

A low-RCS Circularly Polarized Reflectarray with a Linearly Polarized Feed

Technology Description

The novel aspect of this project lies in a circularly polarized (CP) reflectarray, uniquely fed by a linearly polarized (LP) source. Circular polarization is favored in communication systems for its reduced loss in multi-path fading marks and transmitter-receiver disorientations.

The reflectarray efficiently produces a directional beam with high gain at its operating frequency while exhibiting a low radar cross-section (RCS) at out-of-band frequencies. This is crucial for communication systems where circular polarization reduces multi-path fading effects and is less susceptible to disorientations.

Technology Components

- Circularly Polarized (CP) Reflectarray
- Linearly Polarized (LP) Source
- High-Gain Directional Beam
- Low Radar Cross-Section (RCS)
- Multi-Path Fading Mitigation
- Transmitter-Receiver Disorientation Resilience
- Defense Radar and Communication Applications

Applications

- Ideal for on-the-move ground radar scenarios
- Minimizes radar cross-section (RCS) for secure communication
- Enhances security in communication systems
- Reduces vulnerability to radar detection
- suited for unmanned aerial vehicles (UAVs)
- Applicable to advanced radar systems on aircraft
- Minimizes radar visibility for discreet monitoring and protection of sensitive areas

Who can be the potential users?

- **Military Organizations:**
Defense agencies and armed forces seeking advanced radar systems for surveillance and communication.
- **Government Agencies:**
National security and intelligence agencies requiring secure communication channels and radar detection capabilities.
- **Aerospace and Defense Contractors:**
Companies developing radar and communication technologies for military applications.
- **Telecommunications Companies:**
Providers looking to enhance communication reliability in challenging environments.
- **Research Institutions:**
Universities and research facilities focused on advancing radar technology and communication systems.
- **Emergency Services:**
Organizations that require reliable communication during disaster response or emergency situations.
- **Private Security Firms:**
Companies providing surveillance and security solutions that benefit from low-detectability radar systems.

List of Features:

- **Circular Polarization Capability:** Efficiently supports circularly polarized signal transmission to reduce multipath fading effects.
- **Directional Beam Formation:** Produces high-gain directional beams tailored to specific communication needs.
- **Low Radar Cross-Section (RCS):** Minimizes visibility in radar applications, enhancing stealth and reducing interference.
- **Wide Operating Frequency Range:** Operates effectively across various frequency bands for versatile applications.
- **Compatibility with Linearly Polarized Sources:** Uniquely fed by linearly polarized sources, allowing for flexibility in integration.
- **Compact Design:** Space-efficient structure suitable for deployment in various environments, including compact devices.
- **Robust Performance in Multi-Path Environments:** Maintains signal integrity in complex environments with multiple reflections.

THEME : IoT(Internet of Things)

DOMAINS :

- Education
(Colleges, Universities, Schools)
- Research & Development
- Electronics Manufacturing
- Telecommunications
- Semiconductor Industry
- Automation & Robotics
- Automotive Electronics

- ❑ **Tech ID : I003**
- ❑ **Patent : Filed**
- ❑ **Owner : Debidas Kundu, Assistant Professor, Department of ECE**
- ❑ **Contact Us : alok@iiitd.ac.in**