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Radiation Fields, Effects and Risks in Human Space Missions (5)

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EUROPEAN RADIATION FACILITIES NETWORK (ERFNET)

Abstract

The European Radiation Facilities Network (ERFNet) is a distributed infrastructure for which is undergoing a feasibility study, funded by ESA. ERFNet aim is to support studies relevant for radiation risk mitigation in exploration class space missions. In the first development ERFNet goal will be to help studies on radiation shielding, including works targeted at optimizing the design and development of space habitats. Future upgrades will likely include also radiobiology studies. ERFNet provides a single access point (Web-interface) to the system, developed for an easy and complete access to most of the relevant information in the field, to operate on this information (i.e. perform new simulations to characterize and use new materials for shielding purposes), to provide suggestions for design optimization, to facilitate access and use of the linked facilities. To achieve these tasks, an ERFNet Knowledge Base (EKB) will be developed. The EKB will link to existent databases (DBs) holding relevant data, aiming at providing standardized and simple access to these data. Whenever needed the EKB will also store in its own repository relevant data and tools. Tools to search for information in literature DBs will be included in the EKB. Tools and strategies to suggest optimal configurations/materials/etc. for the crew radiation risk minimization will be developed. To achieve this goal, ERFNet will link to the most up-to-date risk model. Finally, all the results obtained will be stored in the EKB to increase the amount of information for the successive users. To provide flexibility and upgrade easiness, the EKB will be modular. As an example, the reference risk model will be easily updated whenever needed. This will be achieved developing specific interfaces between the different moduli. A number of European irradiation and habitat facilities are being chosen to be the “Core” facilities in ERFNet to be used for support and experimental validations of the design solutions provided by the EKB. Upgrades to exploit these facilities for space radiation shielding work are foreseen within ERFNet. This would include, for example, Galactic Cosmic Rays and Solar Particle Events simulators for the irradiation facilities, prototyping and material laboratories as well as virtual/augmented reality tools aimed to improve the support for the users in developing their novel ideas, in the habitat facilities. ERFNet feasibility review is due in July 2019. In this talk the status of the project and its major aims will be presented.