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Abstract

Nanosatellites become more and more attractive for future space missions because of high cost effectiveness and flexibility. These high integrated satellites with a mass up to 10 kg gain more importance for space missions such as messaging services, disaster monitoring and earth observation. Distributed satellite systems with inter-satellite links provide enhanced system capabilities with respect to time-delay, system redundancy and availability. An interaction among the satellites requires an adapted network architecture. Therefore, to satisfy the required system constraints in diverse missions a concept for a satellite network architecture is proposed. The main focus is laid on nanosatellite network topologies with short and medium distances up to some 100 km applying one single (radio frequency) working channel. Potentially applicable multiple access techniques like CDMA, FDMA and TDMA are discussed and evaluated. The results show, that time division duplex scheme with session-oriented point-to-point protocols in data link layer is more suitable for selected missions and strong resource limitations in nano spacecraft platforms. Furthermore, an applicable layer model is defined and a possible protocol implementation is outlined.