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**Design of multiband antennas using 3D-printing
for UAV and nanosatellite applications**

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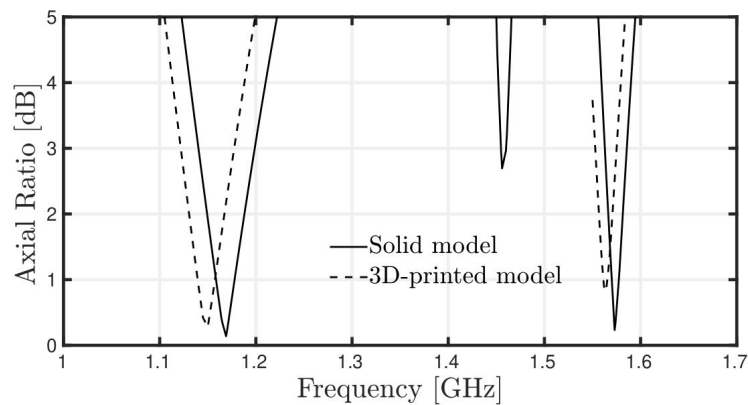
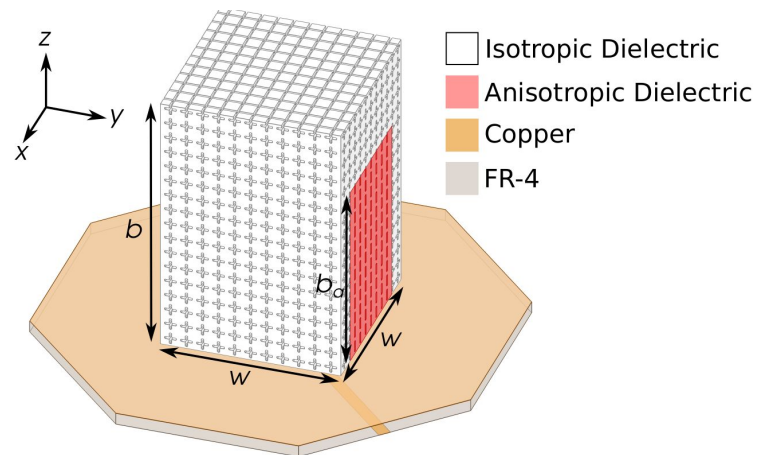
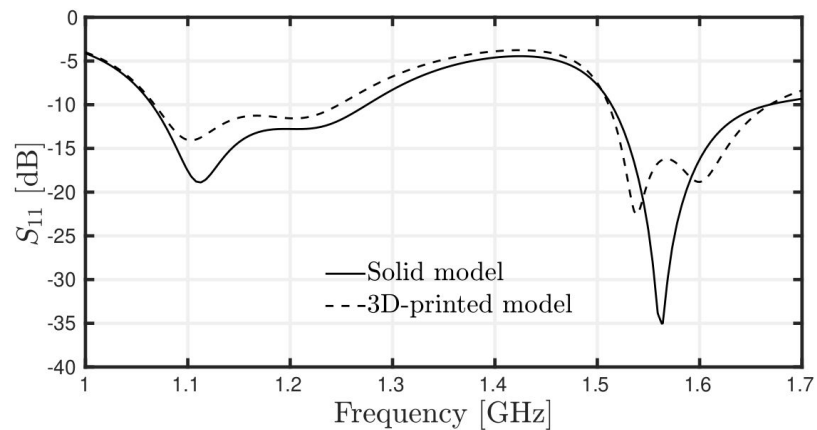
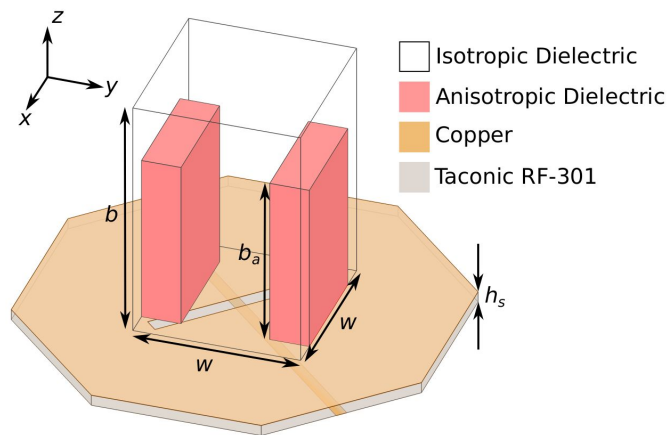
February, 2022

