

3DPAMS:

Polymer-based 3D Printed integrated front-end hardware for Atmospheric science observations
multi-channel Microwave Sounder payloads

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NPL

Joint NCEO-CEOI Conference: 24th and 25th June 2020 (on-line)

Centre for
EO Instrumentation



Project Overview

Project type: CEOI

Cost: £250k

Duration: 15 months + delays due to COVID, etc

Completion due: Mid-2021

Partners: NPL and Imperial College London

Project Overview

3-D printing:

Use polymer base material

Metal plated

Advantages:

Very lightweight

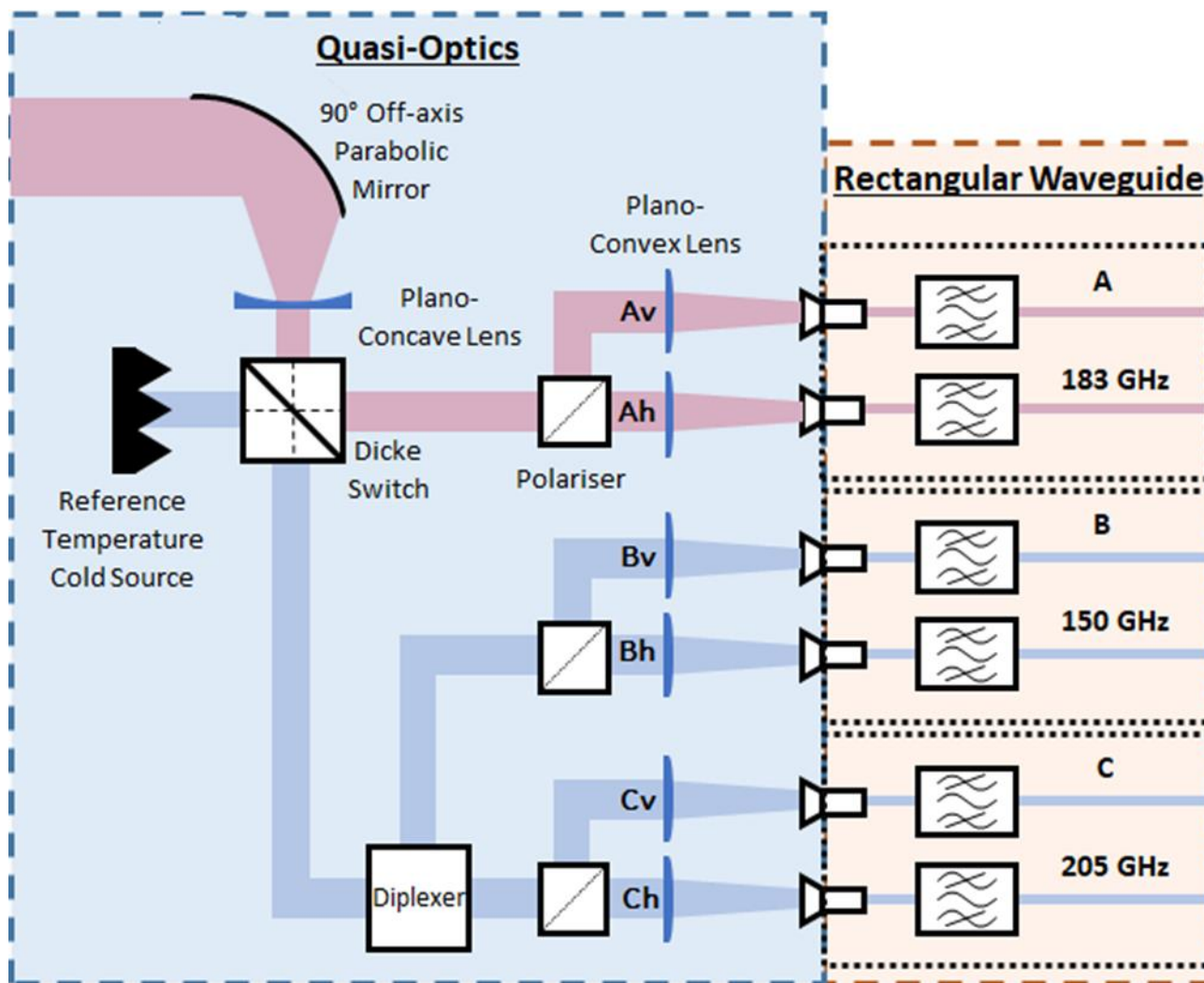
Very good electrical conductivity

Project Overview

Two stage project:

