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(57) Abstract :
[031] The present invention discloses a quantum-enabled satellite system equipped with a dynamically adjustable beamwidth mechanism designed to enhance targeting precision and optimize communication performance. The system integrates quantum communication capabilities for secure data transmission using quantum key distribution (QKD) protocols, such as BB84 and E91. A key feature of the invention is its ability to modulate the divergence of the communication beam using an optical phased array or tunable lens assembly, which adapts in real-time based on environmental conditions, target movement, and operational parameters. An onboard artificial intelligence (AI) processor analyzes continuous sensor data to predict target behavior and adjust the beam's divergence angle accordingly, ensuring efficient and secure signal delivery. The system also incorporates a feedback loop for continuous optimization of beam alignment, enabling high-precision communication in dynamic environments. The modular design of the system allows for scalability and integration with satellite constellations, making it suitable for a wide range of applications, including secure governmental communications, military surveillance, and global quantum communication networks. Accompanied Drawing [FIGS. 1-2]

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