www.im-twin.eu

# IM-TWIN: from Intrinsic Motivations to Transitional Wearable INtelligent companions for autism spectrum disorder

*a European-funded project*

## *Press Conference*

## Deliverable 6.16


This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 952095.

Project duration 36 months (November 2020, October 2023). Consortium: Consiglio Nazionale dele Ricerche (ITA), Universiteit Utrecht (NLD), Centre de Recherches Interdisciplinaires (FRA), Università degli Studi di Roma La Sapienza (ITA), Plux-Wireless Biosignals S.A. (PRT).

# Deliverable data

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| **Work Package:** | 6 Management and dissemination |
| **Work Package leader:** | CNR-ISTC |
| **Deliverable beneficiary:** | CNR-ISTC |
| **Dissemination level:** | Public |
| **Due date:** | 31th October 2023 (Month 36) |
| **Type:** | Websites, patents filing, etc. |
| **Authors:** | B. Ozcan, V. Sperati, Flora Giocondo, L. Jacquey, N.Faedda, C.Sogos, Lukas P.A. Arts, P. Gamboa, K. Mrotzeck, J.K. O'Regan, V. Guidetti, E.L. van den Broek, G. Baldassarre |

# Acronyms of partners

| | |
|---|---|
| CNR-ISTC | Consiglio Nazionale delle Ricerche,<br>Istituto di Scienze e Tecnologie della Cognizione (Italy) |
| UU | Universiteit Utrecht (The Netherlands) |
| CRI | Centre de Recherches Interdisciplinaires (France) |
| LA SAPIENZA | Università degli Studi di Roma La Sapienza (Italy) |
| PLUX | Plux - Wireless Biosignals S.A. (Portugal) |

# Table of contents

# 1. Overview of the deliverable

This deliverable presents the press release content, prepared by the partners to announce the completion of the IM-TWIN project. Last section provides details about the dissemination of the press note through the press office.

# 2. Press release content

## “Reaching out to Autism through the Use of Novel Technology”

*The European project IM-TWIN (from Intrinsic Motivations to Transitional Wearable INtelligent companions for autism spectrum disorder) ended in October 2023. The 3-year project, supported by 5 international partners, developed new interactive technologies, also based on Artificial Intelligence, to support early intervention in autism spectrum disorders.*

According to the World Health Organization (WHO), the global incidence of Autism Spectrum Disorder (ASD) is estimated to be approximately 1 in 100 children worldwide. One way to support these children originated in the European project "*IM-TWIN: from Intrinsic Motivations to Transitional Wearable INtelligent companions for autism spectrum disorder*". The 3-year project, which ran from November 2020 to October 2023, involved five European partners from Italy, Portugal, France and the Netherlands.

As explained by the project coordinator Gianluca Baldassarre, from the Institute of Cognitive Sciences and Technologies (National Research Council of Italy, ISTC-CNR), “*The project aimed to create a technological system, called ‘IM-TWIN’, to support neurodevelopmental therapists and neuropsychiatrists in the early treatment of Neurodevelopmental Disorders (NDD), with particular reference to ASD*”.

The IM-TWIN system is formed of 3 components: innovative, interactive soft toys that look like animals, called ‘*Transitional Wearable Companions* (TWC)’, a wearable sensorised T-shirt for the detection of a child’s physiological parameters, and sensorised camera glasses, for the detection of eye contact between child and therapist.

Beste Ozcan, researcher from ISTC-CNR and inventor of the TWCs, explains that “*smart soft toys can be used to stimulate the curiosity and engagement of autistic children. For example, the TWC “Panda PlusMe” can produce gratifying sensory responses, such as coloured lights, amusing sounds and mild vibrations when its paws are caressed. Another example is the TWC “Octopus X-8” that is able to produce responses that are different when its tentacles are touched by the child versus the therapist. These features allow the therapist to set up play activities that train a child's social competencies: e.g. imitation, eye contact, joint attention and turn-taking*”.

