

## **ESA input to Geant4 2012 review**

Giovanni Santin, Petteri Nieminen

9 Nov 2012

*Space Environments and Effects Analysis Section  
European Space Agency  
ESTEC*

# ESA input to Geant4 2012 review



- Continuous and expanding demand for Geant4-based capabilities and analyses within ESA, other Space Agencies and broader space community (instrument dev., industry)
  - Originally ESA focal point for space users, now much more spread
  - Reasonably healthy ESA funding situation for external R&D (usually in Open Competition within ESA Member States, and usually Geant4 in combination with other software developments, applications or analyses). However significantly diminished internal ESA resources → travel fund limitations, etc.
  - “Space” contributions: toolkit modules (GPS, RDM, CAD I/F, physics, adjoint MC) and app’s (GRAS, MULASSIS, PLANETOCOSMICS, Vanderbilt CRÈME-MC/MRED,...). Speed, ease of use critical for adoption of MC in space domain.
- Collaboration actively involved in support to space users
  - Dedicated “Space applications” HyperNews thread
  - Geant4 Space User Workshops (next one in Barcelona, March 2013) and linked Technical Forum
- We note the efforts and improvement with implementation of 2007 Review recommendations, including
  - Possibility for users to combine standard and low-E e.m. physics models according to application case
  - New accurate ion e.m. models (ICRU-73)
- We welcome the integration in the Geant4 release of user developments relevant to space, including
  - Extremely low energy transport for track-structure in Silicon (MuElec)
  - Reverse (adjoint) MC transport capability
  - Geant4-DNA
  - Phonon transport
- Overall responsive and effective collaboration approach in a quite “atypical” application domain