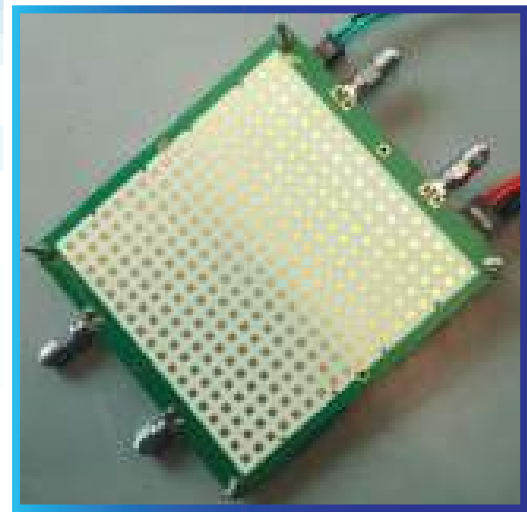




Nxt Gen Communication Technology

Indigenous 5G testbed

- The 5G testbed project was funded by the Department of Telecommunications (DoT) to help Indian startups and companies lead in 5G technology.
- The project aims to create a testing setup that works like a real 5G network, which has supported many commercial 5G rollouts.
- It includes a complete 5G system with base stations and user devices that handle fast internet (eMBB), super-low delay communication (URLLC), and large-scale device connections, including Narrowband IoT.
- The system operates on both sub-6 GHz and mmWave frequencies, and SAMEER has built advanced antenna systems (Massive MIMO) for these frequencies to support the testbed.



mmWave MIMO Antenna



FR1 massive MIMO antenna

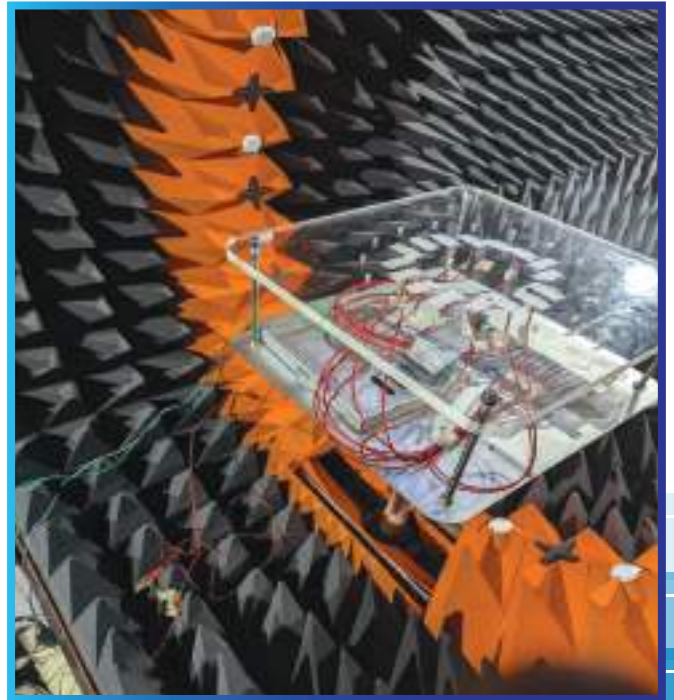
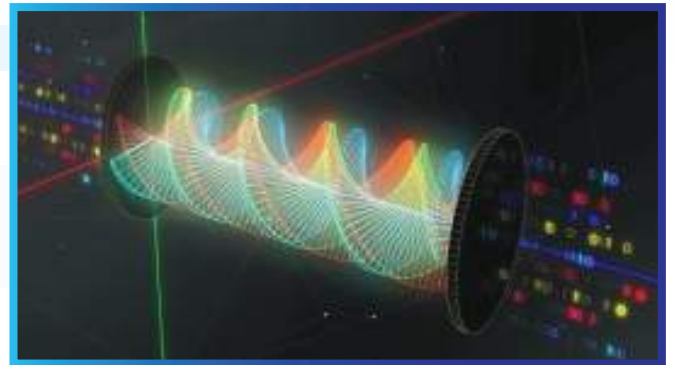




Nxt Gen Communication Technology

6G THz Testbed with OAM Multiplexing

- Orbital Angular Momentum (OAM) is an advanced multiplexing technique that enables high-speed data transmission by combining multiple data channels onto distinct OAM modes within the same frequency band.
- Using a 16-element circular antenna array, this system allows dynamic generation of programmable OAM modes to increase data throughput at mmWave frequencies. This approach offers a promising solution for future high-capacity wireless communication systems.
- A similar concept is currently being explored and implemented at J-band. SAMEER is in the process of establishing a 6G test bed operating at sub-THz and THz frequencies.

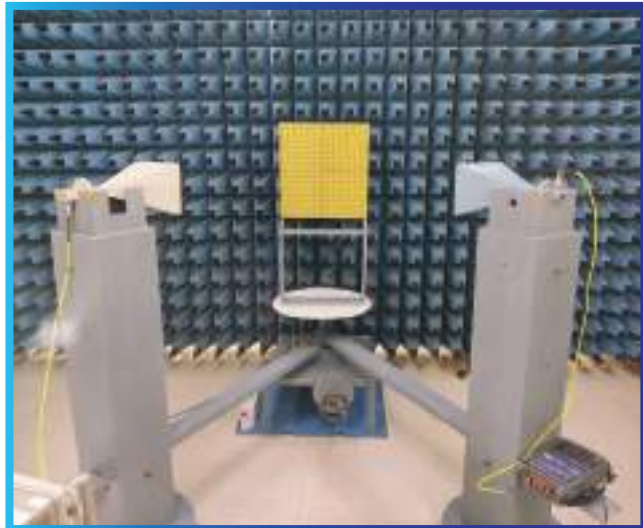




Nxt Gen Communication Technology

6G Intelligent Reflecting Surface (IRS)

- Intelligent Reflecting Surfaces (IRS) are set to play a vital role in 6G wireless networks by enabling smart and reconfigurable radio environments.



- IRS can dynamically control incident signals to focus them in intended direction to establish non-line-of-sight (NLoS) communication link with enhancing coverage, reducing interference, and improving energy efficiency.
- By overcoming challenges like signal blockages and fading, IRS becomes essential for delivering reliable, low-latency, and high-capacity 6G communication.





Nxt Gen Communication Technology

Antennas for 6G communication

- Antennas for 6G communication are required to meet rigorous demands of sub-THz and THz frequency bands, enabling ultra-high data rates and low-latency connectivity for advanced applications. SAMEER has developed three specialized antennas to address these 6G requirements.

