

Status Dense Aperture Array Technology

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ASTRON

Major progress from the SKADS Programme

The 'SKADS' book: Grab a copy downstairs!

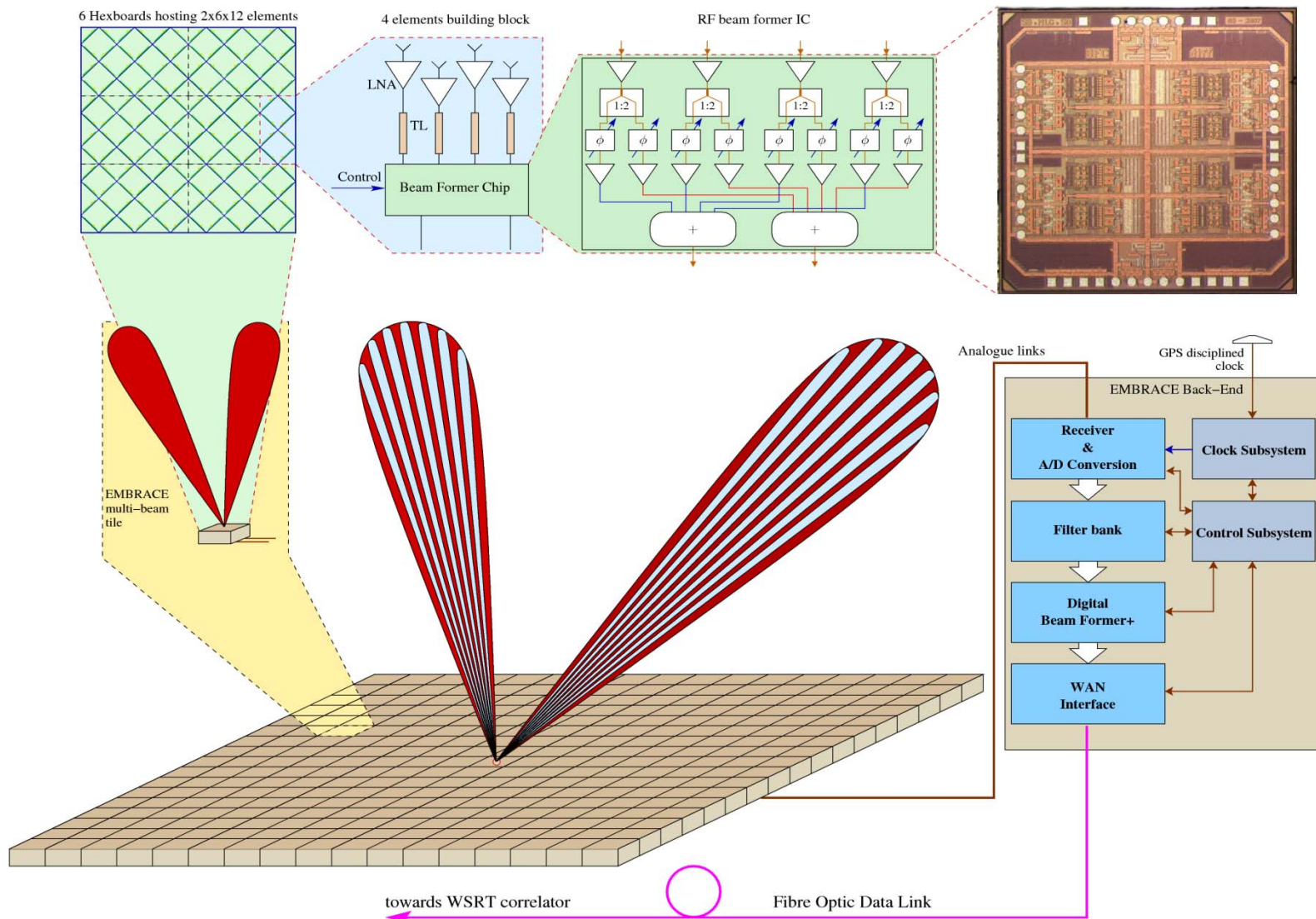
Wide Field Astronomy & Technology

for the

Square Kilometre Array

Proceedings of the conference held at the Château de Limelette, Belgium, 4-6 November 2009

