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OPTICAL SATELLITE NETWORK DESIGN BASED ON CHINA'S DATA RELAY SATELLITE  
SYSTEM

**Abstract**

Data Relay Satellite can be used as the backbone of the space-based information transmission network node because of its high orbit and large bandwidth. A kind of satellite optical network based on the China's Data Relay Satellite System is proposed in this paper, which has multi-layers architecture with GEO satellites and HEO satellites to achieve 100% global coverage. The optical satellite network is designed at very high rates with more than 10Gbps, using multiple ground stations, laser communication for inter-satellite links, and laser/microwave hybrid communication for satellite-to-ground links. In this paper, the physical network topology of the optical satellite constellation is optimally designed. Moreover, the operation mode of the network is discussed taking space station for example. Finally, the coverage, visible time and transmission delay are simulated and analyzed, which demonstrate the feasibility of the optical satellite network configuration.