

HORIZON
2020

Dexterous Transradial Osseointegrated Prosthesis with neural control and sensory feedback

Resultados

Información del proyecto

DeTOP

Identificador del acuerdo de subvención:
687905

[Sitio web del proyecto](#) 

DOI

[10.3030/687905](https://doi.org/10.3030/687905) 

Proyecto cerrado

Fecha de la firma de la CE

10 Noviembre 2015

Fecha de inicio

1 Marzo 2016

Fecha de finalización

31 Agosto 2021

Financiado con arreglo a

INDUSTRIAL LEADERSHIP - Leadership in enabling and industrial technologies - Information and Communication Technologies (ICT)

Coste total

€ 5 165 158,75

Aportación de la UE

€ 4 260 521,25

Coordinado por

SCUOLA SUPERIORE DI STUDI
UNIVERSITARI E DI
PERFEZIONAMENTO S ANNA



CORDIS proporciona enlaces a los documentos públicos y las publicaciones de los proyectos de los programas marco HORIZONTE.

Los enlaces a los documentos y las publicaciones de los proyectos del Séptimo Programa Marco, así como los enlaces a algunos tipos de resultados específicos,

como conjuntos de datos y «software», se obtienen dinámicamente de [OpenAIRE](#) .

Resultado final

Demonstrators, pilots, prototypes (15)

[Short stump wrist](#) 

[Sensorized hand prosthesis - beta](#) 

[Final prosthetic devices for the third implant](#) 

[Long stump wrist](#) 

[Sensorized hand prosthesis - alfa](#) 

[Automated implantable electrode placement algorithms](#) 

[MPC with 1st version of the ASIC and beta version of RF protocol](#) 

[Second version of MPC with high throughput RF link](#) 

[First \$\alpha\$ -prosthesis for the first implant](#) 

[Beta mechatronic coupler](#) 

[Transient EMG hand/wrist control – second release](#) 

[Ported core control/feedback algorithms](#) 

[First \$\beta\$ -prosthesis for the second implant](#) 

[Transient EMG hand/wrist control – first release](#) 

[Alfa mechatronic coupler](#) 

Documents, reports (10)

[Sensorized hand prosthesis alfa – preliminary report](#) 

[Assessment with patients: final report](#) 

[Report on sensory system](#) 

[Requirements for MPC network](#) 

[Report on neurophysiology of touch](#) 

[Final report on neurophysiology of touch](#) 

[Point-process decoding filter for the control of individual DoFs](#) 

[Assessment with patients: report 1](#) 

[Point-process single-unit analysis of HD-sEMG for electrode placement and analysis of muscle synergies](#) 

[Assessment with patients: updated report](#) 

Websites, patent fillings, videos etc. (2)

[Project Brochure](#) 

[Operating communication internet forum](#) 

Other (3)

[Upgraded neurostimulation techniques](#) 

[A database of iEMG and associated signals](#) 

[Neurostimulation techniques](#) 

Open Research Data Pilot (1)

Publicaciones

Peer reviewed articles (35)

[When Less Is More – Discrete Tactile Feedback Dominates Continuous Audio Biofeedback in the Integrated Percept While Controlling a Myoelectric Prosthetic Hand](#) 

Autores: Leonard F. Engels, Ahmed W. Shehata, Erik J. Scheme, Jonathon W. Sensinger, Christian Cipriani

Publicado en: Frontiers in Neuroscience, Edición 13, 2019, ISSN 1662-453X

Editor: Frontiers

DOI: 10.3389/fnins.2019.00578

[A database of high-density surface electromyogram signals comprising 65 isometric hand gestures](#) 

Autores: Nebojša Malešević, Alexander Olsson, Paulina Sager, Elin Andersson, Christian Cipriani, Marco Controzzi, Anders Björkman, Christian Antfolk

Publicado en: Scientific Data, Edición 8/1, 2021, ISSN 2052-4463

Editor: Nature Publishing Group

DOI: 10.1038/s41597-021-00843-9

[Chronic Use of a Sensitized Bionic Hand Does Not Remap the Sense of Touch](#) 

