



DELIVERABLE 4.6

Implementation of DBs and models in the Cloud & recalibration algorithms

Grant Agreement number: 723082

Project acronym: STREAM-0D

Project title: Simulation in Real Time for Manufacturing with Zero Defects

Project coordinator: INSTITUTO TECNOLÓGICO DE ARAGÓN

Call: H2020-FOF-2016

Topic FOF-03-2016: Zero-defect Strategies at System Level for Multi-stage Manufacturing in Production Lines

Project start date: 01/10/2016

Duration: 42 months

Reporting period: From 01/04/2019 to 31/03/2020

Disclaimer

This document contains material which is the copyright of the STREAM-0D consortium, and may not be reproduced or copied without permission. All consortium partners have agreed to the publication of this document for confidential use within the Consortium. The commercial use of any information contained in this document may require a license from the proprietor of that information. The reproduction of this document or of parts of it requires an agreement with the proprietor of that information. The document must be referenced if used in a publication.

© 2016 - 2020 STREAM-0D Consortium

Partners

No.	Name	Short name	Country
1	INSTITUTO TECNOLÓGICO DE ARAGÓN	ITAINNOVA	Spain
2	FERSA BEARINGS	FERSA	Spain
3	ZF TRW – LUCAS VARITY GmbH	ZF	Germany
4	STANDARD PROFIL	SP	Spain
5	LABORATORY FOR MANUFACTURING SYSTEMS AND AUTOMATION	LMS	Greece
6	ECOLE CENTRAL NANTES	ECN	France
7	INTEGRATED ENVIRONMENTAL SOLUTIONS LIMITED	IES	UK
8	STAMTECH SRL	STAM	Italy
9	DAY ONE SRL	DAY-ONE	Italy
10	CENTER FOR TECHNOLOGY RESEARCH AND INNOVATION LTD	CETRI	Cyprus

Document Information

Project	STREAM-0D
Work Package	4
Deliverable n.	4.6
Title	Implementation of DBs and models in the Cloud & recalibration algorithms
Responsible beneficiary	IES
Involved beneficiaries	All partners
Type¹	R
Dissemination level²	CO
Due delivery date	30-9-2019
Actual submission date	30-9-2019

¹ **Types. R:** Document, report (excluding the periodic and final reports); **DEM:** Demonstrator, pilot, prototype, plan designs; **DEC:** Websites, patents filing, press & media actions, videos, etc.; **OTHER:** Software, technical diagram, etc.

² **Dissemination levels. PU:** Public, fully open, e.g. web; **CO:** Confidential, restricted under conditions set out in Model Grant Agreement; **CI:** Classified, information as referred to in Commission Decision 2001/844/EC.

Executive Summary

The present document reports on the High Performance Computing cloud and web enabled database platform (Cloud DB) and API connection to provide secure collection, storage and accessibility of all the continuous data collected and generated in the STREAM-0D project.

The current version of the deliverable, due for M36, focusses on providing an updated description of the structure and implementation of the Cloud DB, as well as the recalibration algorithms for each application.

Firstly, the document reports on the updated features of the Cloud DB. The key improvements over the work previously reported in D4.4 include:

- Data handling performance improvements
- Cloud resource consolidation
- Separation of pilot data & improved access management
- New rule sets for notification management
- Action Trigger rule prototype to automate recalibration
- Improvements to the iDashboards tool to support UI work in WP5

On the latter, the present report provides an overview on how to use the iDashboards in Section 2.2.

The report then focusses on the key concepts underlying the cloud-based recalibration work. Firstly, in Chapter 3, the overall concept is presented; then, the main mathematical concepts required for recalibration are presented, introducing the main sampling techniques, sensitivity analyses and cost functions that are relevant for this kind of problem. Finally, the recalibration algorithm itself is presented in 3.4: Particle Swarm Optimisation (PSO).

The technical framework is then applied to the two STREAM-0D ROMs requiring recalibration – respectively, the SP Seals ROM in Chapter 4, and the ZF Booster ROM in Chapter 5. For both ROMs, first the recalibration approach is detailed; then a sensitivity analysis is carried out to identify the significant parameters for recalibration; and finally, the recalibration implementation is presented with its results. In particular, for the SP Seals ROM, the recalibration is automated in the Cloud DB. The technical infrastructure for this automated process and the testing results are discussed in detail in section 4.6.

Finally, Chapter 6 updates on the general cloud implementation architecture and how the present work serves other tasks and WPs in the STREAM-0D project.