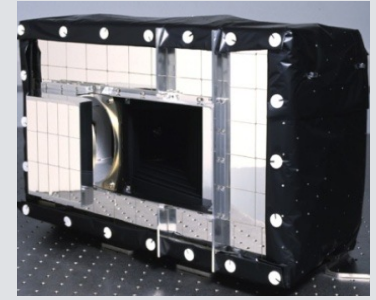
Geostationary Earth Radiation Budget

GERB Project Status

Helen Brindley (GERB PI)

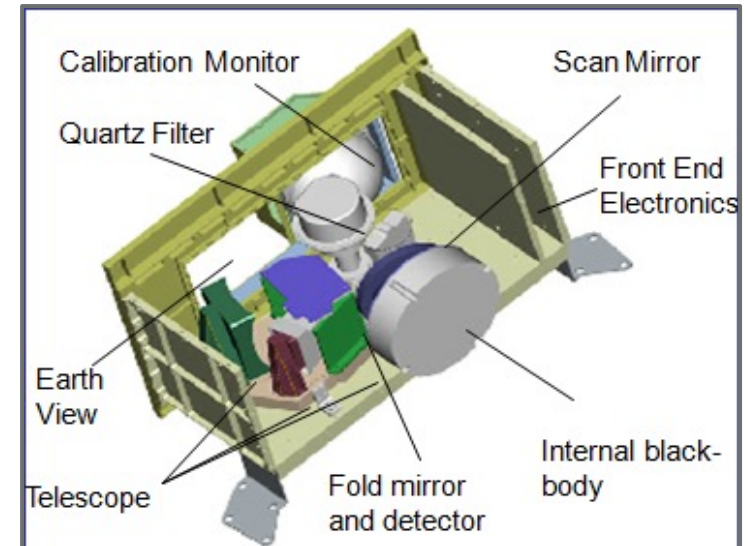
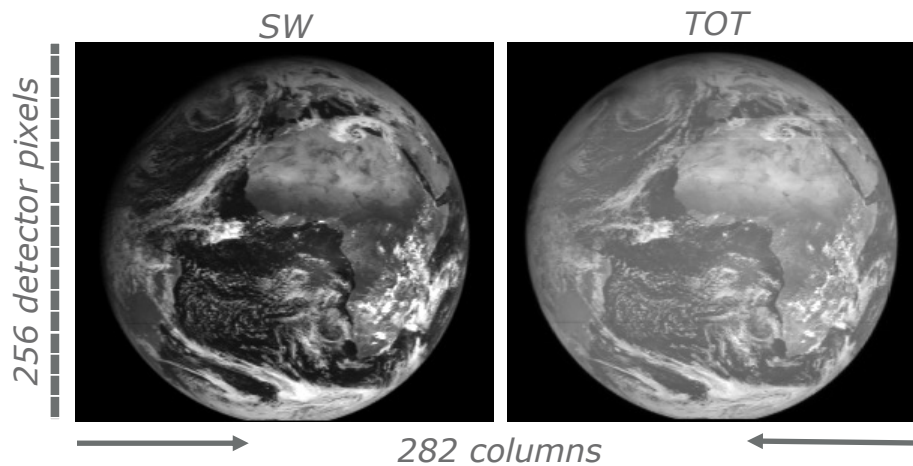
Jacqui Russell (GERB project scientist)

GERB Instrument / Operation



Mounted on the geostationary METEOSAT SECOND GENERATION satellites, spinning at 100rpm, with a counter rotating mirror used to 'despin' a column of the Earth view to obtain a 40ms observation every 0.6 second

Two broad band channels share the same optics and detector. TOTAL channel and with the addition of a quartz filter in the path SW. LW obtained by subtraction



