



Movement Assisting Devices

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

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MOVAID CONSORTIUM

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Building key technologies for the future



The loss of lower limb function and power linked to the elderly, child disability and worker injuries mean that developing the right technology is vital so that people can live within their chosen environment as comfortably as possible for longer.

In the European Union (EU), 2% of children live with moderate or severe disability. The estimated cost of cerebral palsy (CP) in children is 10 times higher than in non-CP children. There is a need for personalised equipment to improve mobility opportunities within our society.

Over the last months, MovAiD has continued to investigate 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.

Below, find out how we are addressing the need for customising design by converting body characteristics into dynamic models. This enables for innovative bespoke devices and a new supply chain management approach for factories of the future.

Sir Saeed Zahedi

[Chas A Blatchford & Sons Ltd.](#) [Chas A Blatchford & Sons Ltd.](#)

Project Coordinator

Get our latest news

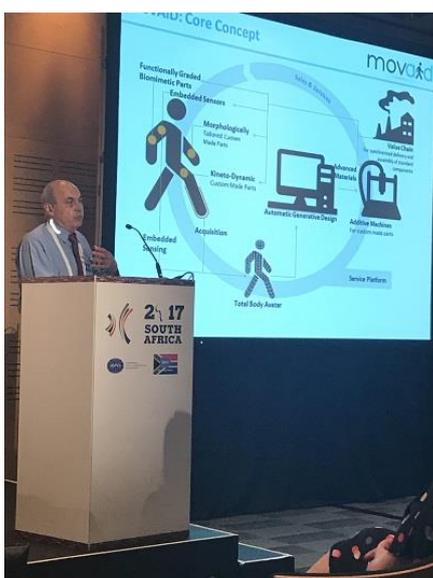
Read the latest from MovAiD including the mid-term review, the outcome of the first symposium in Cape Town, the next Consortium meeting and our presence at the upcoming World Health Organization's Global Research, Innovation, and Education in Assistive Technology Summit.

MovAiD meetings

MovAiD undergoes mid-term review

In April, the MovAiD project underwent the mid-term review. This gave the EU Project Officer a unique chance to assess the progress and quality of the MovAiD Consortium's work within the context of the Horizon 2020 Project guidelines. The next 24-month review meeting is set for October 2017.

First MovAiD symposium: the future of orthotics service provision



Sir Zahedi speaking at the first MovAiD symposium.

MovAiD gained more international visibility recently, organising its first symposium during the International Society of Prosthetics and Orthotics (ISPO) congress, which took place on 9 May 2017 in Cape Town, South Africa.

The focus was on the future of orthotics service provision and initiated some fruitful discussions. The symposium was also an opportunity to update the audience on the status of research in designing Movement Assisting Devices (MADs). A copy of the MovAiD poster presentation from the symposium is [now available](#).

The symposium particularly showcased achievements in additive manufacturing, the advanced design of morphologic parts, and aggregated biometric data for diagnosis and monitoring. It further highlighted how technological advances could be translated to provide more effective orthotics services and personalised orthotics for disabled children, the elderly and workers.

ISPO played a valuable role in hosting and assisting with the organisation of this meeting. Discussions were particularly successful thanks to contributions from Sir Saeed Zahedi (Blatchford) and Prof Edward Lemaire (Ottawa Hospital Research Institute, University of Ottawa).

MovAiD joins WHO GREAT Summit

The MovAiD team recently presented its project highlights at the [Global Research, Innovation, and Education in Assistive Technology \(GREAT\) Summit](#), held on 3 and 4 August 2017 at the World Health Organization headquarters in Geneva. ISPO President Friedbert Kohler also took part in this meeting.

The Summit gathered top global researchers, innovators and educators carrying out research or offering training programmes in assistive technology policy, products, personnel, provision and use.

Global Research, Education and Innovation in Assistive Technology (GREAT) Summit 2017
8-9 August 2017
Geneva, Switzerland

MovAiD Project
Rajiv Hanspal, Saeed Zahedi, UK

Abstract Max 60 words
The Project aims at developing Movement Assisting Devices, which are innovative, "passive" and highly customized kinematic equipment built to provide natural compensation of human movements (both upper and lower limbs).

Background

- Automated design process of movement assisting device using additive manufacturing allows for customization.
- Development of smarter devices using feedback from their use in the field.
- Remote diagnostics, remote maintenance, remote operations.
- New business models including product as a service.

Objectives

- This project investigates how to use technology (additive manufacturing, learning, intelligent platforms, automated design etc.) to create optimized movement assisting devices.
- It evaluates potential new business models - integration of product and service provision.
- This knowledge can then get transferred to other IT areas.

Methodology

- Automated design process of movement assisting device using additive manufacturing allows for customization.
- Development of smarter devices using feedback from their use in the field.
- Remote diagnostics, remote maintenance, remote operations.
- New business models including product as a service.

Expected Outcomes

- Improved productivity
- Reduced number of falls
- Reduced time to manufacture

Impact

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Project Coordination

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MovAiD Poster for Great Summit ([Download](#))

MovAiD Consortium Meeting

The next MovAiD Consortium Meeting will take place in Italy in October 2017. It will focus on technical progress and exploitation.

