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HOW ON ORBIT FUELING SUPPORTS THE DEORBIT TUG BUSINESS CASE

**Abstract**

In today's global space economy there are roughly 2300 satellites currently in operation, hundreds more out of services, and thousands of pieces floating around. The FCC has authorized more than 7500 satellites in 2018 to be launched in the near future. Even with a 1

Currently, deorbiting tugs are planned to be launched with satellite constellations and will remove any failed satellites to prevent collisions. However, due to their limited propellant tank size, they can only serve at most three satellites. To increase the total amount of missions each deorbiting tug can execute is to increase the size of the spacecraft, significantly increase the size of the fuel tank, or to refuel. A larger tank, and subsequently, a larger spacecraft is not an efficient nor cost-effective way to extend missions per tug. With an increase in size comes a subsequent increase in cost across the entire mission including launch, AIT, insurance, fuel, etc.

Through refueling, a deorbiting tug can increase the number of missions by three times allowing the servicing company to have more business model flexibility and "optionality" for each spacecraft. The key to refueling is the availability of a wide range of propellants for the servicing vehicle to use, such as Hydrazine and Xenon.

This paper will look at how refueling supports the deorbiting mission case by cutting a servicing company's total operating cost by eliminating the need to build and launch multiple fleets of servicing spacecraft.