



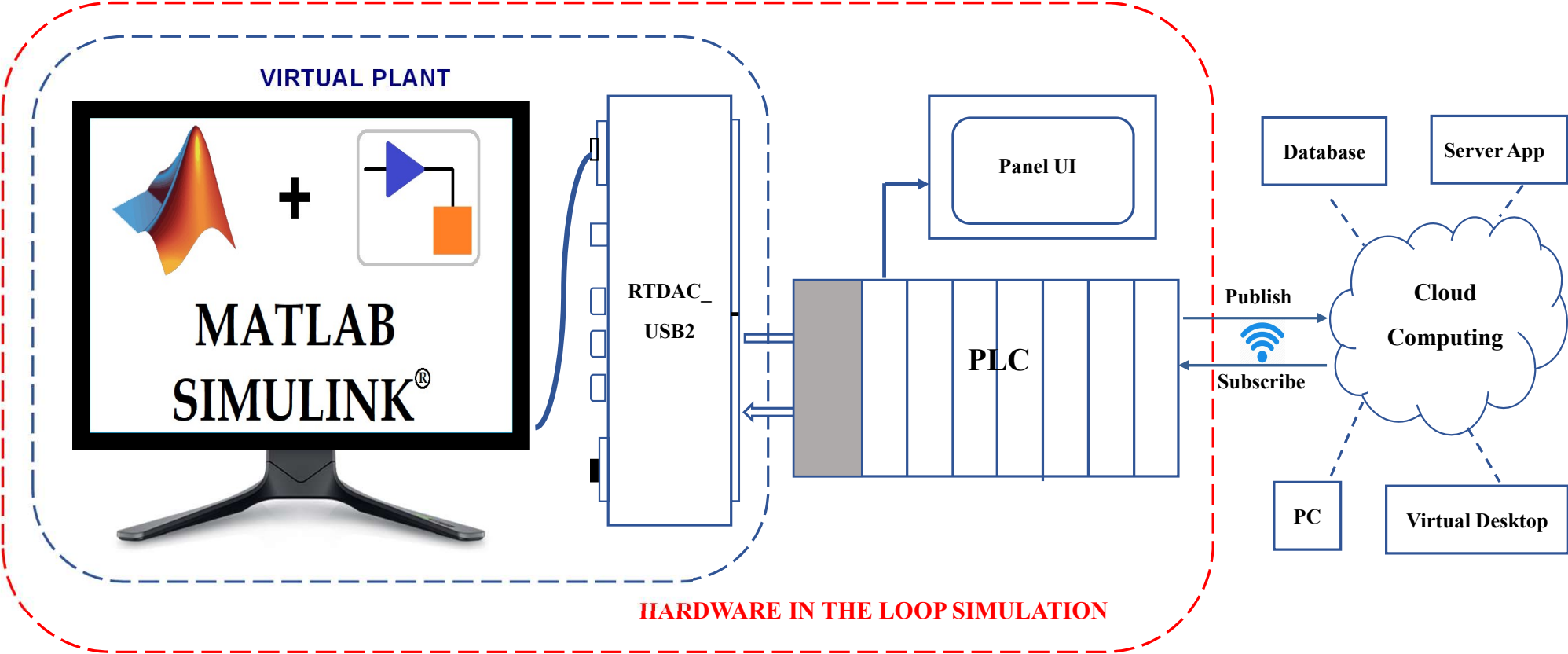
TESTING PLATFORM FOR REAL-TIME CONTROLLERS BASED ON HARDWARE IN THE LOOP SIMULATION

