

Smart Textiles for the International Space Station

Large space contract for Danish companies and researchers. The European Space Agency (ESA) has just signed a contract for 1.04 million EUR for the development of training tights with integrated sensors and wearable computing that can help astronauts to train effectively.

The project name is GAIN – Garments for Advanced Insights.

Danish company Ohmatex A/S was awarded the contract together with two other Danish partners, the Department of Biomedical Sciences at the University of Copenhagen who will validate the equipment on the International Space Station ISS after a development and maturing phase of 18 months and Danish Aerospace Company A/S who is an experienced provider of space exercise equipment and will be responsible for the safety and space-qualification of the electronics.

On average, astronauts in space spend 2 hours each day training to maintain muscle strength and prevent undesirable effects caused by weightlessness. In preparation for longer missions ESA is looking for new methods and wearable solutions that can provide deeper insight into training. The system measures the electrical activity and oxygenation of skeletal muscles during training while stretch sensors track changes in leg volume resulting from fluid displacement or muscle atrophy.

There are great prospects for both medical research and the technology itself. The contract for ESA offers Danish players in human space flight the chance to become leaders in this field.

The advantages are not confined to space. On Earth, the experiment can contribute to understanding the physiological mechanisms behind fluid accumulation (edema) which, for example, affects heart failure patients and pregnant women suffering from preeclampsia. For the commercial partners, there are spin-off opportunities for products within the sports and medico segments.

The activity, supported by ESA's [GSTP](#) technology development programme, will run for three years and end with two training models for terrestrial use and one model to be flown to the space station. It is expected that the equipment will be launched in around 2021. The total contract sum of DKK 7.75 million DKK is distributed between Ohmatex, receiving 3.3 million, Danish Aerospace Company receiving 2.5 million and the Department of Biomedical Sciences 1.8 million respectively.

ESA's Technical Officer Arnaud Runge, based at ESA's Technology Center in the Netherlands, is pleased that the project has reached this stage. "This activity is the third contract that ESA is awarding to Ohmatex and Danish partners to work on muscle activity monitoring. The opportunity to demonstrate this technology on the International Space Station is a great achievement and reward for this team. With this tool, we do hope to gain additional knowledge on how the human body behaves in space and therefore optimize the regime of exercise of our astronauts so that they remain in good shape".

<p>About Ohmatex: Ohmatex A/S (see www.ohmatex.dk) develops intelligent textiles (e-textiles), combining clothing with IT technology. In 2020 Ohmatex will launch its own product for monitoring athletes' muscles as spin-off from its collaboration with ESA.</p> <p>Contact: CTO Christian Dalsgaard, tel. +45 73707387, mobile +45 40966951, email: chd@ohmatex.dk</p>	<p>About Danish Aerospace Company Danish Aerospace Company A/S (see www.danishaerospace.com) develops and produces training equipment, biomedical devices for health monitoring and water filtering equipment for manned spaceflight, that can also be used in extreme environments.</p> <p>Contact: Director (CEO) Thomas A. E. Andersen, tel. +45 63107017, mobile +45 40294162, ta@DanishAerospace.com</p>
<p>About the Dept. Of Biomedical Sciences at Copenhagen University The Dept. Of Biomedical Sciences is a multi-disciplinary institute with national and international research groups in the clinical sector as well as industry. The Institute is part of the Health Faculty at the University of Copenhagen.</p> <p>Contact: MD. Ph.D Lonnie Grove Petersen, Currently. University of California, San Diego, tel. +1 858 263 6365, email lonnie@sund.ku.dk</p>	<p>About European Space Agency ESA is the European Space Agency, an international organisation, which provides for and promotes, for exclusively peaceful purposes, cooperation among European States in space research and technology and their space applications, by elaborating and implementing activities and projects in the field of space</p> <p>Contact: Project Officer Arnaud Runge, tel. +31 715654770, email Arnaud.Runge@esa.int</p>

Images can be downloaded [here](#):

DISCLAIMER.: The information and views set out in this press release are those of the individual and do not necessarily reflect the official opinion of the European Space Agency.

About the ESA logo, please note the following: the ESA logo shall be downloaded at the following address:
http://webservices.esa.int/ESA_Logo/index.php.