UNISEC-Global Study
IAA Study Group  SG4.23

- Post-Mission Disposal for Micro and Smaller Satellites: Concepts and Trade Studies
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Chapter 1
Overview
Process to identify best Post Mission Disposal (PMD) solution
Manage space and ground safety

Chapter 2
Explain Debris Mitigation Guidelines (and relevant international/national standards and laws)

Chapter 3
Determine orbital lifetime of a satellite
Manage space safety

Chapter 4
Determine if satellite will survive reentry
Manage ground safety

Chapter 5
Propulsion and increase drag force\(^{(1)}\) by increasing area exposed to atmospheric drag

Chapter 6
Induce non-drag force\(^{(2)}\) on satellite

Chapter 7
Trade study results between options outlined in Chapters 5 and 6 to guide selection of best approach for your satellite

Note: Removal within 25 years after mission is the maximum allowable, strive for shorter orbital lifetime since this threshold could be shortened in the future and it is responsible behavior to minimize your effects on other space operators.

Note: Case studies of related laboratory & space demonstrations will be embedded in Chapters 5 & 6.

Note: (1) Drag force: change in orientation, extend appendages, deploy drag augmentation, etc. and (2) Non-drag force: solar sail and electrodynamic tether

Note: PMD Trade Study provides guidelines for (1) effectiveness (by altitude, spacecraft functionality, and mass), (2) efficiency relative to cost ($, size, mass, and power), and (3) complexity/reliability. Effectiveness is measured by reduction of lifetime while minimizing collision time-area (i.e., reduce orbital lifetime but do not increase hazard to other space objects in the process).

Note: For satellite mass below 500kg of typical materials no debris will survive to the ground.

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<td>Sergey Trofimov for Solar Sail (use solar radiation pressure) Satomi Kawamoto for Electrodynamic Tether (use Earth’s magnetic field via Lorentz Force)</td>
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