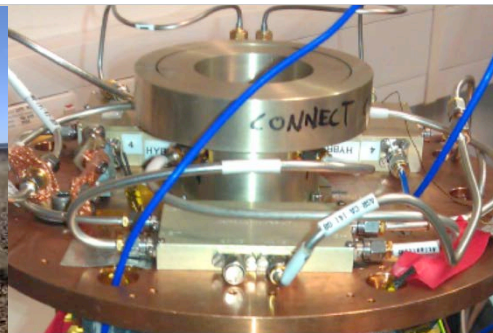


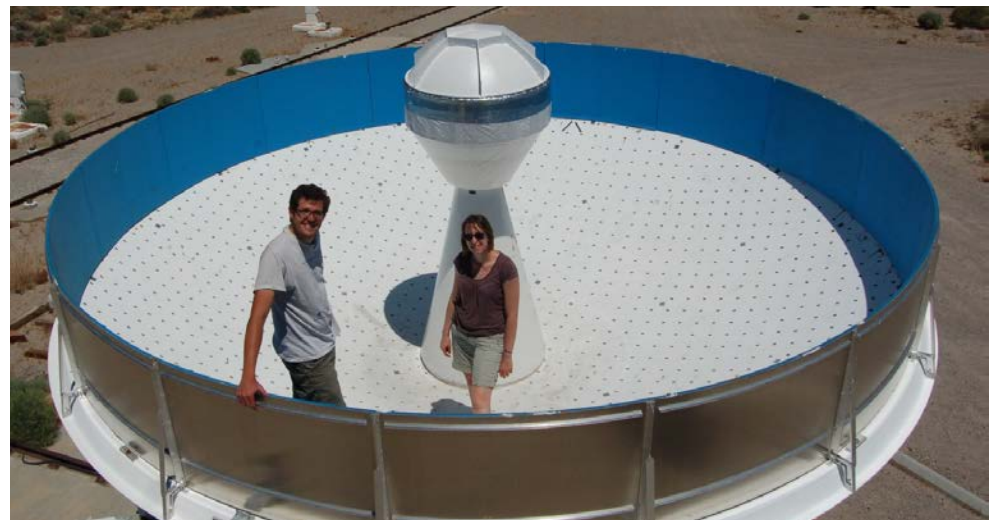
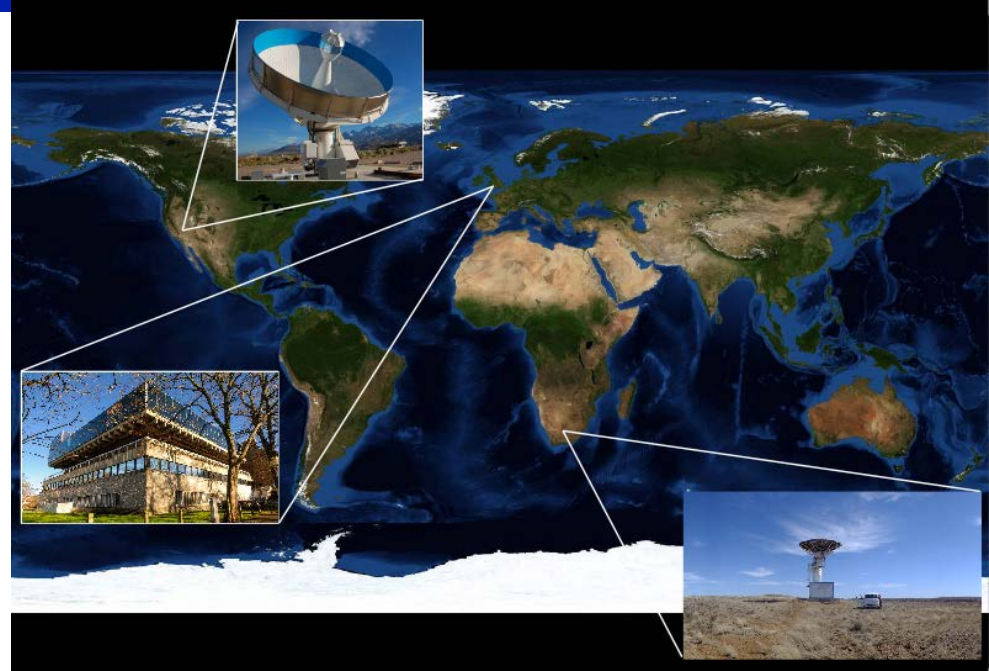
Thoughts on potential EU-Africa technology & instrumentation partnerships



Angela Taylor
University of Oxford, UK

C-Band All-Sky Survey (C-BASS)

