

Movement Assisting Devices

MANUFACTURING OF PERSONALISED KINETO-DYNAMICS PARTS AND PRODUCTS
FOR WORKERS, ELDERLY AND CHILDREN

Newsletter 1 – December 2016

Welcome to MovAiD	2
Get our Latest News.....	3
MovAiD Meetings.....	3
MovAiD joins Exoskeleton Technology Day.....	3
MovAiD General Assembly 2016.....	3
MovAiD Kick Off Meeting.....	3
Update from MovAiD Work Packages (WP)	4
WP1 Novel concepts for Movement Assistive Device (MAD).....	4
WP2 MovAiD Integration Platform	4
WP3 MovAiD Advanced Materials	5
WP4 MovAiD Computational Design	5
WP5 MovAiD Additive Manufacturing Machines and Processes.....	6
WP6 and Innovation Award at PMI 2016	7
WP7 Dissemination and Communication.....	7
Project Outlook.....	7

Movement Assisting Devices

MANUFACTURING OF PERSONALISED KINETO-DYNAMICS PARTS AND PRODUCTS
FOR WORKERS, ELDERLY AND CHILDREN

Newsletter 1 – December 2016

MOVAID CONSORTIUM

COORDINATORS

Chas A Blatchford & Sons
Limited, United Kingdom

Brunel University London,
United Kingdom

PARTNERS

Consiglio Nazionale delle
Ricerche – ITIA, Italy

Netherlands Organisation for
Applied Scientific Research,
Netherlands

Scuola Universitaria
Professionale della Svizzera
Italiana, Switzerland

Synesis s.c.a.r.l, Italy

Gait Up SA, Switzerland

AnyBody Technology A/S,
Denmark

Technology Transfer System
S.r.l., Italy

KMWE Precisie Eindhoven
BV, Netherlands

ALSTOM TRANSPORTE SA,
France

Michelotti Orthopedic
Solutions, Italy

International Society for
Prosthetics and Orthotics,
Belgium

Welcome to MovAiD



We are faced with several societal challenges due to demographic change, rising costs of social services and health care, a lack of qualified personnel in certain industrial sectors and the risk of workplace-related injuries.

MovAiD investigates how technology and additive manufacturing can address some of these obstacles. Under the Horizon 2020 framework, this cross-

disciplinary project, including 13 partners from academia and industry, aims to develop technologies for manufacturing passive and highly-personalized wearable equipment to assist disabled children, the elderly and workers in their everyday lives.

The project covers eight work packages including novel concepts for Movement Assistive Devices (MADs), an integration platform, advanced materials, computational design, additive manufacturing machines and processes, as well as demonstrators, dissemination, communication and business exploitation and project management.

MovAiD tries to address the need for customising design by converting body characteristics to a dynamic model. This enables for innovative bespoke devices and a new approach of supply chain management for the factories of the future.

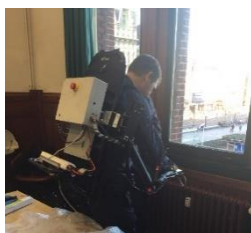
Saeed Zahedi
[Chas A Blatchford & Sons Ltd.](#)
Project Coordinator

Get our Latest News

This month, discover the latest partner updates from these work packages and read how the International Society for Prosthetics and Orthotics (ISPO) is supporting MovAiD.

MovAiD Meetings

MovAiD joins Exoskeleton Technology Day



KMWE Precisie represented MovAiD at the Exoskeleton Technology Day in Amsterdam on 28 November, 2016. A Robo-Mate meeting gathering 50 participants involved in state-of-the-art EU projects, it was an opportunity to see selected exoskeleton prototypes first-hand. Learn more [here](#).

MovAiD General Assembly 2016

Barcelona was the location for the MovAiD General Assembly, from 24 to 25 October, 2016. Hosted by Alstom, participants saw the impressive manufacturing facilities where trains and trams are built and tested.



Discussions centred around the work package updates, from user requirements, the integration platform, modelling and simulation to additive manufacturing machines. Participants also focused on activities for the coming months.

MovAiD Kick Off Meeting

The Kick Off meeting took place in September 2015, highlighting the need for customisation, personalisation, fitting, monitoring and diagnosis and mass market. It introduced partners and participants and provided an overview of the work packages, their interrelationships and dependencies.

Update from MovAiD Work Packages (WP)

WP1 Novel concepts for Movement Assistive Device (MAD)

WP1 focuses on identifying target groups, understanding their activities and translating user requirement results into a MAD reference design. These devices can reduce costs associated with treating movement disabilities and preventing their consequences.

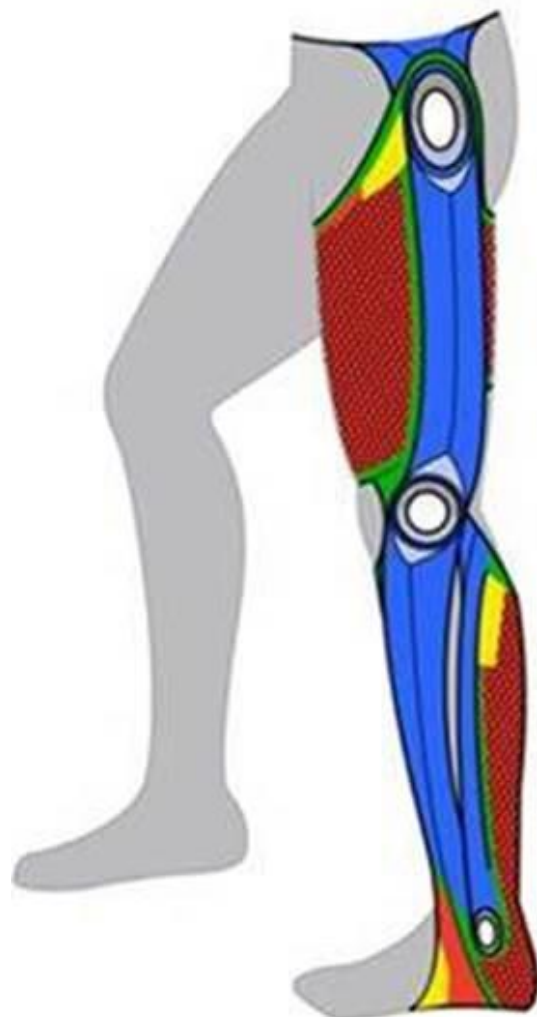
Project partner Alstom began by analysing ergonomic risks associated with workers in manufacturing scenarios, identifying correct kinesiology, injury prevention conditions and enablers for improved productivity. WP1 identified potential sensor systems and defined the typical target movement range and dynamics. Moreover, the work package also considered the preventive and corrective aspects for the different target groups, feeding into the MAD reference design that is currently in progress. Target groups also include the elderly and children with neuromuscular disease.

