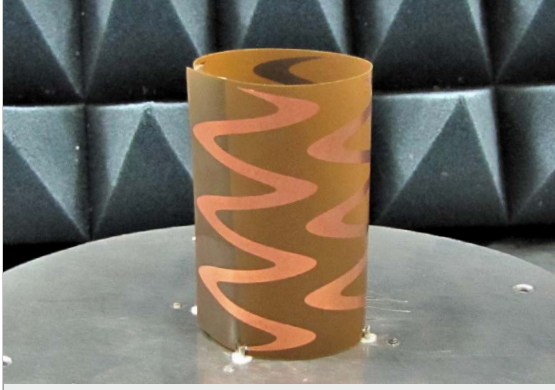
L3HARRIS®
FAST. FORWARD.

ALL-POLARIZATION HELIX ANTENNA

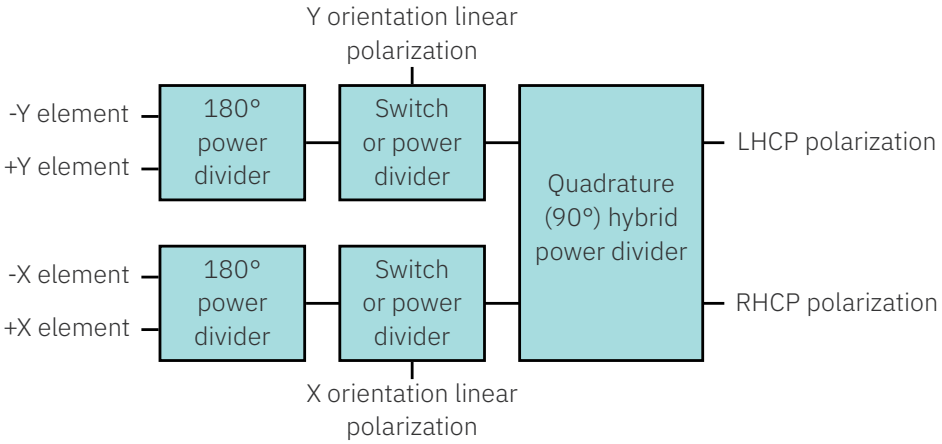


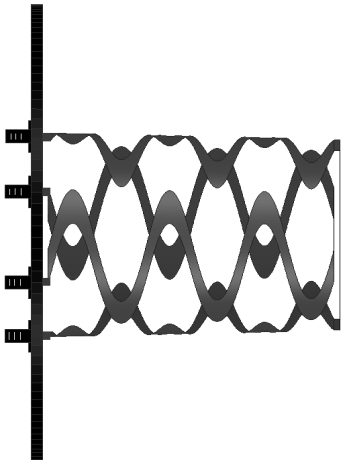
A novel helix alternative, providing higher gain for its size with multiple polarization options

To emulate the high directivity of the axial mode helix antenna while providing multiple polarization capability, L3Harris has developed a cylindrical form antenna using sinusoidal radiating elements.

The performance of this antenna is similar to the axial mode helix except any polarization combination can be synthesized. Units of the antenna are customized to specific gain frequency and size requirements.

Unlike the prior art sinuous antenna the All Polarization Helix Antenna[1] provides gains to +20 dBi or more. Units can be supplied with or without external hybrid power dividers depending on required polarizations/operational requirements.





Profile view of UHF All Polarization Helix Antenna

KEY FEATURES

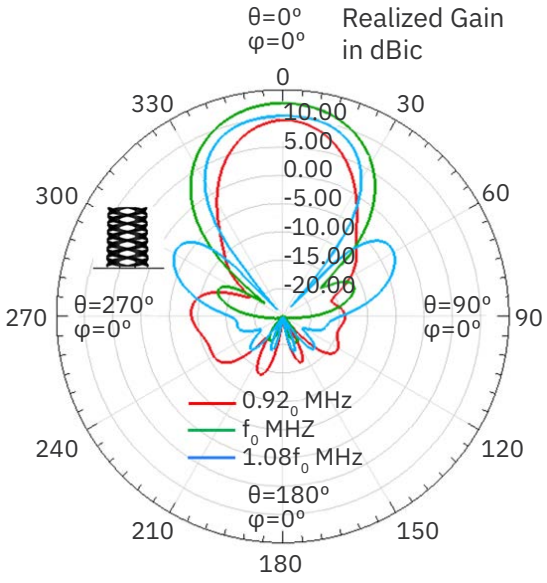
- **Linear polarization**
- **Circular polarization**
- **Dual linear polarization**
- **Dual circular polarization**
- **Up to 60% bandwidth**
- **Gains to 20 dBi plus**
- **Designed for helix upgrade and replacement**

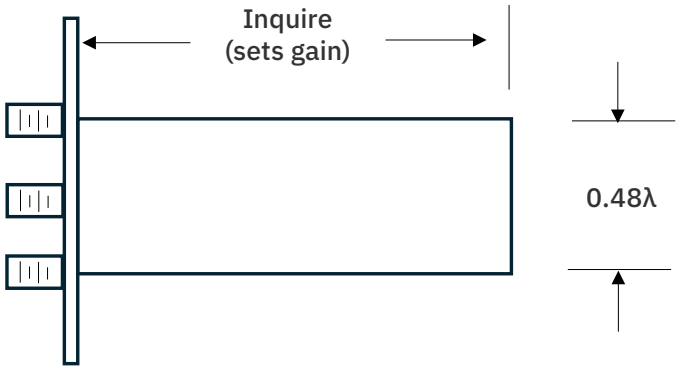
[1] "The All Polarization Helix Antenna", F. Parsche, IEEE iWAT Workshop, Cocoa, FL 2025.

TYPICAL MEASURED PERFORMANCE

Performance varies with choice of antenna size, radome design, manufacturing tolerances, installation and environmental conditions. Radiation pattern is typical for a four element antenna of 0.58λ height without hybrid beamformer.

0.58 WAVELENGTH LONG EXAMPLE	
Port Impedance	50 ohms
Voltage Standing Wave Ratio	<2 to 1 over 18% 3 dB gain bandwidth
Polarizations	All with external hybrids
Element Excitations, Right Hand Circular Polarization	1 ∟0°, 1 ∟-90°, 1 ∟-180°, 1 ∟-270°
Radiation Pattern	Single directive beam
Realized Gain	12.6 dBic
3 Db Beamwidth	42 degrees
3 Db Realized Gain Bandwidth	18%
Sidelobe Amplitude	17 dB down





U.S. Patent Application 18/788, 698

All-Polarization Helix Antenna

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