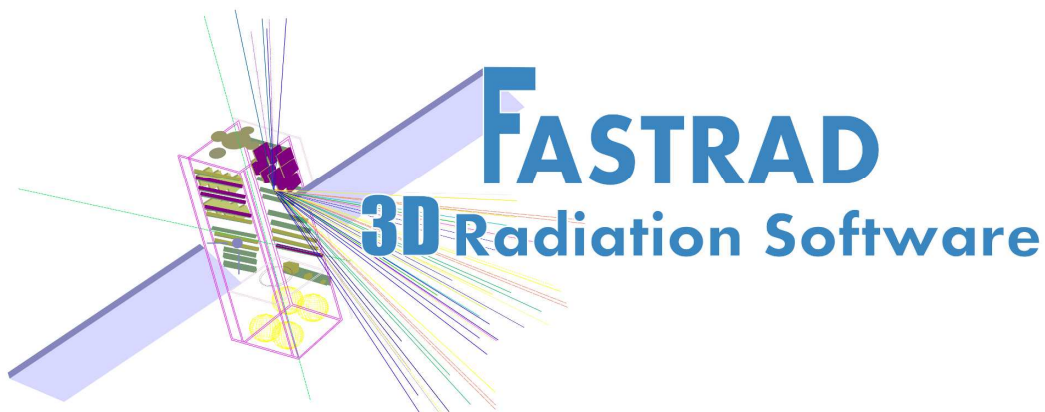


# FASTRAD® 3.8.0

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## Release Note



# 1 Introduction

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For the past 10 years, FASTRAD® has been recognized as the **reference software** for radiation shielding analyses. Over 70 clients in the global space industry are using this **3D modelling tool** for **advanced radiation dose analysis and calculation**.

FASTRAD® allows its users to **decrease overall shielding mass** and **improve radiation sensitive equipments reliability**. Thanks to its STEP format import module, 3D modelling of components, sub-systems or satellite structures has never been this **easy!** New and improved **Reverse Monte Carlo method** is the perfect solution to quickly perform complex and precise calculations.

We are committed to assist our customers and to maintain a **high level of performance** through three main directions: **reactivity, efficiency and innovation**. Our team of PhDs, engineers and technicians is dedicated to bring a **permanent support** and **continuous improvements and evolutions**.

Today, FASTRAD® is known as a **powerful decision-support tool**, easy to use with a friendly interface. The use of an activation dongle allows a subscriber to use its **annual license on multiple PCs**, one session at a time.

More information available via the **dedicated website** <http://www.fastrad.net>  
and direct hotline +33 561 009 560.

Currently the maintained version is **3.8.0**

## 2 New features and Improvements

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### Forward and Reverse Monte-Carlo

- Calculation convergence improvement in the RMC module: several mechanisms have been implemented to avoid having particles with a weight that is too high (secondary splitting, splitting on high weight particle, exponential transform for gamma). These particles may cause large convergence variations.

These modifications have a small impact on the calculation results. For low dose levels (of the order of a few krad or lower) results can be up to 10% higher. For higher doses, results are almost identical (less than 5% difference).

- Multiple external flux definition in the RMC module: The user can define one or more external fluxes for electrons and protons.
- Multiple sources of particles can be simulated at the same time for an FMC calculation. A new interface allows to define each source with their geometrical and physical attributes, and to enable each one or not for the next run. There is no limitation in terms of number of sources, type of particles shot, type of sources, ... The output file contains the description of the sources taken into account for the run.
- Calculation resumption in the RMC module: It is now possible to resume an RMC calculation where it stopped, in order to shoot more particles and get better convergence (without restarting the calculation from the beginning).
- In multi-thread, the frequency of the results merge and writing of the output file containing the merged results can be specified in the options: from 5 minutes to 6 hours. More often the file is written, more the calculation time will be longer.
- Sigma (error) stopping criteria: The user can define the error criterion, based on which the calculation for each detector will stop. In that way, the calculation will stop for detectors that converge earlier, allowing to allocate more CPU resource on detectors which need more particles to have a good convergence. In mono-thread the error criterion is checked when the result file is written, in multi-thread it is checked when thread results are merged and written (depending on the frequency defined in the MC option).
- TNID material check correction during an RMC calculation: Material check on TNID calculation was too strict, it was checking if all materials in the model were in NIEL database instead of just those assigned to a detector selected for the calculation.
- TNID disabling when material check fails for an RMC calculation: FASTRAD asks the user to disable the TNID calculation for the current run if a material is missing from the NIEL database.

### Script module

- Script language: A script language has been integrated into FASTRAD. It allows the user to interact with the main FASTRAD entities and to do parameterized tasks, deal with custom file format, etc.
- Script Integrated Development Interface: Provides a dedicated interface that allows the user to write its own script. Multiple features exist to help the user.
- Scripts Portfolio: Allows to save personal script files and quickly execute them.
- Script Preferred: Allows to define the mostly used scripts to be accessible by the shortcut definition module.

## Import/Export

- During a STEP file import, if invalid shapes are detected they are now included in the current FASTRAD model and they appear in red in the hierarchical tree. The calculation cannot be launched while invalid shapes are in the model.
- GDML prism/trapezoid import and export: GDML importer can read 'xtru' which represents a prism or a trapezoid, and prism and trapezoid are now translated using 'xtru' GDML type.
- GDML reflexion and scaling geometrical transformations management: importer and exporter can deal with reflexion and scaling transformations.

## General / Interface

- Multi-selection in the hierarchical tree and in the 2D/3D viewer: One or more nodes can be selected by holding the 'ctrl' key or with a selection rectangle in the hierarchical control. In addition, several shapes can be selected by double left clicking on the view while holding the 'CTRL' key. A selection area can appear if the user double-left clicks and holds the button down during the second click. Most of the actions available for one selected node are applicable to several selected nodes.
- The behaviour of "Cut/Paste" on the hierarchical nodes has been modified: this operation does not remove the selected nodes until these cut objects are pasted in the model. The operation "Delete" (CTRL+Del) allows to erase the selected nodes from the hierarchy
- Shortcut definition module: most of the available keyboard shortcuts in FASTRAD can be defined, modified and deleted.
- New option dialog design: as FASTRAD contains an increasing number of options, the option dialog has a new design to make it more easily usable.
- Ghost on hollowing shapes: When a hollowing shape is selected, its ghost representation is drawn in the 3D view.
- Many dialog boxes, mainly interface containing list of items, are now resizable: materials list, material definition, detectors list, overlapping list, ...
- The load of ".ray" files has been improved: this process does not freeze the main interface anymore, even while opening huge models.
- Several dongle IDs can be stored in the user's machine: no need anymore to fill-in again the password when switching the dongle (for a given machine, dongle password must be written only once).