

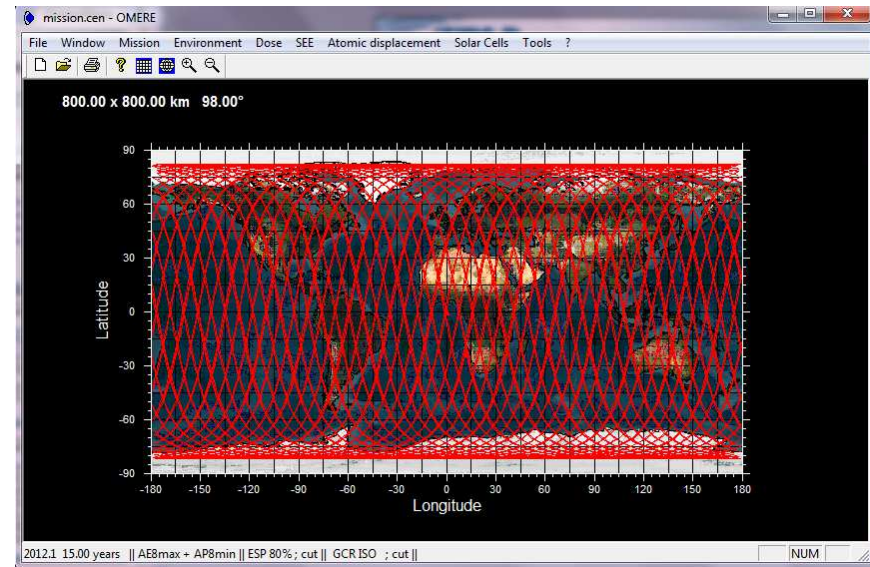
The OMERE freeware for space radiation environment and effects

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■ The OMERE Software

- The project
- The partnership
- Existing modules
- User statistics
- Future developments