Autores: Max Ortiz-Catalan, Enzo Mastinu, Charles M. Greenspon, Sliman J. Bensmaia

Publicado en: Cell Reports, Edición 33/12, 2020, Página(s) 108539, ISSN 2211-1247

Editor: Cell Press

DOI: 10.1016/j.celrep.2020.108539

[Automatic discovery of resource-restricted Convolutional Neural Network topologies for myoelectric pattern recognition](#) 

Autores: Alexander E. Olsson, Anders Björkman, Christian Antfolk

Publicado en: Computers in Biology and Medicine, Edición 120, 2020, Página(s) 103723, ISSN 0010-4825

Editor: Pergamon Press Ltd.

DOI: 10.1016/j.compbiomed.2020.103723

[Grip control and motor coordination with implanted and surface electrodes while grasping with an osseointegrated prosthetic hand](#) 

Autores: Enzo Mastinu, Francesco Clemente, Paolo Sassu, Oskar Aszmann, Rickard Brånemark, Bo Håkansson, Marco Controzzi, Christian Cipriani, Max Ortiz-Catalan

Publicado en: Journal of NeuroEngineering and Rehabilitation, Edición 16/1, 2019, ISSN 1743-0003

Editor: BioMed Central

DOI: 10.1186/s12984-019-0511-2

[A database of multi-channel intramuscular electromyogram signals during isometric hand muscles contractions](#)

Autores: Nebojsa Malesevic, Anders Björkman, Gert S. Andersson, Ana Matran-Fernandez, Luca Citi, Christian Cipriani, Christian Antfolk

Publicado en: Scientific Data, Edición 7/1, 2020, ISSN 2052-4463

Editor: Nature Publishing Group

DOI: 10.1038/s41597-019-0335-8

[Grasp force estimation from the transient EMG using high-density surface recordings](#)

Autores: Itzel Jared Rodriguez Martinez, Andrea Mannini, Francesco Clemente, Angelo Maria Sabatini, Christian Cipriani

Publicado en: Journal of Neural Engineering, Edición 17/1, 2020, Página(s) 016052, ISSN 1741-2552

Editor: IOP Publishing

DOI: 10.1088/1741-2552/ab673f

[Restoring Natural Forearm Rotation in Transradial Osseointegrated Amputees](#)

Autores: Irene Boni, Jason Millenaar, Marco Controzzi, Max Ortiz-Catalan

Publicado en: IEEE Transactions on Neural Systems and Rehabilitation Engineering, Edición 26/12, 2018, Página(s) 2333-2341, ISSN 1534-4320

Editor: Institute of Electrical and Electronics Engineers

DOI: 10.1109/tnsre.2018.2880948

[The PLOS ONE collection on machine learning in health and biomedicine: Towards open code and open data](#)

Autores: Leo A. Celi, Luca Citi, Marzyeh Ghassemi, Tom J. Pollard

Publicado en: PLOS ONE, Edición 14/1, 2019, Página(s) e0210232, ISSN 1932-6203

Editor: Public Library of Science

DOI: 10.1371/journal.pone.0210232

[Instrumented platform for assessment of isometric hand muscles contractions](#)

Autores: Nebojša Malešević, Gert Andersson, Anders Björkman, Marco Controzzi, Christian Cipriani, Christian Antfolk

Publicado en: Measurement Science and Technology, Edición 30/6, 2019, Página(s) 065701, ISSN 0957-0233

Editor: Institute of Physics and the Physical Society

DOI: 10.1088/1361-6501/ab0eae

[Human 8- to 10-Hz pulsatile motor output during active exploration of textured surfaces reflects the textures' frictional properties](#) 

Autores: Mariama Dione, Johan Wessberg

Publicado en: Journal of Neurophysiology, Edición 122/3, 2019, Página(s) 922-932, ISSN 0022-3077

