Atmospheric detection

Lunar detection

Both SKA-LOW only.
Specialised hardware to be provided by us.

Engineering change proposals submitted for interfaces.
large ($\gtrsim 50\%$) overlap in interested members; but

- different hardware and data reduction,
- different science goals,
- distinct KSPs.
commensality, n.

Etymology: *com*- together with + *mensa* table

The habit of eating at the same table
Air-shower detection: completely commensal.
  ▶ zero dependence on beamforming, imaging
  ▶ operate 100% of the time!

Lunar detection: partially commensal.
  ▶ moon occults 0.3–14% of FWHM beam
  ▶ moon drifts at 0.5°/hr
  ▶ \( T_{\text{moon}} \sim T_{\text{sky}} \)

So:
  ▶ pulsar & transient search mostly unaffected
  ▶ imaging tricky

Possible synergy with EoR, with moon as calibrator.
(Vedantham et al. MNRAS 450 2291 (2015).)
RFI test results from LORA array at LOFAR:

Compared to this, at SKA-LOW:

- SiPMs instead of PMTs
- RF-over-fibre instead of cables
- buried, better shielding?

Nanosecond-scale pulse averaged over milliseconds: power $\times 10^{-6}$

Project most affected by nanosecond-scale RFI: us.
RFI test results from LORA array at LOFAR:

shielded

unshielded

cables in front of antenna

SKA-TEL-SKO-0000202

SKA EMI/EMC STANDARDS AND PROCEDURES
Passive interference

coupling

particle detector

antennas
Passive interference
Passive interference
LORA array at LOFAR:
  ▶ Control PC: 250 W
  ▶ 20 detectors: 250 W
  ▶ Total: 500 W

Similar array at SKA-LOW:
  ▶ Control PC: 250 W
  ▶ 180 detectors: 2,250 W
  ▶ Total: 2,500 W

SKA-LOW: ~ megawatts
In commissioning phase:

▶ Early science possible with first few SKA-LOW stations.
▶ Side-effect: debugging, localisation of impulsive RFI.

In operational phase:

▶ Data should go public immediately.
▶ Most likely, no one will replicate our analyses, except possibly to check significant results.
▶ Other applications of stored baseband data not expected ... but if they turn up, no ownership of the data is implied.
Summary

Two potential KSPs, each dependent on an engineering change proposal.

Air-shower KSP *completely* commensal.

Lunar KSP partially commensal; still exploring extent.

RFI probably not a problem; will test thoroughly.

No proprietary period for data.