

Abstract

Visual assessment of the radiation distribution in the ISS lab module

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The Lab module of the International Space Station (ISS) is one of the working areas where the crewmembers are expected to spend majority of their time. By considering the integrated shielding provided by the rack systems, outer shell and inner shell material composition, an estimated total shielding for a given location in the working area is calculated. Shield data for about 3888 different points that are about 10 cm apart in the working area were calculated utilizing the CAMERA ray-tracing algorithm. Considering this shielding, estimated dose equivalent and fluence values were calculated using the HZETRN transport code for a given ambient radiation environment. The estimated dose and fluence values in the working area are then translated to a 3-D lattice with interpolated color scheme to visualize the radiation estimates at various locations of the working area of the Lab module utilizing MATLAB-5 software. This visualization and animation of the radiation dose distribution can be generated in near realtime to track any changes in the radiation field during the orbit precession of the ISS. Several perspective views of the Lab module's working area with the radiation dose visualization along with the estimates of spatial distribution inside the human body will be presented for a simulated ambient radiation.

[Presentation](#) [Vizualization](#)