Upcoming ISPO UK Annual Scientific Meeting

MovAiD will join the 2017 [Annual Scientific Meeting of ISPO UK Member Society](#) taking place at the Gillespie Centre, Clare College in Cambridge on Friday 8 and Saturday 9 September 2017. Further information, will be available here in due course.

Update from MovAiD Work Packages (WP)

This newsletter we focus on WP4 MovAiD Computational Design. Find the latest updates and results.

WP4 MovAiD Computational Design

There are very few studies on the impact of mechanical design on the human body. WP4 Project partner, AnyBody Technology (ABT) has begun a design optimization framework for Movement Assisting Devices (MADs) (see figure 1), including an example for the knee ankle foot orthosis (KAFO) (see figure 2).

In Figure 1, J is the set of objectives, C is a set of constraints, and P is the vector of design parameters of interest. Depending on the phase of the design, conceptual or detailed, the blue part can be excluded or included, respectively.

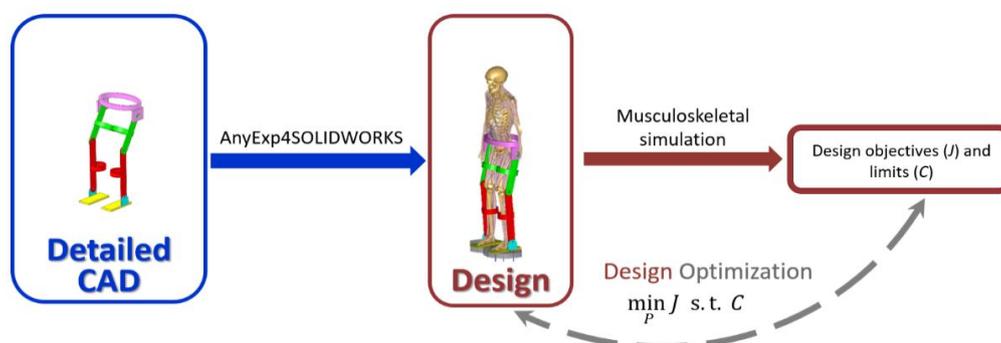


Figure 1) MAD design optimization framework.

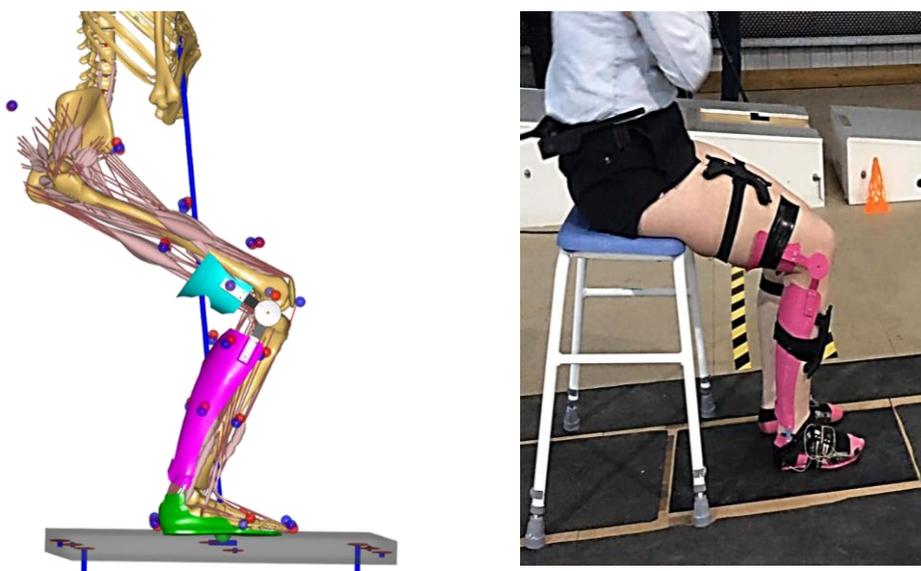


Figure 2) (a) Integrated KAFO CAD model—exported through AnyExp4SOLIDWORKS-- with a musculoskeletal model in AnyBody and (b) Experimental set up for sit-to-stand task

In the KAFO study, which was presented at the WearRAcon 2017 congress and is explained in ABT's webcast, the design optimization objectives show how metabolic cost and knee reaction load is minimized to find the optimal stiffness at the KAFO knee joint within a sit-to-stand movement.

These simulation pipelines help to design and evaluate MADs by considering various physiological performance metrics, and enabling engineers to create devices that achieve multiple design objectives.

Watch the recording of ABT's webcast, [here](#).

Outlook

MovAiD promotes the development of smart, innovative, low-cost solutions and technologies, enabling a new generation of Movement Assistive Devices (MADs).

Outcomes from this project hope to increase the competitiveness of the European manufacturing industry and improve quality of life for children, the elderly and workers.

MADs 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. Children with neuromuscular disease will have better mobility, helping them perform problematic physical activities with less effort for longer. Offloading pressure on worker's joints will lead to fewer injuries in the EU's workplaces, grow the overall effectiveness of workers and enhance the competitiveness and attractiveness of European industry.

Movaid.eu

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