

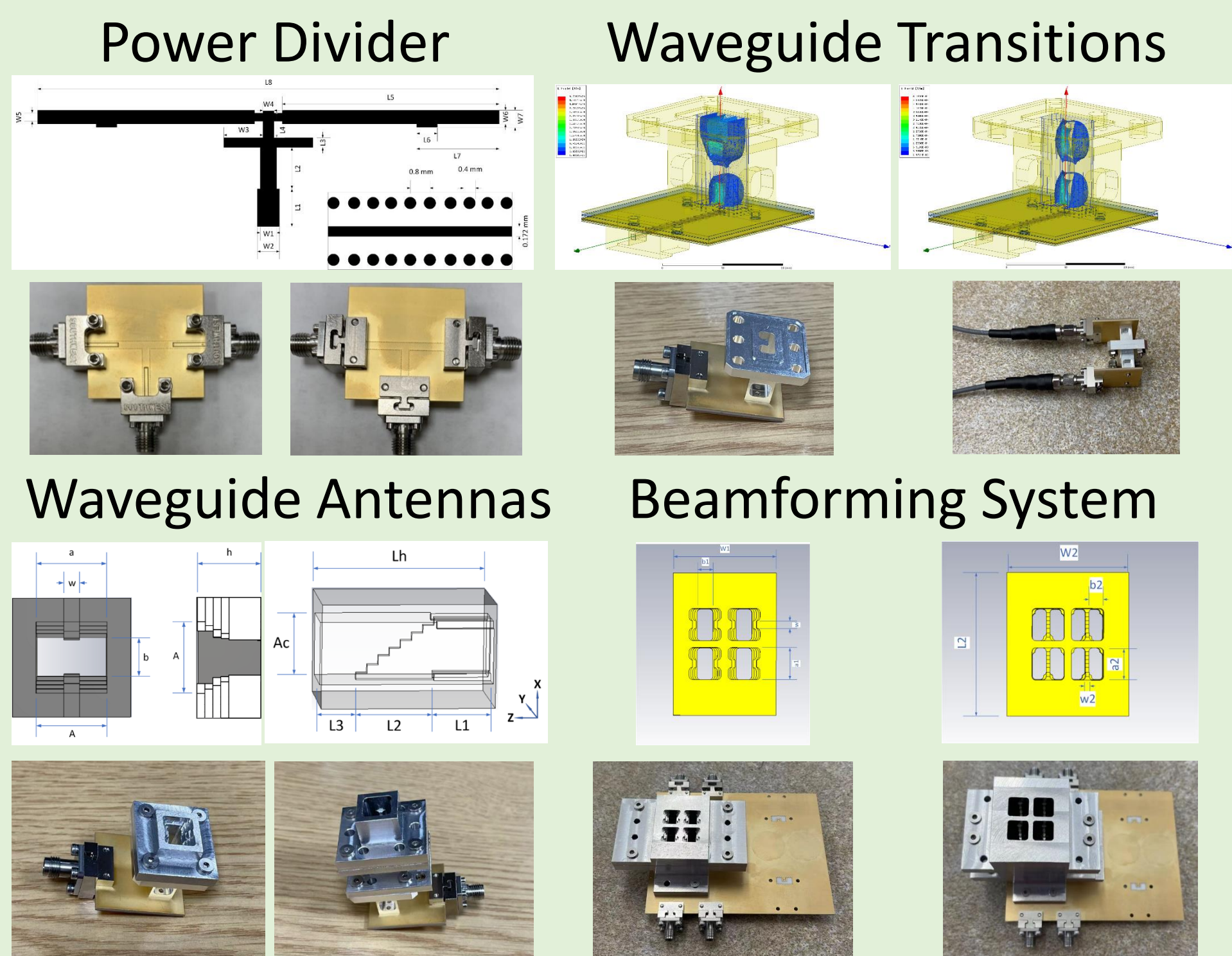
Work package 1: Technologies for flexible payloads

