

Integral

- for better knowledge about the dangerous gamma-rays

With Integral, the most high energetic space radiation we know can be continuously detected with instruments that are very well adjusted to these phenomena. Used on earth in medical examinations, but fortunately for us, continuous influence from space is effectively stopped by the atmosphere. For this reason, the use of satellites is the only the way to detect and investigate the radiation and effect. Integral adds itself to a continuous number of European instruments that investigate rays from the sub-millimetre through the visible spectrum to the very high energetic gamma rays, rays that are one million times more energetic than visible light.

Integral, which is the abbreviation for International Gamma Ray Astrophysics Laboratory is a real international laboratory with participants from all the fourteen ESA member states in addition to participants from the USA, Russia, the Czech Republic, and Poland. The idea and the project is mainly European, but in addition to participating in some instruments the USA has bought observation times in exchange for use of American ground stations and Russia for free launch with a Proton launcher.

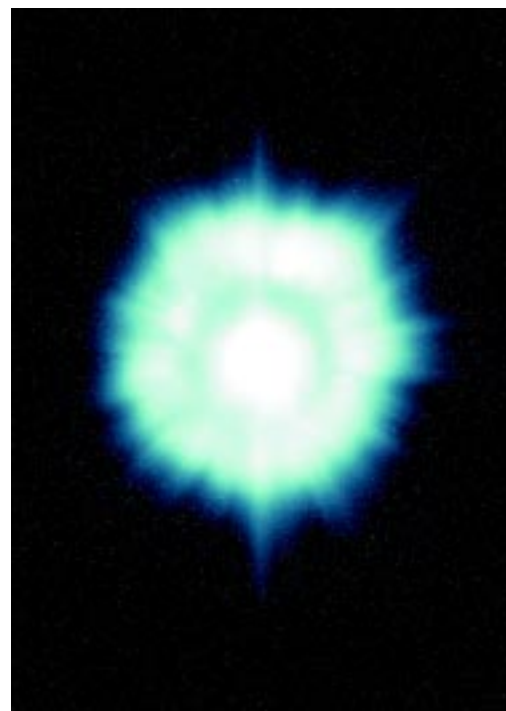
In its elliptical orbit with its farthest point at 153 000 kilometres from earth, Integral will spend 90 percent of its time outside earth's radiation belts, but every 72 hours the satellite will pass only 9000 kilometres from the earth's surface. The radiation belts, that have a maximum height at around 40 000 kilometres, can hamper the observations in the gamma-ray field and is the main reason to the chosen orbit.

What gained knowledge can Integral contribute with? It is expected that Integral can provide better knowledge of the phenomena connected to gamma-ray busters, active galaxies, the hearth of the Milky Way, exploding stars, super novae, neutron stars, and stellar black holes.

How will the data be accessible?

All operations of Integral will be carried out at the Integral Science Operations Centre in Noordwijk, The Netherlands. Experts at ISOC evaluate the proposals and draw up a list of targets and detailed observations schedules for Integral. The schedules are sent to the operations centre at ESOC, Darmstadt, Germany, transformed into commands that Integral will understand, and sent to the satellite, via the communications antennas in Redu, Belgium or Goldstone, California.

After Integral has collected observations, the raw science data is forwarded to the Integral Science Data Centre (ISDC) near Geneva, Switzerland. There it is converted into usable data files, archived, and distributed to the astronomical community. A worldwide network of space science institutes and observations will receive the data within one minute. This is essential especially when sudden and short-lasting phenomena such as gamma-ray bursts occur.



Artist's impression of gamma-ray burst.

Picture: ESA

In summary, the ISOC

- Will prepare AO's for observations, will receive proposals and assess their technical feasibility and make assessments available to the time Allocation Committee
- Is responsible for the mission planning and implementation of the observing programme.
- Is responsible for the definition of scientific operations including the instrument configuration for each observation.
- Will decide on the generation of alert for targets of opportunity in order to change/interrupt the observing programme.
- Will keep an archive for all scientific data that are created and maintained by the Integral Science data Centre (ISDC).