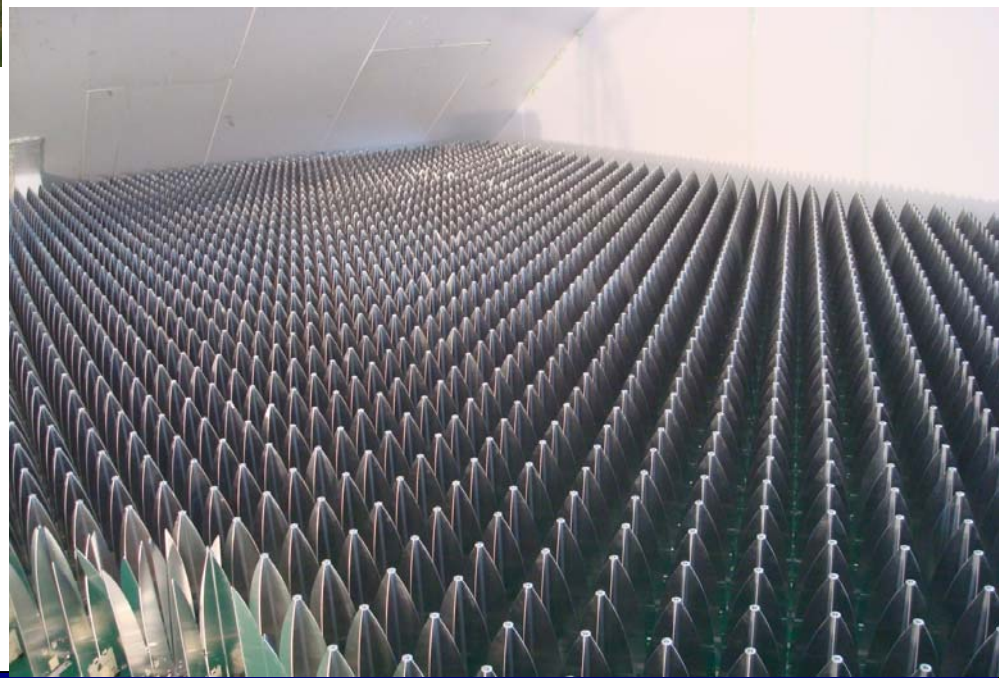
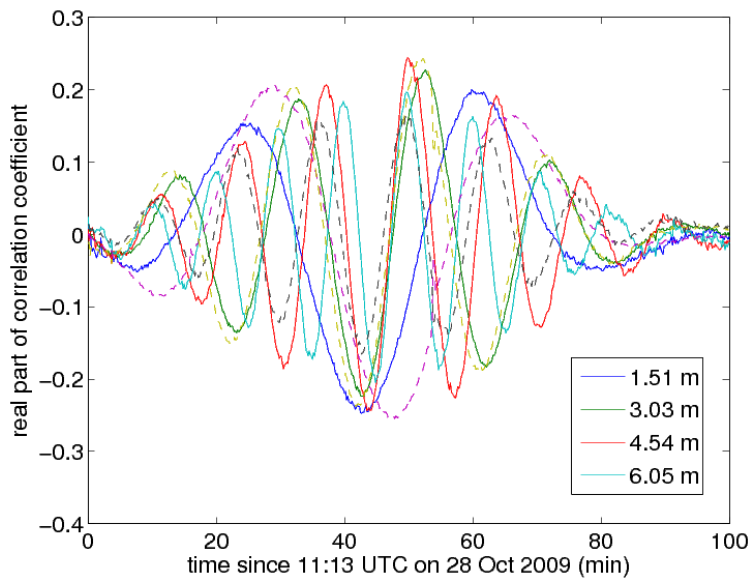
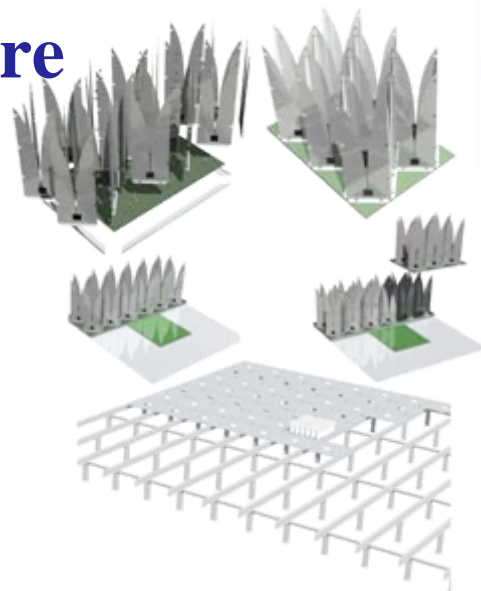
EMBRACE Architecture overview



