

Physiotherapy Science Research Unit

XoSoft

Soft modular exoskeleton to assist people with mobility impairments

Many people experience varying degrees of mobility impairment due to an accident or afflictions of old age. Assistive devices play a pivotal role in their lives and impact on their ability to live independently and perform basic tasks of daily living. Yet most assistive devices, such as powered wheel chairs, do not encourage or support the activation of legs, which is essential to prevent further atrophy. An international, multidisciplinary consortium of researchers from nine organisations and seven European countries has therefore set out to develop, within the framework of the European Union's Horizon 2020 Research and Innovation Programme, a novel solution: a wearable, intelligent clothing system named XoSoft.

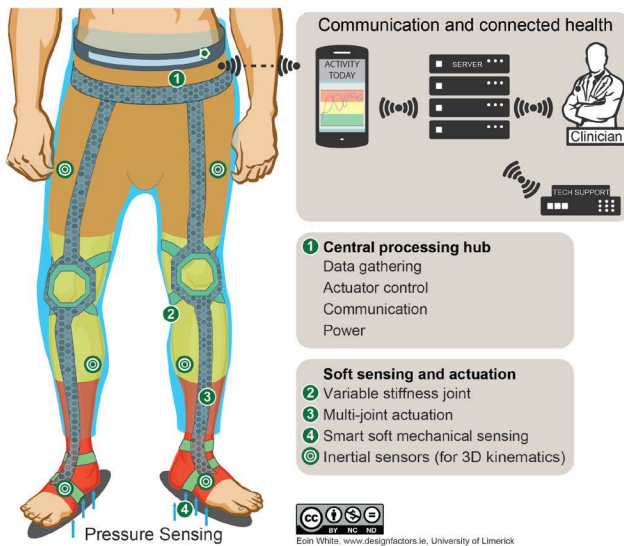
Background

Between 2000 and 2050, the older population (80 years +) is projected to almost quadruple from approximately 100 million to 395 million people worldwide. Many people experience varying degrees of mobility impairment due to an accident or afflictions of old age. Assistive devices play a pivotal role in their lives and impact on their ability to live independently and perform basic tasks of daily living. There are currently 40 million people in Europe who cannot walk without an aid. Yet most assistive devices, such as powered wheel chairs, do not encourage or support the activation of legs. XoSoft should answer the need of these and other user groups for low to moderate mobility assistance. The exoskeleton is developed by a consortium of five

research groups and three companies with EU project experience in exoskeleton / assistive orthotics development.

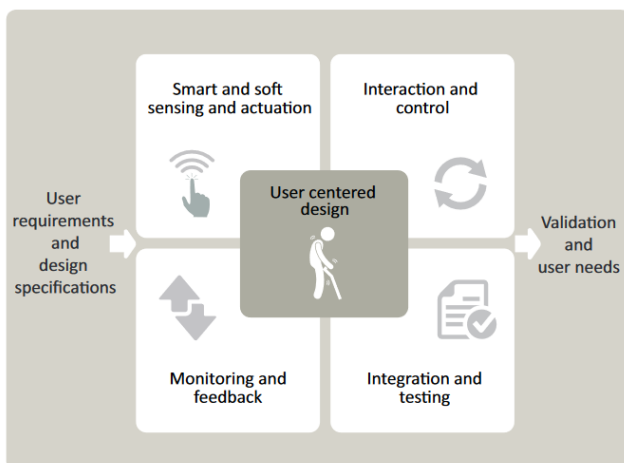
Objectives

The overall aim of this multidisciplinary research action is to develop a soft, modular, lower limb exoskeleton that elderly and disabled people with mobility impairments can wear to increase their mobility and to assist their leg strength and support. XoSoft will employ smart soft robotics, biomimetic controlled actuation and connected health data feedback and interface.



Activities

A core feature of XoSoft is that it follows a user centered design approach. The figure below illustrates the XoSoft design and development approach, which is subdivided into nine Work Packages.



User requirements and design specifications are established before concept technology development commences. The design is realised in the selection of technologies, which are developed based on their ability to deliver the user centered design solution. Finally, the mature prototype will be evaluated in clinical and home trials.

Project partners

- Fondazione Istituto Italiano di Tecnologia (IT)
- Consejo Superior de Investigaciones Científicas (ES)
- Saxion University of Applied Sciences (NL)
- University of Limerick (IE)
- ZHAW Institute of Mechatronic Systems (CH)
- Roessingh Research and Development BV (NL)
- accelopment AG (CH)
- Geriatrics Center Erlangen (DE)
- Össur hf (IS)



ISTITUTO ITALIANO DI TECNOLOGIA
ADVANCED ROBOTICS



ISTITUTO ITALIANO DI TECNOLOGIA
CENTER FOR MICRO-BIROBOTICS



Project management ZHAW Institute of Physiotherapy

Eveline Graf, PhD
Prof. Markus Wirz, PhD

Project duration

1st February 2016 – 31st January 2019

Project team ZHAW

– Christoph Bauer, PhD
– Carole Pauli

Funding

Horizon 2020 Framework Programme of the European Union, ICT-Robotics

Project status

Completed

Contact

ZHAW School of Health Professions
Institute of Physiotherapy
Dr. Eveline Graf
Katharina-Sulzer-Platz 9
P.O. Box
CH-8401 Winterthur

Phone +41 58 934 64 80
eveline.graf@zhaw.ch
www.zhaw.ch/en/health