

The short-arm centrifuge



Since 2007, MEDES has had a short-arm centrifuge at the Space Clinic.

Due to the growing complexity of the clinical studies entrusted to MEDES, in particular the assessment of artificial gravity with the aim of preventing disorders induced by weightlessness, MEDES decided to acquire more high-performance equipment. The most promising countermeasure for dealing with the effects of microgravity is artificial gravity, which involves recreating apparent gravity through centrifugation.

By artificially recreating a situation of gravity for astronauts, an effect is achieved that can prevent the consequences of exposure to weightlessness on all the body's physiological functions.

This centrifuge is housed at the MEDES Space Clinic and is mainly used as a countermeasure during the various studies conducted at the clinic.

Produced under an ESA contract and with its support, it was designed and installed by the Belgian company Verhaert.

The ground-based laboratory version of the centrifuge has a diameter of about 6 metres, so can apply centrifugation simultaneously to two people either sitting or lying down.

Practical information

- * **The centrifuge occupies two rooms** (one for the centrifuge itself and another for the control room).
- * **The centrifuge is equipped with four arms**, each with either a bed or a seat at the end. **These “nacelles” have been designed to be comfortable for people of different sizes.** For example, the positions of the handles and foot-rests are adjustable.

- * **Each nacelle is fitted with a hood to cover the subject's head (a “dark environment” system) preventing them from seeing the outside to avoid visual stimuli likely to trigger motion sickness. Inside the “dark environment” is a camera, two spotlights for illuminating the subject's face throughout the test and a screen displaying information about the current centrifugation (rotation speed, time remaining, acceleration experienced, etc.) or any other image.**
- * **An audio connection is also provided** via a headset and a microphone, allowing permanent communication with the centrifuge operators (always at least two people, one of which is a doctor).
- * **The intensity of the centrifugal force can be adapted to each person** according to their size and the acceleration to be applied.
- * **This centrifuge is also fitted with two devices for the medical monitoring of subjects during centrifugation sessions. Their vital parameters (electrocardiogram (ECG), blood pressure, heart rate, respiratory rate, oxygen saturation, etc.) are recorded and transmitted to a screen in the control room, where they are monitored in real time by the doctor.**