EMBRACE Specifications

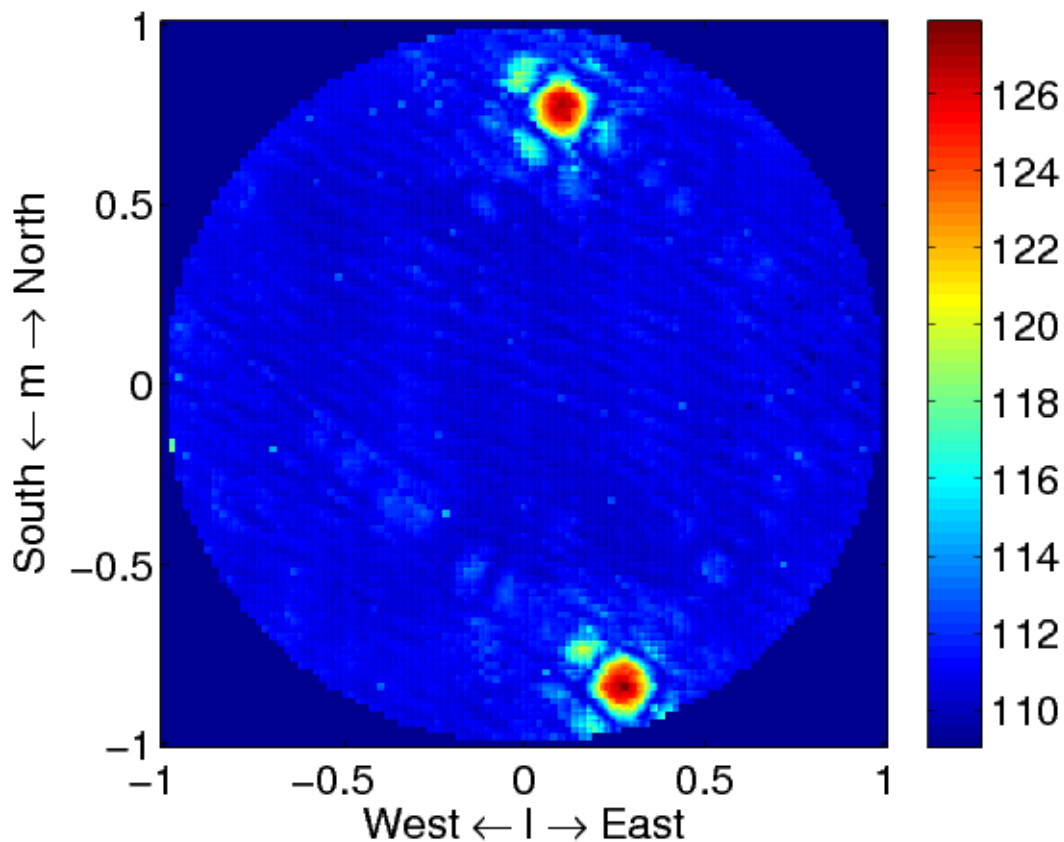
Frequency range (modified for RFI)	900 MHz - 1500 MHz.
Polarisation	Single polarisation
Physical Collecting area	~160 m ² WSRT / 90 m ² Nançay
Aperture Efficiency	> 80%
Electronic Scan Range	+/-45 deg
T	100K @ 1GHz
Element phase control accuracy	3 bit (also time delays)
Instantaneous bandwidth	40 MHz Output bandwidth
Dynamic range A/D Converter	60dB (effective # of bits ~10)
Number of independent FoV (RF beams)	2
No of digital beams	8+

