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## Orbit Decay Predictions of Low Earth Orbit Satellites and the DeorbitSail

*Tuesday, 10 July 2012 15:30 (20 minutes)*

### Abstract content <br> &nbsp; (Max 300 words)

Spacecrafts are exposed to risk of collision with orbital debris and operational satellites throughout its launch, early orbit and mission phases. This risk is especially high during passage through or operations within the Low Earth Orbits (LEOs) region. Hence, understanding the lifetime of these spacecrafts in LEOs would be useful for studying long term evolution of space objects population, assessing the impacts of these objects on active spacecrafts, and the effects of increased drag on spacecrafts (DEORBITSAIL / Solar Sail deorbiting).

This paper investigates the present orbit decay progress of the SUNSAT micro satellite by using relevant orbital parameters derived from historic Two Line Element (TLE) sets and comparing with decay and lifetime prediction models. A semi-analytical Liu theory is employed to determine the mean elements and expressions for the time rates of change as well as relevant software developed to implement the decay theory.

Test cases of observed decayed satellites and other decaying satellites would be used to evaluate the predicted theory.

A proposed orbital debris solution/ technology known as DEORBITSAIL would also be investigated to get insight on possible phenomenon that could reduce the lifetime of spacecrafts and manned space flights with regards to de-orbiting using aerodynamic drag and solar radiation pressure and solar sail de-orbiting

### Apply to be<br> consider for a student <br> &nbsp; award (Yes / No)?

yes

### Level for award<br>&nbsp;(Hons, MSc, <br> &nbsp; PhD)?

MSc

### Main supervisor (name and email)<br>and his / her institution

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### Would you like to <br> submit a short paper <br> for the Conference <br> Proceedings (Yes / No)?

Yes

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