

# Experts in Radiation Assurance for Harsh Environments

[www.trad.fr](http://www.trad.fr) - [fastrad.net](http://fastrad.net) - [rayxpert.com](http://rayxpert.com) - [r2cots.com](http://r2cots.com)

## 25 YEARS OF EXCELLENCE

For the past 25 years, TRAD Tests & Radiations has been recognized as a leading and innovative company providing high reliability support in radiation assurance services for space, nuclear and other harsh environments.

## WHAT WE DO

Electronic Components Testing

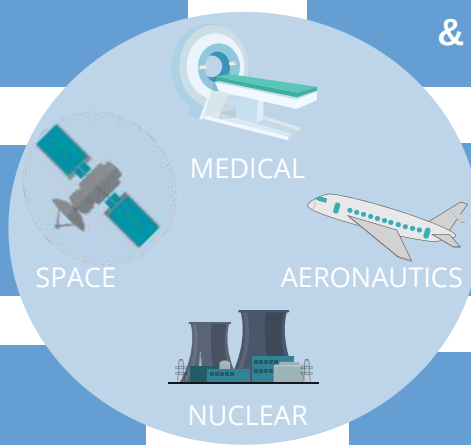
Material Qualification & Characterization

Radiation Engineering Activities / R&D / Training

R2COTS®  
Sourcing / Qualification of electronic components

Irradiation Facilities  
Co<sup>60</sup> & Cf<sup>252</sup> sources, Pulsed laser, etc.

Advanced Simulation Software



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## OUR OFFER

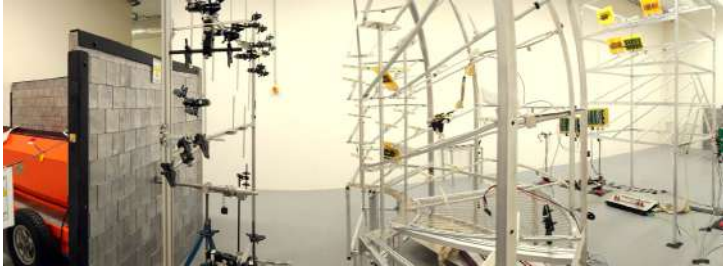
- Radiation environment definition / analysis of RHA & other specification documents
- Part sensitivity evaluation: SEE error prediction, applicable radiation test data research & exploitation, TID, TNID tolerance, test plan optimization
- Radiation-oriented 3D modeling: shielding optimization, design validation, etc.
- Radiation software editor in the space, nuclear and medical sectors
- Analysis and solutions: mitigation solution, derating recommendation, etc.
- Electronic component testing: test bench development and test campaigns (TID, TNID, SEE)
- Material testing and characterization: thermal cycling, irradiation campaign, electrical test, etc.
- Sourcing & radiation qualification of electronic components
- Complete and tailored training courses at TRAD or at client's premises
- R&D activities, partnerships with academic entities and agencies

# Electronic Component Testing

**Over 8 000 tests already carried out on our premises and counting!**

- Parametric (Gamma, Protons & Neutrons): Total Ionizing Dose (TID), Displacement Damage (TNID)
- Functional (Heavy Ions, protons & Neutrons): Single Event Effects (SEU, SEL, SET, SEB/SEGR, etc.)

Component types: extensive experience with ESCC, MIL-STD on integrated circuits, (analog, digital, mixed), memories (SRAM, Flash, NAND, DDR, etc.), ASICs, FPGAs, Power PCs, etc.



## Material Qualification & Characterization

Assessing surface and bulk hazards of materials in harsh environments by:

Particle irradiation campaigns: thermal cycling, UV ageing, electrical tests, etc.

Material types: coatings, paints, solar cells, optics, cables, joints, fibers, polymers, lubricants, adhesives, etc.

## Engineering Activities

TRAD offers an unmatched range of services in radiation assurance, enabling our clients to reduce design costs, qualification delays and expand system life time:

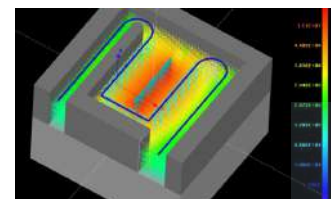
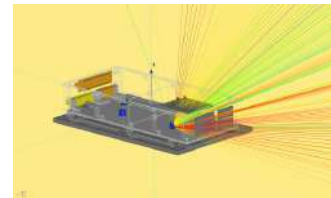
- Radiation analysis: TID/TNID calculations, SEE rates, assessment of radiation effects and recommendations.
- Research: new radiation-induced phenomena study, radiation sensitivity of new technologies, model definition and validation.
- Training courses: introduction to radiation space environment, radiation effects on systems, dose calculation and shielding optimization.

## Advanced Simulation Software

Unique application bundle for radiation environment and dose calculation:

- FASTRAD®: 3D radiation shielding analysis & optimization software for satellites. Ray tracing & Monte Carlo methods. visit [www.fastrad.net](http://www.fastrad.net)
- RayXpert®: 3D Monte Carlo calculation tool for nuclear & medical applications. visit [www.rayxpert.com](http://www.rayxpert.com)
- OMERE: 3D modeling freeware for space radiation environment. visit [www.trad.fr/en/space/omere-software](http://www.trad.fr/en/space/omere-software)

*TRAD can also develop specific functionalities according to customers' needs.*



## R2COTS® - Sourcing & Qualification of Electronic Components

- Catalogue-purchase of radiation tested electronic device commercial references.
- Off-the-shelf pre-qualified substitute reference identification and procurement. Efficient balance between qualification level, requested number of samples and final cost. visit [www.r2cots.com](http://www.r2cots.com)



*We are proud to assist and cooperate with major companies, international agencies, laboratories & universities such as 3D Plus, Airbus DS, Thales Alenia Space, CNES, ESA, EREMS, Northrop Grumman, CERN, E2V, IRSN, ISS-Reshetnev, JHU-APL, MIT-LL, NASA, OHB, Orano, Bouygues Construction, Nuvia, Sofradir, STMicroelectronics, TESAT Spacecom, etc.*