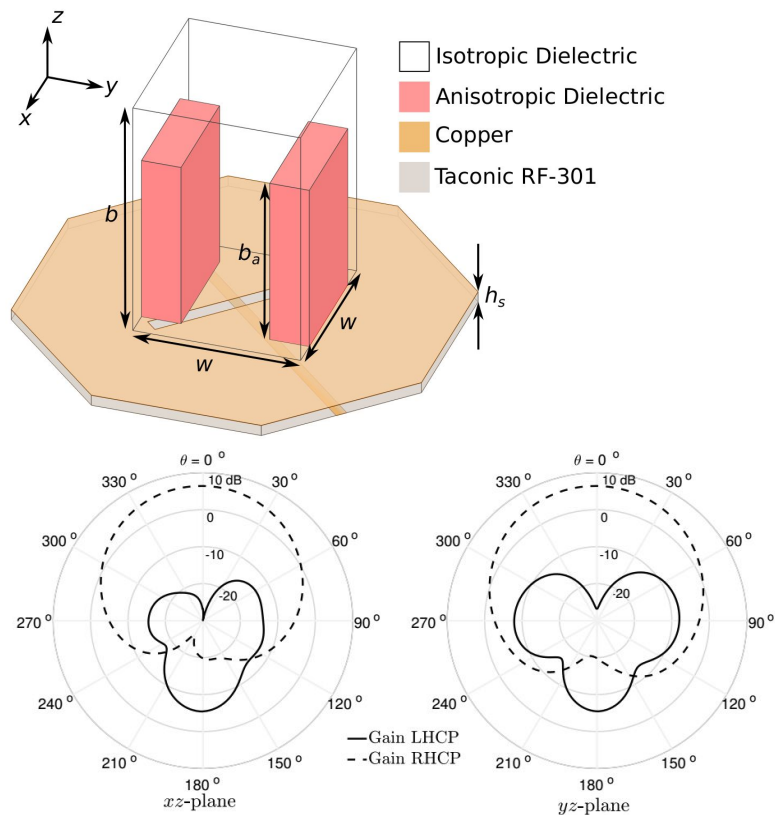
Goal

- Use of engineered materials to achieve special antenna characteristics
- Design multiband antennas for UAV with circular polarization

