**NASA** INFORMATION
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# Human Research Facility

The Human Research Facility (HRF) supports life sciences investigations on the International Space Station. The hope is to understand the physiological and psychological changes in humans due to spaceflight.

There are two types of investigations: One is basic research that uses microgravity; the other unique aspect of the Space Station environment addresses scientific questions regarding human physiology and human adaptation to spaceflight.

The HRF is a rack that provides services and utilities to experiments and instruments installed within it. These include electrical power, command and data handling, cooling air and water, pressurized gases and a vacuum.

The HRF rack houses a computer workstation and portable computer laptop. This allows crew members to command and test the rack's equipment, as well as collect and store experiment data. It sends data to and from scientists on Earth, and it provides a place for the crew to keep notes and for human life sciences experiments.

Also housed in the rack is equipment for the Gas Analyzer System for Metabolic Analysis Physiology, or GASMAP, and Ultrasound human life sciences experiments. These are generic diagnostic research tools designed to support a variety of future human research investigations.

GASMAP is used for the assessment of crew aerobic capacity. It analyzes human metabolics, cardiac output, lung diffusing capacity, lung volume, pulmonary function and nitrogen washout.

The Ultrasound Imaging System provides three-dimensional image enlargement of the heart and other organs, muscles and blood vessels. It is capable of high resolution imaging in a wide range of applications, both research and diagnostic, such as:

- Echocardiography, or ultrasound of the heart
- Abdominal ultrasound, deep organ
- Vascular ultrasound
- Gynecological ultrasound
- Muscle and tendon ultrasound
- Transcranial ultrasound
- Ultrasound contrast studies
- Small parts ultrasound

HRF hardware enables the collection of data from the Space Station's crewmembers. The medical and research community needs this to assure crew health.

Scientific research, including human research, is a primary goal of the International Space Station. Areas of concern to human well-being and performance, such as renal stone risk, bone density deterioration and the effects of ionizing radiation, are also studied using the HRF system and hardware.

The human research helps improve our understanding of life, health and disease. It assures safe and productive human spaceflight and develops space technologies relevant to scientific and medical problems on Earth.