Paper ID: 49163
oral

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

Author: Mrs. Maja Tommerup
Danish Aerospace Company A/S, Denmark, mbt@danishaerospace.com

Mr. Daniel Hansen
Danish Aerospace Company A/S, Denmark, dh@danishaerospace.com
Mr. Søren Bendtsen
Danish Aerospace Company A/S, Denmark, sb@danishaerospace.com
Mr. Jesper Carlsen
Danish Aerospace Company A/S, Denmark, jc@danishaerospace.com

# CYCLING TO THE MOON AND ROWING TOWARDS MARS

**Abstract**

Humans have always wished to explore space and as our journeys move beyond low Earth orbit the development of a small and reliable, but at the same time optimal equipment for muscular, bone and cardiovascular stimulants, is one of the big challenges.

E4D (European Enhanced Exploration Exercise Device) is a new versatile exercise device developed to ensure, that human space explorers will stay fit, so they eventually can return safely to Earth and even be fit to land and work on other planets.

This new device allows for four different but well known types of exercise to be performed on future space vehicles via one combined compact device. These exercises are cycling, rowing, resistive exercises and rope pulling.

E4D is not just a flexible but also a powerful exercise devise. It provides 300 kg of load at up to 3 m/s during resistive exercise. For continues cycling and rowing 500 watt is delivered with an even higher peak capacity. Rope pulling is targeted at up to 80 kg of resistance. These four types of exercise ensures both aerobic and anaerobic exercise. Furthermore E4D also supports certain types of exercises to be performed in the event of power loss.

The device is designed to let astronauts exercise in an earthlike fashion. Results from pre-, in- and post-flight can be compared by performing similar exercises in flight as on ground. E4D collects and stores real-time data during exercise. This data can be accessed from ground for analytical and science purposes. Furthermore key data is displayed to provide valuable feedback to the user during exercise as e.g. rounds, repetitions and loads.

E4D is building upon the heritage and experience from previous reliable equipment such as the CEVIS ergometer.