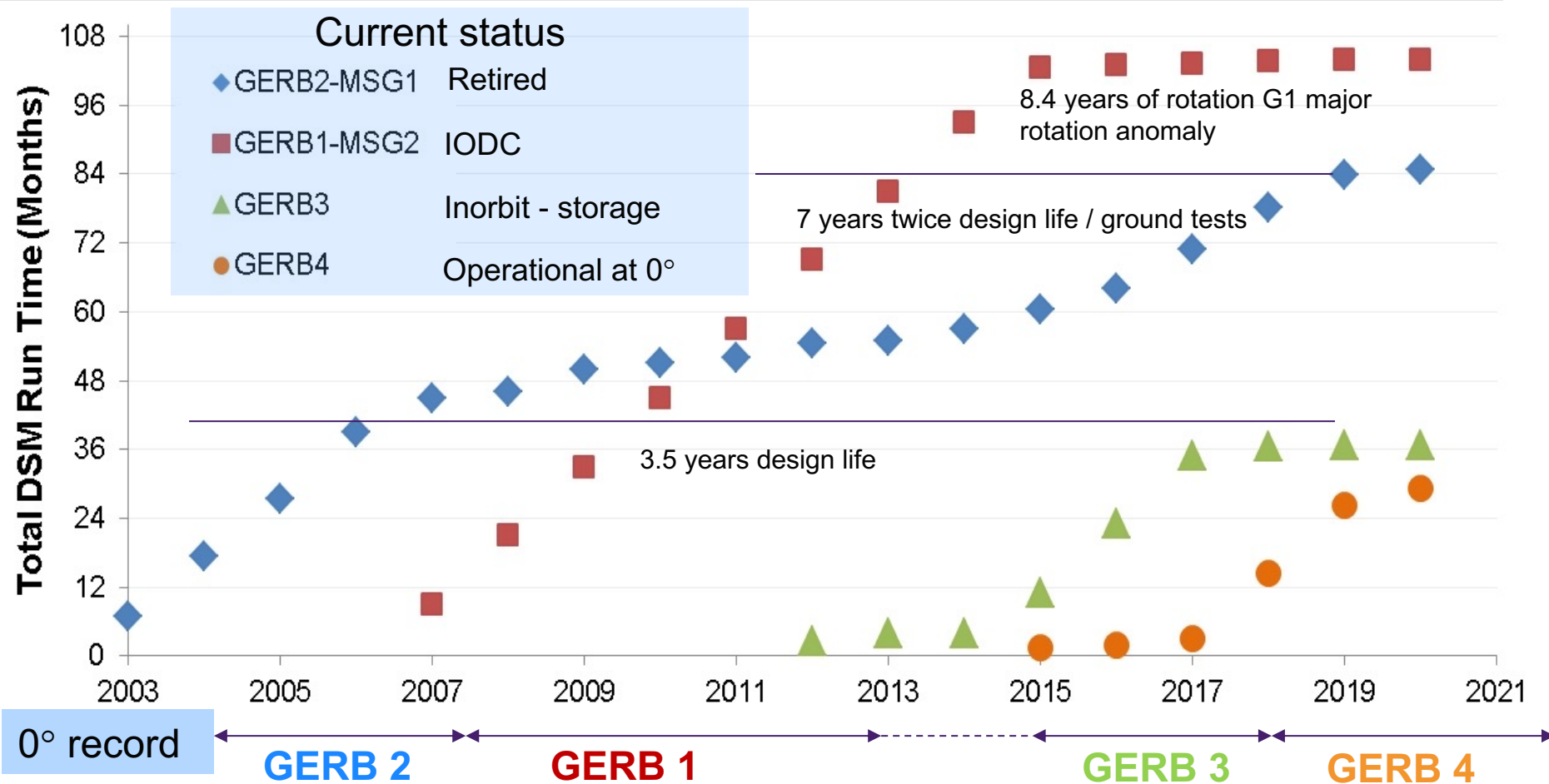
| Waveband | Spectral range | Absolute accuracy |
|----------------------------------|---|-------------------|
| Shortwave | 0.32 μm to 4.0 μm | <2.25 % |
| Longwave (by subtraction TOT-SW) | 4.0 μm to >100 μm | <1.0 % |

In ~3 minutes 282 columns of 256 pixel each, make up one Earth scan and black body and space views for calibration.