Prof. PhD. Eng. Marian Barbu

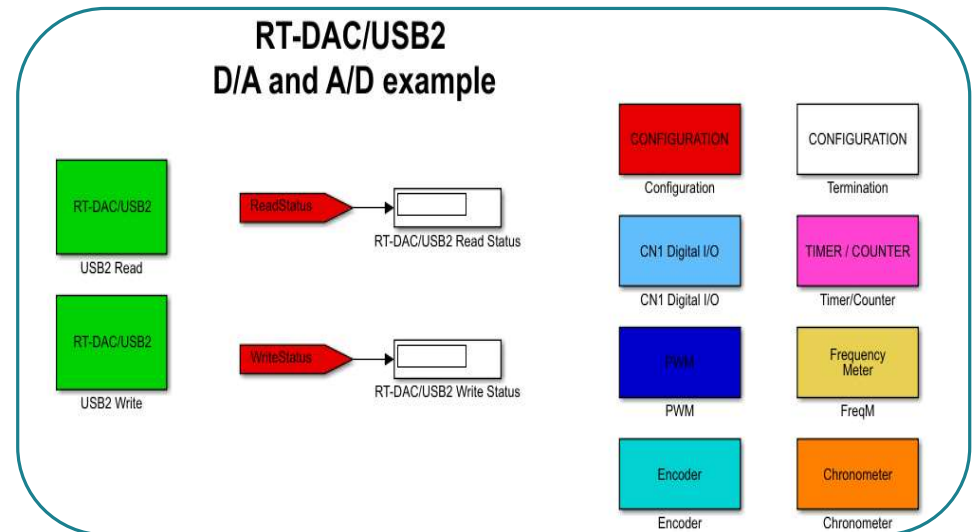
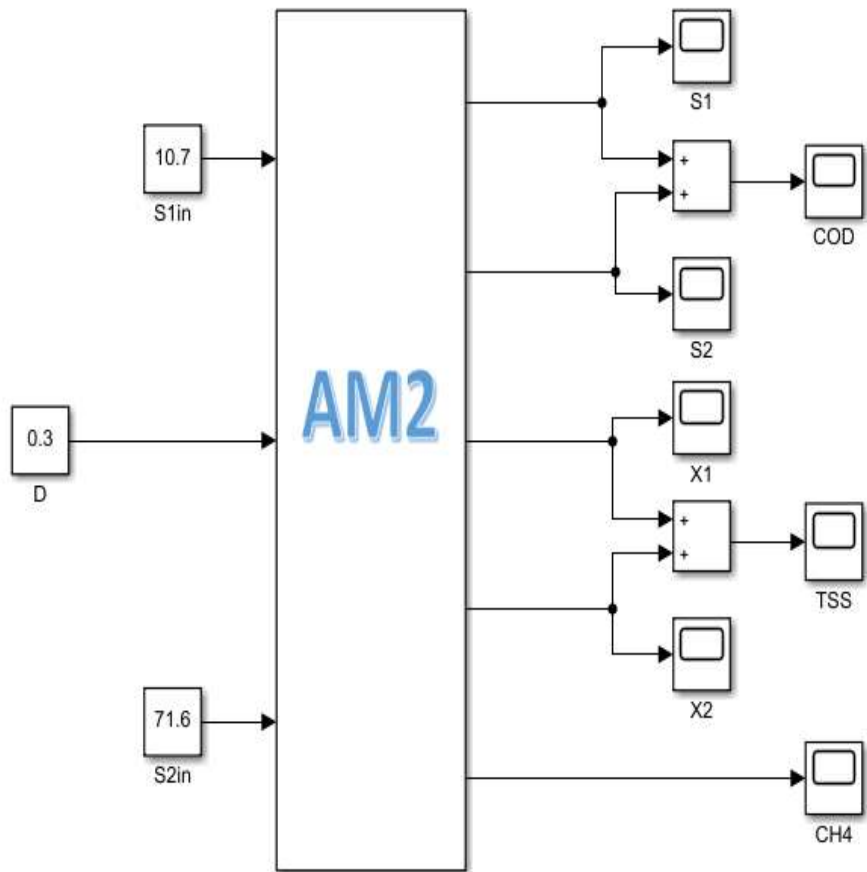
"Dunărea de Jos" University of Galati, România

