



# Newsletter

## Preface

Dear Reader,

We are glad to introduce you the first newsletter of the SERENA project.

Purpose of this newsletter is to provide an overview of the SERENA activities within its first year and a brief description of its industrial pilots. Finally, recent project activities and future events are presented.

SERENA is a European Union funded Research & Development Project under the Horizon 2020 Framework Program. The project has started on 1st October 2017 and will last until the 30th September 2020. The project engages 14 organizations from various EU countries and the consortium is coordinated by COMAU S.p.A, Italy.

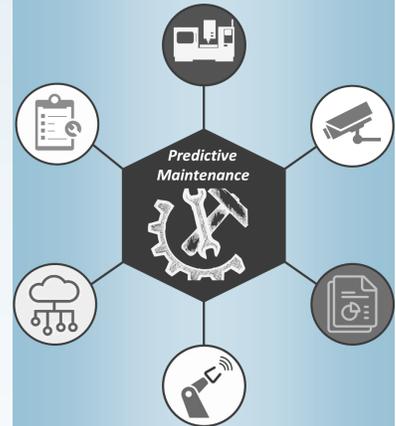
SERENA will provide a bridge for transferring the latest R&D results in predictive maintenance by providing:

- ◆ advanced IoT systems and smart devices for collecting data from different resources and cloud-based remote management of these data
- ◆ platform for predictive maintenance activities & AR based operator local maintenance personnel support,
- ◆ advanced artificial intelligence methods for predictive maintenance,
- ◆ plug-and-play cloud-based communication framework.

SERENA represents a powerful platform to aid manufacturers in simplifying their maintenance burdens, by reducing costs, time and improving the productivity of their production processes.

Sincerely,

*The SERENA project consortium*



*This project has received funding from the European Union's Horizon 2020 Framework Programme for research and innovation under grant agreement No 767561.*

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## Future Events

- **Sep 18:** Presentation of SERENA in IEEE-IS2018
- **Nov 18:** SERENA General Assembly meeting to take place in Bilbao
- **Nov 18:** Prototype demonstration for evaluating concept

## Vision

Introduce a powerful tool to aid manufacturers in simplifying their maintenance burdens.

## Aachen technical meeting

In March 2018, the SERENA development team gathered in IPT to discuss the developments and the integration roadmap.



## Predictive maintenance in a nutshell

The growing complexity of modern engineering systems and manufacturing processes is an obstacle to keeping these systems operating at high levels of reliability.

The number of sensors and the amount of data gathered on the factory floor increases constantly, while there are hidden resources, 85% of data and information are unstructured and 42% of all transactions are still based on paper.

This opens the vision of truly connected production processes where all machinery data are accessible allowing easier maintenance in case of unexpected events. Physical maintenance issues can cause costly disruptions in the manufacturing process.

Physical maintenance issues can cause costly disruptions in the manufacturing process. With predictive analytics, however, repairs and maintenance tasks can be prioritized and allocated to pre-planned outages based on real-time probabilities of various future failures. The strategy of predictive maintenance saves time and money and helps minimize costly production downtimes.

Predictive maintenance techniques such as vibration and thermal monitoring along with Reliability techniques such as Failure Modes and Effects Analysis (FMEA) and Root Cause Failure Analysis (RCFA) will result in bottom-line savings through early detection.

## SERENA

*Versatile plug-and-play platform enabling remote predictive maintenance*

## Predictive maintenance cluster

This cluster is comprised by the EU funded projects implemented under the FOF-09 Topic of the H2020-IND-CE-2016-17 Call and targets on the establishment of an extended community in predictive maintenance technologies and beyond .



PreCoM

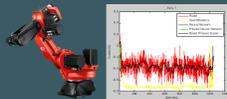


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## Industrial Use cases

### Robotics



#### Key characteristics

- Unexpected failures
- Production breakdowns
- Expert maintenance personnel

#### Needs

- Equipment monitoring
- Robot operating conditions
- Data security/privacy

### White Goods



#### Key characteristics

- Unexpected failures
- Production breakdowns
- Expert maintenance personnel

#### Needs

- Equipment monitoring
- Robot operating conditions
- Data security/privacy

### Elevators Production



#### Key characteristics

- Unexpected failures
- Production breakdowns
- Need of machine provider experts

#### Needs

- Decrease cost
- Increased throughput
- Product quality & safety

### Metrological Engineering



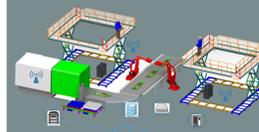
#### Key characteristics

- Unexpected failures
- Need of TRIMEK experts for maintenance within other industries