Objectives

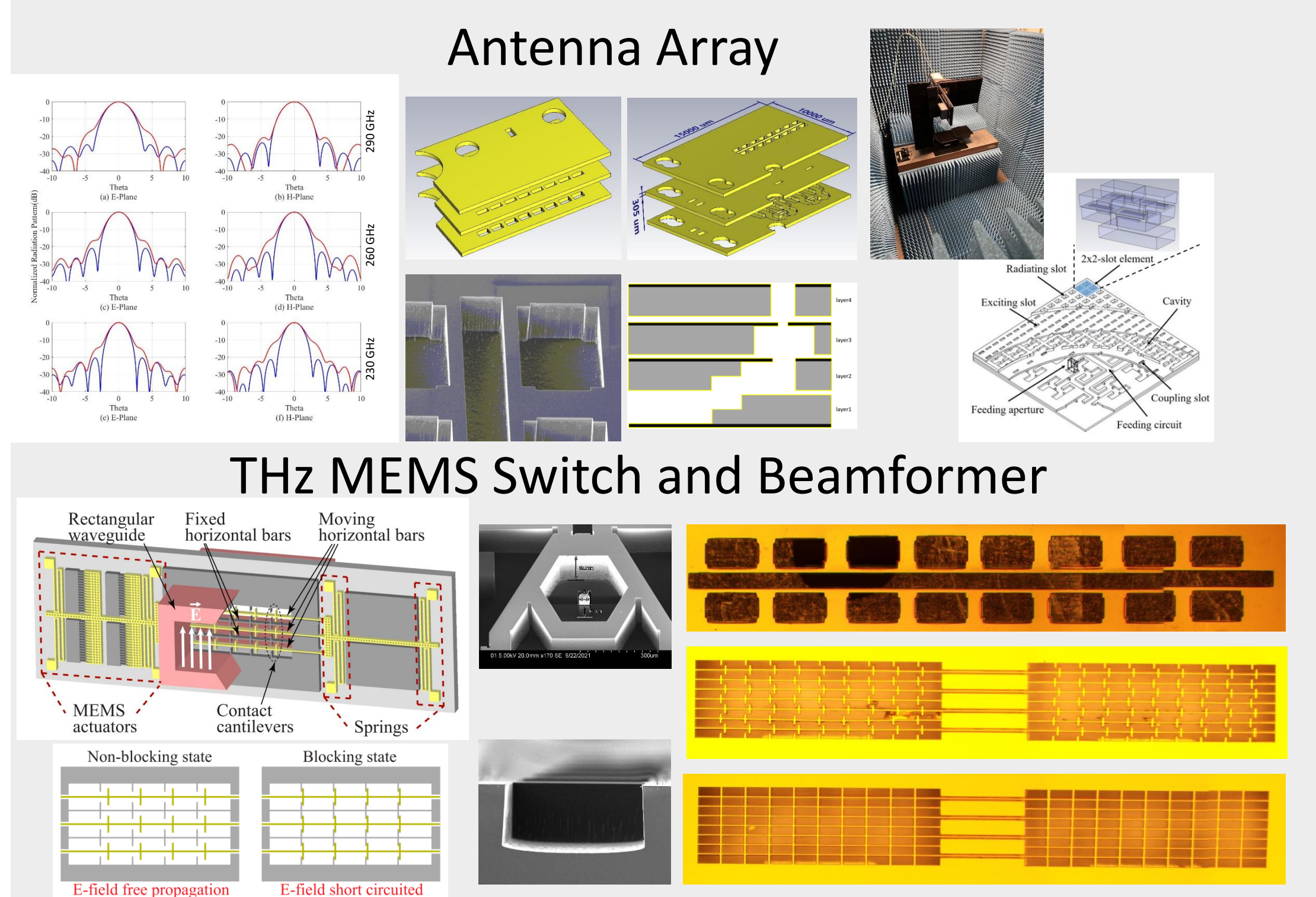
- O1.1 Developing a new generation of MEMS switching/tuning mechanisms for highly-miniaturized, low-weight, low-loss, frequency-agile reconfigurable microwave systems to operate up to submillimetre-wave frequencies.
- O1.2 Investigating advanced beamforming networks.
- O1.3 Exploring the potential use of planar/hybrid technologies (such as the SIW and its alike) for implementing miniaturized components and sub-systems with tuning capabilities.
- O1.4 Realizing efficient tuning with minimal deterioration of high-Q frequency-selective components at the front-end of flexible payloads.
- O1.5 Fabricating prototypes with experimental characterizations.

