DELIVERABLE 5.2

Testing and demo under HIL environment

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

Partners

No.	Name	Short name	Country
1	INSTITUTO TECNOLÓGICO DE ARAGÓN	ITAINNOVA	Spain
2	FERSA BEARINGS	FERSA	Spain
3	ZF TRW – LUCAS VARITY GmBH	TRW	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	STAM SRL	STAM	Italy
9	DAY ONE SRL	DAY-ONME	Italy
10	CENTER FOR TECHNOLOGY RESEARCH AND INNOVATION LTD	CETRI	Cyprus

Document Information

Project	**STREAM-0D**
Work Package	**5**
Deliverable n.	**5.2**
Title	**Testing and demo under HIL environment**
Responsible beneficiary	**STAM**
Involved beneficiaries	**ITAINNOVA, LMS, IES, ZF, SP, FER**
Type[1]	**R**
Dissemination level[2]	**CO**
Due delivery date	**30-9-2019**
Actual submission date	**02-04-2020**

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

This deliverable describes the offline validation tests performed on the STREAM-0D control system for the three industrial use cases of the project. For each of the use cases, the Control Module is validated to test the performances and the ability to improve the process behaviour when dealing with data from the real plant and operative conditions similar to the real ones.

For the SP case, a Virtual Line has been created, to replicate the dynamic behaviour of the process plant and validate the optimization approach based on the static ROM. Multiple configurations of the process are tested on the Virtual Line, to determine the ability of the control module to minimize the error on the final product. Afterwards, the optimization module has been connected with iSCAN, in the same configuration that will be used for the real process control, and has been tested on past production.

For the ZF case, data coming from a production batch have been collected and used to validate the control strategy, the ROM precision and the Recalibration module performances. With the real values for the Lap Gap and the Jump-In available, tests have been performed to demonstrate the ability of the optimization system to provide optimal suggestions for the Lap Gap during production and to validate the precision of the ROM to correlate the Lap Gap with the Jump-In for all boosters, considering also the corrective action of the Recalibration Module.

For the Fersa case, the testing and deployment of Data Driven Models (DDMs) in a controlled environment as well as the required steps to deploy DDMs in the Fersa's shopfloor are presented. First, details are provided on the process alarms definition and generation, also presenting the alarms deployment architecture. Following this section, the implementation in the shopfloor is discussed and results from the line are provided.