e-mail: Marian.Barbu@ugal.ro

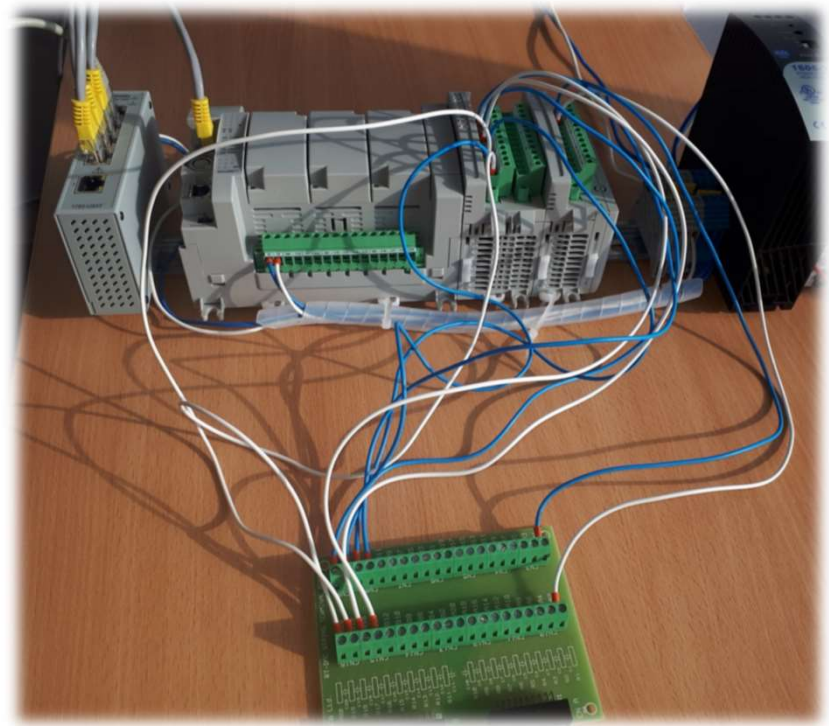
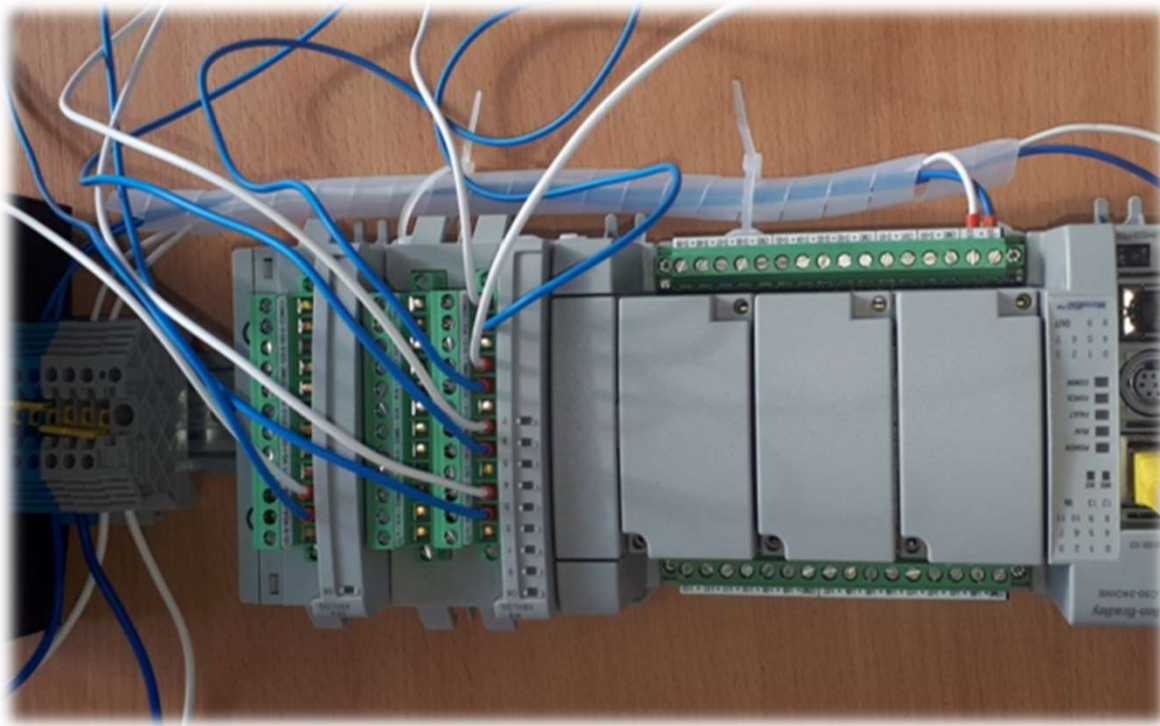
The Structure of the Testing Platform



