

IAF SPACE COMMUNICATIONS AND NAVIGATION SYMPOSIUM (B2)  
Interactive Presentations - IAF SPACE COMMUNICATIONS AND NAVIGATION SYMPOSIUM (IPB)

Author: Mrs. Yanmei Jia  
University of Chinese Academy of Sciences, China

Ms. Hangfei Zhang  
University of Chinese Academy of Sciences, China

Mr. Guoqing Tian  
University of Chinese Academy of Sciences, China

Dr. Zhong Hongen  
Technology and Engineering Center for Space Utilization, Chinese Academy of Sciences, China

RESEARCH ON HIGH-THROUGHPUT DATA ROUTING TECHNOLOGY FOR LOW-EARTH-ORBIT  
(LEO) MEGA-CONSTELLATIONS ALL-OPTICAL NETWORKS

**Abstract**

The development trend of the low-earth-orbit (LEO) mega-constellations Internet is moving towards an all-optical network, which effectively addresses the issue of limited frequency resources in a mega-constellation and enhances system capacity. To optimize routing strategies and further improve data exchange throughput within the mega-constellation all-optical network, we propose a high-throughput data exchange technology that utilizes optical network coding to double the optical network's throughput in a mega-constellation. Through numerical simulations, we analyze the performance of this approach. Additionally, by leveraging regularity, symmetry, and predictability in satellite distribution patterns, we evaluate and analyze hop numbers within the mega-constellation all-optical network with a focus on minimizing inter-satellite forwarding hops. These findings provide valuable insights for designing efficient routing strategies within such networks.