■ Demonstration

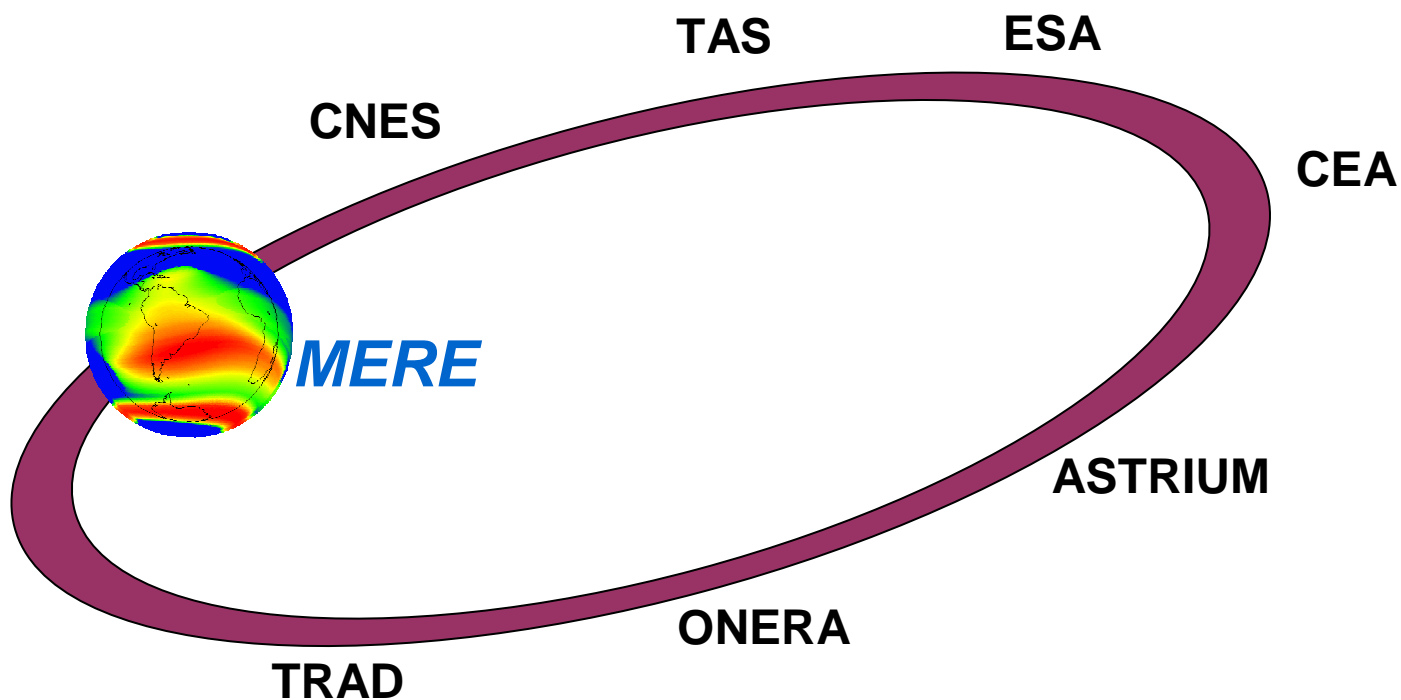


OMERE (not Homer!) = Outil de Modélisation de l'Environnement Radiatif Externe

The project

- ▶ Since 1999.
- ▶ TRAD development with CNES support.
- ▶ Freeware for space radiation environment and effects on electronic components.
- ▶ Stand alone software (no internet connection needed).
- ▶ Conceived to meet industrial requirements.
- ▶ Integrates ONERA models.
- ▶ Integrates outcomes of Research and Technology projects financed by the CNES.
- ▶ Coupling with FASTRAD®.

The partnership



Existing modules

- ▶ **Orbit and mission definition**
 - Orbit parameter definition or orbit file input
 - Multi-segment missions
- ▶ **Radiation environment definition**
 - Radiation belt models
 - Solar proton and solar ion models (average statistical and flare)
 - Cosmic Ray models
 - CDF file (electrons+protons) or NOAA file (protons) input
- ▶ **Ionising dose**
 - Dose depth curve behind Al equivalent shielding
 - Total Dose calculation using a sector file (FASTRAD®)
 - Dose rate calculation along the orbit

Existing modules

- ▶ **LET spectrum**
 - Behind fixed aluminium equivalent shielding or using a sector file.
- ▶ **Particle Transport**
 - Electron, proton, ion behind fixed aluminium equivalent shielding or using a sector file.
- ▶ **Single Event Effects**
 - Component database
 - Weibull fit of ion and proton cross-section curves
 - PROFIT and SIMPA methods for predicting proton cross-section curve from the ion one
 - Mission average and along the orbit single event rate behind fixed aluminium equivalent shielding or using a sector file.

Existing modules

- ▶ **Non-Ionising dose**
 - Using NIEL curves from the ONERA NEMO (NIEL Evaluation Model of ONERA) code.
 - Electron, proton and neutron (only for Si and GaAs) equivalent fluence.
- ▶ **Equivalent LET**
 - LET variation inside the sensitive volume for an ion of energy E .
- ▶ **Solar Cells**
 - JPL method.
- ▶ **Multi-mission calculations**
 - Batch calculations of environment and effects for multiple missions.
 - Post processing tools.