The “Virtual Plant”

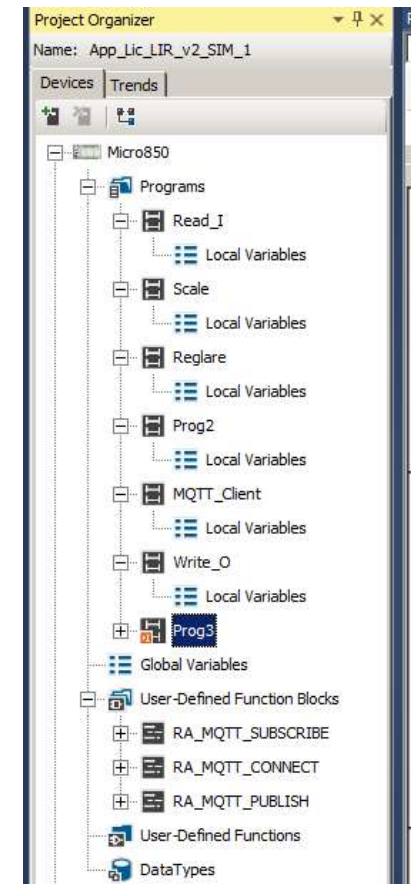
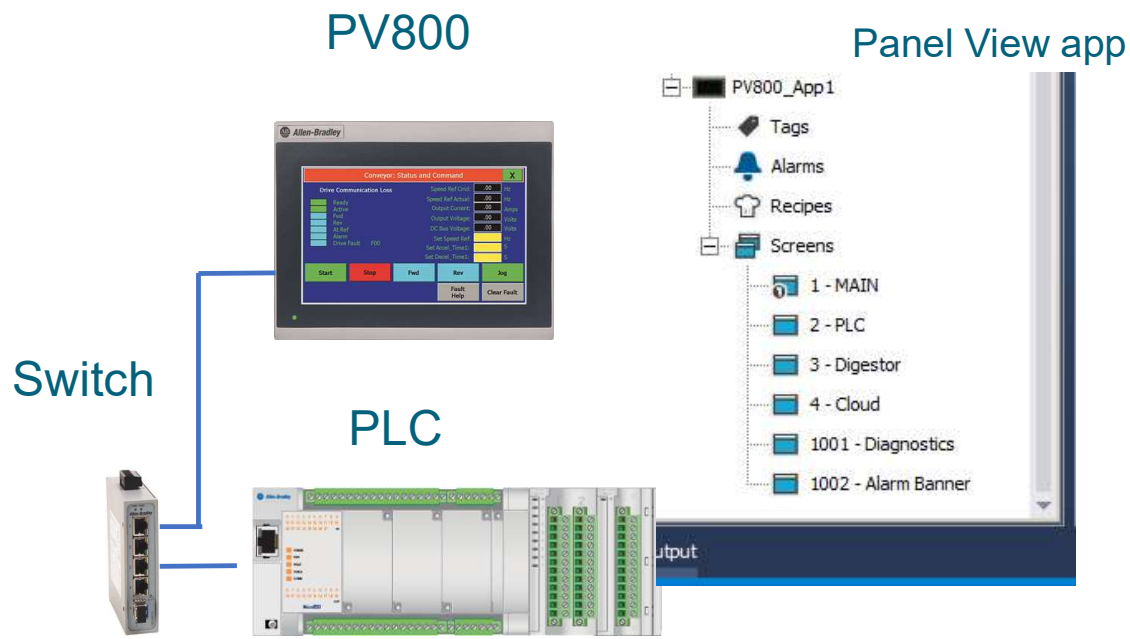