Progress

ESR1: Hybrid Waveguide and Beamforming Systems



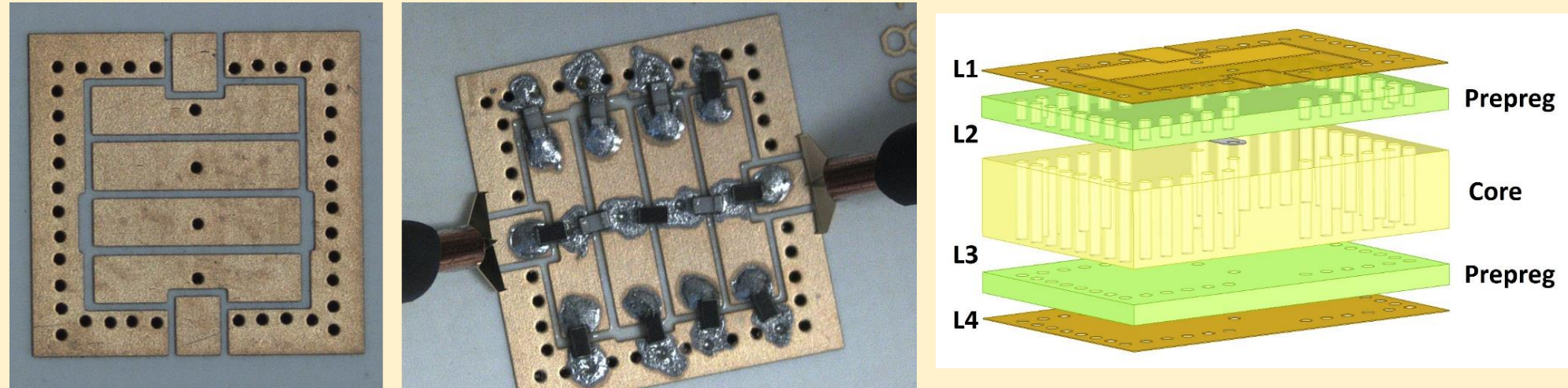
ESR9: Antenna Array, MEMS Switch and Beamformer



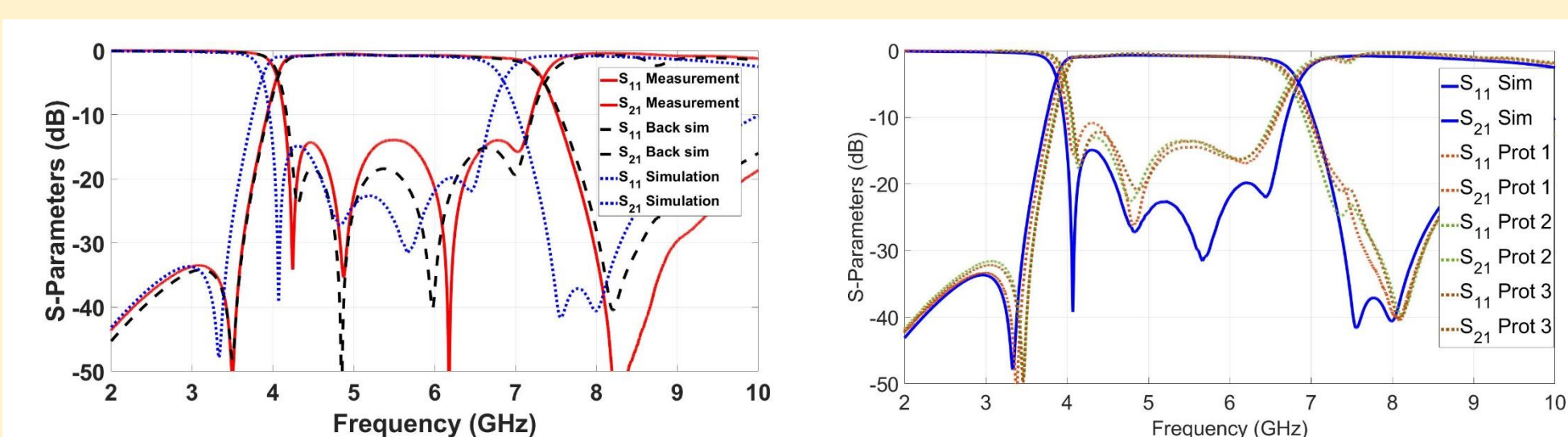
ESR5: Novel planar/hybrid technologies for miniaturized RF components and sub-systems with reconfiguration capabilities

- Miniaturized and low-loss filters using:
- Substrate Integrated Waveguide (SIW) technology
 - Multi-layer technologies (e.g. LTCC)
 - Advanced substrate materials
- Reconfiguration capabilities of the above filters:
- Filter reconfiguration (i.e. f_0 , BW and type of response)
 - Post-manufacturing tuning of high-Q narrow-band filters

In this work a miniaturized ultra-wideband bandpass filter in coaxial substrate integrated waveguide (SIW) technology has been designed manufactured and tested. To improve the response selectivity and coupling control, a multi-layer structure has been implemented, introducing both strong magnetic and electric coupling. The result is a compact device, with dimensions of $7 \times 7 \text{ mm}^2$.