Editor: American Physiological Society

DOI: 10.1152/jn.00756.2018

[Evidence for sparse C-tactile afferent innervation of glabrous human hand skin.](#) 

Autores: Roger H. Watkins; Roger H. Watkins; Mariama Dione; Mariama Dione; Rochelle Ackerley; Rochelle Ackerley; Helena Backlund Wasling; Johan Wessberg; Line S. Löken

Publicado en: Journal of Neurophysiology, Edición 1, 2021, ISSN 1522-1598

Editor: American Physiological Society

DOI: 10.1152/jn.00587.2020

[Human low-threshold mechanosensitive responses to pure changes in friction controlled using an ultrasonic haptic device](#) 

Autores: Mariama Dione, Roger Holmes Watkins, Eric Vezzoli, Betty Lemaire-Semail, Johan Wessberg

Publicado en: Scientific Reports, Edición 11/1, 2021, ISSN 2045-2322

Editor: Nature Publishing Group

DOI: 10.1038/s41598-021-90533-8

[Testing silicone digit extensions as a way to suppress natural sensation to evaluate supplementary tactile feedback](#) 

Autores: Leonard F. Engels, Leonardo Cappello, Anke Fischer, Christian Cipriani

Publicado en: PLOS ONE, Edición 16/9, 2021, Página(s) e0256753, ISSN 1932-6203

Editor: Public Library of Science

DOI: 10.1371/journal.pone.0256753

[Embedded System for Prosthetic Control Using Implanted Neuromuscular Interfaces Accessed Via an Osseointegrated Implant](#) 

Autores: Enzo Mastinu, Pascal Doguet, Yohan Botquin, Bo Hakansson, Max Ortiz-Catalan

Publicado en: IEEE Transactions on Biomedical Circuits and Systems, Edición 11/4, 2017, Página(s) 867-877, ISSN 1932-4545

Editor: Institute of Electrical and Electronics Engineers

DOI: 10.1109/TBCAS.2017.2694710

[Compliant Prosthetic Wrists Entail More Natural Use Than Stiff Wrists During Reaching, Not \(Necessarily\) During Manipulation](#) 

Autores: Gunter Kanitz, Federico Montagnani, Marco Controzzi, Christian Cipriani

Publicado en: IEEE Transactions on Neural Systems and Rehabilitation Engineering, Edición 26/7, 2018, Página(s) 1407-1413, ISSN 1534-4320

Editor: Institute of Electrical and Electronics Engineers

DOI: 10.1109/TNSRE.2018.2847565

[Biomechanical Characterisation of Bone-anchored Implant Systems for Amputation Limb Prostheses: A Systematic Review](#) 

Autores: Alexander Thesleff, Rickard Brånemark, Bo Håkansson, Max Ortiz-Catalan

Publicado en: Annals of Biomedical Engineering, Edición 46/3, 2018, Página(s) 377-391, ISSN 0090-6964

Editor: Kluwer Academic Publishers

DOI: 10.1007/s10439-017-1976-4

[Vector Autoregressive Hierarchical Hidden Markov Models for Extracting Finger Movements Using Multichannel Surface EMG Signals](#) 

Autores: Nebojša Malešević, Dimitrije Marković, Gunter Kanitz, Marco Controzzi, Christian Cipriani, Christian Antfolk

Publicado en: Complexity, Edición 2018, 2018, Página(s) 1-12, ISSN 1076-2787

Editor: John Wiley & Sons Inc.

DOI: 10.1155/2018/9728264

[Improving internal model strength and performance of prosthetic hands using augmented feedback](#) 

Autores: Ahmed W. Shehata, Leonard F. Engels, Marco Controzzi, Christian Cipriani, Erik J. Scheme, Jonathon W. Sensinger

Publicado en: Journal of NeuroEngineering and Rehabilitation, Edición 15/1, 2018, ISSN 1743-0003

Editor: BioMed Central

DOI: 10.1186/s12984-018-0417-4

[An Alternative Myoelectric Pattern Recognition Approach for the Control of Hand Prostheses: A Case Study of Use in Daily Life by a Dysmelia Subject](#) 

Autores: Enzo Mastinu, Johan Ahlberg, Eva Lendaro, Liselotte Hermansson, Bo Håkansson, Max Ortiz-Catalan

Publicado en: IEEE Journal of Translational Engineering in Health and Medicine, Edición 6, 2018, Página(s) 1-12, ISSN 2168-2372

Editor: Institute of Electrical and Electronics Engineers Inc.

DOI: 10.1109/JTEHM.2018.2811458

[Discrete Vibro-Tactile Feedback Prevents Object Slippage in Hand Prostheses More Intuitively Than Other Modalities](#)

Autores: Mohamed Aboseria, Francesco Clemente, Leonard F. Engels, Christian Cipriani

Publicado en: IEEE Transactions on Neural Systems and Rehabilitation Engineering, Edición 26/8, 2018, Página(s) 1577-1584, ISSN 1534-4320

Editor: Institute of Electrical and Electronics Engineers

DOI: 10.1109/TNSRE.2018.2851617

[Independent Long Fingers are not Essential for a Grasping Hand](#)

Autores: Federico Montagnani, Marco Controzzi, Christian Cipriani

Publicado en: Scientific Reports, Edición 6/1, 2016, ISSN 2045-2322

Editor: Nature Publishing Group

DOI: 10.1038/srep35545

[Touch and Hearing Mediate Osseoperception](#)

Autores: Francesco Clemente, Bo Håkansson, Christian Cipriani, Johan Wessberg, Katarzyna Kulbacka-Ortiz, Rickard Brånemark, Karl-Johan Fredén Jansson, Max Ortiz-Catalan

Publicado en: Scientific Reports, Edición 7, 2017, Página(s) 45363, ISSN 2045-2322

Editor: Nature Publishing Group

DOI: 10.1038/srep45363

[Classification complexity in myoelectric pattern recognition](#)

Autores: Niclas Nilsson, Bo Håkansson, Max Ortiz-Catalan

Publicado en: Journal of NeuroEngineering and Rehabilitation, Edición 14/1, 2017, ISSN 1743-0003

Editor: BioMed Central

DOI: 10.1186/s12984-017-0283-5

[Self-Contained Neuromusculoskeletal Arm Prostheses](#)

Autores: Max Ortiz-Catalan, Enzo Mastinu, Paolo Sassu, Oskar Aszmann, Rickard Brånemark

Publicado en: New England Journal of Medicine, Edición 382/18, 2020, Página(s) 1732-1738, ISSN 0028-4793

Editor: Massachusetts Medical Society

DOI: 10.1056/nejmoa1917537

[Continuous supplementary tactile feedback can be applied \(and then removed\) to enhance precision manipulation](#)

Autores: Leonardo Cappello, Waleed Alghilan, Massimiliano Gabardi, Daniele Leonardi, Michele Barsotti, Antonio Frisoli, Christian Cipriani

Publicado en: Journal of NeuroEngineering and Rehabilitation, Edición 17/1,

2020, ISSN 1743-0003

Editor: BioMed Central

DOI: 10.1186/s12984-020-00736-9

[SEEDS, simultaneous recordings of high-density EMG and finger joint angles during multiple hand movements](#) 

Autores: Ana Matran-Fernandez, Itzel Jared Rodríguez Martínez, Riccardo Poli, Christian Cipriani, Luca Citi

Publicado en: Scientific Data, Edición 6/1, 2019, ISSN 2052-4463

Editor: Nature Publishing Group

DOI: 10.1038/s41597-019-0200-9

[Patterned Stimulation of Peripheral Nerves Produces Natural Sensations With Regards to Location but Not Quality](#) 

Autores: Max Ortiz-Catalan; Johan Wessberg; Enzo Mastinu; Autumn Naber; Rickard Brånemark

Publicado en: IEEE Transactions on Medical Robotics and Bionics, Edición 5, 2019, ISSN 2576-3202