Description PLC (1)

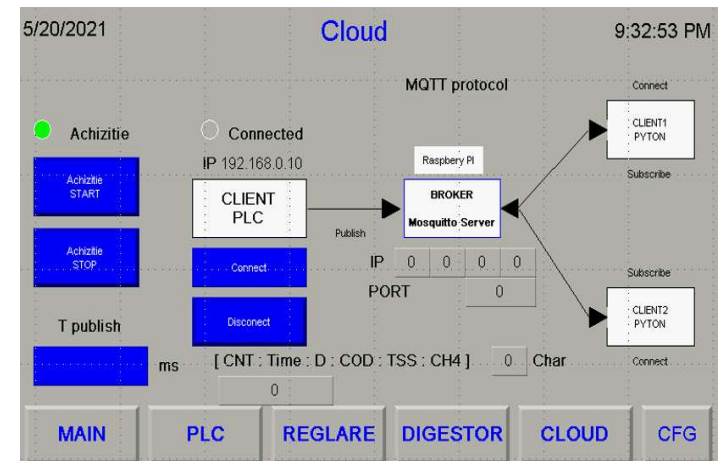
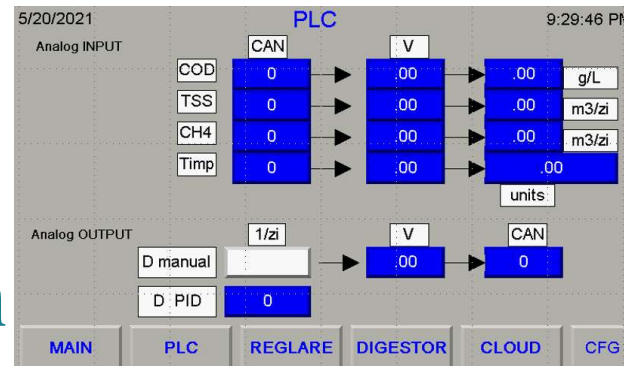
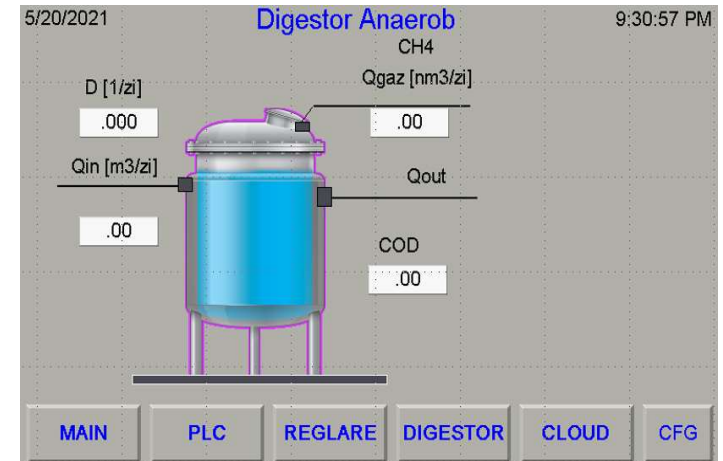
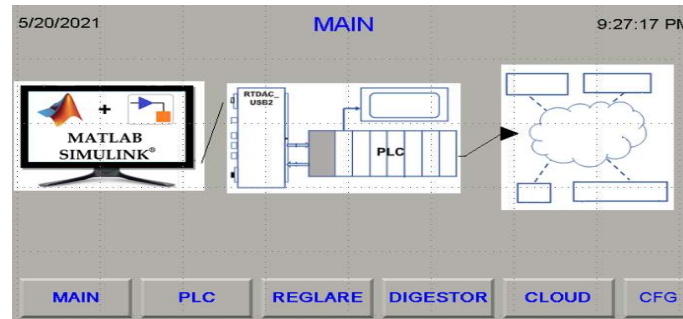