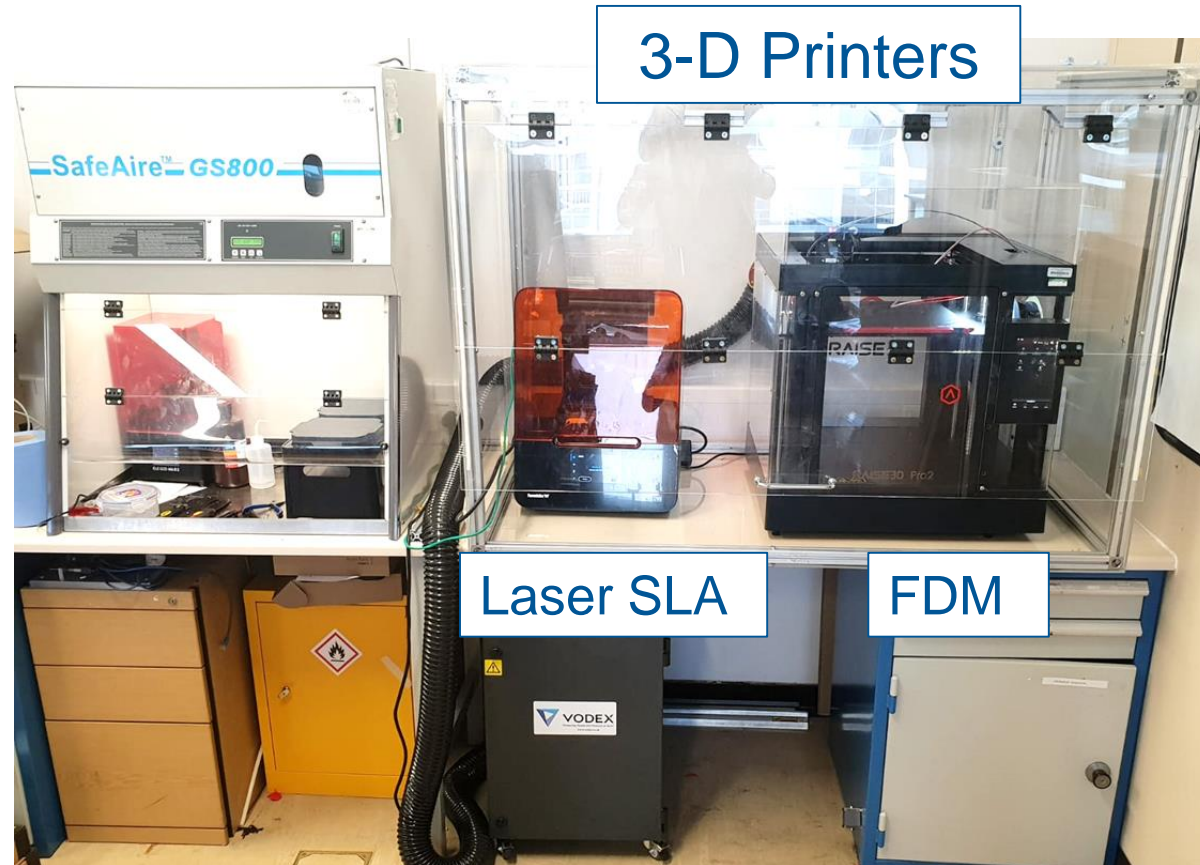
- 1. Components – design / build / test**
- 2. System – design / build / test**

