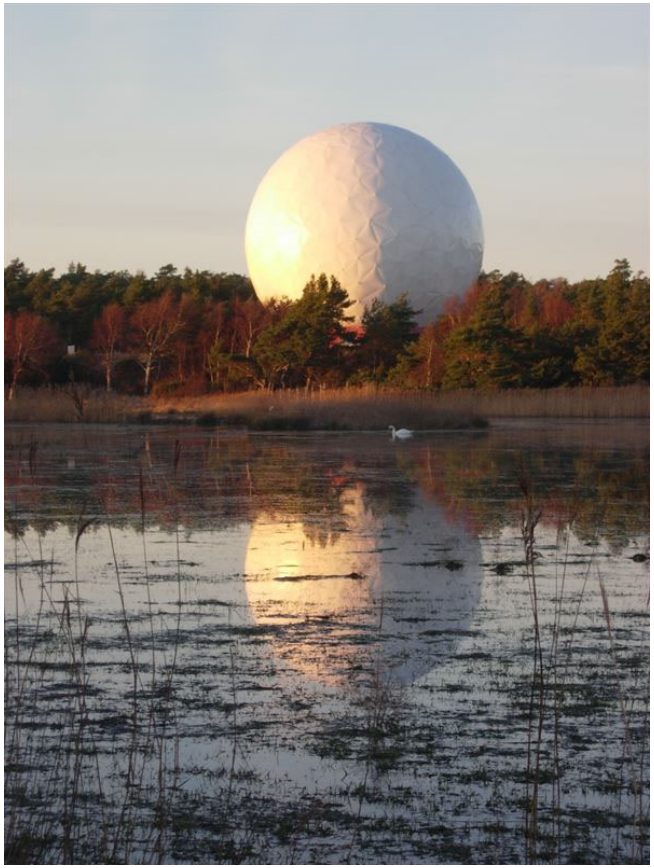
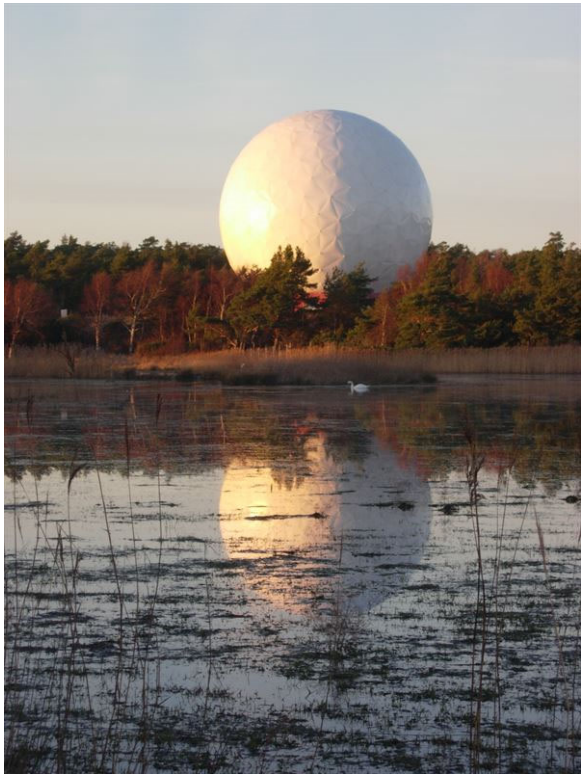
Tri-band receiver
for Onsala Space Observatory 20 m



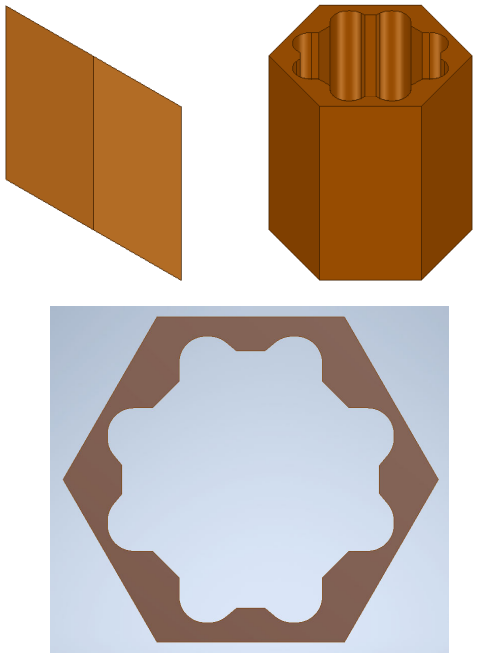
Overview of the project



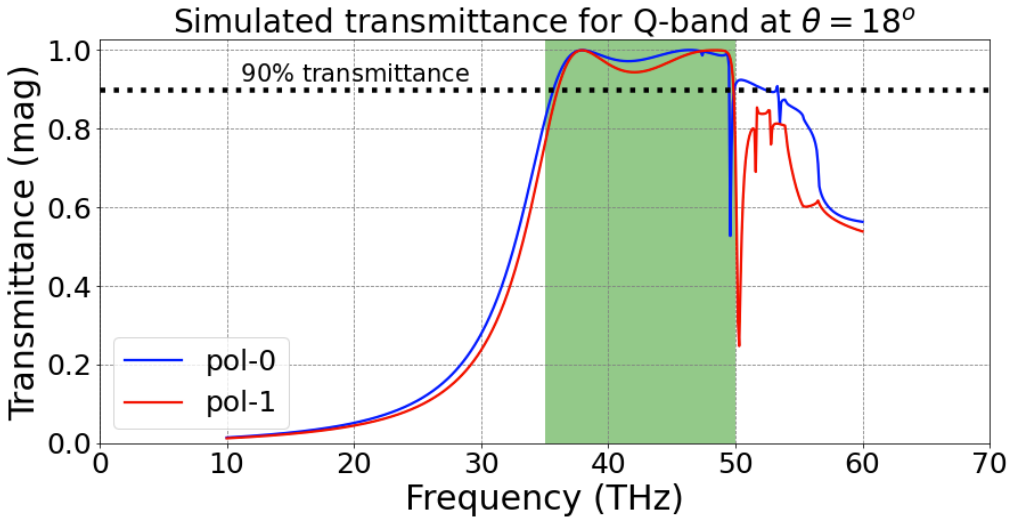
- Tri-band dual polarization VLBI receiver able to simultaneously operate at the frequencies of 22, 43 and 86 GHz.
- Will replace present multiband receiver, covering 18-50 GHz
  - Used mostly for VLBI observations
- May also replace current 3/4 mm receiver, covering 67-116 GHz
  - Used for VLBI and single dish observations
- Target bands: Goals
  - K-band: 18-24 (GHz) - spanning 6 GHz
  - Q-band: 35-50 (GHz) - spanning 15 GHz
  - W-band: 80 -116 (GHz). - spanning 36 GHz
- IF bandwidth – what is the EVN spec? – For 5+ years 4 GHz per pol enough(?) or go for 32 GHz per pol (2 x 16 GHz sidebands) – also possible single dish driver.
- Investigating a different optical layout than KVN type designs, using all-metal dichroics inside cryostat – which transmit and select high frequency first.

  Pro –Lower system noise. **Con**- slightly larger size, slightly lower fractional BW

Dichroic filter: the key technological component



Thickness (t) = 4.3 mm
Metallic frame x3 thicker



Transmission over 90% in the range
35.6-49.6 GHz (33% BW)

Proposed optical system to deliver a 3-band receiver