Description PLC (2)

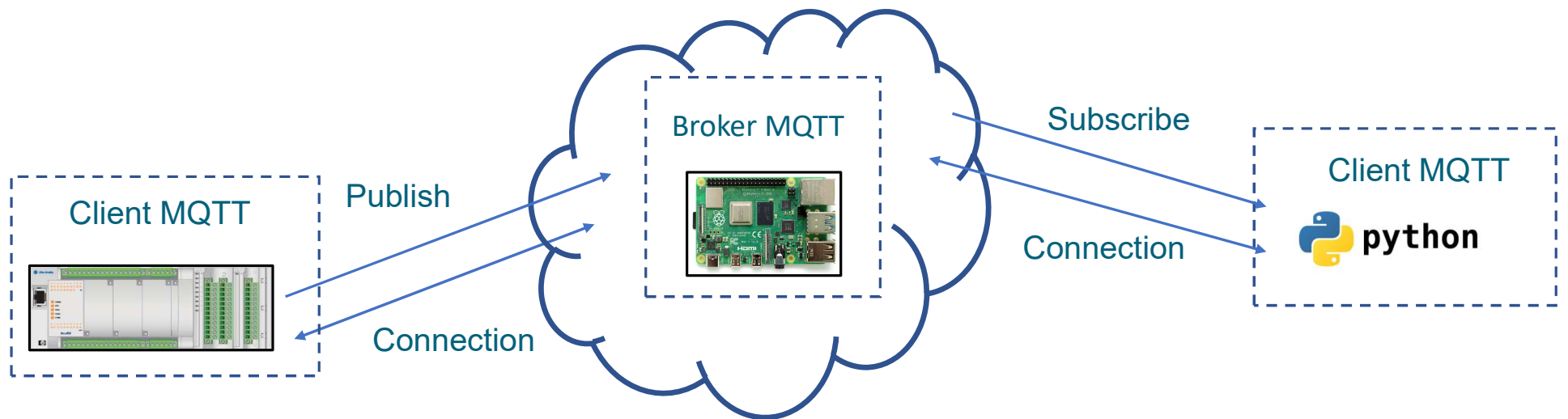
PLC app



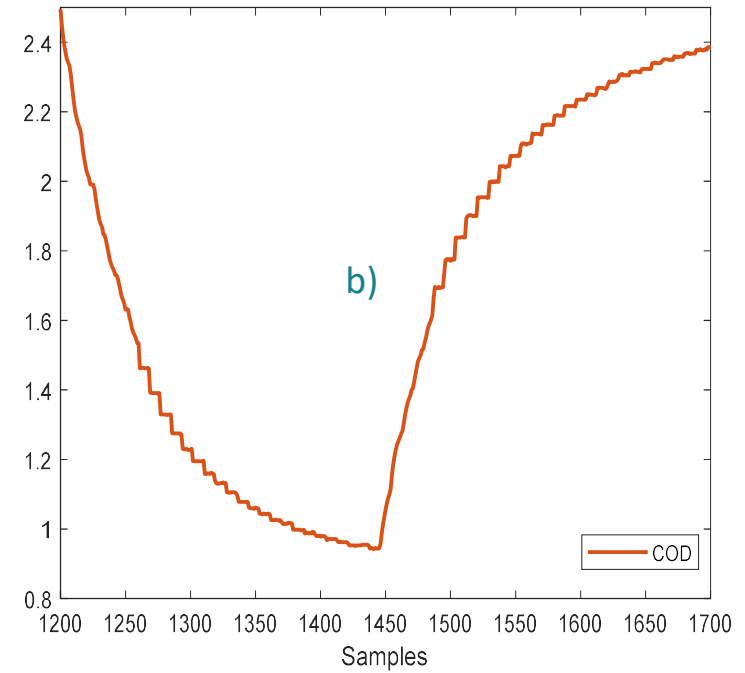
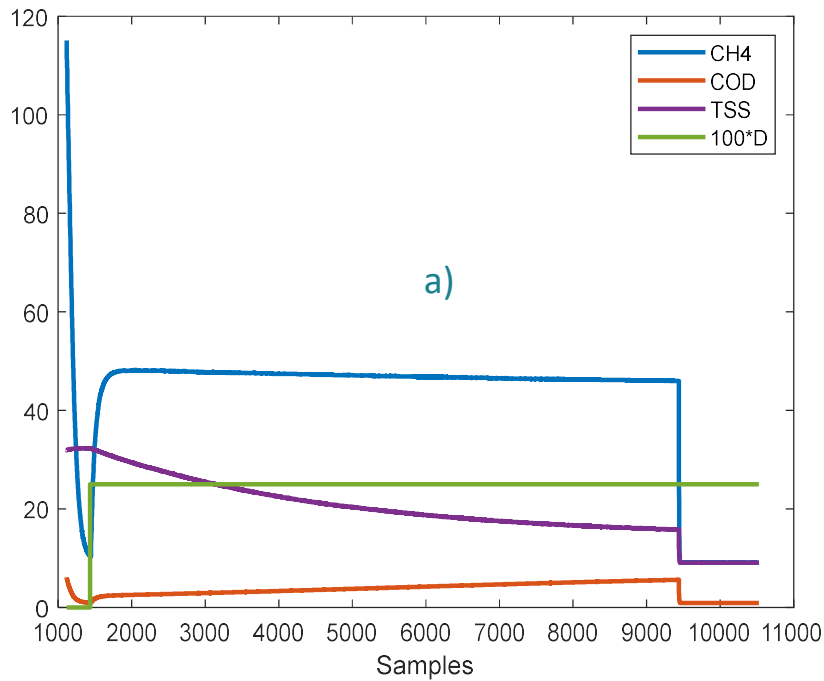
