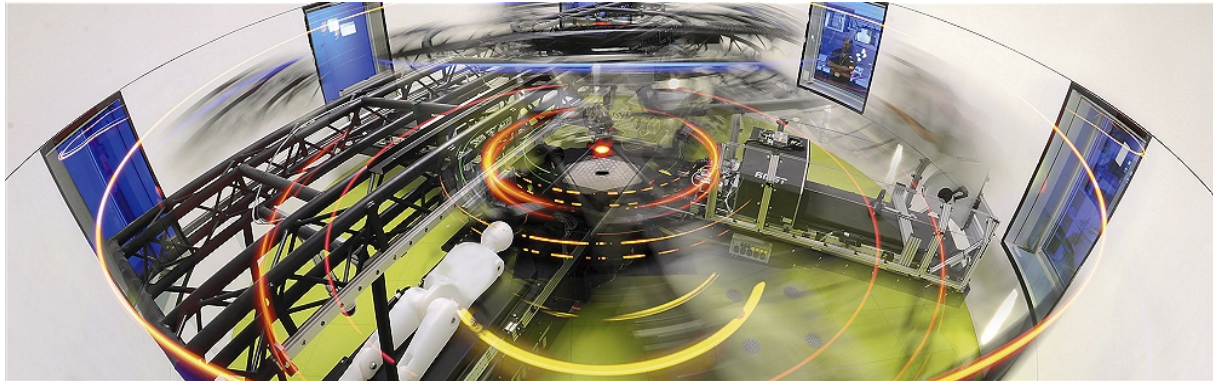


Profile

DLR Short Arm Human Centrifuge Institute of Aerospace Medicine



GENERAL FACTS

- **Site:** DLR Institute of Aerospace Medicine, :envihab, Module 1, Cologne, Germany
- **Opened in 2014**
- **Operation:** throughout the year with 1.5 headed team

TECHNICAL FACTS

- **Radius:** 3.80 m
- **Max. radial acceleration of 6 g at outer perimeter**
- **Max. onset rate:** 0.2 g/s
- **Number and type of nacelles:** 4 multifunctional gondolas
- **Radius of nacelles adaptable within 200 cm (also during centrifugation)**
- **Centrifugation and examination of 4 test subjects simultaneously**
- **Subject height 150 cm to max. 210 cm**
- **Max. loading capacity:** 800 kg
- **Standard monitoring of vital signs:** ECG, blood pressure, heart rate, arterial oxygenation
- **Audio and visual monitoring**
- **Measurable human physiological and medical parameters:** continuous blood pressure, ECG, spirometry, electromyography, eye movement etc.
- **Lighting can be varied**
- **Standard training on integrated erg, vibration platform and ergonomic sledge jump system**
- **Dynamics of movement can be monitored by a motion capture system and two triaxial power measuring platforms**
- **ultrasound examination while spinning by robot-guided system to study the effects on heart and vessels**



APPLICATION

- **The Short Arm Centrifuge offers enhanced methods for research of the impact of increased gravity, especially to develop countermeasures concerning health risks which occur under microgravity (deterioration of bone and muscle structure, cardiovascular weakness, dizziness, stuffy heads, motion sickness, inner ear disturbances, comprised immune systems, back pain).**
- **Present countermeasure programs are still insufficient and physiological responses to artificial gravity need to be better understood. These effects on the human body can be studied on Short Arm Centrifuges and the physical performance of astronauts can be improved by different training and testing methods.**
- **Hypergravity findings are also applicable to terrestrial health issues, e.g. to the consequences of extended bed rest due to illness or age. Research on osteoporosis, muscular atrophy, and cardiovascular health will be conducted with this excellent human centrifugal research tool.**

HIGHLIGHTS

- **Training including squats and reactive jumps to examine joint stress, movement sequences and stress of the circulatory system under increased gravity**
- **Studies „Stable“ and „VascoRob“: first time ultrasonic examinations of the heart and vessels (arteries) with robot-assisted medical ultrasound system under hypergravity**
- **In future: Live-Imaging with fluorescence microscopy (e.g. growth of cardiomuscular or nerve cells under hyper-g)**

COOPERATION

- **NASA**
- **ESA**
- **University Hospital Zürich**
- **University College London**
- **Aviation Medicine, German armed forces**
- **University Konstanz**
- **Sports University Cologne, etc.**

ANSPRECHPARTNER

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LITERATURE

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