

Dissemination plan and Report (final version)

Deliverable 7.2



MUWVO

MULTI-METHOD WORKSPACE FOR HIGHLY SCALABLE PRODUCTION LINES

Project identifier	MUWO
Project title	Multi-method workspace for highly scalable production lines
Document version	V1.0
Planned delivery date	M35 (December 2023)
Actual delivery date	M35 (December 2023)
Document title	Dissemination plan and Report (final version)
Work Package	WP 7
Abstract	This deliverable presents a report of the dissemination activities performed throughout the MUWO project.
Keywords	Scientific article, paper, conference, fair, meeting, website, post

Function	Name	Entity
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Executive summary

In order to promote the project to a wider audience and provide the opportunity for more people to benefit from the project's results, project partners have participated in several dissemination activities in which they have presented the obtained results.

This deliverable gathers the details of the dissemination activities that have been carried out over the course of the project, such as participation on conferences, industrial fairs, or publication of scientific papers.

Partner contributions record

#	Entity	Contributor on Phase 1	Date of Contribution1	Contributor on Phase 2	Date of Contribution2
1	Accuro	X	14/07/2022	X	05/12/2023
2	ACD	X	26/07/2022		
3	Alpata	X	04/08/2022		
4	Evosoft				
5	Inovasyon	X	26/07/2022		
6	ISEP	X	20/07/2022	X	09/05/2023
7	Progim	X	04/08/2022		
8	SisTrade	X	18/07/2022		

Changes record

Version	Date	Entity	Description of Changes
V0.1	29/03/2023	ACCURO	Creation of the document template, ToC and guidelines for partners to follow.
V0.2	09/05/2023	ISEP	Added ISEP's dissemination activities
V0.3	05/12/2023	ACCURO	Compiled all the dissemination activities reported through the Google form.
V1.0	05/12/2023	ACCURO	Final editing and formatting.

Contents

1. Introduction	8
1.1. Document objectives and scope	8
1.2. Document structure	8
2. Dissemination activities	10
2.1. Conferences, seminars and industry fairs	10
2.1.1. Activity 1	10
2.1.2. Activity 2	10
2.1.3. Activity 3	10
2.1.4. Activity 4	10
2.1.5. Activity 5	11
2.1.6. Activity 6	11
2.2. Scientific articles	11
2.2.1. Activity 1	11
2.2.2. Activity 2	11
2.2.3. Activity 3	12
2.2.4. Activity 4	12
2.2.5. Activity 5	12
2.2.6. Activity 6	12
2.2.7. Activity 7	13
2.2.8. Activity 8	13
2.2.9. Activity 9	13
2.2.10. Activity 10	13
2.2.11. Activity 11	14
2.3. Web pages	14
2.3.1. Activity 1	14
2.4. Social networks	14
2.4.1. Activity 1	14
2.5. Other	14
2.5.1. Activity 1	14
2.5.2. Activity 2	14
2.5.3. Activity 3	15
2.5.4. Activity 4	15
3. References	15

List of figures

No table of figures entries found.

List of tables

No table of figures entries found.

1. Introduction

The project Multi-method Workspace for highly scalable production lines (MUWO) is a Smart Engineering project that aims to increase the efficiency of manufacturing processes that use different manufacturing methods with different degrees of automation and digitalization, and that undergo changes in batch sizes over the time. By creating a platform that allows the combination of processes and subprocesses, the creation of smart production plans and the monitoring of equipment, it aims to provide a solution to a problem widely faced in small industries where large investments in cutting-edge equipment are not possible.

MUWO aims to be an exploitable solution that allows the end user to solve their problems. To reach this point, it is necessary to have a good communication and dissemination strategy that allows to communicate the results of the project in an effective way, not only to the scientific community and specialized public, but also to the media and the society.

1.1. Document objectives and scope

This document gathers the information of the dissemination activities carried out during the 35 months of the project. This information includes the type of activity, which partners have participated in it, a detailed description of what was done during the activity (if partners prepared a presentation and what they presented, if they used posters, flyers, links to websites, social media posts, etc.), the type of audience which it was addressed (the scientific community, general public, end users) and whether partners have established a relationship or contacted someone who may be of interest for future collaborations or exploitation.

The information collected in this deliverable comes from the Google Form presented in deliverable 7.2 [Dissemination plan and report \(initial version\)](#).

1.2. Document structure

The deliverable body is divided into several sections according to the type of activity, so that all activities of the same type are grouped in the same section. Thus, there are 6 sections in which the activities can be classified:

- Conferences, seminars and industry fairs: within this category fall events such as conferences, congresses, seminars, webinars, workshops, industry fairs, and similar. These are activities in which a partner can give a lecture or present a demonstrator in front of an audience, regardless of the type of audience.
- Scientific articles: these are scientific publications in specialized journals that are not usually aimed at general public, but rather at a more specialized audience and in a more academic or research environment.
- Articles in specialized magazines: these are publications on specific topics such as technology more oriented to the general public.
- Web pages: this group includes publications either on the consortium's web page and on the web page of each partner.

- Social networks: here you will find publications made by the partners in their social networks such as LinkedIn or Facebook.
- Others: here are other activities that do not fall into the previous categories, although they are still dissemination activities.

Inside each section, a description of the activities is provided. These descriptions include:

- The title of the activity
- The date or dates of the activity
- The location, if the event was not online
- The partners involved
- A detailed description of the activity that may include figures, links to websites or any other kind of materials.
- The target audience of the activity
- A description of the contacts reached during the activity (if any)

2. Dissemination activities

The dissemination activities carried out by the different partners that constitute the consortium are described below. This information was collected by means of the Dissemination activity report form presented in deliverable 7.2 [Dissemination plan and report \(initial version\)](#), which can be accessed [here](#).

2.1. Conferences, seminars and industry fairs

2.1.1. Activity 1

In June 2021, Sistrade celebrated their S-Day, where they presented Sistrade's product portfolio along with the developments in the R&D projects (including MUWO) to both clients and prospects. The event was attended by about 100 people, who gave positive feedback regarding MUWO. Some companies were interested in the project, especially monitoring and prediction-wise of the production lines. Although the project was in the first third of its timespan, it captured the attention of the event visitors. More information about this activity can be found at <https://www.sistrade.com/en/blog/innovation/sday2021/>.

2.1.2. Activity 2

Presentation of paper "Predictive Maintenance for Maintenance-effective Manufacturing using Machine Learning Approaches" in the on-site Conference – International Joint Conferences HAIS-SOCO-CISIS-ICEUTE & STARTUP OLÉ (<http://2022.sococonference.eu/>), Universidad de Salamanca, Spain. It was done on the 6th of September 2022 between 18:15 - 20:15. ISEP was the only partner involved in the activity. It is estimated a target audience number of 200, with a number of people in the decision support systems and machine learning fields being more interested in project MUWO.

2.1.3. Activity 3

Presentation of paper "Machine Learning Applied to Industrial Machines for An Efficient Maintenance Strategy: A Predictive Maintenance Approach" at the Conference ICEER 2022 - The 9th International Conference on Energy and Environment Research, ISEP, Porto, Portugal (<http://www.iceer.net/index.html>). It was done on the 14th of September of 2022 between 16:45 - 17:00, paper E098 in the book of abstracts. ISEP was the only partner involved in the activity. It is estimated a target audience number of 200, with a number of people in the decision support systems and machine learning fields being more interested in project MUWO.

2.1.4. Activity 4

Demonstration of the MUWO platform at the Sistrade Industrial Sustainability Conference (Sustenibilidade Industrial – Indústria 4.0) held in Porto on October 2022. In this event,

Sistrade contacted all the firms that attended, and business has been concluded with two new companies as a result of the event. In the future, these new connections will be able to use the ECMON platform.

2.1.5. Activity 5

Participation in Eskisehir Industry Fair (Eskişehir Endüstri Fuarı 2022) held in October 2022. In this event, ACD, Inovasyon and Progim prepare a stand where they presented their solutions and products, as well as the results of the projects in which they are participating, including MUWO. The stand was visited by more than 250 people.

This fair was a great opportunity to contact potential buyers and explain the solutions that comprise MUWO (scheduling, maintenance, digital twin, etc.). In addition, it was very useful to evaluate the demands of the participants in the fair and improve exploitation opportunities.

2.1.6. Activity 6

Participation in the fair Bursa Makine Teknolojileri Fuarı (BUMATECH – 2022; <https://bursamakinefuari.com/en/exhibitor-list>) in December 2022. In this fair, which covers various industries and had more than 30 000 visitors from 67 countries, ACD and Inovasyon presented the details of the MUWO project (goals, targeted outputs, current situation).

Potential buyers were contacted, the solutions that comprise MUWO (scheduling, maintenance, digital twin, etc.) were explained and the demands of the participants in the fair were evaluated.

2.2. Scientific articles

2.2.1. Activity 1

The SOCO'22 presented paper "Predictive Maintenance for Maintenance-effective Manufacturing using Machine Learning Approaches" (Mota et al., 2023) was published by Springer in a special volume of Lecture Notes in Networks and Systems on the 12th of October 2022. The series publishes the latest developments in Networks and Systems (<https://link.springer.com/book/10.1007/978-3-031-18050-7>). ISEP was the only partner involved in the activity. It is estimated a target audience number of 325, with a number of people in the decision support systems and machine learning fields being more interested in project MUWO.

2.2.2. Activity 2

The ICEER 2022 (The 9th International Conference on Energy and Environment Research, ISEP, Porto, Portugal - <http://www.iceer.net/index.html>) presented paper "Machine Learning Applied to Industrial Machines for An Efficient Maintenance Strategy: A Predictive Maintenance Approach" will be published in the open access Energy Reports, ScienceDirect - The 9th International Conference on Energy and Environment Research –“Greening Energy

to Shape a Sustainable Future". ISEP was the only partner involved in the activity. It is estimated a target audience number of 500, with a number of people in the decision support systems and machine learning fields being more interested in project MUWO.

2.2.3. Activity 3

The paper entitled "Production Line Energy Cost Optimization with Renewable Energy Resource Usage in a Flexible Job Shop Configuration" was accepted to be presented at the conference "IFAC World Congress 2023", Yokohama, Japan (<https://www.ifac2023.org/>), thus it will only be published after the IFAC 2023 paper presentation on the 9th to 14th July 2023. ISEP was the only partner involved in the activity. It is estimated a target audience number of 500, with a number of people in the manufacturing and decision support systems fields being more interested in project MUWO.

2.2.4. Activity 4

The paper entitled " Joint Optimization of Production and Maintenance for Effective Manufacturing " was accepted to be presented at the conference "23rd IEEE International Conference on Environment and Electrical Engineering", Madrid, Spain (<https://www.eeeic.net/eeeic/>), thus it was only be published after the IEEE 2023 paper presentation on the 6th to 9th June 2023 (Mota, Faria, & Ramos, 2023). ISEP was the only partner involved in the activity. It is estimated a target audience number of 500, with a number of people in the manufacturing and decision support systems fields being more interested in project MUWO.

2.2.5. Activity 5

The paper entitled "Production and Maintenance Scheduling for Total Cost and Machine Longevity Optimization" was accepted to be presented at the conference "International Conference on Future Energy Solutions (FES2023)", Vaasa, Finland (<https://sites.uwasa.fi/fes2023/>), and was published after the FES 2023 paper presentation on the 12th to 14th June 2023 by the IEEE Xplore (Mota, Faria, Canizes, & Ramos, 2023). ISEP was the only partner involved in the activity. It is estimated a target audience number of 500, with a number of people in the manufacturing and decision support systems fields being more interested in project MUWO.

2.2.6. Activity 6

The manuscript entitled "Joint Optimization of Production, Maintenance, and Quality for Manufacturing: A Literature Review" was submitted to the Renewable and Sustainable Energy Reviews Journal (<https://www.sciencedirect.com/journal/renewable-and-sustainable-energy-reviews>). It is still under review, thus it is still awaiting its acceptance. ISEP was the only partner involved in the activity. It is estimated a target audience number of 500, with a

number of people in the manufacturing and decision support systems fields being more interested in project MUWO.

2.2.7. Activity 7

The manuscript entitled "Machine Overstrain Prediction for Early Detection and Effective Maintenance: A Machine Learning Algorithm Comparison" was submitted and accepted to the SOCO 2022 conference special issue for the journal "Logic Journal of the IGPL (<https://academic.oup.com/jigpal/>). ISEP was the only partner involved in the activity. It is estimated a target audience number of 500, with a number of people in the decision support systems and machine learning fields being more interested in project MUWO.

2.2.8. Activity 8

The paper entitled "Machine learning applied to industrial machines for an efficient maintenance strategy: a predictive maintenance approach" was accepted to be presented at the "Energy Informatics.Academy Conference 2023", São Paulo, Brazil (<https://www.energyinformatics.academy/eia-2023-conference>), currently in press. ISEP was the only partner involved in the activity. It is estimated a target audience number of 400, with a number of people in the decision support systems and machine learning fields being more interested in project MUWO.

2.2.9. Activity 9

The manuscript entitled "Production Scheduling for Total Energy Cost and Machine Longevity Optimization through a Genetic Algorithm" was submitted to the 22nd Portuguese Conference on Artificial Intelligence (EPIA 2023), Faial Island, Azores (<https://epia2023.inesctec.pt/>), to be presented between the 5th to 8th September 2023. It is still under review, thus it is still awaiting its acceptance. ISEP was the only partner involved in the activity. It is estimated a target audience number of 500, with a number of people in the manufacturing and decision support systems fields being more interested in project MUWO.

2.2.10. Activity 10

The manuscript entitled "Integration of Production, Maintenance, and Quality in Manufacturing: A Literature Review on Artificial Intelligence Techniques" was submitted to the Journal of Manufacturing Systems (<https://www.sciencedirect.com/journal/journal-of-manufacturing-systems>). It is still under review, thus it is still awaiting its acceptance. ISEP was the only partner involved in the activity. It is estimated a target audience number of 500, with a number of people in the manufacturing and decision support systems fields being more interested in project MUWO.

2.2.11. Activity 11

The manuscript entitled "Production Plan Rescheduling for Machine Breakdown Events using a Genetic Algorithm" was submitted to the IEEE PES ISGT Europe 2023 (ISGT Europe 2023), Université Grenoble Alpes, France (<https://ieee-isgt-europe.org/>), to be presented between the 23rd to 26th of October 2023. It is still under review, thus it is still awaiting its acceptance. ISEP was the only partner involved in the activity. It is estimated a target audience number of 500, with a number of people in the manufacturing and decision support systems fields being more interested in project MUWO.

2.3. Web pages

2.3.1. Activity 1

A localised website in Portuguese language was developed by Sistrade (<https://muwo.sistrade.com/>) to enhance the dissemination of the project not only in Portugal, but also in Portuguese-speaking countries worldwide. This site also offers links to the official project site and social networks. Until September 2022, this website had 2000 views.

2.4. Social networks

2.4.1. Activity 1

Dissemination of the Portuguese MUWO website through Sistrade's LinkedIn (<https://pt.linkedin.com/company/sistrade>). This post was mainly targeted to Sistrade's LinkedIn followers, which include both clients and prospects. Until September 2022, this post had 5335 reactions.

2.5. Other

2.5.1. Activity 1

In June 2022, the Turkish partner Progim participated in a meeting with 12 more consultants regarding Model Factory in Ankara. During this meeting, Progim's CEO, Engin Eroglu, explained MUWO's expected outputs and the benefits it could bring to manufacturing industry, and collected potential problems to be solved by MUWO. This could ease the search of potential customers for MUWO in the future.

2.5.2. Activity 2

In June 2022, Progim had several meetings with 2 companies —one from the ceramic sector and another one from the cardboard packaging sector— in order to collect their complex problems while planning and during production and introduce them to MUWO and its outputs. Progim made some studies regarding the issues identified in order to implement the mechanisms to solve them with MUWO. These 2 companies will be real customers.

2.5.3. Activity 3

A poster was created to disseminate MUWO in the events Sistrade is present (ex: Business fairs, industry meetings, etc).

2.5.4. Activity 4

The master's dissertation "Joint Optimization of Production and Maintenance for Effective Manufacturing and Demand Response Participation" from Bruno Mota is available at (Mota, Otimização Multiobjetivo de Produção e Manutenção para uma Manufatura Eficaz e Participação em Programas de Reposta da Demanda, 2023)(Mota, 2023) t. It focuses on production line management for cost-effective and machine longevity manufacturing, which considers production and maintenance through a Genetic Algorithm for production and maintenance scheduling, and an Artificial Neural Network for predictive maintenance. It was presented on the 15th of November 2022 in the School of Engineering (ISEP) of the Polytechnic of Porto (P.Porto), Porto, Portugal, for a master's degree in Artificial Intelligence Engineering. ISEP was the only partner involved in the activity. It is estimated a target audience number of 36, with a number of students and professors interested in production line management through intelligent decision support systems being more interested in project MUWO.

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