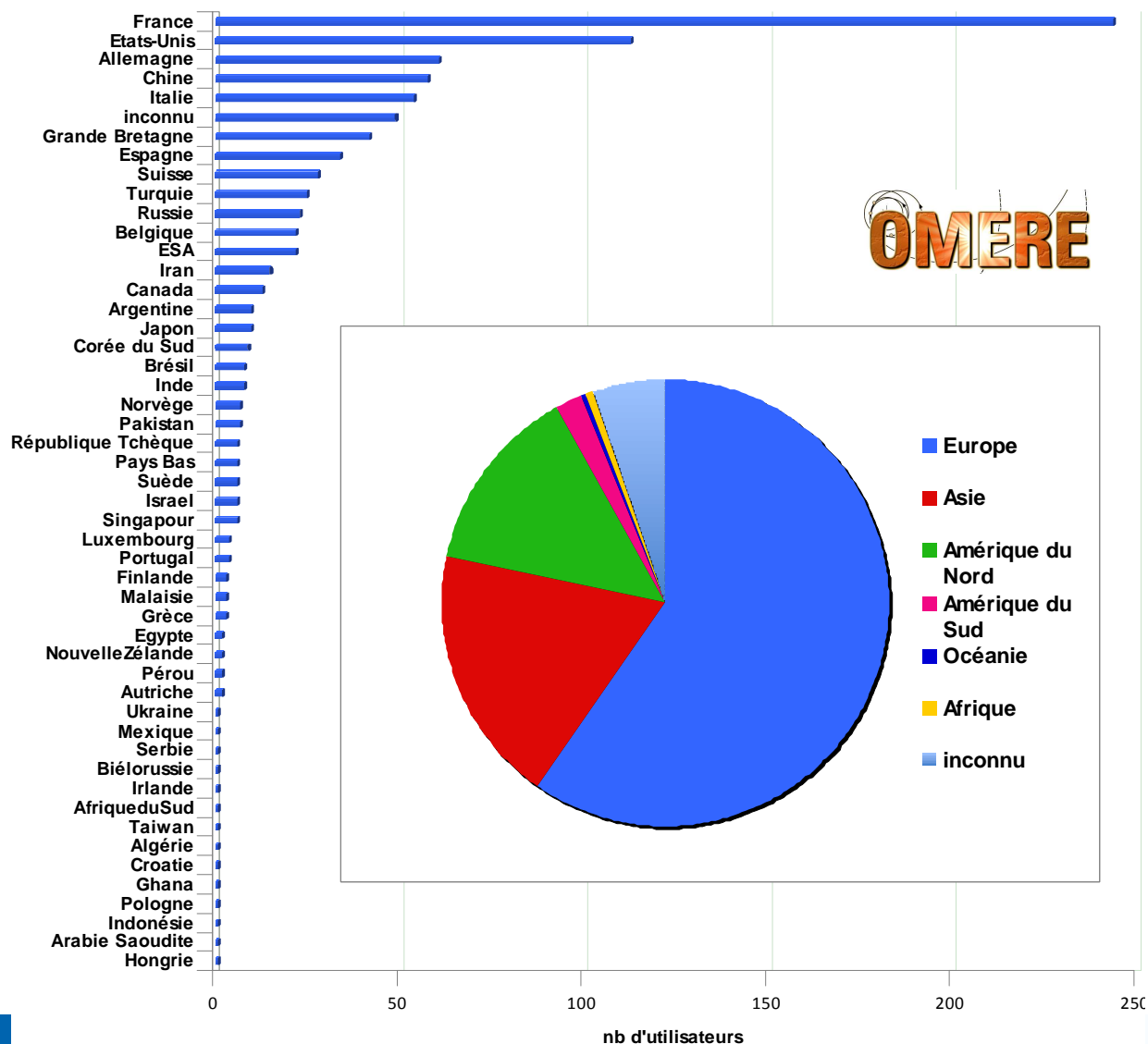
Existing modules

- ▶ **Graphs**
 - Plotting of results obtained
 - Overplotting using input files
 - Interactive graphs
- ▶ **Version verification**
- ▶ **Help menu and Advanced User Manual**

The users

- ▶ **System engineering (can be a client requirement)**
- ▶ **Electronic component engineering**
- ▶ **Equipment and scientific instrument conception**
- ▶ **Research and development**
- ▶ **Education**

