

SPACE LIFE SCIENCES SYMPOSIUM (A1)
Medical Care for Humans in Space (3)

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A WRIST MRI FOR THE INTERNATIONAL SPACE STATION

Abstract

A wrist-sized Magnetic Resonance Imager (MRI) has been designed for installation on the International Space Station (ISS) in 2016. The ISS-MRI will be housed in an 8 panel unit (PU) drawer for an ISS standard International Standard Payload Rack (ISPR). The design mass of the complete ISS-MRI is less than 180 lbs. The ISS-MRI uses new approaches to MRI magnet design and to encoding spatial information into the nuclear magnetic resonance (NMR) signal to reduce the mass of the MRI by an order of magnitude over existing approaches to MRI. The wrist provides a standard diagnostic site for the study of bone and muscle health in clinical populations in Earth (e.g. for the assessment of osteoporosis). The ISS-MRI will be used to study bone and muscle mass loss and tissue changes in astronauts in situ during long duration space flight. The knowledge gained from such studies will be used to reduce the health risks for long duration space flight to Mars, for example. In addition to direct use for ISS-based research, the ISS-MRI will also demonstrate the new MRI technology to the point where spin-offs of the technology into the terrestrial clinical medical imaging arena become possible. Such Earth-bound applications include MRI access for remote regions, in primary health care settings, in the emergency room and in the operating room for use with minimally invasive and robotic surgery.