DRAMA/MIDAS Clinic

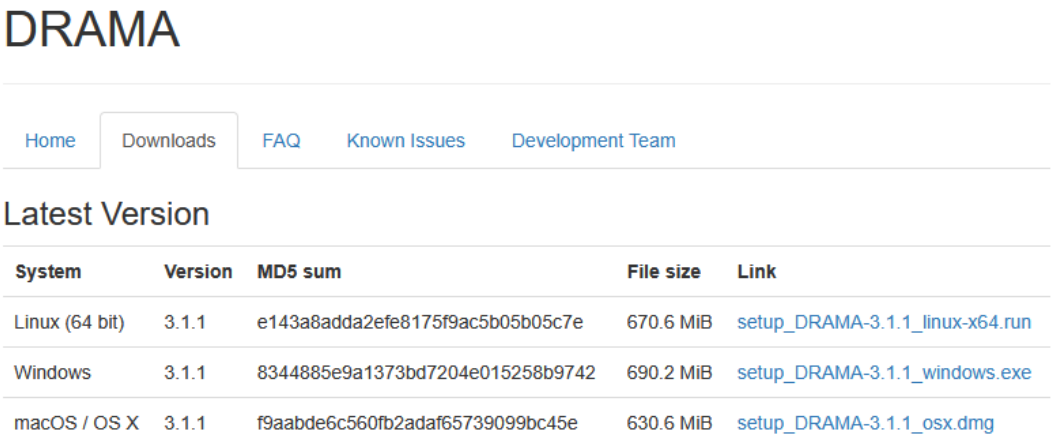
Space Debris Office

12/06/2025

Debris Risk Assessment and Mitigation Analysis (DRAMA) Software

Available through https://sdup.esoc.esa.int/drama/

- ARES – Assessment of Risk Event Statistics: To consider the possible requirements for collision avoidance manoeuvres during a mission
- **MIDAS – MASTER (-based) Impact Flux and Damage Assessment Software: To model the collision flux and damage statistics for a mission**
- CROC – Cross Section of Complex Bodies: To compute the cross-section of a self-designed complex body
- OSCAR – Orbital SpaceCraft Active Removal: To compute the orbital lifetime and assess post-mission disposal strategies
- SARA – Re-entry Survival and Risk Analysis: Combines two tools for the re-entry (SESAM) and risk (SERAM) analysis



DRAMA/MIDAS Requirements, Documentation & Tutorials

- MASTER population files
  - Available through: https://sdup.esoc.esa.int/master/downloads
  - Latest version: 2408 (Reference Epoch in August 2024)
- Helpful documentation
  - https://sdup.esoc.esa.int/drama/downloads
- Training and Tutorials
  - https://sdup.esoc.esa.int/drama/downloads
- ESA Guidelines and requirement verification docs
  - https://sdup.esoc.esa.int/documents/

Documentation

Document	File size	Link
Final Report DRAMA-2.0.0	3.5 MiB	DRAMA-2.0.0-Final-Report.pdf
Final Report DRAMA-3.0.0	5.2 MiB	DRAMA-3.0.0-Final-Report.pdf
Software User Manual	2.5 MiB	DRAMA-Software-User-Manual.pdf
Technical Note ARES	2.9 MiB	Technical-Note-ARES.pdf
Technical Note MIDAS	723.4 KiB	Technical-Note-MIDAS.pdf
Guideline on Collision Avoidance (ARES)	760.2 KiB	DRAMA-ARES-Collision-Avoidance-Verification.pdf
Guideline on Small Debris Risk Assessment (MIDAS)	654.8 KiB	DRAMA-MIDAS-Risk-Assessment.pdf
Guideline on DRAMA Materials (SARA)	293.4 KiB	DRAMA-SARA-Materials.pdf
Guideline on DRAMA Spacecraft Modelling (SARA)	600.5 KiB	DRAMA-SARA-Modelling.pdf
Licence Agreement	399.4 KiB	DRAMA-Licence-Agreement.pdf
Python Package	-	DRAMA Python Package

Training and Tutorials

Name	File size	Link
Basic - Calliope	690.1 KiB	DRAMA-Hands-On-Calliope.pdf
Medium - Melpomene	1.2 MiB	DRAMA-Hands-On-Melpomene.pdf
Melpomene Project Files	7.7 MiB	melpomene-tutorial-303.zip

DRAMA/MIDAS Basic Functionalities and Outputs

Impact Flux Analysis

- Simple debris & meteoroid flux estimation on:
  - a spherical surface or
  - a randomly tumbling plate
- Output (data and plots):
  - Number of Impacts vs. time/diameter/mass
  - Probability of Collision vs. time/diameter/mass
  - Number of Catastrophic Impacts vs. time/diameter/mass

Damage Analysis

- Debris & meteoroid flux estimation on:
  - user-defined surfaces (up to 10)
  - surface definitions: orientation, area, BLE & walls
- Output (data and plots for each modelled surface):
  - Flux analysis-like data + plots along with:
  - Failure Flux vs. time/diameter/mass
  - Number of Penetrations vs. time/diameter/mass
  - Probability of no Penetration vs. time/diameter/mass
  - Probability of Penetration vs. time/diameter/mass

END-TO-END Examples

Impact Flux Analysis:

- Large Satellite
- Small Satellite

Damage Analysis:

- Large Satellite

Feedback Collection Round

- Teams Poll (anonymous)
- Post-it (anonymous, on-site only)
- Or simply just share your feedback directly with the group

Features or functionalities I would like to see included in future DRAMA/MIDAS versions?

Something that could benefit from more detailed documentation?

I would like to have:

- 3D spacecraft model (similar to SARA)
- …
- …

Issue/Bug Reports

- …
- …
- …

Contact Us

Space Debris User Portal support

space.debris.support@esa.int

Space Debris Forum

https://debris-forum.sdo.esoc.esa.int/