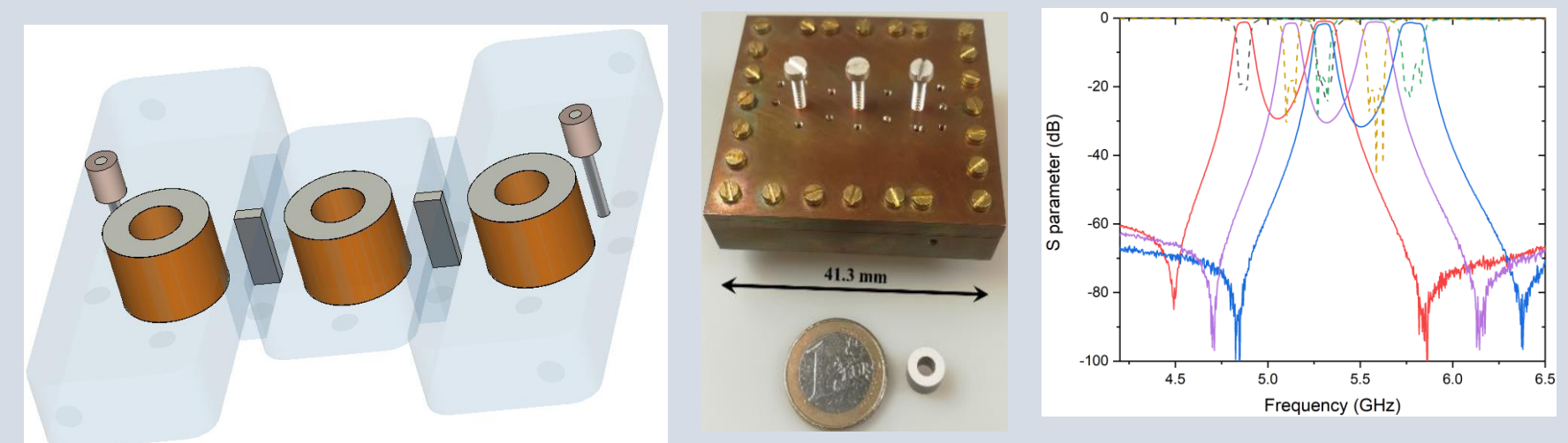


Post manufacturing response correction is allowed by the SMD elements reconfiguration. As can be seen in the figure below, it is possible to recover the response from variations due to manufacturing tolerances.



ESR7: Tunable Filters

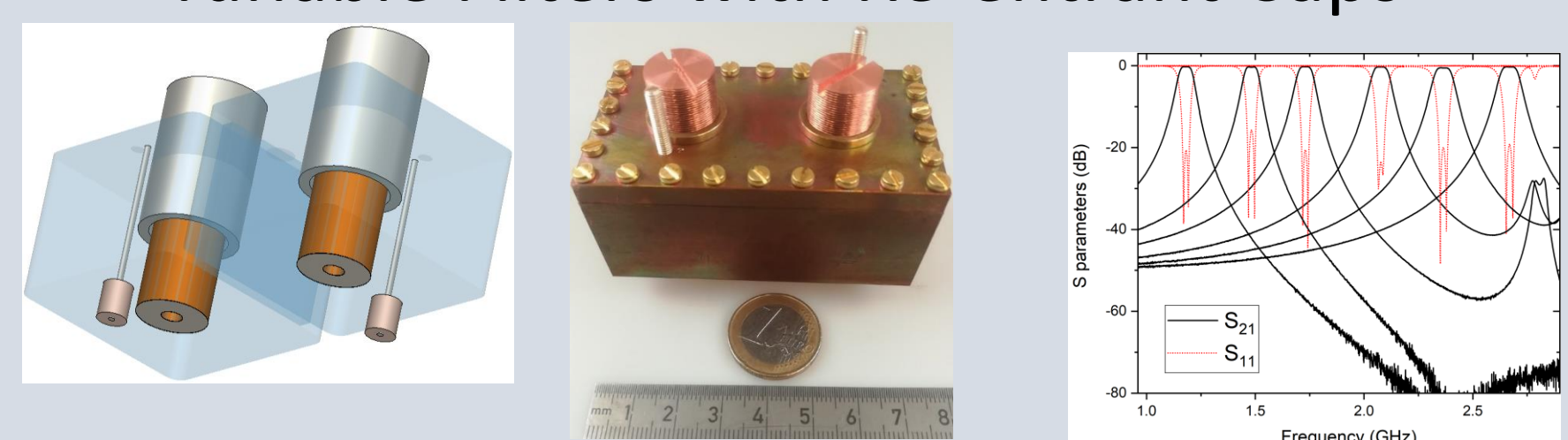
Tunable Dual-Band Filters



Inset Configuration



Tunable Filters with Re-entrant Caps



Compact

High Q

Widely Tunable



Advanced Technologies
for future European
Satellite Applications



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