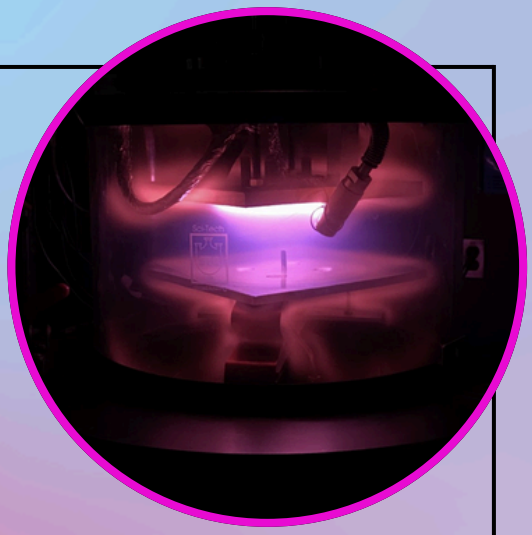
Thesis Defense



LEO DRAG SAIL DEGREDATION DUE TO ATOMIC OXYGEN & ULTRAVIOLET RADIATION

As the orbital debris population grows, so does the risk to active spacecraft. In response, the FCC reduced the required time to deorbit from 25 to 5 years. Many low area to mass ratio objects, such as CubeSats, cannot passively comply under the new regulation. One purposed solution is to deploy a drag sail at end of life to increase drag and therefore speed up orbital decay. However, atomic oxygen in low Earth orbit degrades the sail's thin membrane. This study examines the survival of single-sided aluminized Mylar when exposed to atomic oxygen and vacuum ultraviolet radiation. Fifty-two tests were conducted. An inverse prediction model was developed to estimate Mylar survival as a function of AO exposure. Using the results of the AO test data, an orbit simulation is developed that models deorbit with a drag sail in an AO environment. Results indicate deorbit time is highly sensitive to sail size and solar activity.

Friday, June 6th @ 2:10-4:00 PM
Building 41, Room 122

Microsoft Teams

Hannah Rost