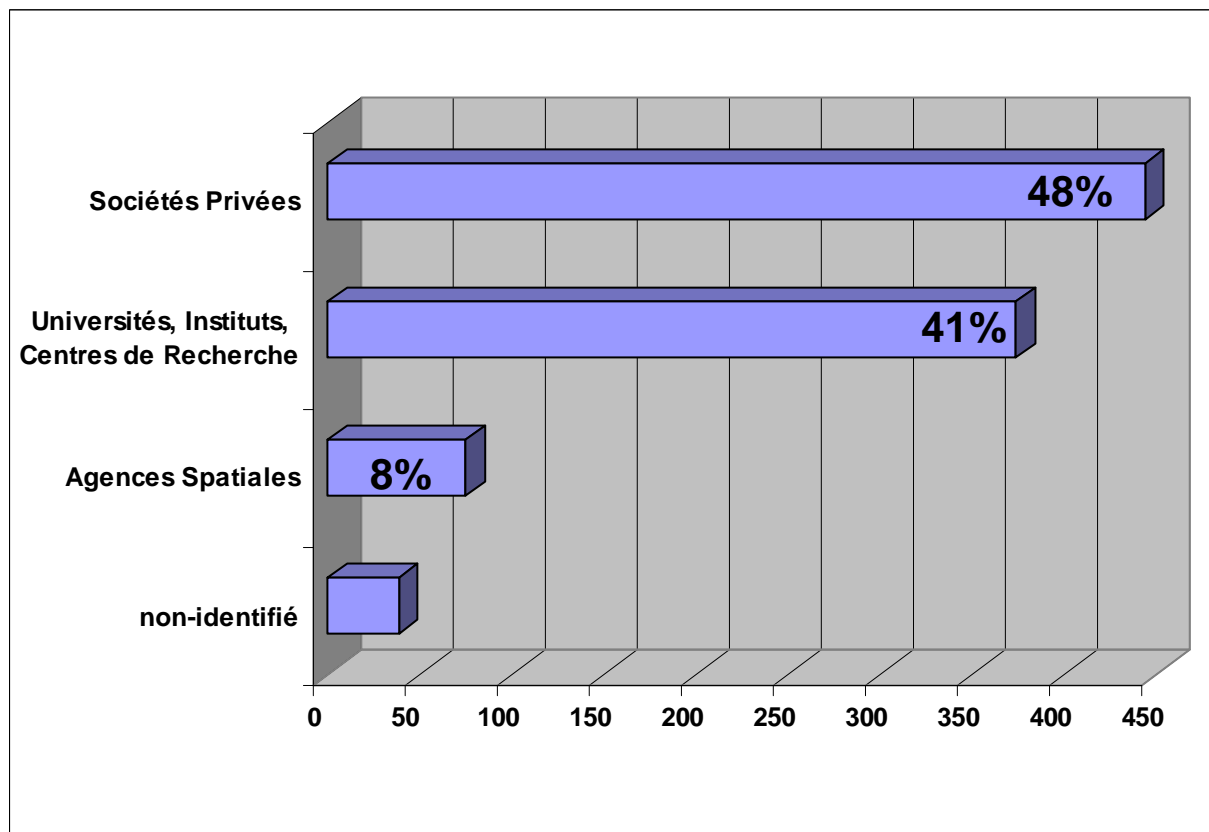
User statistics



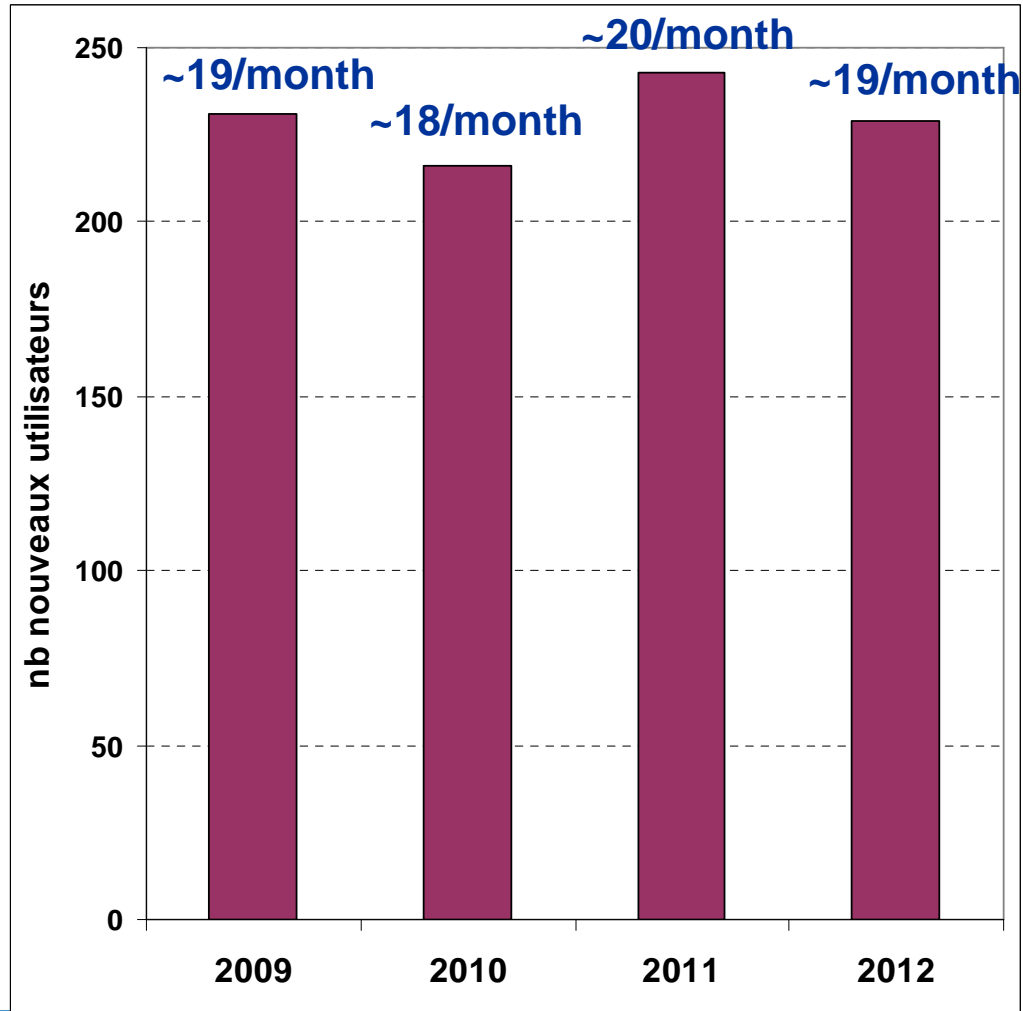
- 932 new users during the period Oct 2008 – Dec 2012.

- 50 different countries.

