The OMERE freeware for space radiation environment and effects

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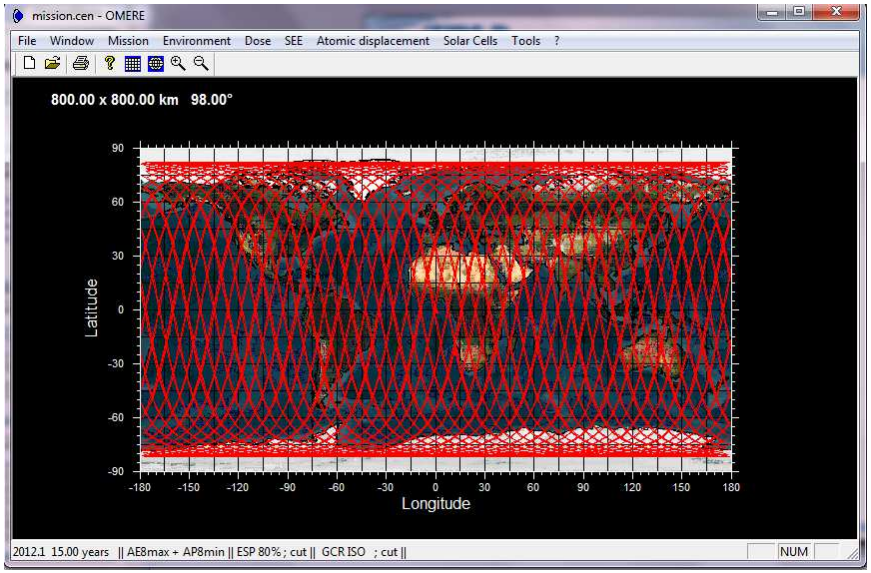
Outline

- **The OMERE Software**
  - The project
  - The partnership
  - Existing modules
  - User statistics
  - Future developments
- **Demonstration**



The OMERE software

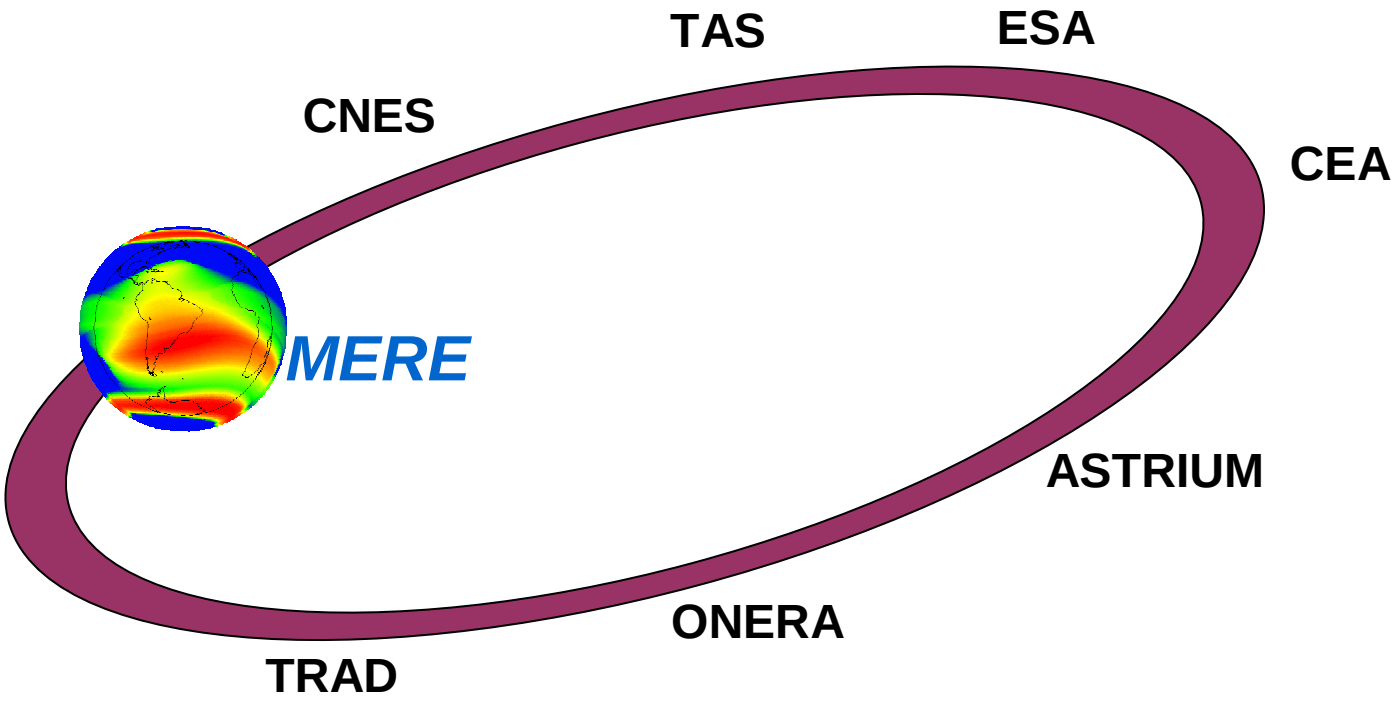
OMERE (not Homer!) = Outil de Modélisation de l'Environnement Radiatif Externe