PLUX Wireless Biosignals, a Portuguese partner company, highlights that “*the sensorised T-shirt was designed to collect physiological data in very young ASD children. In particular, it allows the detection of galvanic skin response, heart rate, skin temperature, and body motion --*

*all parameters related to the stress level of the subject"*. In the pilot test, the T-shirt proved to be able to collect reliable data on children involved in therapeutic play activities. In this regard, the researchers headed by Egon L. van den Broek from Utrecht University in the Netherlands, developed an innovative algorithm, called "fast Continuous Wavelet Transformation - fCWT". The fCWT outperforms currently existing algorithms in extracting meaningful patterns from intrinsically noisy physiological signals. After this processing, the data can potentially be used to train an Artificial Intelligence (AI) to 'understand' the affective states of autistic children during the therapeutic activities. These states can be challenging to comprehend in ASD.

Finally, the sensorised camera glasses were developed to use AI and Computer Vision to reliably detect eye contact between therapist and child. This behaviour is crucial for monitoring social engagement in ASD children.

All experimental activities involving ASD and neurotypical children were performed respectively at the University of Rome *Sapienza*, Department of Human Neuroscience, Section of Child Neuropsychiatry, supervised by Vincenzo Guidetti and Carla Sogos, and at a team headed by Kevin O'Regan at the Learning Planet Institute, in Paris.

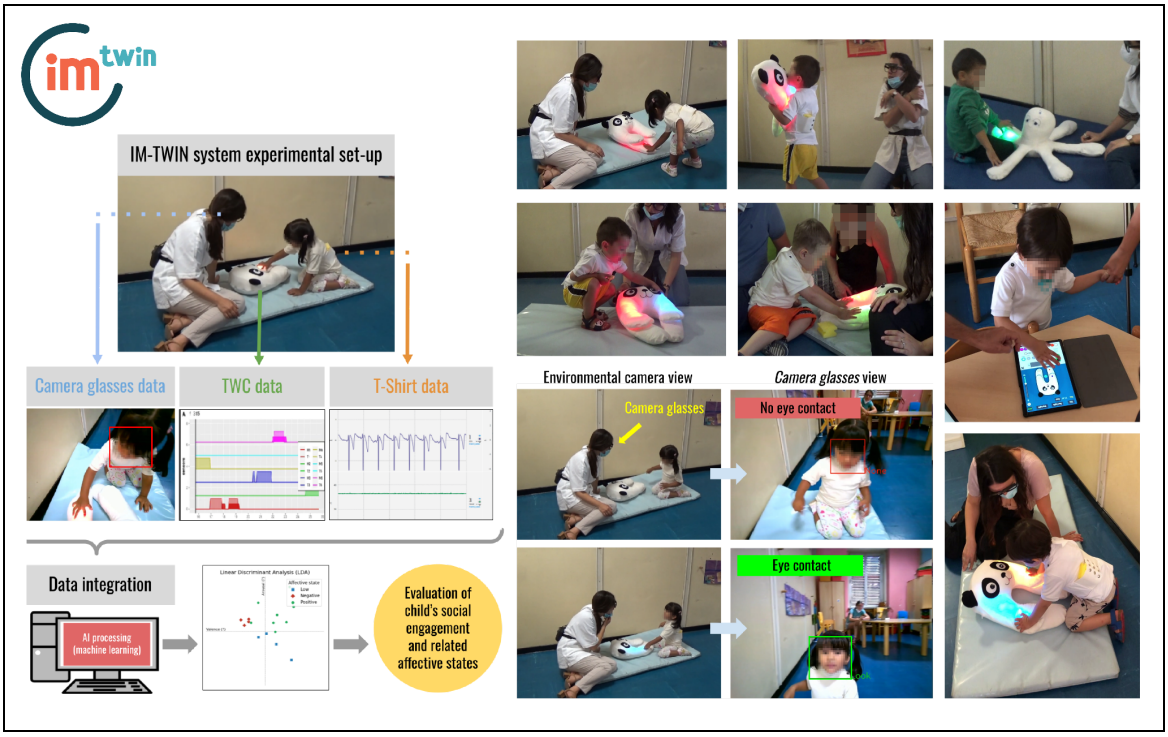
As remarked by Gianluca Baldassarre "*the IM-TWIN system represents an innovative new technological tool built for ASD early intervention, that can help the therapist to monitor and stimulate children through play-like activities, thus facilitating the development of social skills*".

**Dissemination material:**

- website: https://im-twin.eu/
- brochure: IM-TWIN booklet
- promotional video: IM-TWIN project technological outcomes

**For information:**

- Gianluca Baldassarre, gianluca.baldassarre@istc.cnr.it, coordinator of the project Institute of Cognitive Sciences and Technologies, ISTC-CNR




# 3. Dissemination of the press release

The Italian version of the press note was released by the CNR press office on date 7 December 2023, and is available at the following link: www.cnr.it/it/nota-stampa/n-12406 (fig. 1).