User statistics

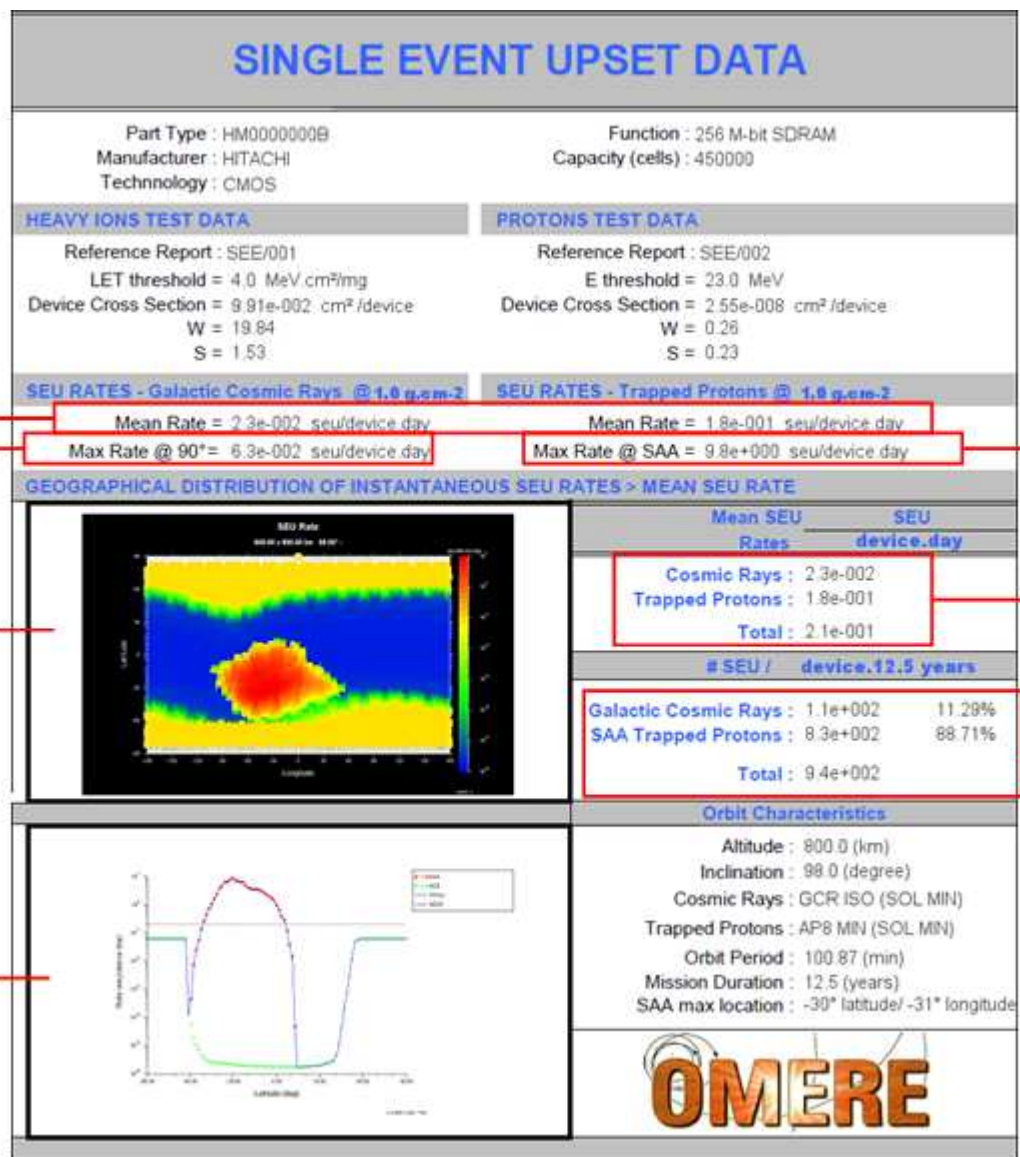


User statistics



- **New OMERE v3.6 online (mail sent on 20/09/2012)**
65 downloads in 24 hours and 90 until the end of September!
- **The most used modules**
SEE (LET) > Environment > Dose > Atomic Displacement (NEMO) > Equivalent LET

Future modules



Field 1

Field 2

Field 3

Figure 1

Field 4

Field 5

Figure 2



The screenshot shows the TRAD website interface. At the top left, it says "You are here > Home page". A search bar is at the top right. The main header features the TRAD logo and the tagline "Tests & radiations". Below this is the text "SOLUTIONS PROVIDER FOR RADIATION ASSURANCE PROCESS". A navigation menu includes: OUR COMPANY, TEST & RADIATION, MATERIALS, RADIATION ANALYSIS & SOFTWARE, TRAINING & PRODUCTS, ACTIVITY POLES, and WEBLINKS. A red arrow points from the "TRAINING & PRODUCTS" menu item to a callout box. Another red arrow points from the "RADIATION ANALYSIS & SOFTWARE" menu item to another callout box. The main content area features a background image of a planet with a bright light source. Text on the page includes: "As of 30/11/12, TRAD is accredited ISO 9001: 2008 for the following activities: RADIATION AND THERMAL TESTING OF COMPONENTS, ELECTRONIC SYSTEMS AND MATERIALS; RADIATION ENGINEERING AND EXPERTISE; SOFTWARE DEVELOPMENT; TRAINING; AND COBALT 60 IRRADIATION". Below this, it states: "Many different types of radiation effects are known to be adversely influential on the behavior of EEE components. These effects may ultimately lead to component and failure. This is why it is essential to evaluate radiation effects on components regarding their ability to withstand the radiation environment." Further down, it says: "TRAD proposes to be your partner and to provide you with our specific knowledge in the field of radiation effects on electronic devices (project support, calculations, expertise, tests, consulting, training, etc.)." At the bottom, it reads: "TRAD: « SOLUTIONS PROVIDER FOR RADIATION ASSURANCE PROCESS »."

Download the OMERE package at www.trad.fr

We also provide OMERE training!

For any questions please contact me: athina.varotsou@trad.fr