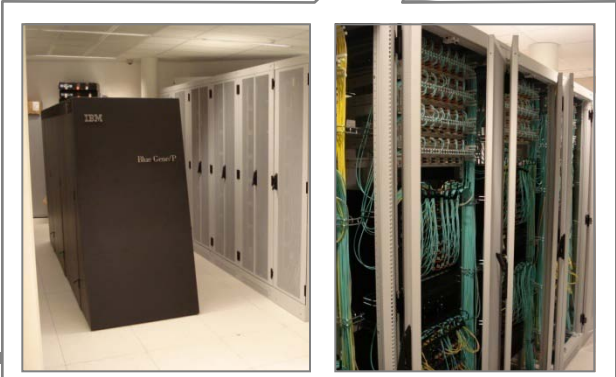
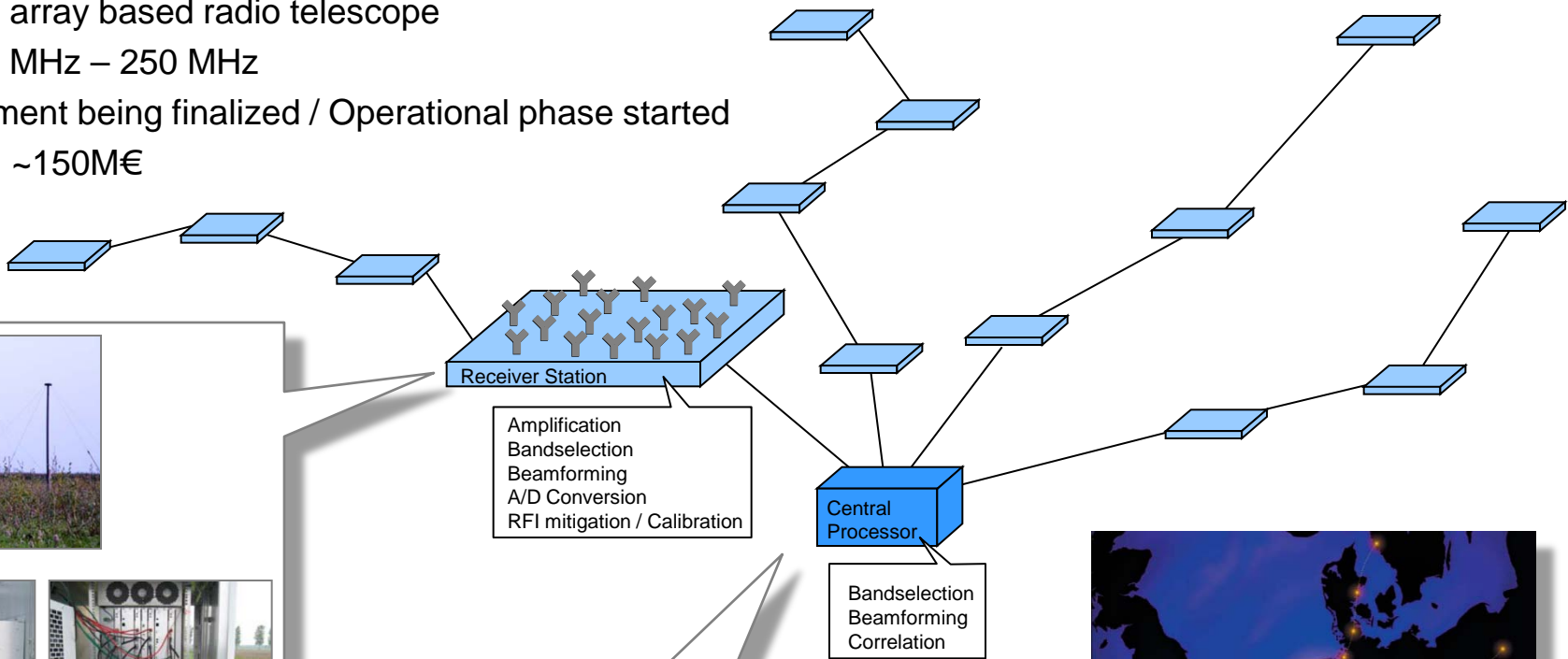