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 OMERE software

The partnership



The OMERE Software

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

The OMERE Software

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.

The OMERE Software

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**

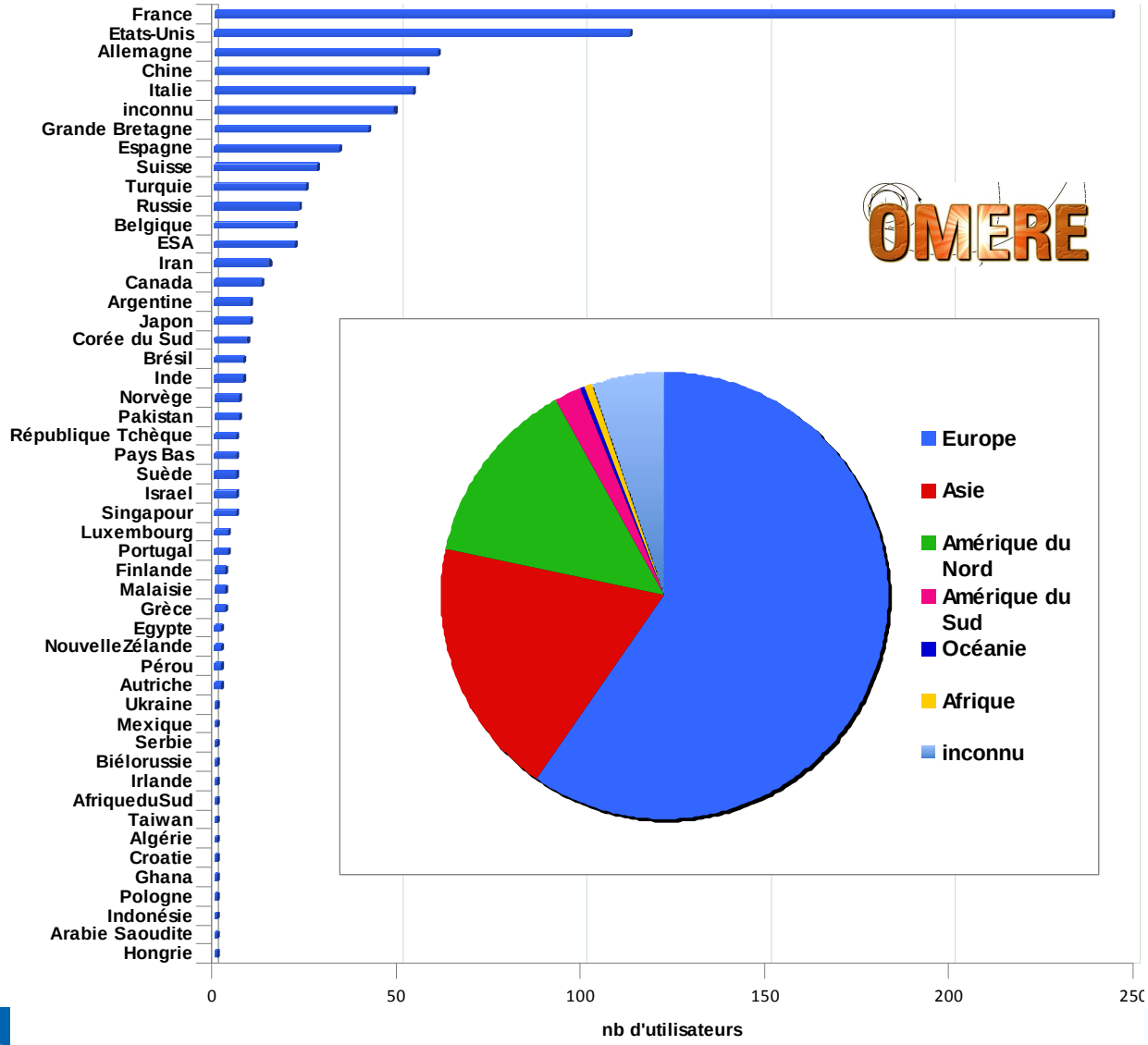
The OMERE software

The users

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