Native spatial resolution 50 x 50 km (at nadir, rectified grid)

GERB instrument status and life

Met-8 (G2) end of service in June 2022
 Met-9 (G1) relocation to IODC in May 2022.
 Current GERB support contract ends in Feb 2024, possible extension for 2 years for MTG overlap or longer (2030) in a reduced capacity.





GERB instrument and data status

- **Met-8 (G2) Prime 2004-2007**
 - » Edition 1 record 15' resolution record on CEDA,
 - » Obs4MIPS monthly diurnal product in production
- **IODC 2017-2022**
 - » requires processing updates for science production)
- **end of service in June 2022**
- **Met-9 (G1) Prime 2007-2012**
 - » Edition 1 15' resolution record on CEDA,
 - » V1 Obs4MIPS monthly diurnal product on CEDA
 - » V2 Obs4MIPS filled monthly diurnal product ready for release
- **IODC 2022-**
- **Met-10 (G3) Prime 2012-2018**
 - » Instrument failure 2013-2015
 - » Requires processing updates in progress to process post 2015 to science quality
- **Met-11 (G4) Prime 2018-2022**
 - » Currently in full reprocessing

Primary GERB products are 'instantaneous' fluxes for GEO region at 15 minute time resolution (60 N-60 S, 60E to 60W)

Monthly diurnal average products now also provided for GERB 1 and 2 in Obs4MIPS format

Current 2 instrument cost funding split:
 1.35 FTE RAL (29% of funds); 2 FTE IC (30% funds); 2 FTE RMIB (41% funds)
 Need to realize significant cost reduction for future funding beyond Feb 2024