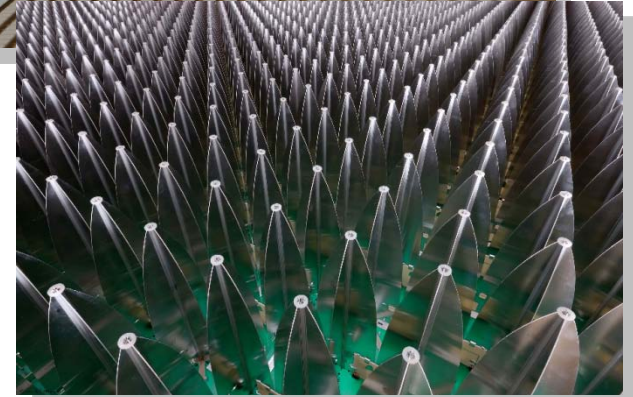
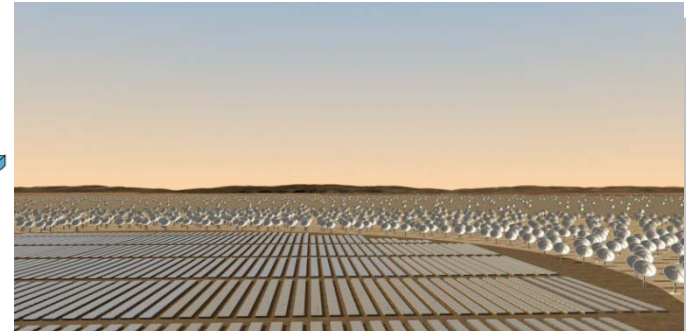
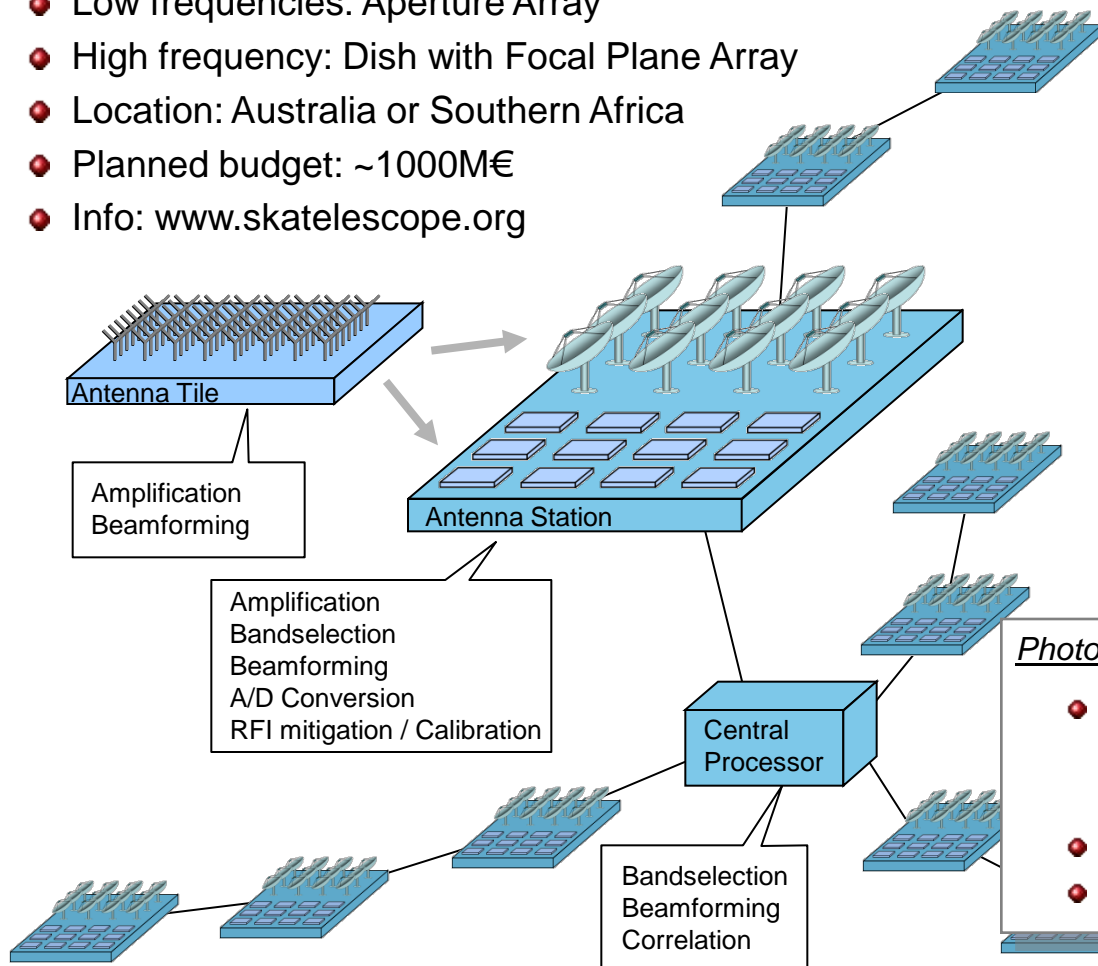
ASTRON



