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High Altitude Radiation Monitor (HARM)

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The measurement of energy deposition in matter and tissue resulting from the exposure to ionizing radiation can be classified as radiation dosimetry. Since our bodies are incapable of detecting ionizing radiation, the energy deposited by radiation in our bodies could be harmful. Therefore, it is important to measure and monitor the radiation exposure. Since radiation was classified as a health hazard in the early 1960s, one of the outstanding challenges for commercial airlines is to assess the radiation risks of passengers due to the complex radiation field at these flight altitudes. To improve our understanding of this radiation field, different factors have to be outlined and investigated.

To investigate the effects of radiation at flight altitudes, a very small and lightweight active dosimeter known as HARM was built as a prototype for this project. This instrument use a silicon semiconductor sensor capable of measuring neutral and charged particles. The instrument is designed to measure the absorbed dose rate in silicon, which is used to estimate how much energy have been directly deposited in tissue. Its measurements will address the biological effects when the ionizing radiation interacts with our bodies during a flight.

In this presentation, I will talk about the current approaches to radiation risk estimation recommended by the International Commission on Radiological Protection (ICRP). Then, I will discuss HARM's prototype development and its working principle, as well as its performance and calibration tests.

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