Terrestrial Gamma-ray Flashes analysis for Aircraft Transport Safety

Objectivos
TGF (Terrestrial Gamma-ray Flashes) are gamma-ray emissions, produced by cumulonimbus clouds. These emissions that were discovered in 1994, are being recorded by astrophysics space missions, such as AGILE (Astrorivelatore Gamma ad Immagini LEggero).
TGF are produced at the top of thunderclouds by avalanches of electrons accelerated within thunderstorm strong electric fields and abruptly braked in the atmosphere. Exhibiting energies from a few keV up to several tens of MeV, TGF are the most energetic phenomenon naturally occurring on Earth and can represent a severe risk for airplanes and aircraft transports, both for the crew and the on board electronics.

The objective of this thesis is to evaluate typical TGF flux at commercial flight altitude (~10 km), the potential dose absorbed crew and the probability of being caught by TGF in certain types of flight routes. The student will use several dedicated simulation tools and also C++ based GEANT4 as well as real TGF data measured by AGILE.
This result will be of major importance to propose to airline companies and flight-safety institutions effective solutions for crew and aircraft transport safety.

Requisitos
Good programming skills (C++, GEANT4, etc.) are an advantage for this thesis

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