- Phased array based radio telescope
- $\Delta\nu = 10 \text{ MHz} - 250 \text{ MHz}$
- Deployment being finalized / Operational phase started
- Budget: ~150M€



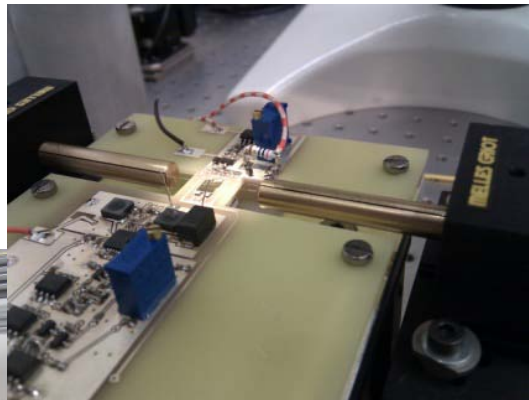
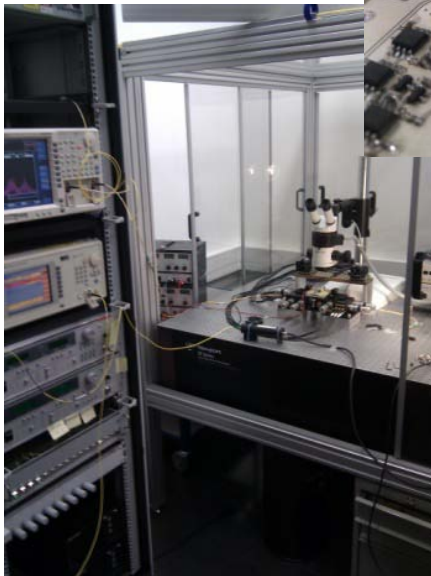
- $\Delta\nu = 70 \text{ MHz} - 20 \text{ GHz}$
- Low frequencies: Aperture Array
- High frequency: Dish with Focal Plane Array
- Location: Australia or Southern Africa
- Planned budget: $\sim 1000\text{M}\text{€}$
- Info: www.skatelescope.org



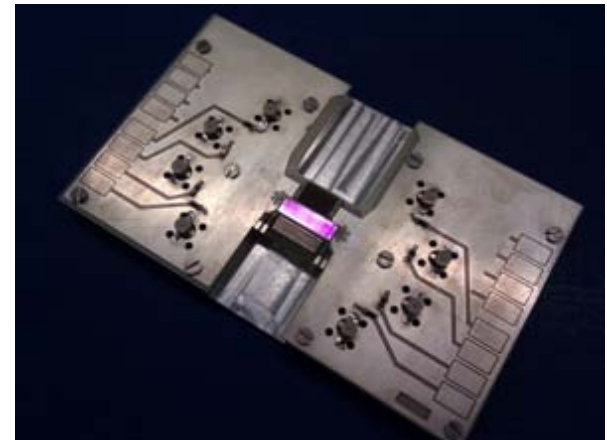
Photonic technology for SKA

- 10Gb/s and beyond digital optical data transport
 - COTS systems and components
 - Custom made technology
- 1 GHz – 20 GHz analog optical signal transport
- Microwave-photonic signal processing