Editor: Institute of Electrical and Electronics Engineers

DOI: 10.1109/tmr.2019.2931758

[Neural feedback strategies to improve grasping coordination in neuromusculoskeletal prostheses](#) 

Autores: Enzo Mastinu, Leonard F. Engels, Francesco Clemente, Mariama Dione, Paolo Sassu, Oskar Aszmann, Rickard Brånemark, Bo Håkansson, Marco Controzzi, Johan Wessberg, Christian Cipriani, Max Ortiz-Catalan

Publicado en: Scientific Reports, Edición 10/1, 2020, ISSN 2045-2322

Editor: Nature Publishing Group

DOI: 10.1038/s41598-020-67985-5

[Safety of long-term electrical peripheral nerve stimulation: review of the state of the art](#) 

Autores: Clara Günter, Jean Delbeke, Max Ortiz-Catalan

Publicado en: Journal of NeuroEngineering and Rehabilitation, Edición 16/1, 2019, ISSN 1743-0003

Editor: BioMed Central

DOI: 10.1186/s12984-018-0474-8

[Neuromusculoskeletal Arm Prostheses: Personal and Social Implications of Living With an Intimately Integrated Bionic Arm](#) 

Autores: Alexandra Middleton¹, Max Ortiz-Catalan

Publicado en: Frontiers in Neurorobotics, 2020, ISSN 1662-5218

Editor: Frontiers Research Foundation

DOI: 10.3389/fnbot.2020.00039

[Ultraconformable Temporary Tattoo Electrodes for Electrophysiology](#) 

Autores: Laura M. Ferrari, Sudha Sudha, Sergio Tarantino, Roberto Esposti, Francesco Bolzoni, Paolo Cavallari, Christian Cipriani, Virgilio Mattoli, Francesco Greco

Publicado en: Advanced Science, Edición 5/3, 2018, Página(s) 1700771, ISSN 2198-3844

Editor: Wiley

DOI: 10.1002/advs.201700771

[Online Grasp Force Estimation From the Transient EMG](#) 

Autores: Itzel Jared Rodriguez Martinez, Andrea Mannini, Francesco Clemente, Christian Cipriani

Publicado en: IEEE Transactions on Neural Systems and Rehabilitation Engineering, Edición 28/10, 2020, Página(s) 2333-2341, ISSN 1534-4320

Editor: Institute of Electrical and Electronics Engineers

DOI: 10.1109/tnsre.2020.3022587

[Extraction of Multi-Labelled Movement Information from the Raw HD-sEMG Image with Time-Domain Depth](#) 

Autores: Alexander E. Olsson, Paulina Sager, Elin Andersson, Anders Björkman, Nebojša Malešević, Christian Antfolk

Publicado en: Scientific Reports, Edición 9/1, 2019, ISSN 2045-2322

Editor: Nature Publishing Group

DOI: 10.1038/s41598-019-43676-8

[Learning regularized representations of categorically labelled surface EMG enables simultaneous and proportional myoelectric control](#) 

Autores: Alexander E. Olsson, Nebojša Malešević, Anders Björkman, Christian Antfolk

Publicado en: Journal of NeuroEngineering and Rehabilitation, Edición 18/1, 2021, ISSN 1743-0003

Editor: BioMed Central

DOI: 10.1186/s12984-021-00832-4

Conjuntos de datos

Conjuntos de datos vía OpenAIRE (2)



[A database of multi-channel intramuscular electromyogram signals during isometric hand muscles contractions](#) 

Autores: Nebojsa Malesevic; Matran-Fernandez, Ana; Citi, Luca; Cipriani, Christian

Publicado en: figshare

[A database of high-density surface electromyogram signals comprising 65 hand gestures performed in an isometric manner](#) 

Autores: Nebojsa Malesevic; Olsson, Alexander; Sager, Paulina; Andersson, Elin; Cipriani, Christian; Controzzi, Marco; Björkman, Anders; Antfolk, Christian

Publicado en: figshare

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