

SPACE COMMUNICATIONS AND NAVIGATION SYMPOSIUM (B2)
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xwm@nssc.ac.cnVCM-OFDM TECHNIQUE FOR ADVANCED SPACE COMMUNICATIONS SYSTEM WITH HIGH
SPECTRAL EFFICIENCY**Abstract**

The development of precious scientific payloads brings higher demand on the efficiency of space communications system to transmit the increasing volume of scientific data. Aiming to this issue, Orthogonal Division Multiplexing (OFDM) is chosen for its inherent capability of high-rate data transmission. Further, we propose a new technique which combines Variable Coding Modulation (VCM) with OFDM to enhance both the high transmission reliability and communication link spectral efficiency. With VCM-OFDM technique, the channel coding and modulation mode (CODMOD) can be variable in each sub-channel according to the link conditions, in order to fit the link budget curve and maintain a relatively fixed link margin. Hence, link resource waste can be reduced and throughput can be remarkably improved. Considering that OFDM-based systems are sensitive to Doppler shifts/spread, the CODMOD selection should be optimized subject to this scenario. This paper introduces the architecture of near-earth space data transmission system based on VCM-OFDM technique. The Doppler influence is analyzed through simulation and the CODMOD selection algorithm is discussed. The results prove the high performance on spectral efficiency enhancement of VCM-OFDM by comparison with several existing alternative methods.