Demonstrated Real Hardware



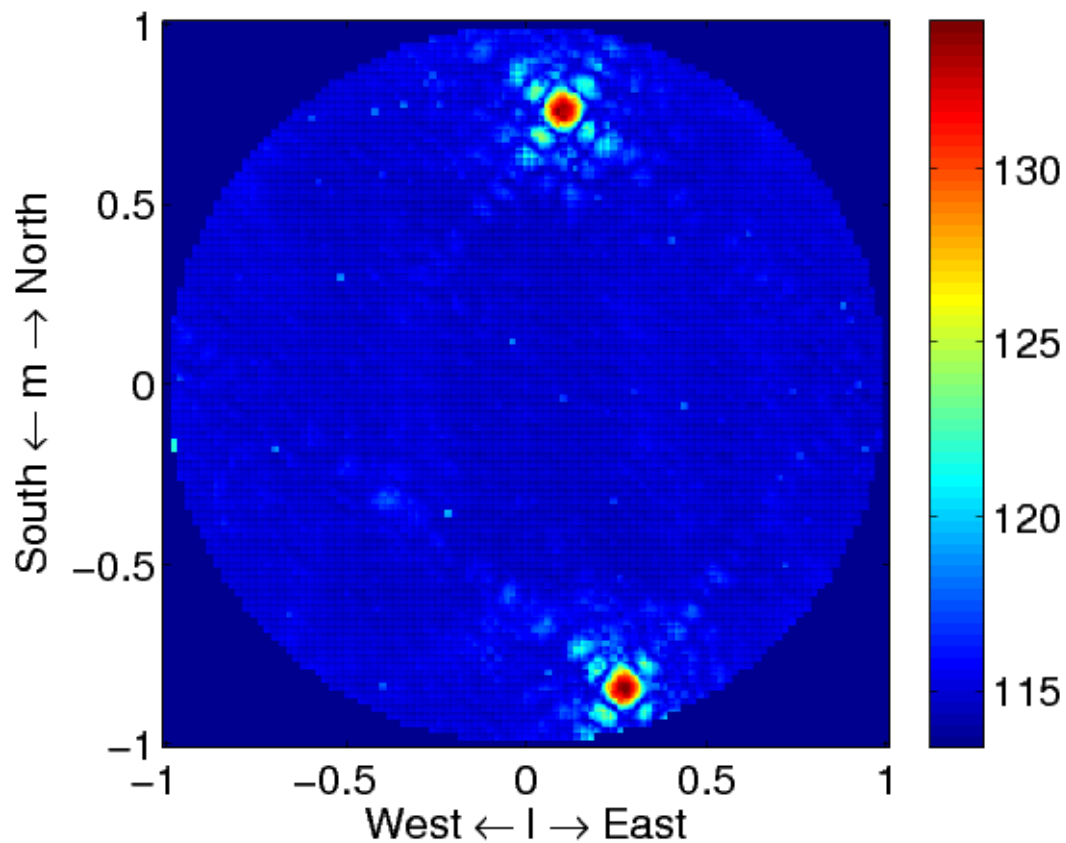
It Does work!

