The Zero Debris Technical Booklet

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The Zero Debris Community - consisting of spacecraft developers, operators, space agencies, researchers, and regulators - has recently released the Zero Debris Technical Booklet to accompany its Zero Debris Charter. The booklet is a compendium of the technologies required to prevent and reduce space debris, and to ensure that satellites are de-orbited in reasonable timeframes. It also covers space traffic coordination, preventing casualties on the ground from re-entering space debris and understanding the impact of re-entry on the atmosphere, along with protecting the dark and quiet skies.

Six chapters on different aspects of space debris:

1. Prevent release of debris

Avoid unintentional release of debris in orbit

Do not intentionally release debris

2. Guarantee timely and successful clearance

Improve orbital clearance with high probability of successful de-orbiting

Prepare space objects for removal

Demonstrate removal services

3. Prevent debris generation through break-ups or collisions

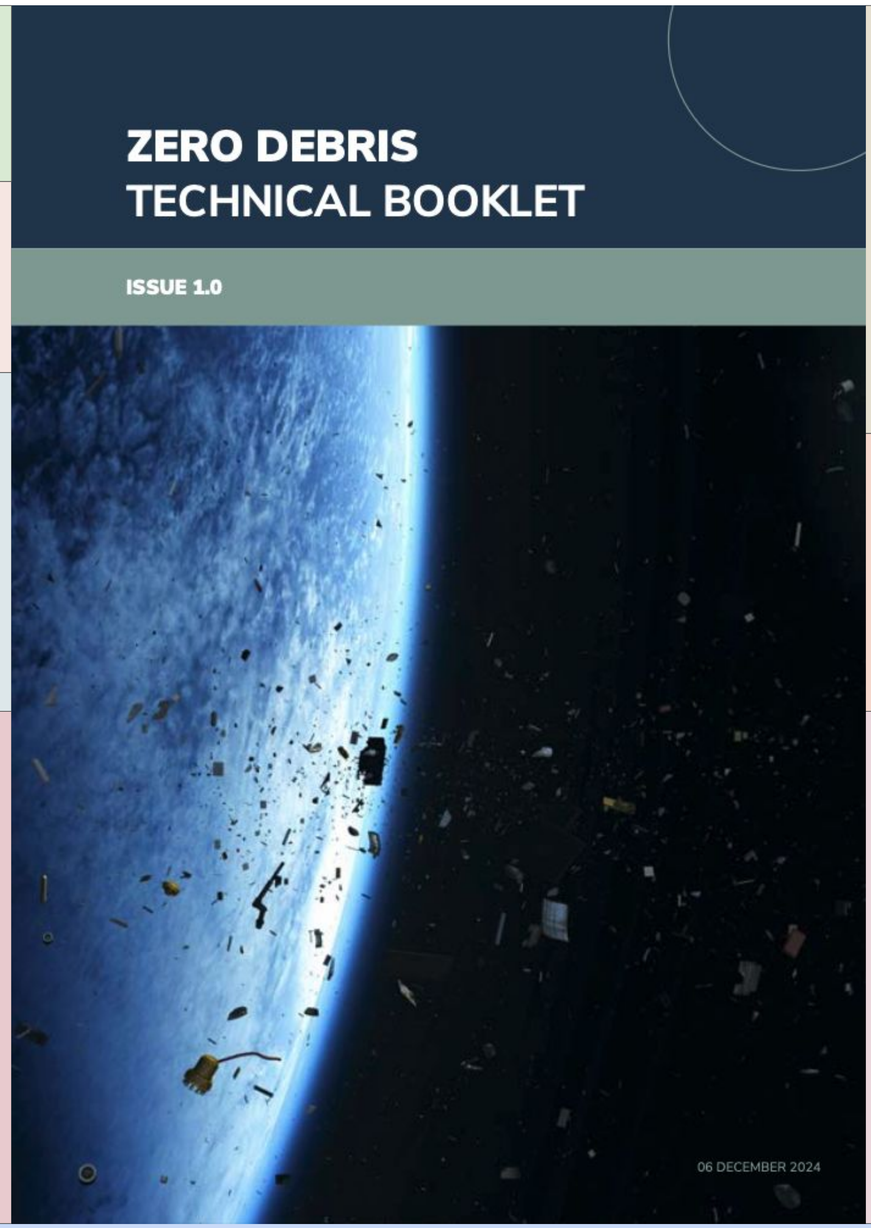
Improve collision risk assessment

Standardised evaluation of implied and encountered risks

Improve collision avoidance capabilities during design stage

Minimise risks linked to untrackable objects by design

Minimise risks of internal break-ups



4. Improve space traffic surveillance and coordination

Improve space traffic coordination and information sharing

Improve space surveillance performance

Enhance correlation and uncertainty quantification methodologies

Robust tasking of tracking for larger catalogues

5. Prevent casualties on ground

Reduce risks linked to uncontrolled re-entry

Reduce technical impacts of controlled re-entry

Minimising debris impacts on human population and infrastructure

6. Understand and mitigate adverse consequences of space objects and debris

Understand environmental impacts of re-entry

Protect Dark and Quiet Skies

Prediction and mitigation of the unintended emission from space objects and debris to protect the integrity of astronomical observations

Prediction of interference caused by intended emissions

The Booklet is regularly discussed at Zero Debris and Clean Space conferences, with plans for a coordination group to make regular updates to cover the technical methods to achieve Zero Debris by 2030. Feedback and contributions are welcome!