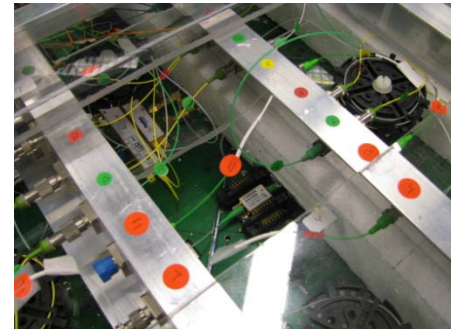
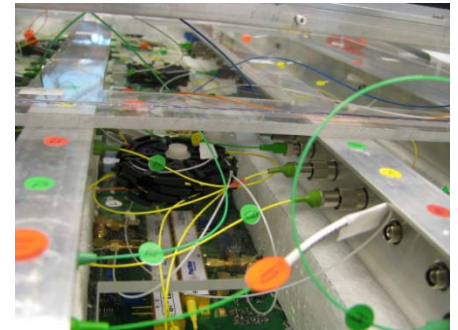
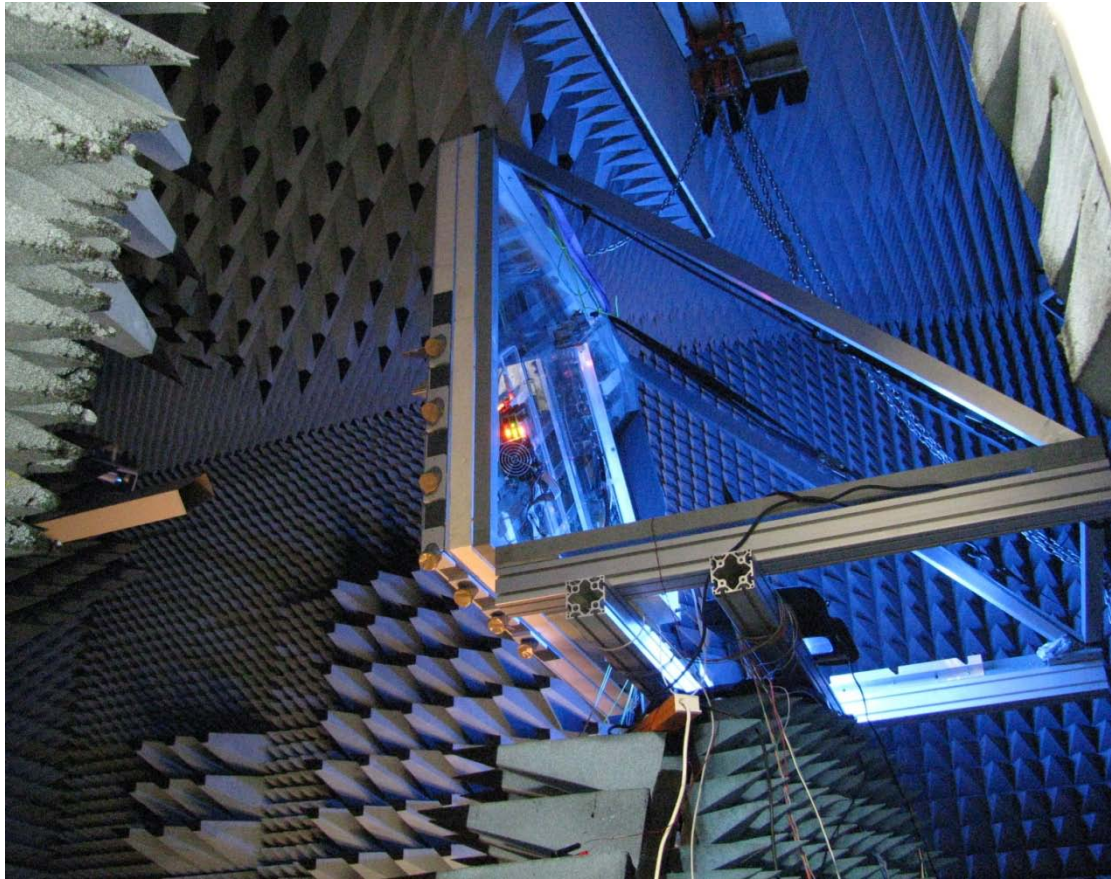
- ◆ Integrated microwave-photonic PCB/PIC technology



- ◆ DML & EML technology
- ◆ Performance
 - ◆ Bandwidth: 10 GHz
 - ◆ SFDR: 50 dB
- ◆ Low Cost (~ € 100)
 - ◆ RF/Photonic integration
 - ◆ Array technology



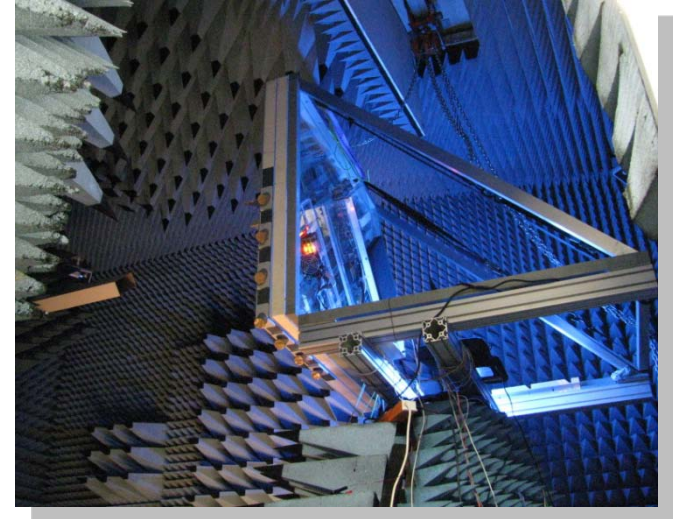
- System with discrete components



- True time delay beamformer
- 16 receiver system
- 500 MHz – 1.5 GHz

◆ Requirements:

- ◆ Chip size: ~ 10 mm for both dimensions
- ◆ Number of optical ports: 1 - ~ 16
- ◆ Pitch: TBD (~ 250 μm)
- ◆ Spot diameter: 3 μm - 10 μm
- ◆ Number of dc ports: $n \times 16$ (n : ~ 3)
- ◆ Number of rf ports (10 GHz): ~ 16



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