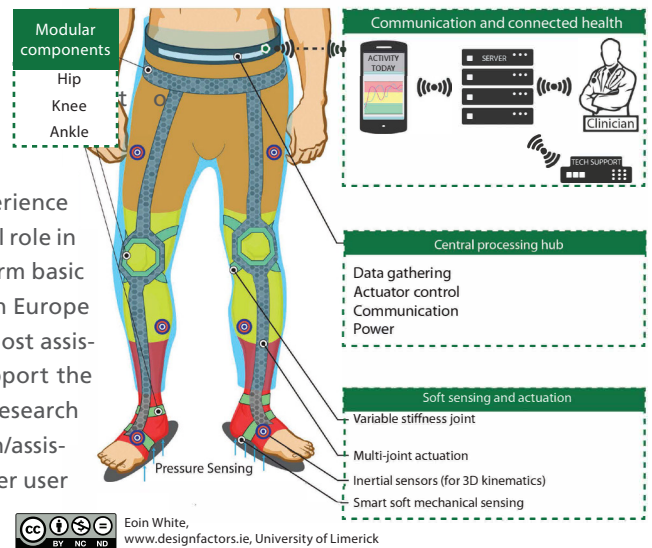


XoSoft

Soft modular biomimetic exoskeleton to assist people with mobility impairments

Background

Between 2000 and 2050, the older population (80 years+) is projected almost quadruple from approximately 100 million to 395 million people worldwide. Many of the elderly and patient groups such as stroke sufferers or patients with incomplete Spinal Cord Injuries (SCIs) experience varying degrees of mobility impairment. 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 3.2 million wheelchair users in Europe and further 40 million people 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, to be developed by a consortium of five research groups and three companies with EU project experience in exoskeleton/assistive orthotics development, is a class I medical device for these and other user groups to answer their need for low to moderate mobility assistance.



Objectives

The overall aim of this multidisciplinary research and innovation action is to develop a soft, modular, lower limb exoskeleton that elderly and disabled people with muscle weakness and/or a partial loss of sensory or motor function can wear to assist their leg strength and support, to increase their mobility and thereby improve their health and quality of life. XoSoft will employ smart soft robotics, biomimetic controlled actuation and connected health data feedback and interface. XoSoft will be:

- A highly customisable modular system, comprising an ankle-foot-knee module which can be worn on one or on both sides and a hip module
- Easy to wear, comfortable, serviceable and compatible with the daily life of the users
- Making use of advanced textiles and smart materials to create sensing, variable stiffness joints and actuation
- Controlled through biomimetics to identify the user's motion and intention and to determine and provide the appropriate level of assistance
- Equipped with integrated health connectivity and analysis features to enable the wearer and their clinicians/therapists to review activity information and to register deterioration of the conditions at an early stage
- Developed with a user-centered design approach: following extensive testing in the lab, the concept is subject to trials in clinical settings and home environments.

Funding Programme:

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



Project Coordinator:

Dr Jesús Ortiz, Fondazione Instituto Italiano di Tecnologia, IT

Project Duration:

01/02/2016-31/01/2019

Project Budget:

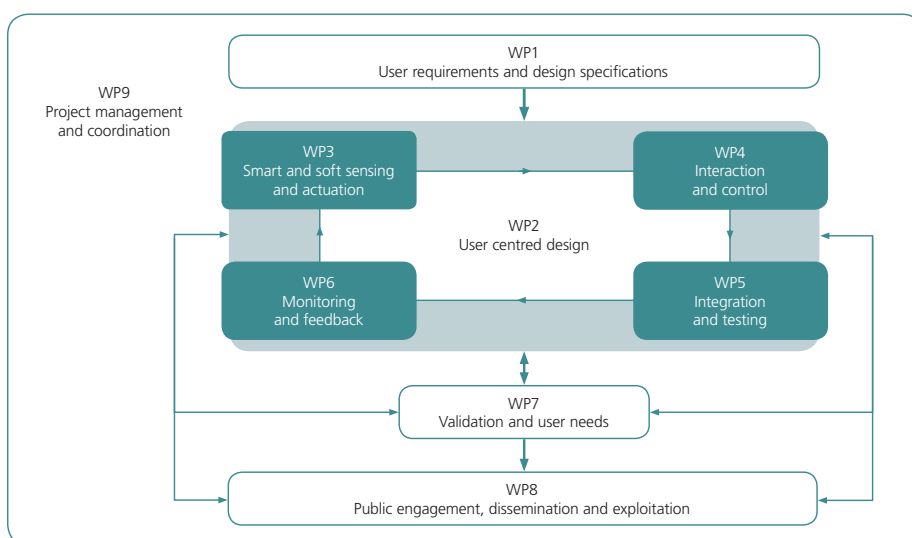
5.4 million euro

Project Website:

www.xosoft.eu

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 (WP).








User requirements and design specifications (WP1) are established before concept technology development commences. WP 2 (User centered design) runs in parallel and in conjunction with each of the technology WPs. The design is realised in the selection of technologies, which are developed based on their ability to deliver the user centered design solution. The technology development to achieve the vision are realised in WP3 (Smart and soft sensing and actuation), WP4 (Control and interaction), WP5 (Integration and testing) and WP6 (Monitoring and feedback). WP7 will finally evaluate the mature prototype in clinical and home trials.

Impact

This project will deliver a modular exoskeleton for the lower limb made of soft materials as an assistive device for persons with low to moderate mobility restrictions. This novel device will meet key EU Policy targets related to the domain of healthcare and robotics, as set out in the *Robotics 2020 Multi-Annual Roadmap for Robotics in Europe* and the *Strategic Research Agenda for Robotics in Europe 2014 - 2020*, which identify a need to develop assistive robotics "where the primary function of the robotic system is to provide assistive help either to carers or directly to patients either in hospital or in a specialist care facility". XoSoft aims to go even beyond this and to become the first commercially available soft exoskeleton for the mainstream mobility assistance market.

Our Services:

-  Funding Advice
-  Proposal Writing
-  Contract Negotiations
-  Project Management
-  Project Dissemination

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