Sky image with Afristar point source 2x2 tiles



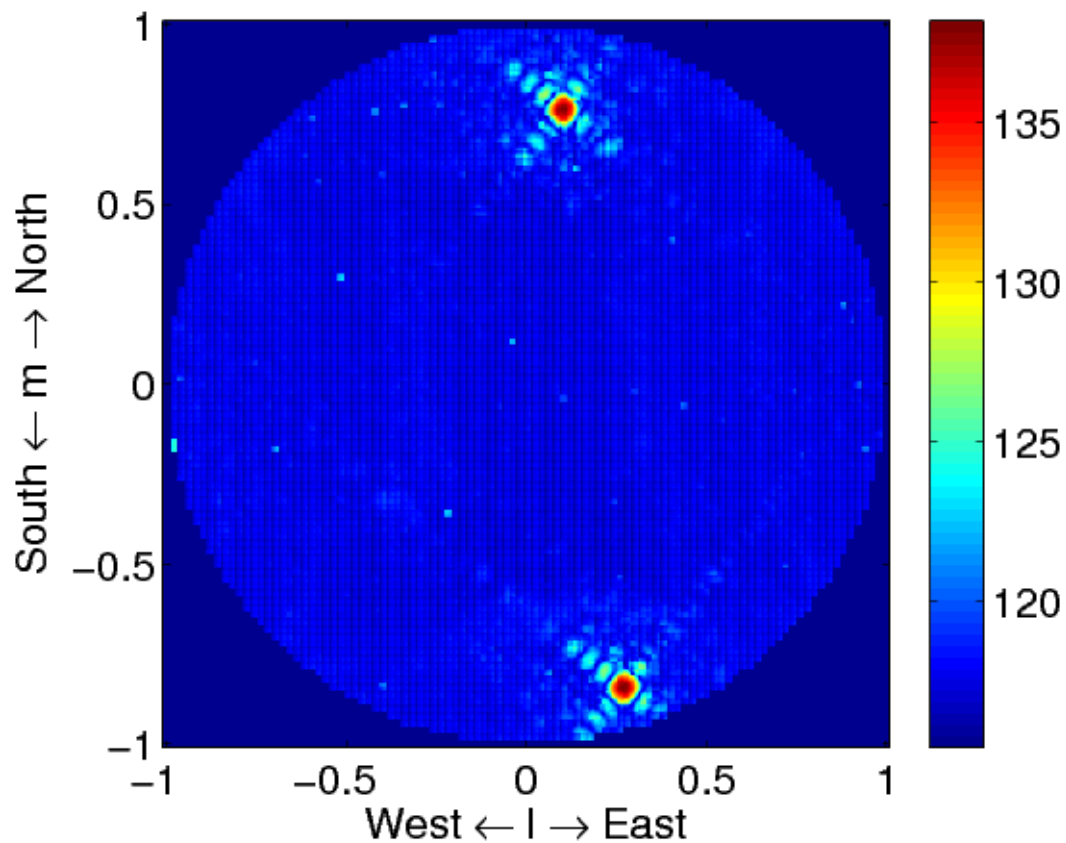
It Does work!

Sky image with Afristar point source 3x3 tiles



It Does work!

Sky image with Afristar point source 4x4 tiles



Major Achievements

- Demonstrated successful cooperation of several European institutes
- Successful engagement with Industries
- Demonstrated AA technology by building two AA stations: Westerbork and Nancay
- A major step forward in achieving low cost AA technology

Next: Aperture Array Verification Programme

- Main demonstrator called AAVS: Deliver an AA telescope with about 15 stations and 2000 m² collecting area around 2012/2013
- EMBRACE provides a fantastic platform for enhanced dense AA evaluation
- Risks:
 - Low risk when design is based on EMBRACE front-end technology
 - High risk on digital processing for given bandwidth (and thus FoV) requirements