UNISEC-Global Study
IAA Study Group SG4.23

- **Post-Mission Disposal for Micro and Smaller Satellites: Concepts and Trade Studies**
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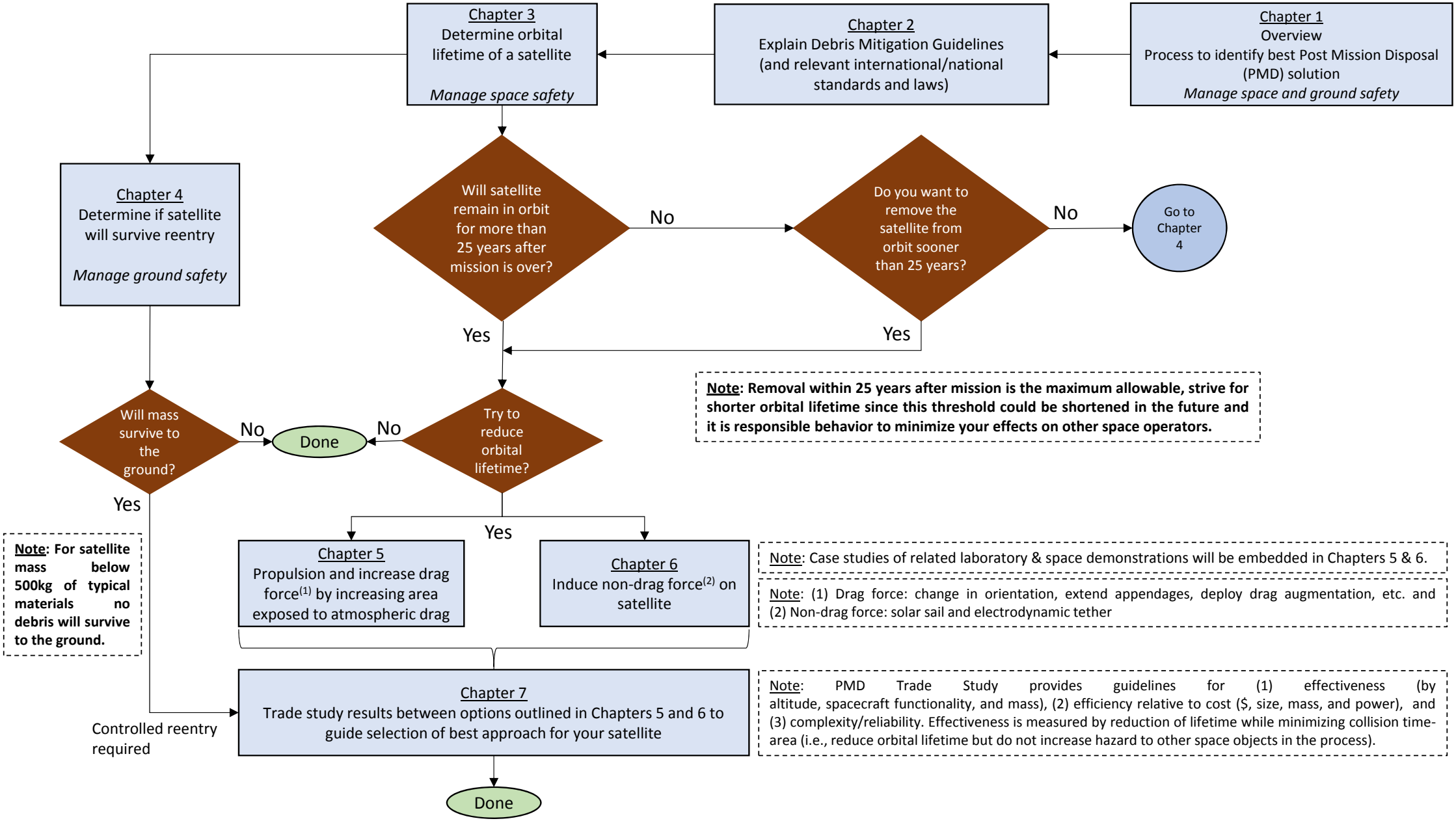
Chapter 1
Overview
Process to identify best Post Mission Disposal (PMD) solution
Manage space and ground safety
Chapter 2
Explain Debris Mitigation Guidelines (and relevant international/national standards and laws)
Chapter 3
Determine orbital lifetime of a satellite
Manage space safety
Chapter 4
Determine if satellite will survive reentry
Manage ground safety
Will satellite remain in orbit for more than 25 years after mission is over?
No
Do you want to remove the satellite from orbit sooner than 25 years?
No
Go to Chapter 4
Yes
Yes
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.
Will mass survive to the ground?
No
Done
No
Try to reduce orbital lifetime?
Yes
Yes
Note: For satellite mass below 500kg of typical materials no debris will survive to the ground.
Chapter 5
Propulsion and increase drag force(1) by increasing area exposed to atmospheric drag
Chapter 6
Induce non-drag force(2) on satellite
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
Controlled reentry required
Chapter 7
Trade study results between options outlined in Chapters 5 and 6 to guide selection of best approach for your satellite
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).
Done

Authors and Status

Chapter	Pages	Drafter(s)	Status	Comments
1. Overview	2	Darren McKnight	Draft Done	
2. Mitigation Guidelines	10	Christophe Bonnal		
3. Determine Orbital Lifetime	15	Darren McKnight and Alim **Rustem** Aslan	Draft Done	
4. Reentry Survival	10	Dave Spencer	Draft Done	
5. Propulsion and Drag Force	15	Norman Fitz-Coy, Mohammed Khalil Ibrahim, and Lourens Visagie		
6. Non-drag Force	15	Sergey Trofimov for Solar Sail (use solar radiation pressure) Satomi Kawamoto for Electrodynamic Tether (use Earth's magnetic field via Lorentz Force)		
7. Trade Study	20	Juan Carlos Dolado Perez, Marlon Sorge, and Klaus Schilling	Outline Done	