

IAF SPACE EDUCATION AND OUTREACH SYMPOSIUM (E1)
Hands-on Space Education and Outreach (8)

Author: Dr. Michael Holik

Institute of Experimental and Applied Physics, Czech Technical University in Prague, Czech Republic

Mr. Vladimír Vicha

Institute of Experimental and Applied Physics, Czech Technical University in Prague, Czech Republic

Prof. Stanislav Pospisil

Czech Technical University In Prague (CTU), Czech Republic

Dr. Robert Filgas

Czech Technical University In Prague (CTU), Czech Republic

Prof. Ivan Stekl

Institute of Experimental and Applied Physics, Czech Technical University in Prague, Czech Republic

SESTRA - THE EFFECTIVE INSTRUMENT ON A WAY TO BETTER COMPREHENSION OF
SPACE RADIATION PROPERTIES AND ITS IMPACT**Abstract**

A pixel detector technology proved to be a very powerful instrument successfully applied in radiation detection, monitoring, recognition, analysis, and of course, it contributed to indisputable progress in scientific and technological research. Its recognition abilities are considered outstanding to other detector technology. Trend of miniaturization allowed to shrink the spacious radiation study laboratory oftenly consisting of bulky instruments into dimensions of a compact hand held tool while keeping high performance and providing valuable results. SESTRA (School Education Set with Timepix for Radiation Analysis) the educational kit, based on Timepix pixel detector developed in CERN, supplemented with a wide set of accessories (radiation sources, mechanical adapters, positioning system, a book of detailed guidelines, acquisition control and visualization software tool, etc.) was designed to maximally ease user handling and reproduction of exemplary experiments. A form of real time visualization of a detector response to impacting radiation demonstrates in a clean way the different properties of different radiation types (i.e. all basic kinds of ionizing radiation, such as alpha, beta particles, as well as gamma rays and cosmic muons). In the case of working principles of some commonly exploited techniques (i.e. radiography, determination of material composition, thin layer measurement, etc.) the hands-on experience provided by the educational kit substantially helps in the principle understanding. Especially for high school students and university students, who are the main targeting user group, it makes learning more attractive and motivating to progress in further study. However, the potential profit of the educational kit is not solely limited to that group. It can be considered as a general tool allowing a rapid familiarization with specific aspects of radiation related problematics. Beside the experiments directly practicable with the provided sources of basic radiation kinds, the educational kit concept allows to proceed with a study of cosmic radiation via accessing and analyzing datasets gained at passed space missions experienced on board of satellites at the earth orbit equipped with the Timepix pixel detector similar to one contained in SESTRA kit. It gives further perspective to importance in understanding of radiation properties and its potential impact (e.g. radiation field composition analysis, dose delivery and harmful effect on electronics and human crew, etc.).