



**Innovative and efficient solution, based on modular, versatile, smart process units for energy and resource flexibility in highly energy intensive processes**

## **Deliverable D5.4**

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**Title: Monitoring and Control tool, Implementation**

**Due Date:** 31/03/2020

**WP5** AFF40 (analytics for factories 4.0) platform

**T5.3** CIRMET Monitoring and Control Tool

**Dissemination Level:** Public

**Website project:** <https://www.spire2030.eu/cirmet>

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## Deliverable information

Deliverable n°	5.4
Deliverable title	CIRMET Monitoring and Control tool, Implementation
Type	Software report
WP	5
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## Dissemination Level

PU	Public, fully open, e.g. web	X
CO	Confidential, restricted under conditions set out in Model Grant Agreement	
CI	Classified, information as referred to in Commission Decision 2001/844/EC.	

## D5.4 Summary

Deliverable 5.4 is the CIRMET Monitoring and Control tool Implementation. This document describes briefly the main aspects of the developments carried out for this implementation. There is a confidential document that explains them in detail.

The development of the Monitoring and Control tool (M&C tool) is structured in two main areas:

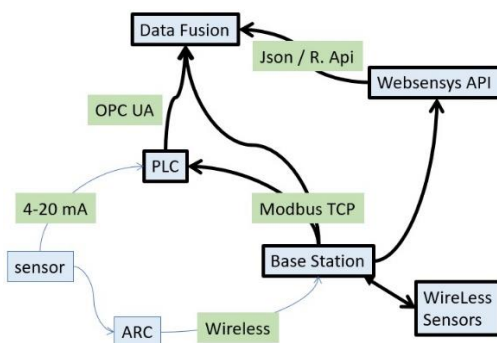
- **The core of the M&C tool**, which are a set of functionalities to manage sensors and collect the information they send. They have been developed by Wireless Value and they rely on previous developments from this company.
- **The interfaces**, which are software developments to communicate the core functionalities to other layers of the AAF40, and to industrial processes from the external world, through the communication with sensors deployed all over the use cases.

The core functionalities are based on the WebSensys server by Wireless Value. This is a webserver application designed for managing, collecting and displaying measurement data from sensors. It has been developed as a decentralized application of WebSensys to run standalone in different locations.

Regarding the interfaces, there have been different developments that are summarized next:

- Interfaces to the physical work: these are developments necessary to make the AFF40 collect data from industrial processes.
  - Measurement matrices for the use cases, which are sets of measurements that are needed in Recuwaste and Effimelt for their control and monitoring. There are two matrices, one for each use case, with every measurement needed classified as monitoring or control, and with commercial sensors that can measure them. This is the tool that is necessary to go to the market and buy the necessary sensors that will feed data into the AFF40 later on. All the partners have participated in it.
  - Data gathering box, which is a device able to manage and collect measurements from a set of sensors that are connected to it by wire. It has been developed by ARC and it is a complementary device to the wireless infrastructure developed by Wireless Value.
  - Torque sensor: during the analysis of the sensors needed by the use cases, it came out the possibility of developing a customized design of the torque sensor. ARC, with the collaboration of MGEP, decided to develop an innovative torque sensor by integrating it into the CVT design. This development is currently ongoing, and the first versions will come up in the next months.
- Interfaces to the upper layers of the AFF40: these are developments necessary to make the collected data flow to the upper layers of the AFF40 for their processing.

- o Data fusion layer: the main data exchange between the WebSensys server and the data fusion layer will be through the data export API, which is explained in detail in the confidential deliverable. Wireless Value and MSI have worked together in the interface to make real the integration between both layers, which has been already validated. The flow of data between both layers can be illustrated with the following figure, where the different paths between the data fusion layer and the different entities of the M&C tool are shown.



- o Simulation models: data are necessary to test the whole interfaces and layers of the AFF40. However real data depends highly on the availability of the use cases. To speed up the availability of data and validate the upper layers, MSI in collaboration with MGEP and DIGIMET has been developing simulation models of Recuwaste and Effimelt, which will be available for the upper layers to play with. This is especially relevant to task 5.1 and task 5.2 to help validating the soft-sensor and optimization tools developed in those tasks.

The interaction between the different entities of the M&C tool are shown in the following picture:

