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

a European funded project

PlusMe production 2

Deliverable 3.6

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Deliverable data

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Authors:	V. Sperati, P. Sperandio[1], M. De Luca[2], A. Pecora[3], B. Ozcan, M. Schembri, G. Baldassarre

Acronyms of partners

CNR-ISTC	Consiglio Nazionale delle Ricerche, 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)

[1] Company *aTon srl* www.aton-srl.it/it/
[2] Institute of Marine Engineering, National Research Council of Italy, INM-CNR, www.inm.cnr.it/
[3] Institute for Microelectronics and Microsystems, National Research Council of Italy, IMM-CNR, www.imm.cnr.it/

Table of contents

1. Overview of the deliverable

This deliverable reports details about the production of the last 15 samples of the engineered *PlusMe* device; these items add up to the previous 10 samples, reported in the previous deliverable *D3.5 PlusMe production 1*[4].

The small-scale production of electronics has been realised by the Italian engineering company *aTon srl* (www.aton-srl.it/it/). The series manufacturing of textile parts (eternal cotton cover and inner tulle fabric linings), has been realised by the Italian sewing laboratory *SoftDoodles* (www.softdoodles.com/), based on the original *PlusMe* design.

The engineered electronic prototype was developed within the related European project *PlusMe: Transitional Wearable Companions for the therapy of children with Autism Spectrum Disorders* (www.plusme-h2020.eu), by the Institute of Microelectronics and Microsystems, an institute part of the National Research Council of Italy (www.imm-cnr.it). In this regard, the collaboration between ISTC-CNR and IMM-CNR was described in the *PlusMe* project deliverable *D1.1 Identification of a research partner for engineering PlusMe*[5].

2. PlusMe second small-scale production

2.1 Electronics

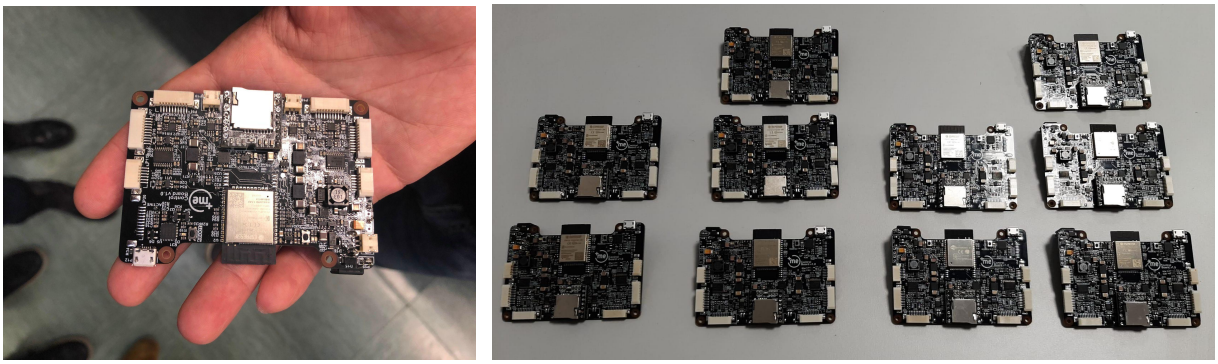

Figure 1: on left, the engineered PCB prototype hosting the main electronics of *PlusMe*, realised by IMM-CNR; on right, a set of 10 PCBs, replicated and assembled by the Italian engineering company *aTon srl,* based on the PCB prototype.

The small-scale production of the inner electronics of *PlusMe* device was entrusted to the Italian engineering company *aTon srl* (Fig.1). The production is based on the new engineered prototype, described in detail in the *PlusMe* project deliverable *D1.3 PlusMe product*

[4] https://im-twin.eu/wp-content/uploads/2022/05/DELIVERABLE_2_D3.5_PlusMe_production_1.pdf
[5] www.plusme-h2020.eu/wp-content/uploads/2021/06/D1.1_identification_of_company_for_engineering_plusme.pdf

demonstrator[6]. The electronics, consisting of PCBs, flexible strips, speakers, sensors and actuators, batteries (Fig.2), is assembled at ISTC-CNR, and then inserted inside *PlusMe*.

Figure 2: on left, a complete set of 15 electronics, including PCBs and flexible strips, ready to be assembled; on right, 3 assembled electronics, ready to be embedded in the *PlusMe*.

2.2 Textile parts

The small-scale production fabric elements was entrusted to the Italian sewing laboratory *SoftDoodles*; the samples are based on the original *PlusMe* design, realised at ISTC-CNR within the *PlusMe* project (Fig.3).

Figure 3: Left: 5 complete sets of textile elements for *PlusMe*, including the external cover and the inner linings. Right: the final assembled *PlusMe* (photo taken during the exhibition *Maker Faire* 2022, where the prototype was presented to the audience).

[6] www.plusme-h2020.eu/wp-content/uploads/2021/12/D1.3_plusme_product_demonstrator.pdf

The new *PlusMe* presents a more professional, child-friendly shape. A new textile – a mix of 90% cotton and 10% elastane, certified *Oeko-Tex Standard 100*[7] for safe use with children – was also used; this fabric is characterised by softness and elasticity, pleasant features more suitable for a plush toy.

5. Future Developments

ISTC-CNR is now finishing assembling the whole set of 25 samples (7 samples are currently fully assembled and ready for use). A brief video presenting the new toy features is available at the project website link https://im-twin.eu/video/. The produced toys will be used for both the clinical and dissemination activities; in particular, the new *PlusMe* samples are going to be delivered to both project partners and to external users (e.g. research and rehabilitation institutes, neurodevelopmental therapists, associations) who asked to be included in the product trial. ISTC-CNR will then provide the necessary support to use the devices.

[7] https://www.oeko-tex.com/en/our-standards/oeko-tex-standard-100