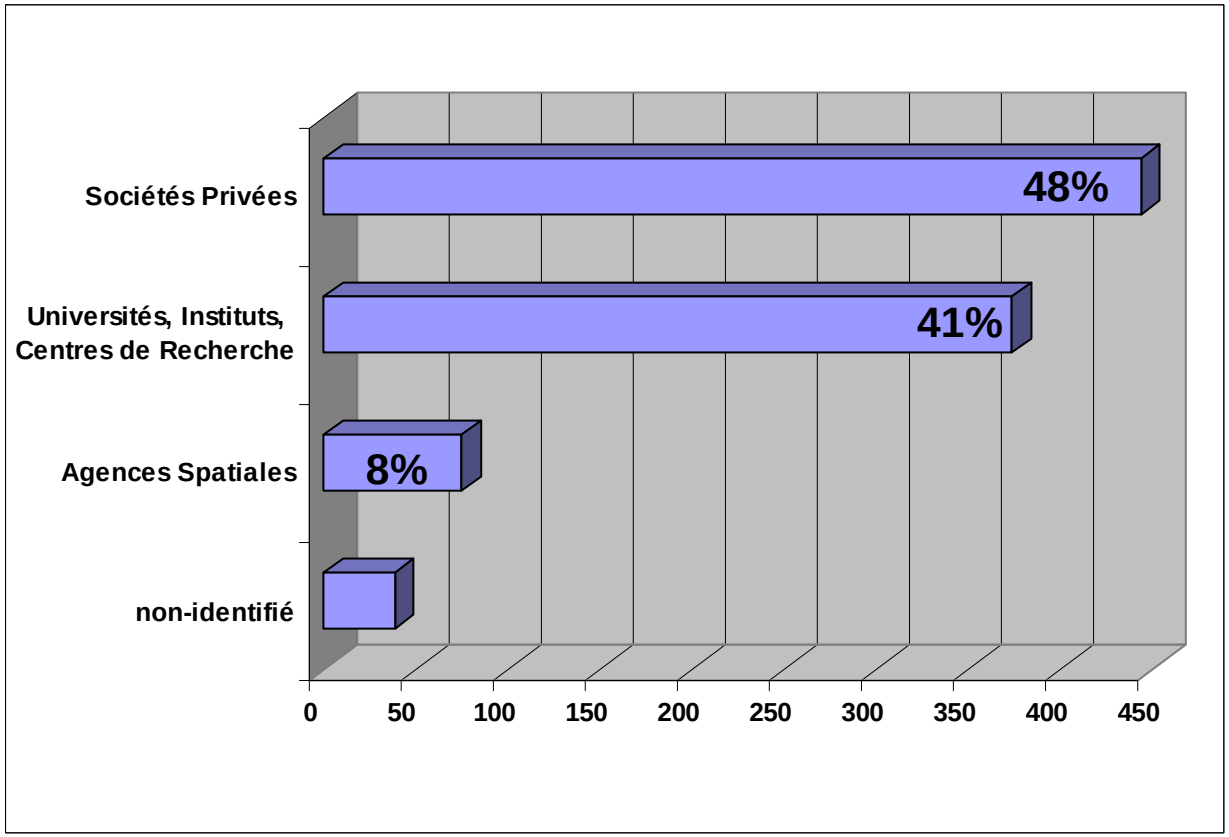
The OMERE software

User statistics



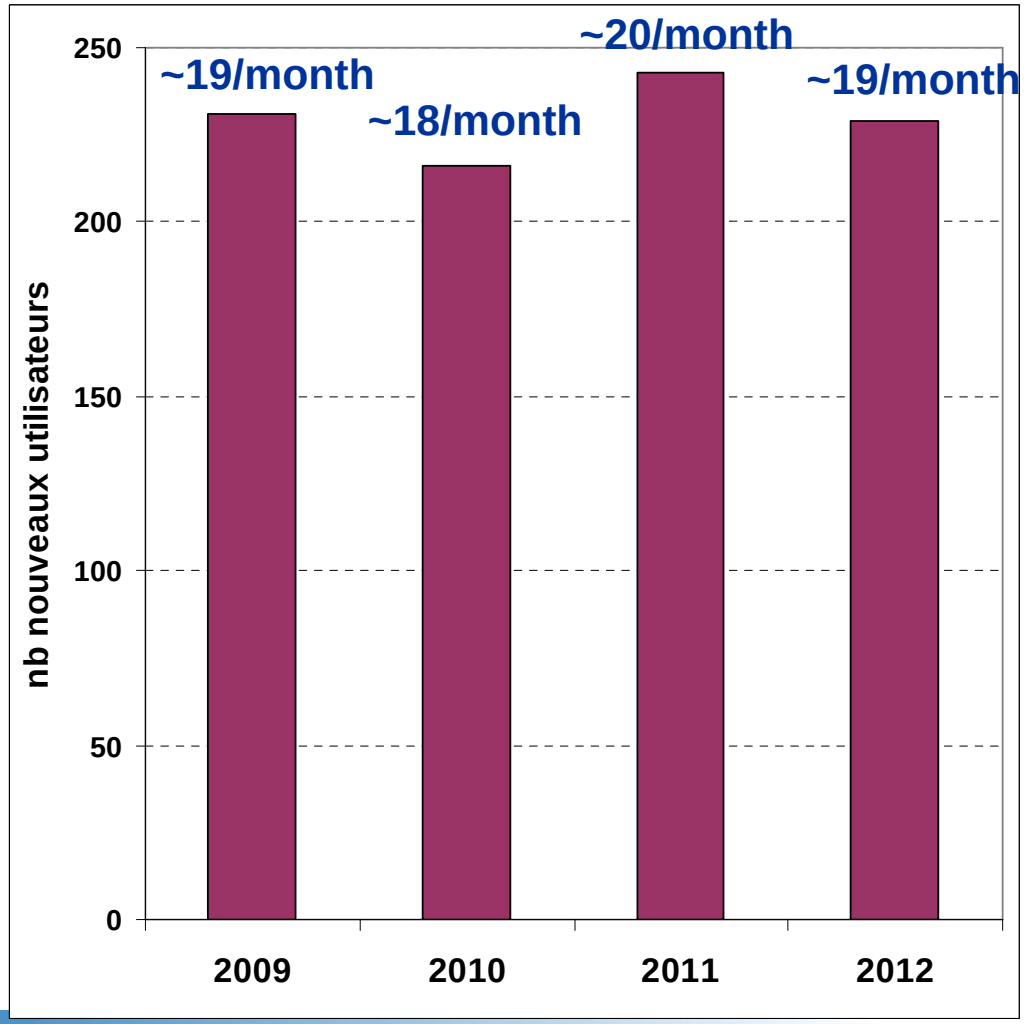
- 932 new users during the period Oct 2008 – Dec 2012.
- 50 different countries.

