National Aeronautics and Space Administration

Johnson Space Center

HUMAN HEALTH AND PERFORMANCE

Exploring Space | Enhancing Life

Radiation Monitoring, Protection and Exposure Analysis

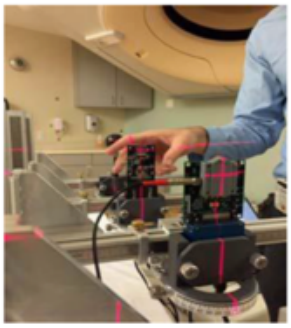
Understanding Radiation Effects on Humans in Extreme Environments

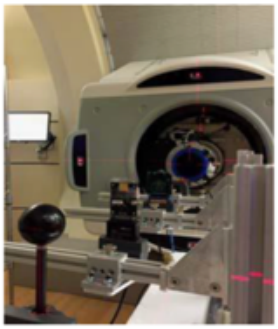
The Space Radiation Analysis Group (SRAG) offers many unique capabilities at the intersection of technology development, data analysis, statistics, information technology, health care, and radiation safety. It deals with the resources, devices, and methods required to optimize

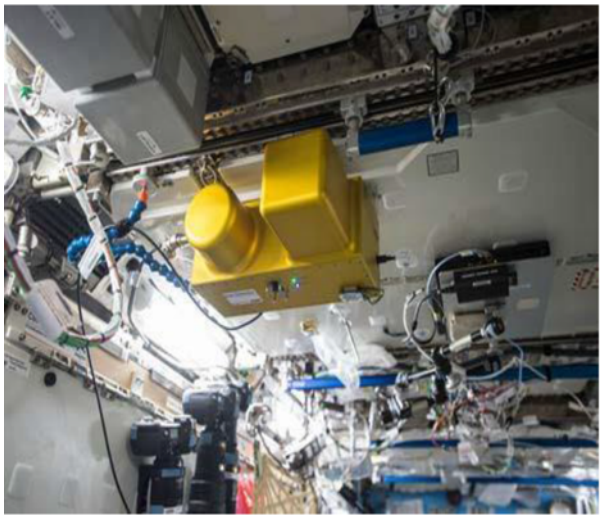
World Renowned Skills and Unique Capabilities

The Johnson Space Center, a world leader in human spaceflight, possesses unique knowledge, skills, and capabilities that can be applied to solving human health and performance challenges here on earth, particularly those related to operating in extreme and harsh environments.

NASA expertise is available in the areas of particle/helio-physics, space radiation science, big data analysis, and information technology. These skills complement NASA's human knowledge for monitoring, assessing, and protection solutions for space radiation exposures. These capabilities coupled with technology development and ground based radiation research enable NASA to provide an integrated solution to radiation exposure analysis and mitigation.







Analyses

JSC has unique expertise and capabilities in physics, simulation and radiobiology tools. These tools enable NASA to perform:

- Vehicle design and (complex) shielding assessments in different environments
- Shelter/shielding methods and optimization
- Predict/assess the biological effects of space radiation exposures

Combined, these skills enable NASA to make better/safer shielding recommendations for habitats, vehicles, and storm shelters for crew and passengers.

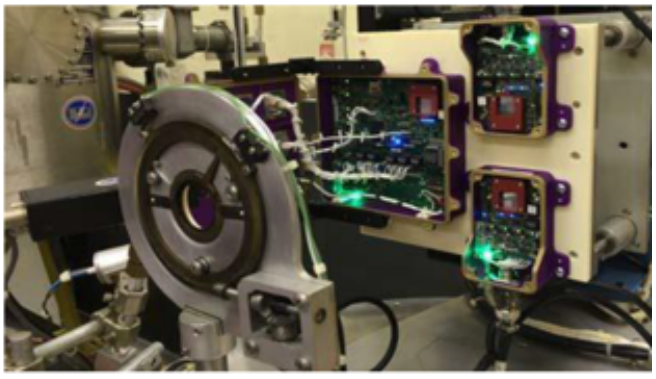
JSC's unique radiation subject matter expertise and services are available and can be used to aid in development of radiation monitoring, assessment tools and human-centered operations that can be used for terrestrial applications such as medical environment monitoring; nuclear power plants; military Army and Navy applications and operations; aid in development of Commercial Crew radiation hazard detection and protection; and new space mission endeavors such as an orbiting commercial venture.

Console Monitoring and Support

JSC has more than 50 years of operational spaceflight experience and provides round-the-clock solar radiation environment monitoring for human spaceflight operations support. SRAG routinely participates in flight rule development; alert warning systems integration; and space weather forecast modeling. These four capabilities will help JSC ensure safe human spaceflight operations in the upcoming exploration missions beyond Low Earth Orbit.

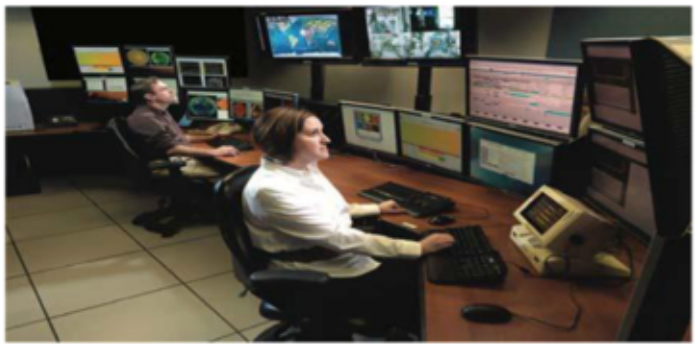
Radiation Testing and Logistics

JSC routinely coordinates and conducts radiation instrument measurements at various medical and accelerator facilities around the world. These measurements are used for instrument calculation, algorithm development, requirements verification, and multi-instrument comparisons.

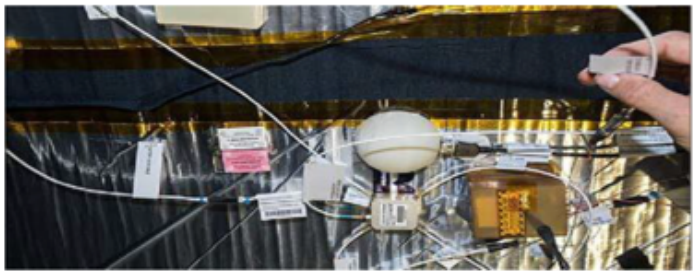


Radiation Monitoring and Measurements

JSC has unique expertise and capabilities to assess extreme environment operations, dosimetry, radiation environment measurements, and design and shielding analyses with a very strong reliance on information technology.



JSC offers personal radiation exposure monitoring through the use of passive detectors and is currently testing personal active detectors. Passive radiation dosimetry support for human radiation exposures is provided through the Space Radiation Dosimetry Laboratory (SRDL).



JSC also performs intra- and extra-vehicular radiation environment monitoring and characterization through the use of many passive and active detectors (ranging from micro-dosimeters to charged/neutral particle spectrometers). Currently, JSC is utilizing the International Space Station (ISS) as a development/ certification testbed for future exploration-class instrumentation that will enable high fidelity measurements in simultaneous low mass/low power configurations.

For the benefit of all

For more information:
NASA Human Health and Performance Directorate
www.nasa.gov/hhp/

Point of Contact:
Nancy Srb
nancy.l.srb@nasa.gov
281.244.1689