

ESABASE2 Space Environment Simulation Framework

Facts

ESABASE2 provides its users with all means to perform reliable and highly efficient space environment analyses. Its up-to-date architecture and interfaces make it a valuable contribution for a more efficient spacecraft design.

ESABASE2 stands for

- a state-of-the-art PC based tool,
- comprehensive data exchange capabilities,
- ergonomic geometry modelling and viewing capabilities,
- result visualisation and post processing capabilities.

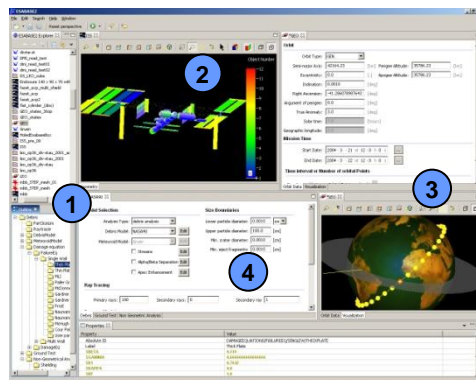
Efficiency through Ergonomics

Ergonomic Workflow

ESABASE2 convinces its users by an ergonomic workflow concept. Dedicated editors support the user in the definition of design and mission parameters.

1. Project editor and outline
2. Geometry editor
3. Mission editor and visualisation
4. Application editor

Duplication of work is minimised by the possibility to combine once established geometries, mission specifications and application parameter settings.



ESABASE2 framework with different editors open

Interface to CAD Tools

The interface to external CAD tools like CATIA via STEP files (AP 203/214) allows the import of existing geometry models.

Data Exchange

ESABASE2 users can easily exchange single ESABASE2 files (e. g. geometries) and/or all data belonging to one ESABASE2 run.

The ESABASE2 framework allows the conversion of geometry data between different formats such as STEP AP 203/214, GDML, STEP-SPE.

The input files of the former ESABASE2 tool can be re-used.

ESABASE2/Debris

Risk Analysis

In order to appropriately consider the risk posed to a spacecraft by the space debris and meteoroid environment, fully three-dimensional analyses are required taking into account geometrical shadowing effects, the latest environment models, secondary ejecta and state-of-the-art damage and failure laws.

Orbits and Trajectories

ESABASE2/Debris allows the analysis of Earth-bound orbits, Lunar orbits and Lunar transfer orbits as well as L1/L2 orbits. In addition, a user defined arbitrary trajectory can be processed.

Environment Models

ESABASE2/Debris provides the most complete access to debris and meteoroid models.

Debris Models

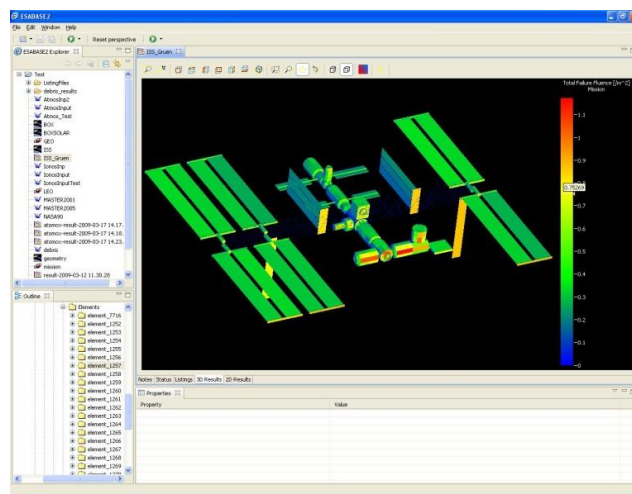
- NASA 90
- ORDEM 2000
- MASTER 2001
- MASTER 2005
- MASTER 2009

Meteoroid Models

- Grün
- Divine-Straubach
- MEM
- LunarMEM
- Jenniskens (streams)

Damage Laws

The design and damage equations implemented in ESABASE2 are freely configurable by means of their relevant parameters. Some common equations with predefined parameters are offered via the debris editor. In addition, user defined damage laws can be linked to ESABASE2 via external freely programmable user subroutines.



Impact flux distribution on the ISS – displayed in the result editor

Other ESABASE2 Analysis Modules

Atmosphere/Ionosphere

The former ESABASE2/Atomic Oxygen application is subdivided into two applications in its ESABASE2 implementation.