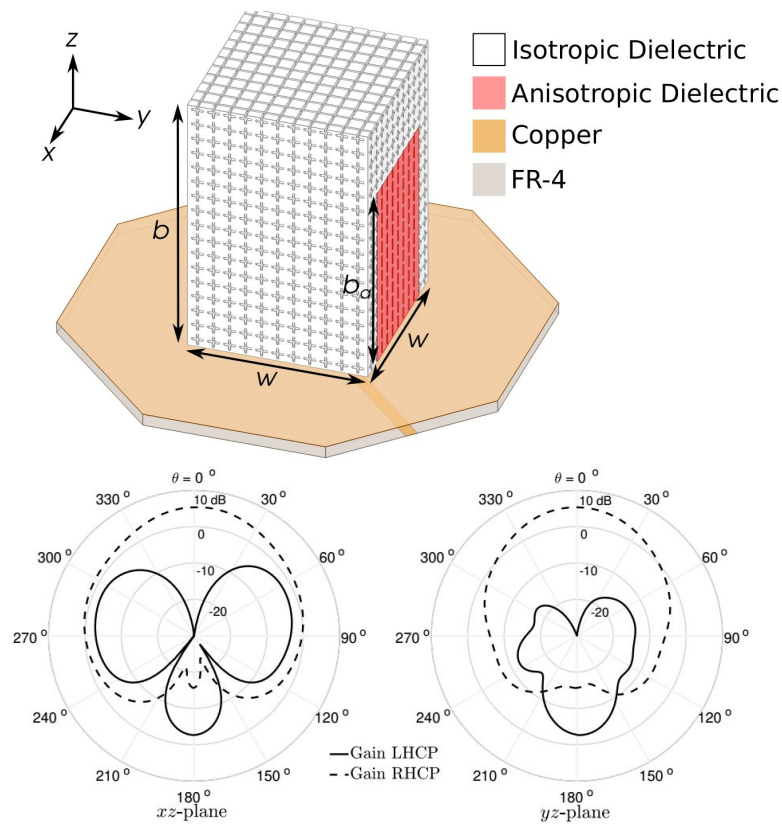
Methodology

- Development of a 3D-printed dielectric antenna with dual-band and circular polarization for GNSS applications (L5 and L1 bands)
- Periodic cells are used so as to obtain inhomogeneity and anisotropy

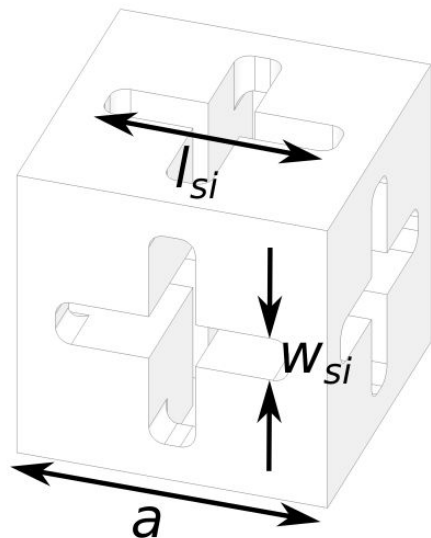




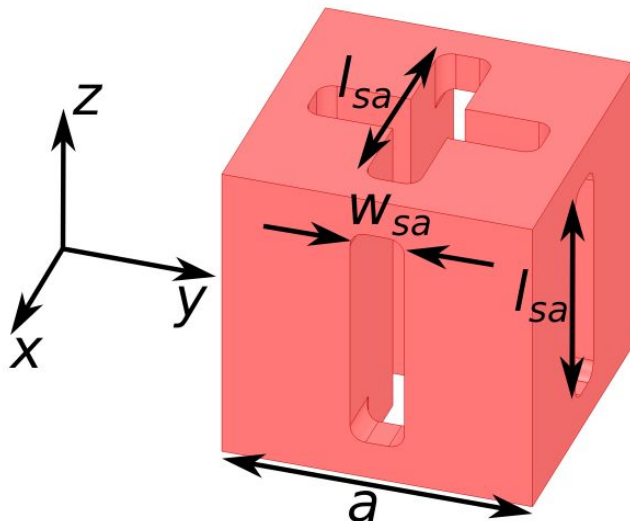
(a) 1.17 GHz



(b) 1.57 GHz



Isotropic Cell
 $\epsilon_r = 10$



Anisotropic Cell

$$\epsilon_r = \begin{pmatrix} \epsilon_x & 0 & 0 \\ 0 & \epsilon_y & 0 \\ 0 & 0 & \epsilon_z \end{pmatrix} = \begin{pmatrix} 10 & 0 & 0 \\ 0 & 10 & 0 \\ 0 & 0 & 22.1 \end{pmatrix}$$

Both cells are made out of Zirconia ($\epsilon_r = 32.5$)

Future work

- 3D-print the proposed antenna
- Perform measurements of the DRA in an anechoic chamber
- Integrate the antenna to a UAV and perform measurements

Publication

Article Title: A Dual-Band Hollow Dielectric Resonator Antenna for GPS Application

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Merci!