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SOME CONSIDERATIONS ON AIRCREW EXPOSURE TO COSMIC RAYS

QUELQUES CONSIDÉRATIONS SUR L'EXPOSITION DES L'AÉRIENNE EQUIPAGE AUX RAYONS COSMIQUES

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Introduction: Cosmic rays still represent a concrete problem in terms of Aircrew radiation exposure. From our review on the state of art, this matter appears well investigated and regulated, various actions have been also taken to contain the related health risks but It is anyway our opinion that further efforts in this field are needed. Our first experimental step was to assess a first level radiation exposure estimation in real time and retrospective way.

Methods: Radiation exposure was assessed on five routes, five military flights, of different contexts in terms of Altitude (range 25kft-37,8kft) and Latitude (range 41-59) by using the CARI-7 (FAA's Civil Aerospace Medical Institute; ICRP pub. 103) computer program in retrospective way. We also used on board a simple and very light geiger detector (Gammascout, GmbH), well aware of its technical limitations we considered anyway useful the possibility to detect in real time and have a recorded track of in-cockpit ionizing events during the flights.

Results: Average Effective-Doses, estimated on higher and longer routes with greater latitude displacements (to the North), was 10.8 μSv for an average time of flight of 2.62 hours. In low altitude and short latitude displacements routes it was estimated an Effective-Doses value of 3.25 μSv for 2.7 hours. The simple Geiger device, as expected, provided a dose estimation of about 30% lower but was able to detect coherently, in the recorded time course, the effects of altitude and latitude in terms of dose-rate.

Conclusions: Due to the scenario complexity of cosmic rays, many related issues remain still open, in particular in high altitude flights, Air Force and space mission contexts. Our objective is to create a multidisciplinary research team (Astrophysicists, Health Physicists, Engineers, Military Crews, Aerospace Medicine Experts...) focusing on the improvement of real-time dosimetry and development of innovative shielding strategies.