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Information from Battelle

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RICHLAND, Washington---A compact device that continuously monitors the radiation dose received by astronauts in space is being developed by researchers at Battelle's Pacific Northwest Division.

The sophisticated dosimeter is for the National Aeronautics and Space Administration. It will provide more detailed in-flight information about the varying amounts and quality of radiation to which astronauts are subjected than has previously been available.

Battelle's Les Braby, the project manager, said passive dosimeters such as film badges have been used by astronauts on previous space missions. These cardboard-thin badges, about 1 1/2 inches square, were worn by the astronauts and "analyzed" at the completion of the mission.

"The newer, more sophisticated device is being developed because of NASA's concern over radiation received during the longer manned space flights," Braby said. "It will enable routine monitoring of radiation levels to determine whether it is safe for the astronauts to be moving about, whether they should be in specially shielded areas, or whether they should be brought back to earth."

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Braby said astronauts are subjected to various kinds and amounts of radiation in space because of factors such as cosmic rays, trapped radiation belts around the earth and solar flares. The monitoring device will measure dose -- the physical measure of radiation deposited in a substance. It will also evaluate dose equivalent, a quantity established to indicate the anticipated biological hazard from different types of radiation.

A laboratory prototype model was successfully tested recently at Battelle's Richland, Washington, laboratories. The final model, which is now being developed, will be about the size of a briefcase and weigh about 15 pounds.

Braby said the device uses low-pressure proportional counters to simulate micron diameter sites in tissue and determine the distribution of doses received by individual cells. These doses to cells are then used to estimate the dose equivalent for space radiations.

"Two detectors are used to cover the widest range of radiation types," he said. "The system's microprocessor can activate a calibration source, adjust the detector voltage, collect data, calculate dose, dose rate and dose equivalent, and provide live display of dose quantities. All the data can be recorded on magnetic tape."

Researchers hope to complete the portable unit in late 1981 or early 1982. Others involved in the study include scientists Charlie Ratcliffe and Noelle Metting.

Battelle's Pacific Northwest Division, with laboratories at Richland, Seattle and Sequim, Washington, performs research and development for industrial sponsors and government agencies. The Division is a component of Battelle Memorial Institute, the world's largest independent research institute. Other major Battelle research facilities are located at Columbus, Ohio; Frankfurt, West Germany and Geneva, Switzerland.

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