- All-sky map of intensity & polarization at 5GHz.
- ‘Low frequency’ channel for Planck CMB satellite – physics of the early universe.
- RSA – UK – USA collaboration.
- 2 RSA PhD students in Oxford
- Opportunity to experience a wide range of science & engineering
 - RF electronics, cryogenics, digital electronics, firmware, software, mechanical & control engineering, data analysis & computing



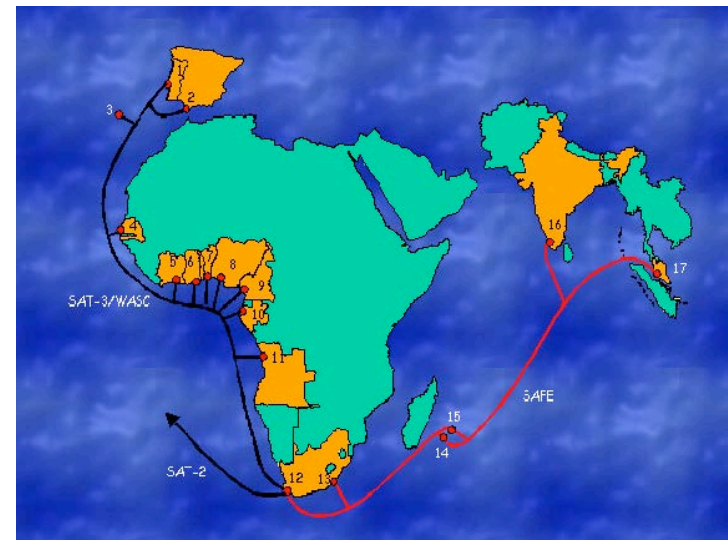
C-Band All-Sky Survey (C-BASS)

- Southern receiver commissioning HartRAO, RSA, Jan 2013.
- Mid-2013, move to Karoo – close to SKA site.
- First experience of operating cryogenic (10K) receiver on SKA site.
- Consolidate RSA participation in commissioning and science – mobility grants, training technicians
- Future upgrade to higher frequency, multi-pixel receiver e.g. X-band – technology development funds.



AVN and Goonhilly Earth Station

- Conversion of telecoms dishes.
- Radio astronomy & commercial on same site.
- Close links with Universities via CUGA (Oxford, Leeds, Herts, Manchester Univs)
- Cryogenic receiver upgrade – based on C-BASS.
- Goonhilly also connected by sub-sea cable via Portugal to Africa – fast data connections.
- Potential for training, co-operation, scientific partnerships...



MeerKAT High Frequency Receivers



- Multiple science cases for 8-14.5 GHz band (with EU PIs/ & CoIs)
- Not part of the SKA programme
- Interest and expertise within Europe to design & build
- Is it possible to fund this outside of SKA via other EU-Africa funding routes??
- Politics?? Timescale with respect to SKA deployment??

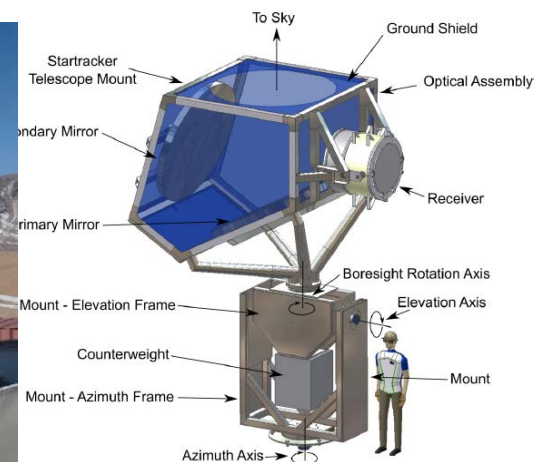
Other high-frequency science

Possibilities for other unique, standalone, smaller-scale experiments.

- Following the C-BASS model – not on, but close, to the SKA site.
- E.g. High-frequency, cryogenic receivers, 15-30GHz
- Small-dish interferometer or focal-plane array
- Large-scale digital back-end (SA strength)
 - Large-scale physics of galaxy clusters
 - Star formation in the epoch of reionization ($z = 3-10$) via CO line
 - Galactic foregrounds - tie-in in with upcoming CMB polarization experiments.

Funding/ideas

- Test site for suitability
- Build small-scale prototypes
- Smaller projects – ideal training ground



Conclusions

- We can build upon existing projects with strong SA-EU partnerships
 - E.g. C-BASS
- There are existing African based projects where enhanced EU-African funding could maximise the science output, training and development impact.
 - E.g. AVN, MeerKat
- We can certainly find new projects which are scientifically excellent and will contribute to development in Africa.

