Application Use Case Examples

Passive Beamforming Devices for Next-Generation RF Systems

Higher Gain - Reduced SWaP-C

A custom graded-index (GRIN) lens with an integrated conformal radome enhances forward-looking RF performance while maintaining an aerodynamic form factor for drone platforms.

Inkbit enables complex dielectric lens and radome designs that improve gain, protect sensitive RF hardware, and reduce system integration complexity.

Design and Simulation

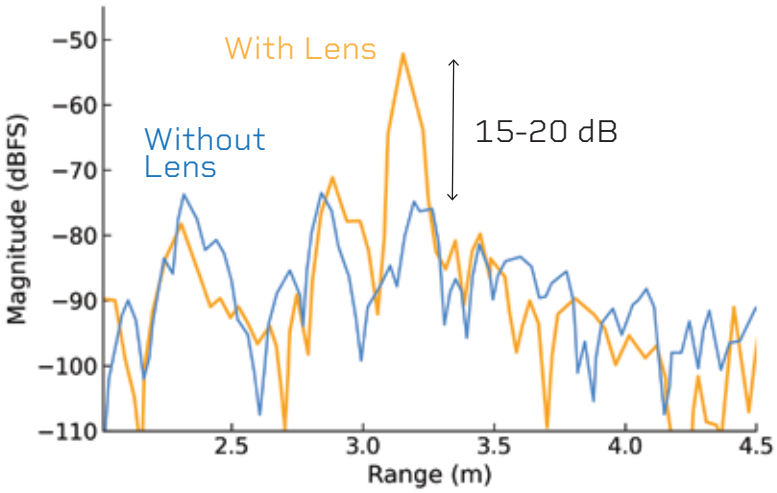
Inkbit provides end-to-end capability from lens design and dielectric engineering to full-wave EM simulation for faster RF component development. With an Infineon XENSIVTM 60 GHz radar sensor, a 30 mm custom lens provides a +17 dB gain enhancement.

7 dBi

Without lens

24 dBi

With lens



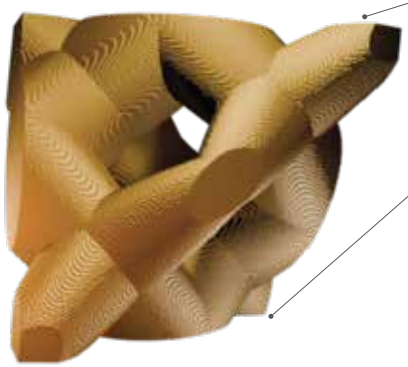
The 3D printed lens amplifies radar return, matching theoretical performance and unlocking new design freedom for next-gen sensing systems.

Precise Dielectric Control

The lens cross-section exhibits a continuously graded GRIN profile engineered to carefully shape RF energy through spatially controlled permittivity.

Inkbit can design lenses with permittivity values from 1.05 to 2.4, enabled by finely resolved features down to 300 µm.

Lens cross-section



Diamond unit cell

Lens Specifications

A custom aspheric GRIN lens with an integrated conformal radome, engineered to maximize the realized gain of a patch antenna array, while preserving a compact, aerodynamic profile for a drone platform.

Unit cell size	3 mm
Lattice type	Diamond
Width	30 mm
Height	30 mm
Minimum D_k	1.1
Maximum D_k	2.0
Weight	20 g
Maximum frequency	80 GHz
Material loss tangent	~0.0015