Both applications provide 3 D numerical analysis capabilities for the assessment of fluxes and fluences of the constituents of the atmosphere or the ionosphere received by an orbiting spacecraft, and the resulting surface effects (e. g. material erosion). The following atmosphere, ionosphere and wind models can be accessed via the applications:

- NRLMSIS-E00
- MSIS86
- JB2006
- MET, DTM
- IRI2007
- IRI90
- HWM93
- HWM90

Sunlight

The Sunlight application performs the calculation of the electromagnetic radiation incident onto the surfaces of a spacecraft during a mission. Amongst others, the application cases listed in the following can be performed:

- Illumination analysis
- Power profile analysis
- UV degradation investigation
- Stray light analysis
- Terrestrial test verification

COMOVA Interface

ESA's contamination, outgassing and vent analysis tool COMOVA is integrated in ESABASE2. The use of COMOVA is facilitated through the geometry editing capabilities and the graphical user interface of ESABASE2. The latter provides both input editors as well as result display facilities.

ESABASE2 Services

Analysis Service

ESABASE2 provides its users with a high amount of configuration possibilities and usable models. The proper application of them requires a sound technical and theoretical background, experience in the application of tools and especially the knowledge and ability to interpret and explain the results provided.

etamax space offers an analysis service, performing the assessment for you by its experienced staff. The risk assessment service includes:

- establishment of satellite geometrical model,
- establishment and justification of the mission vulnerability analysis approach,
- selection and justification of the environment models and failure equations,
- 3 D M/OD analyses by means of the *ESABASE2/Debris* software,
- discussion of the results vs. requirements and provision of design improvement recommendations.

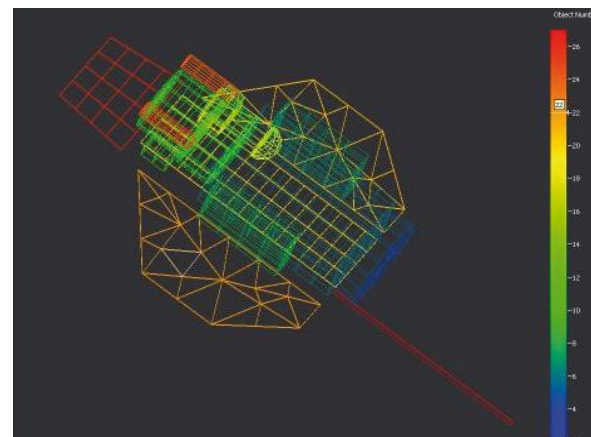
Training

etamax space offers a variety of *ESABASE2* trainings to make you familiar with all aspects of the tool. Each of the training modules is offered via three types of training (standard, on-site and consulting) to properly respond to your training needs.

For more information on the services please visit www.esabase2.net/services/

How to obtain an *ESABASE2* Licence

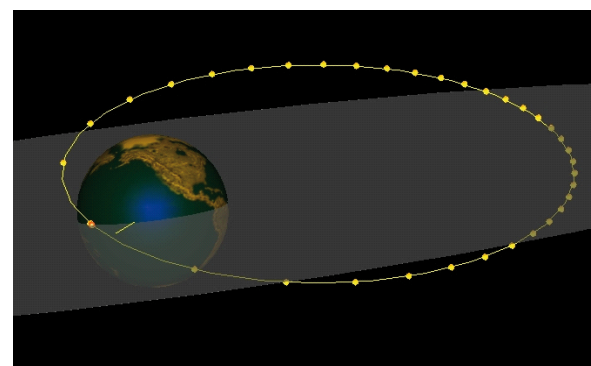
- *ESABASE2* is distributed under an ESA Software Licence.
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- Other interested parties are invited to contact etamax space.
- The distribution of *ESABASE2* is bound to the establishment of a support contract between the licensee and etamax space (you can find the conditions at <http://www.esabase2.net/licensing>).
- Please register at <http://www.esabase2.net> or contact etamax space to obtain an *ESABASE2* license.



Your Access to *ESABASE2*

Please feel free to contact us in case of further questions.

We are looking forward to providing you with more information on *ESABASE2*.



etamax space GmbH
Frankfurter Str. 3 d
38122 Braunschweig
Germany

E-Mail: esabase2@etamax.de
Web: <http://www.esabase2.net>
Phone: +49 (0)531-866688-33
Fax: +49 (0)531-866688-99

Fact Sheet