The English version of the press note is available on the project website at the following link: https://im-twin.eu/press-kit/.

CRI released the press note on the website of the Learning Planet Institute at the following link: www.learningplanetinstitute.org/2023/12/13/press-release-reaching-out-to-autism-through-the-use-of-novel-technology-the-im-twin-project/ (fig. 2).

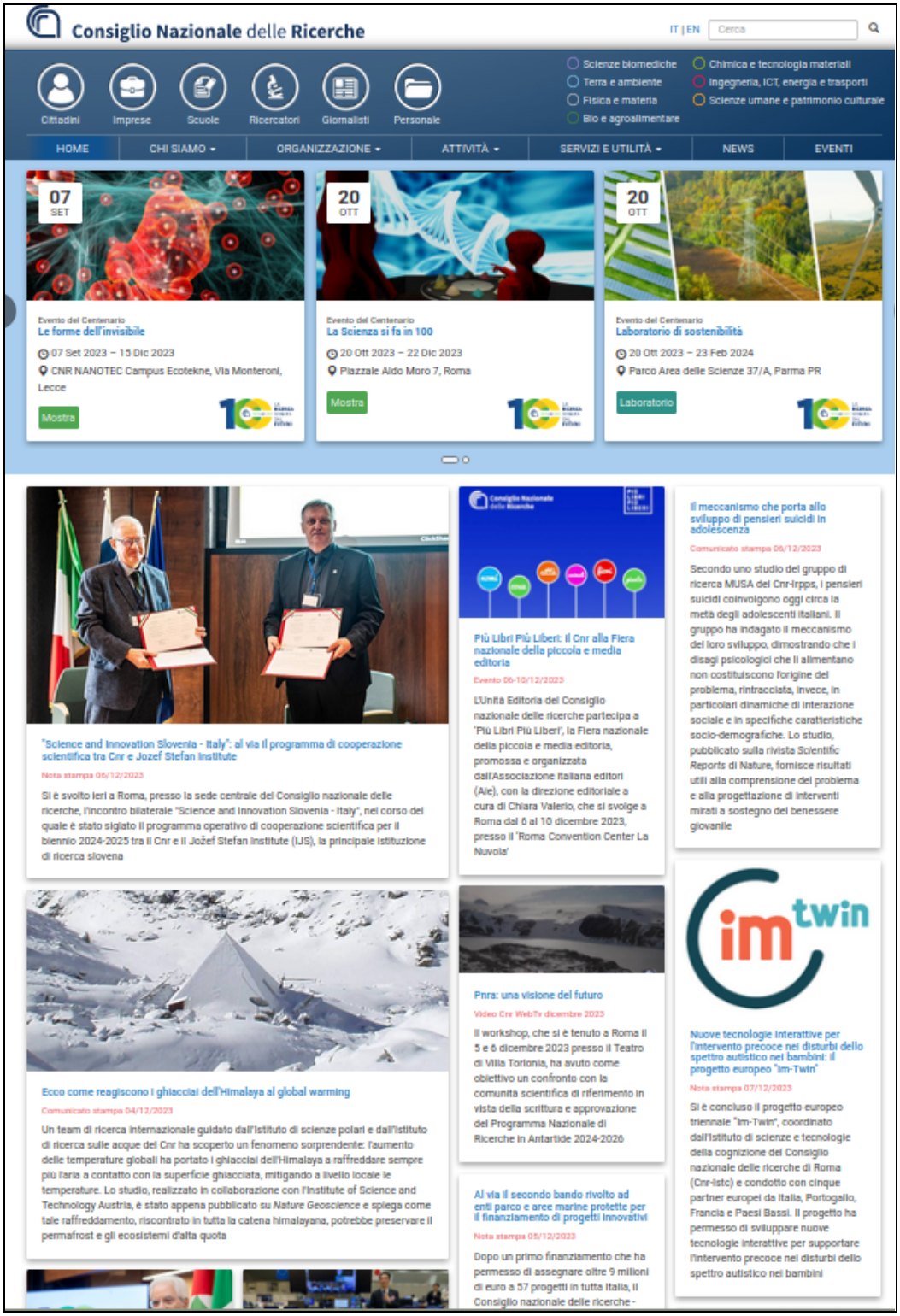



***Figure 1:*** screenshot of the CNR webpage on date 7 December 2023. The press note about IM-TWIN is placed at the lower right corner.

