

22nd IAA SYMPOSIUM ON SPACE DEBRIS (A6)  
Operations in Space Debris Environment, Situational Awareness - SSA (7)

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CONJUNCTION ASSESSMENT AND COLLISION AVOIDANCE: NASA BEST PRACTICES FOR  
SPACE SUSTAINABILITY

**Abstract**

A significant increase in the volume and diversity of activity in space means that it is becoming increasingly congested. Emerging commercial ventures such as satellite servicing, in-space manufacturing, and space tourism as well as new technologies enabling small satellites and large constellations of satellites present serious challenges for safely and responsibly using space in a stable, sustainable manner. To meet these challenges, NASA seeks to improve global awareness of activity in space by publicly sharing flight safety-related information and by coordinating its own on-orbit activity in a safe, responsible manner. In this way NASA can bolster stability and reduce current and future operational on-orbit risks so that space is sustained for future generations. To that end, in December 2020 the National Aeronautics and Space Administration (NASA) published a Spacecraft Conjunction Assessment and Collision Avoidance Best Practices Handbook that reflects how NASA currently operates, which has evolved over time. Consideration is given to important topics such as spacecraft and constellation design; spacecraft “trackability;” pre-launch preparation and early launch activities; on-orbit collision avoidance; and automated trajectory guidance and maneuvering. It may prove useful for entities offering, or intending to offer, Space Situational Awareness (SSA) or Conjunction Assessment (CA) services to consider such examples of responsible practices from the perspective of augmenting these types of capabilities. As technology and innovation continues to improve upon existing capabilities, what kind of new challenges are presented to the SSA community? Can space exploration and commercial ventures thrive while keeping paramount the safety and protection of the space environment?

This paper describes how operators can use the NASA Handbook to assist in developing a robust conjunction assessment operations process. It also presents examples of responsible practices for spacecraft Owners/Operators (O/O) to consider for lowering collision risks and operating safely in space (in Low Earth Orbit (LEO) and beyond) in a stable and sustainable manner. The presentation will also address parts of the Handbook that have proven to be problematic for operators and the studies and analyses the Agency is pursuing to create workable alternatives.