System architecture (front-end)



Components (WR-05: 140 – 220 GHz)

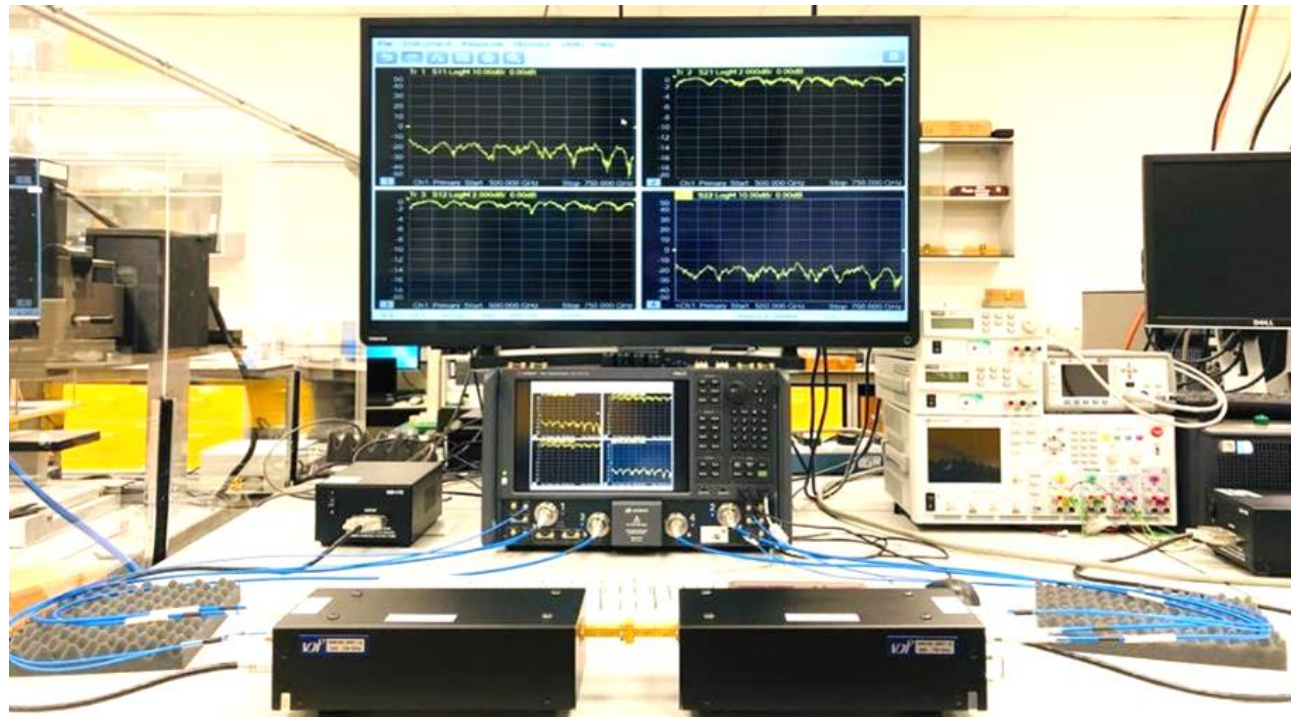
- Waveguide:
 - Lines
 - Antennas
 - Filters (bandpass)
- Quasi-optics
 - Mirrors
 - Lens
 - Polarisers



Current status

All waveguide and quasi-optical components built and electrically tested

VNA:
140 – 220 GHz



Next steps

- Environmental testing of components
 - Temperature $(20 \pm 30) \text{ }^\circ\text{C}$
 - Vacuum $\approx 1 \times 10^{-3} \text{ Torr (0.1 Pa)}$
 - Vibration

- Finalise and build system (integrated front-end)

- Electrically test system (integrated front-end)

Future – beyond this project

- Publish work
- Present work at (ESA) conference
- Seek (industrial) partner(s) for future collaborations
- Progress work above TRL 5