GERB project future

Current GERB funding contract ends Feb 2024

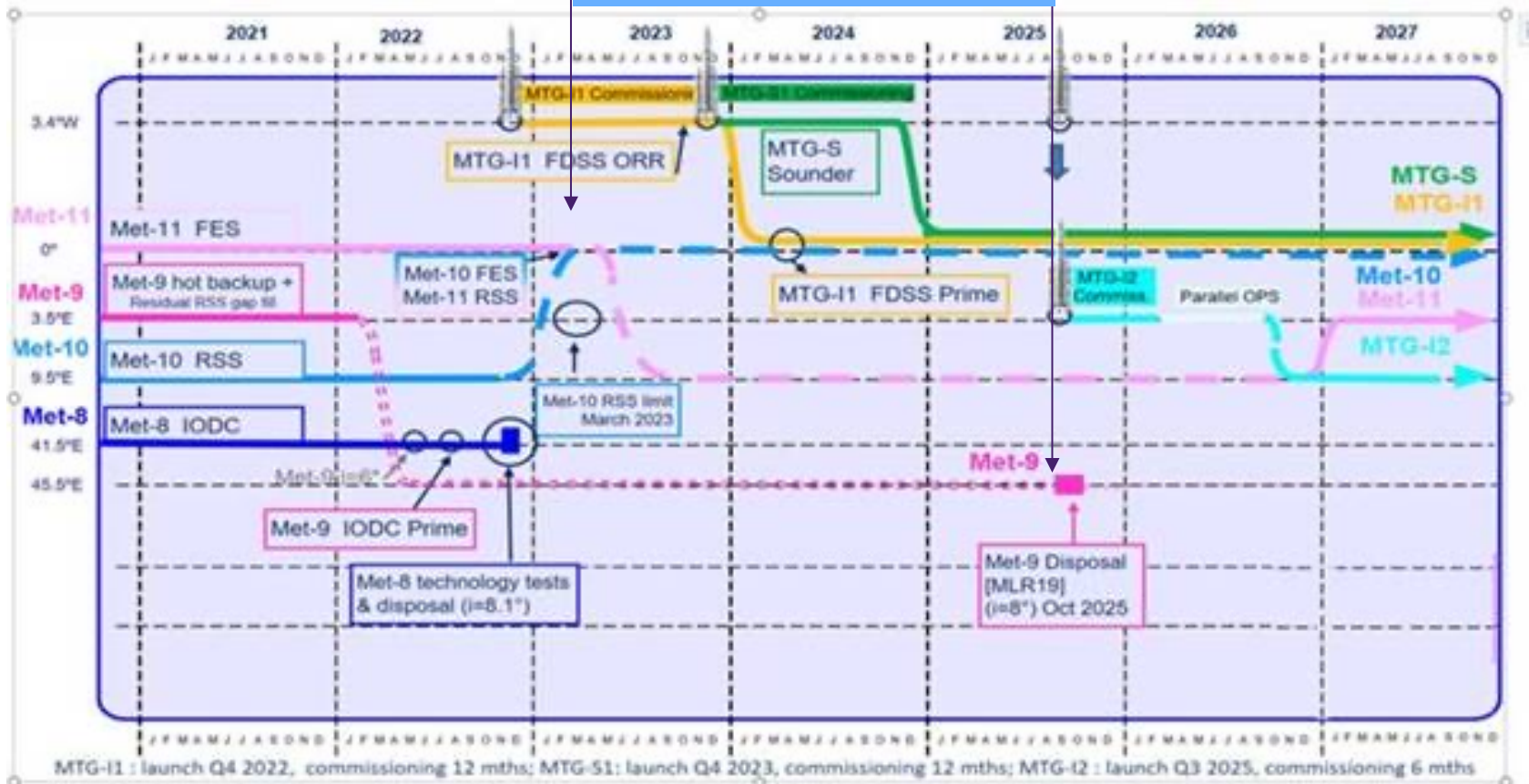
Current funding

Option 1 extension

Option 2 extension

0 degree GERB 4

0 degree GERB 3, collocated with MTG
 41.5E GERB 1 (best effort)



Current 2 instrument cost funding split:
1.35 FTE RAL (29% of funds); 2 FTE IC (30% funds); 2 FTE RMIB (41% funds)

Summary of cost reduction options under consideration

A: Reduced Outputs

2 active GERBs:
65% current costs →
Full data *collection* and current ops support and maintenance of RMIB capacity but **no user products produced, validated or distributed**

1.25 FTE at RAL
1 FTE (ops) at Imperial
1 FTE at RMIB

B: Reduced Time

2 active GERBs:
100% current for two years only (50%+ cost reduction)

Covers the most interesting period with minimal risk or changes in data production distribution or tasks.

Hard stop Feb 2026

1.35 FTE at RAL
2 FTE at Imperial
2 FTE at RMIB

C: Reduced Timeliness & OPS

2 active GERBs:
Y1 100% current cost
Y2 88% current
Y3 61% current

Provide full products for full period (with additional risk).

Reduce timeliness, sun avoidance data and ops support (ops move to EUMETSAT)

Y1 / 2 / 3+
1.35 / 1.45 / 1.2 FTE at RAL
2 / 1 / 1 FTE at Imperial
2 / 2 / 1 FTE at RMIB

GERB project future: summary

- GERB 4 operational record will end at the end of this year
 - It will be consolidated for release under all funding scenarios and GERB 1 IODC will be provided as a science release on a best effort basis
- GERB 3 can restart 0 degree operation from early 2023 and continue into the MTG era but this is awaiting funding decision
 - Two possible funding extension options should allow at least a 3 year record to be collected. This would give overlap with MTG which should produce useful data for science studies and development of NB to BB flux products from MTG:
 - NOTE an operational NB-BB OLR product planned for MTG but no operational broadband SW flux product expected or yet considered from MTG
 - The longer support option will enable operation potentially up-to 2030 in both 0 degree and 41.5E if GERB's keep working. It requires fixing processing, reducing redundancy, increasing latency and repose times and moving operations to EUMETSAT so will decrease the type of instrument changes we can respond to.