

55th IAA SYMPOSIUM ON SAFETY, QUALITY AND KNOWLEDGE MANAGEMENT IN SPACE  
ACTIVITIES (D5)

Knowledge management in the digital transformation (2)

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AN EXAMINATION OF INCENTIVES FOR INFORMATION SHARING TO ACCOMPLISH  
TRANSPARENT SPACE ACTIVITIES AND RESPONSIBLE CONJUNCTION AVOIDANCE

**Abstract**

With the advent of mega-constellations in Low Earth Orbit (LEO), now more than ever, comprehensive information and knowledge sharing is critical to ensuring space actors have equitable and undistributed access to their operational orbits without fear of maneuvering stand-offs leading to conjunctions. This has been a critical area in which an industry thought leader, SlingShot Aerospace, has been working to ingest multiple data sources from external sources and spacecraft operators to best estimate conjunction events as well as track and broadcast ongoing space activities and environmental concerns. To further enhance this vision of a transparent and responsible space, Orbit Fab in this paper will examine methods which would incentivize responsible information sharing for parties to best reach equitable conclusions to the current norm of maneuvering stand-offs that least disrupt operations. This could include tracking, fuel capacity and level, fuel type, thruster(s) specific impulse, wet mass, dry mass, current orbit, ideal/target orbit(s) and ConOps, lifetime station-keeping needs, predicted remaining avionics life, predicted remaining fuel life, and a variety of other parameters to understand each stakeholder’s needs and interests, and give transparency to parties as to the operational handicap this might provide, allowing them to understand each other’s positions and negotiate ahead of time with the least amount of friction possible. How these negotiations might go will be further explored in this paper, including recommendations on common agreement types and terms that could be used to reach resolutions. This will include discussion on a variety of potential maneuvers (or non-actions) that could be performed to best avoid this and future conjunctions while adhering to current and future orbit requirements with the lowest fuel and comprised-revenue expenditures. Within this incentive framework concerns over privacy and competition will also be addressed with input from key parties. The belief of the authors is that long term, this

could be implemented with a refueling architecture and some form a “refueling credits” system that could incentivize and track responsible space actors to act in good faith to keep space safe, which will be further elaborated on in this work.