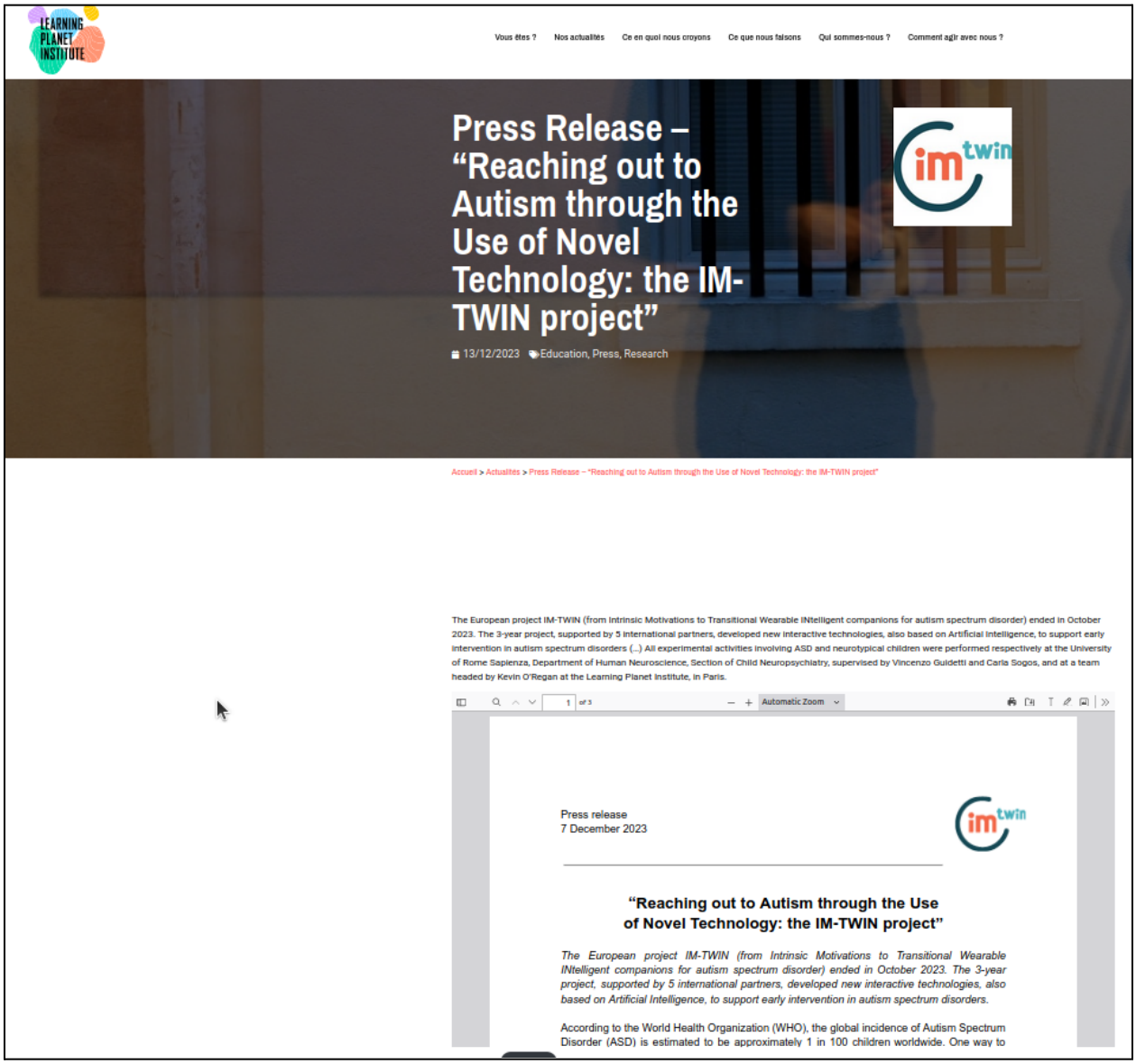



***Figure 2:*** *screenshot of the Learning Planet Institute webpage, where the press release can be downloaded.*