WP2 MovAiD Integration Platform

WP2 develops an integration platform architecture and a total body avatar data model that considers the need for sensor and biometric device scalability. A first version of the integration platform is available online and the web portal application is under development.

A new wearable sensor with multi-standard wireless connectivity and possible on-board processing is set for release end of 2016. It will measure defined movement kinematics. Results will help design simulation tools and optimise the MAD.

The same sensor module will be slightly adapted and embedded in the final MAD product to measure user movements in everyday life. Additional sensors will be



inserted to calculate pressure between the MAD and body, and assess how the device is fitted.

WP3 MovAiD Advanced Materials

WP3 develops materials and related meso-structures to be used in MAD components, offering innovative features as identified in WP1 and WP2. It focuses on defining necessary material composition and distribution to provide specific dynamic functionalities required in the body's complex movement.

The MovAiD approach, based on enabling tools and technologies such as 3D printing, guarantees the flexibility in terms of components' personalization and functionalities, which are freely manufactured with electronics and sensors embedded into the parts.

Research refers to new polymer processing, where the polymeric composition varies with fibres, fillers and additives able to create multi-functional materials necessary to deliver a multi-behaviour of the parts in relation to human gait. Further activities focus on creating smart structures that compensate the complex kinematics and dynamics of the human body.

MovAiD solutions aim to be efficient and optimised. Developing and using conductive materials along with specific 3D printing equipment will create personalised products with embedded sensors able to transfer data and energy from sensors and battery. This integrated solution will guarantee that the quality of the parts and the effectiveness and comfort of the overall products are continuously monitored.

WP4 MovAiD Computational Design

WP4 centres around the computational evolution and design of human interaction with the MAD target movements. A more general Upper Body MAD Conceptual Model is now under development, based on specifications presented in Deliverable D1.4.

In October, AnyBody Technology took part in [IROS 2016](#), IEEE's flagship robotics conference, presenting various possible applications of musculoskeletal simulations including exoskeletons.

Watch July's [online webcast](#) on Modelling Human-Exoskeleton interaction with AnyBody. Professor John Rasmussen, from Aalborg University, explains how musculoskeletal simulation is used in various stages of the design process to enhance safety, reduce weight and minimise power consumption.

Also available are the [proceedings from the 2nd International Symposium on Wearable Robotics](#), which took place from 18 to 21 October, 2016 in Segovia, Spain. This study showcases the effect of adding assistive torques to the hip, knee

and ankle joints in the sagittal plane, using the AnyBody musculoskeletal modelling system. Simulation results show that the hip joint assistance affects the total metabolic energy consumption more than the knee and ankle joints.

movaid

ALSTOM



ANYBODY
TECHNOLOGY

WP5 MovAiD Additive Manufacturing Machines and Processes

The work within WP5 focuses on engineering innovative machines to manufacture additional body contact and structural parts, especially those acting as an interface, wrapped around the body's upper and lower limbs, and guiding movement.

There are several challenges to manufacturing these added part, like developing the right dimensions and mechanical features, which require innovative approaches to piece building and time.

To provide an integrated advanced solution for manufacturing these part, engineers in this project have analysed novel process solutions for creating material with dedicated features and are currently building added manufacturing machines.

WP5's final goal is to create personalised solutions, tailored to people's specific needs and requirements, based on data gathered from biometry and movement analysis.

WP6 and Innovation Award at PMI 2016



Congratulations to Hessel Maalderink and his team who received the Innovation Award at the PMI 2016 conference. This award is granted to the paper describing the most innovative application in the field.

WP6 validates the MovAiD framework based on specific demonstrators within the supply chain, work starts in June 2017.

WP7 Dissemination and Communication

So far, ISPO has offered support in communicating about MovAiD and helped create the project's official [website](#), [promotional flyer](#), and [Facebook page](#). Like our social media page and share this information with your community.

Project Outlook

In the long-term, MovAiD will promote the development of smart, innovative, low-cost solutions and technologies, enabling a new generation of MADs and increasing the competitiveness of the European manufacturing industry.

MADs bridge the gap between exoskeletons and classic orthotic devices, representing highly-personalised solutions tailored to the user's body morphology and movement. They will greatly impact the elderly who can benefit from more secure, stable gait effectively leading to less falls, improving their overall wellbeing and reducing financial pressure on the national health care systems.

Offloading pressure on worker's joints will lead to less injury in the EU workplaces, increase the overall effectiveness of workers as well as the competitiveness and attractiveness of European industry.

Children with neuromuscular disease will have more mobility, helping them perform problematic physical activities with more ease and for longer.

STAY TUNED!

Movaid.eu

Questions? Contact us!

