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## ARCHITECTURE OF NEW GENERATION DATA RELAY SATELLITE SYSTEM

**Abstract**

Based on the future trends of satellites, manned spacecraft and deep space exploration missions, requirements for new generation relay satellite system are analyzed, especially, Chinese new data relay satellite system in detail. Firstly, the paper briefs the past development of the data relay satellite system of major countries and organizations. After that, the paper discusses the architecture of new generation relay satellite system, including selection of satellite platform, multi-access technology, new signal waveform and network protocols, etc. Especially, the link waveform suitable for new generation data relay satellite system is studied in detail. It is demonstrated that the new waveform can increase the data rate of the present Chinese data relay satellite system from 150Mb/s to be more than 900Mb/s. The update demonstration experiment result and conclusion are presented in the paper. The study shows that: In order to let the link data rate to be 10 Gb/s or more, laser communication link or the higher efficient bandwidth waveform for the radio link should be applied. To reduce the system cost and operation budgets, the new generation data relay satellite should be designed as a dedicated satellite to meet a specific requirement, such as deep space missions, and whose satellite platform should be shared with satellite communications systems or other payloads. With the development of the CR and SDX technology, new waveform and multi-access technology are key factors to improve the specifications of new generation data relay satellite system. Considering latency and asymmetric data rate of the data relay link, DTN protocol should be used as the backbone network protocol of new generation data relay satellite system.