#### Needs

- Easy maintenance
- Measurement quality
- Cost of maintenance

### Steel Parts

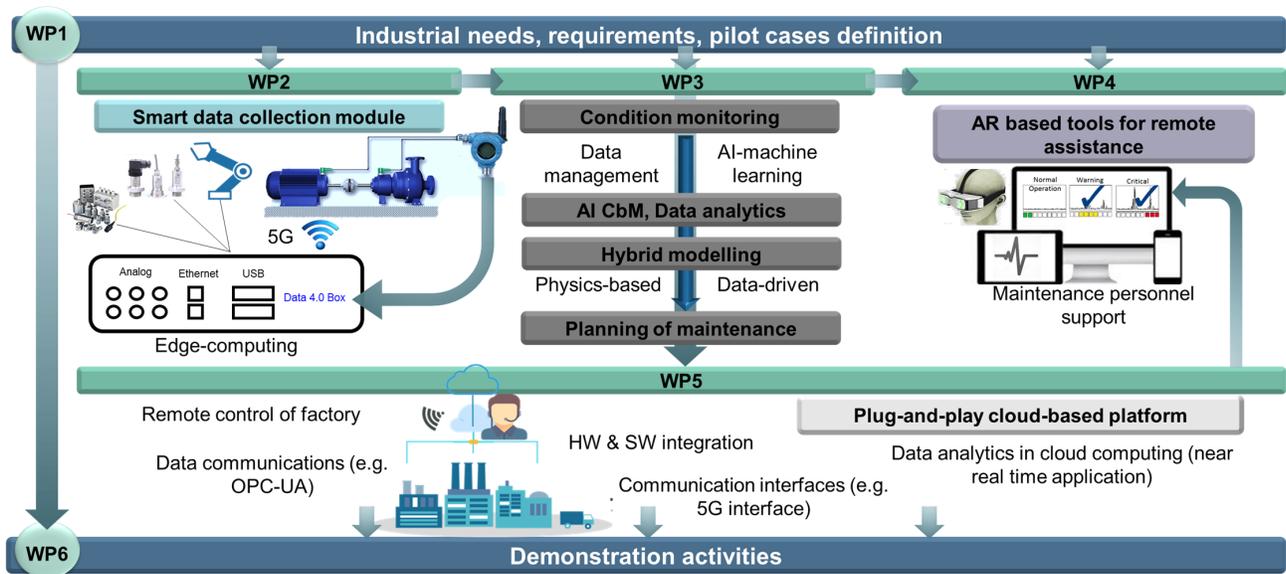


#### Key characteristics

- Unexpected failures
- Need of VDLWEW experts for maintenance within other industries

#### Needs

- Easy maintenance
- Measurement quality
- Cost of maintenance



Overview of SERENA technologies

## Methodology

SERENA project targets the development of a plug-and-play, versatile and remote platform enabling predictive maintenance advantages within different industrial sectors and different kind of machinery. As an Innovation Action it will focus its efforts mainly on the customization of existing technologies with some RTD efforts to bridge technical gaps related to each pilot case, namely:

- Remote factory condition monitoring and control

The objective is a flexible and modular data collection middleware for online monitoring and the versatile integration of manufacturing data into software systems, like data storage, clouds, MES systems, or smart devices.

- AI condition based maintenance and planning techniques

The approach includes the combination of Computational Intelligence and Data Mining Technologies, in order to cope with this changing complexity and simplify the decision making processes with regards to machine maintenance. Moreover, the combination of physics-based and data driven approaches will be investigated for increased accuracy in the prediction. Finally, the corrective and maintenance activities should cope with the production activities and thus an intelligent decision making framework is proposed for scheduling and planning.

- AR based tool for remote assistance and human operator support

The focus is to develop an approach to automatically generate step-by-step instructions based on the technicians' skill levels and on the machine status that is detected by sensor data and visualized on top of the related machine components by 3D AR technologies.

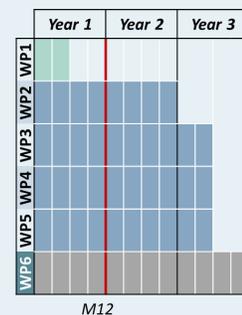
- Cloud-based platform for versatile remote diagnostics

The abovementioned results will be integrated to a cloud platform, supporting deployment of its technologies to versatile environments and data security.

### Impact

- ◆ 10% increased in-service efficiency through reduced failures rates, downtime due to repair, unplanned system outages and extension of component life.
- ◆ More widespread adoption of predictive maintenance as a result of the demonstration of more accurate, secure and trustworthy techniques at component, machine and system level.
- ◆ Increased accident mitigation capability.

### Timeline



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## Consortium

Project  
coordinator:



Project  
manager:



### System integrators and technology providers



### Universities and research institutes



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