User statistics



The OMERE software

User statistics



The OMERE software

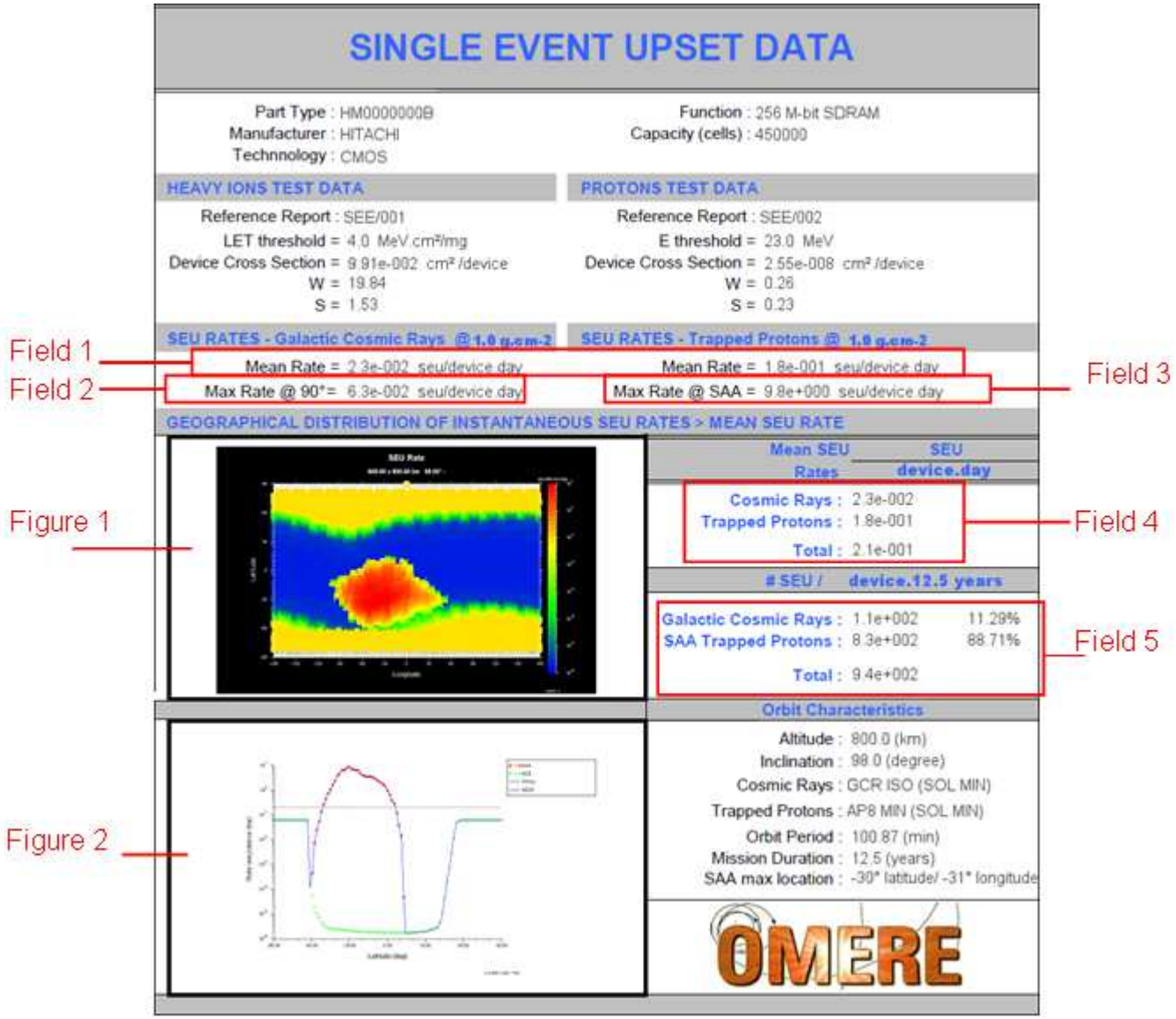
- **New OMERE v3.6 online (mail sent on 20/09/2012)**

  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



The OMERE software

Download the OMERE package at www.trad.fr

We also provide OMERE training!

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