53rd IAA SYMPOSIUM ON SAFETY, QUALITY AND KNOWLEDGE MANAGEMENT IN SPACE ACTIVITIES (D5)
Quality and Safety, always a beginning! (1)

Author: Dr. S.W. Chiu
Viterbi School of Engineering, USC, United States

Prof. David Barnhart
University of Southern California, United States

DEVELOPING GLOBAL SAFE AND SECURE PRACTICES FOR RENDEZVOUS AND PROXIMITY OPERATIONS (RPO) IN A TIME OF GEOPOLITICAL FLUX

Abstract

2019 had been a busy year for the space sector. With the celebration of the 50th anniversary of the moon landing, and China's lunar programme on the far side of the moon, it should have been an incredible time to push the frontier of space science and collaborations. As we entered 2020, however, the technology industry and the International Science and Technology community found themselves operating in an increasingly testing environment for business and scientific collaboration. The increasing commercialization of the space industry has brought new challenges to orbital congestion and spectrum governance. Coupled with deteriorating inter-State rivalry manifested through technology trade discord, recent technology policy developments have cast a sombre shadow over what should have been a golden era of scientific advance. With new initiatives in the domains of space mining, space debris removal, and satellite life extension, there should have been vibrant discussions on interoperability, as well as rendezvous and docking standardization. However, as the space domain has in the past years been categorized as a "contested" domain by some actors, there has been surprisingly limited expansion of discussions in standardization and establishing interoperability, with many citing safety and security concerns for refraining from advances in international standardization initiatives. Previous literature has well established that the expansion of the space economy cannot be achieved without maturing global standards and interoperability. Understandably, safety and security are two major concerns in today's climate. How can rendezvous and proximity operations (RPO) be advanced without compromising the safety and security of existing and future satellites? How can we ensure that new business model, such as refuelable and repairable satellites, can ensure the integrity of future satellites against malicious attempts in rendezvous or docking? This paper seeks to examine both technical, policy, as well as political options that major space stakeholders could consider in the areas of standards and interoperability, providing a comprehensive evaluation of viable ways to expand space activities in a cost-effective and sustainable manner in a time of heightened concerns for satellite safety and security.