DRAMA basic introduction

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What is DRAMA

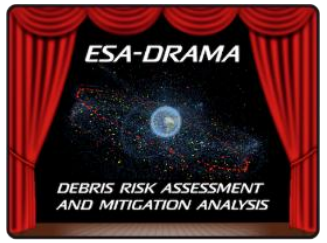
A set of tools for Space Debris Mitigation Analyses

- OSCAR (For disposal and orbital lifetime analysis)
- ARES (For collision avoidance effort analysis)
- MIDAS (For small debris impact risk analysis)
- SARA (For re-entry risk analysis)
- CROC (For cross-section computation)
- Coefficient estimator (For estimating coefficients)
- PROOF (For trackability/brightness analysis)
- (NEPTUNE (For high fidelity propagation))

What do I need to get started?

1. A Space Debris User Portal account
2. A personal computer running a recent(-ish) version of x86-64 Windows/Linux or macOS on Apple Silicon
3. Java (+OpenGL 8 if using CROC, else any Java version)
4. ~16GB of RAM on Windows (maybe less on macOS/Linux)
5. About 2GB of storage for minimal setup
    - The full debris population files take > 100GB of storage, but usually aren't all needed
6. Python (3.10+) for scripting/automation
7. An internet connection for getting the latest:
    - Solar and geomagnetic activity data -> updates daily
    - Material data -> updates rarely
    - Protected region/constellation orbit data -> updates rarely

DRAMA 3 vs DRAMA 4



drama

When to use DRAMA 3:

- For ongoing projects already using DRAMA 3
- When using oriented surfaces for MASTER/MIDAS
- Using pyDRAMA scripts specific to DRAMA 3
- For everything else, prefer DRAMA 4

Known issues with DRAMA 3:

- Hard dependency on Java 8
- Spotty support on latest macOS and Linux/Wayland

DRAMA 4 new features:

- Coefficient Estimator
- Brightness/Trackability analysis
- Compliance Workflows
- Many new features to individual tools
- Performance improvements

What can DRAMA NOT do?

- Active Debris Removal aspects
- Index/Capacity calculations
- Non-earth bound orbits:
    - MASTER has support for libration-point orbits (Other tools don’t)
    - Debris population doesn’t go beyond GEO (Micro-meteoroids only)
    - No lunar/heliocentric orbit support (yet) (Check out https://godot.io.esa.int/ for this)
- Reliability assessments

FAQ

- Will the EU Space Act be supported?
    - Can be added as an additional set of requirements workflows once available
- What does the Roadmap for new DRAMA features look like?
    - Available here: https://debris-forum.sdo.esoc.esa.int/t/drama-development-roadmap/218
- How does DRAMA support Space Debris Mitigation Plans
    - Compliance workflows aim to support the generation of the required documentation
- Pitfalls:
    - Monte Carlo: Is to be deprecated, prefer using pyDRAMA
    - Attitude simulation: Only advised for very specific cases
    - Compliance verification modes: Mostly for reference at the moment, doesn't replace a full anlaysis for the SDMP
    - CROC: Doesn't work on some setups, will be deprecated soon in favour of CE

Advanced usage

pyDRAMA:

- Gives programmatic access to DRAMA (3) tools: OSCAR/SARA/CROC/MIDAS/ARES
- Simplifies usage in “headless” mode (no GUI, e.g. running on a server)
- Currently not available for MASTER/CE/PROOF/NEPTUNE

CLI:

- All tools can be run directly in the terminal via their respective CLI
- Usage depends on the tool, but is “documented” in the respective input files
- pyDRAMA/GUI are “just” wrappers around these executables