

SAC, PRL scientists showcase hack-proof communication tech

- [Home](#)
- [Ahmedabad](#)
- [Cover Story](#)
- SAC, PRL scientists showcase hack-proof communication tech

- Neha Amin
- 03-02-2022 06:00 AM



“It's big achievement for India. We are looking at hack-proof communication which would slowly replace radio communication. The 'heart' of the system has been developed in PRL

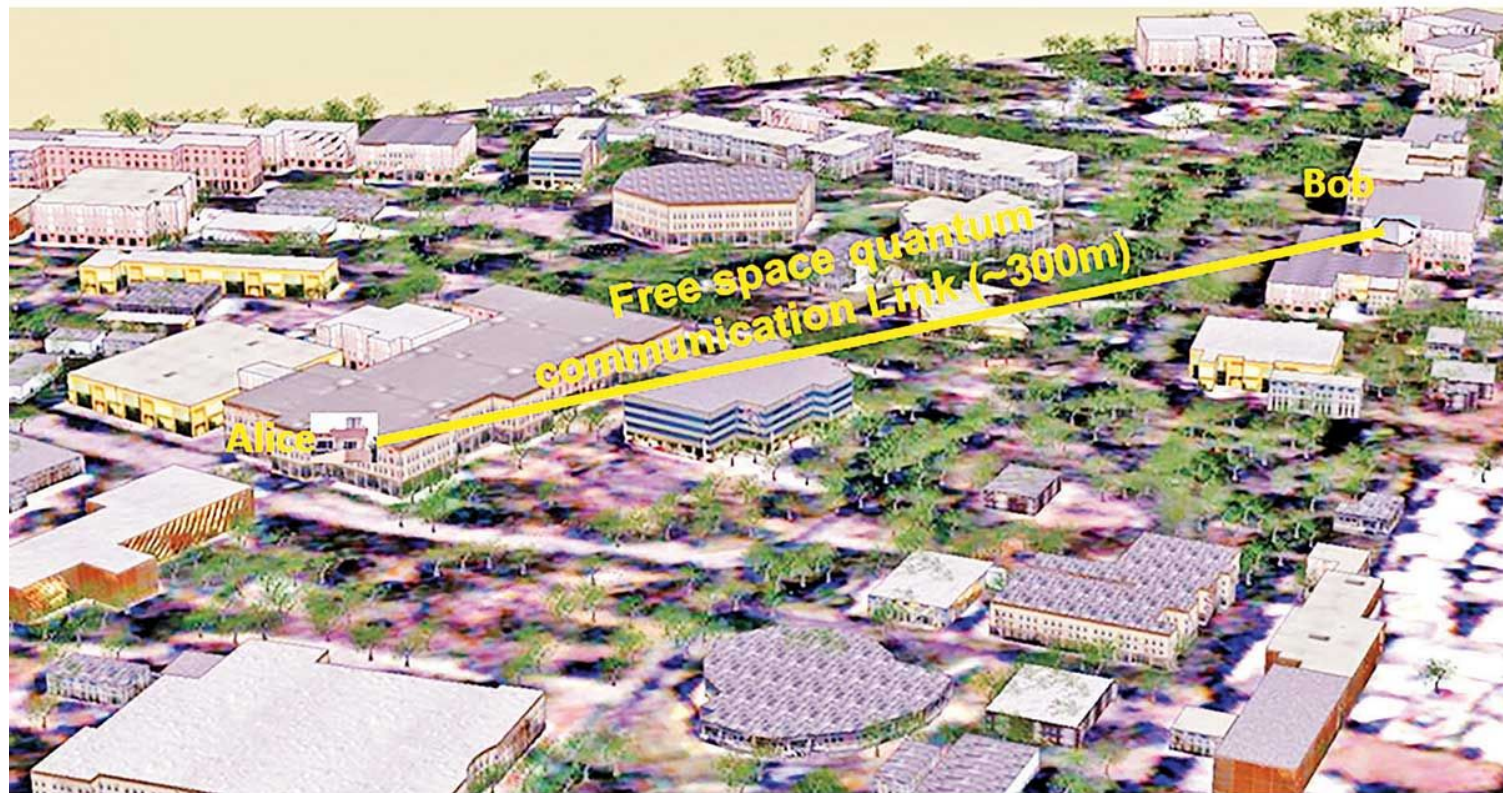
—Anil Bhardwaj, Director, PRL



“SAC demonstrated the technology using a single photon last year which is useful for high data transfer. The latest quantum entanglement offers more data security

—Nilesh Desai, Director, SAC

1 / 2



2 / 2 In the next phase, distance between testing points will be extended to several kilometres

City-based Physical Research Laboratory and Space Applications Centre scientists demonstrate unbreakable ‘quantum entanglement’ technology; set up network between two buildings 300 metres apart, exchange audio-video messages that cannot be hacked; distance to be in kilometres in next phase

In a major breakthrough for India amid the Pegasus row, city-based Physical Research Laboratory (PRL) and Space Applications Centre (SAC) scientists have demonstrated hack-proof satellite-based communication. The technology, which uses the concept of “quantum entanglement” will make it impossible to hack any communication in future.

In layman’s terms, quantum entanglement is the behaviour of atomic particles like photons to act as a unified body even though they are apart from each other. The concept is at the core of futuristic quantum computing. It also has applications in building unbreakable encryption technology and scientists world over are working on it. The demonstration was conducted last week at SAC Ahmedabad between two buildings 300 metres apart. During the demo, scientists indigenously created an atmospheric channel on the ground to share quantum-secure text, images and videos between the two points. The experiment was repeated over several nights to check the robustness of the system.

Quantum communication is one of the safest ways of connecting two places with high-level codes and quantum cryptography that cannot be decrypted or broken by an external entity. If a hacker tries to crack the message in quantum communication, it changes its form in such a manner that the sender gets alerted and the message gets altered or deleted. ISRO chief S Somnath, PRL Director Anil Bhardawaj and SAC (Ahmedabad) Director Nilesh Desai were present to witness the demonstration during which various images were transmitted over a classical channel from one building to another. They were then decrypted at the receiving terminal in real-time.

The feat comes after an earlier breakthrough demonstration of quantum secure videoconferencing by SAC-ISRO using “prepare-and-measure” quantum communication technology, in free space, over a distance of 300 metres in March last year.

India has been working on the system for a long time. China demonstrated quantum communication in a laboratory over a coiled optical fibre up to 404 kilometres long. Commenting on the breakthrough, PRL Director Anil Bhardwaj said, “This is a big achievement for the country. We are looking at hack-proof communication which would slowly replace radio communication. The ‘heart’ of the system has been developed in PRL. Many countries are working on the system and India has now successfully demonstrated it. Initially, we demonstrated it across 300 metres, which will be subsequently increased to several kilometres.”

SAC Director Nilesh Desai said, “The quantum entanglement system is a milestone in secured communications. SAC demonstrated the technology using a single photon last year which is useful for high data transfer. The quantum entanglement offers more security. The application of this technology is for PIN numbers which are mostly used for commercial transactions. SAC will use the technology on an experimental basis in a satellite to be launched in six months to one year. The system would be fully used in PSLV by 2024.”

Need for speed, security

In March 2021, ISRO had successfully demonstrated free-space Quantum Communication over a distance of 300 m. The demonstration included live video conferencing using quantum-key-encrypted signals. This was done using a single photon system which stressed on data transfer. While the latest demonstration uses quantum entanglement which focuses more on security.

More