Screen captures from the implementation of the PLC



The structure of the MQTT communication with the cloud

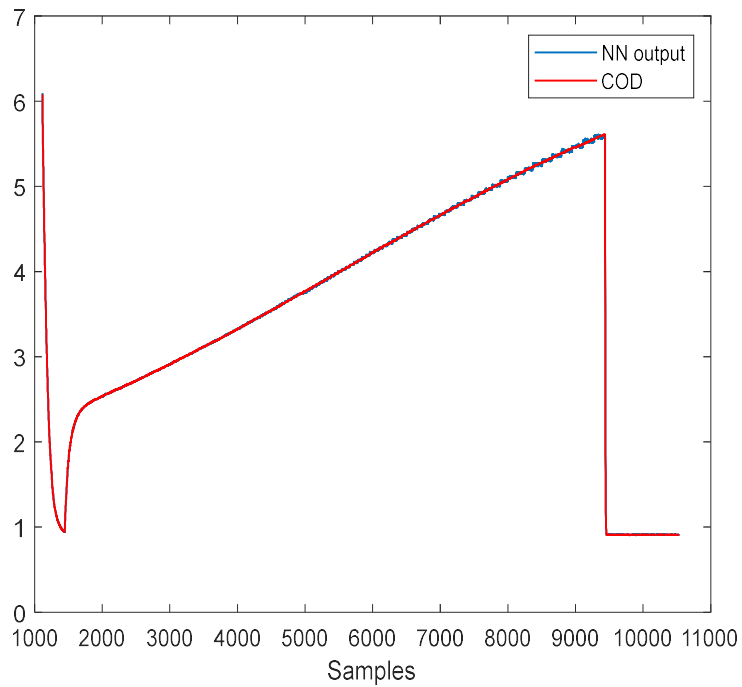


Experimental Results (1)

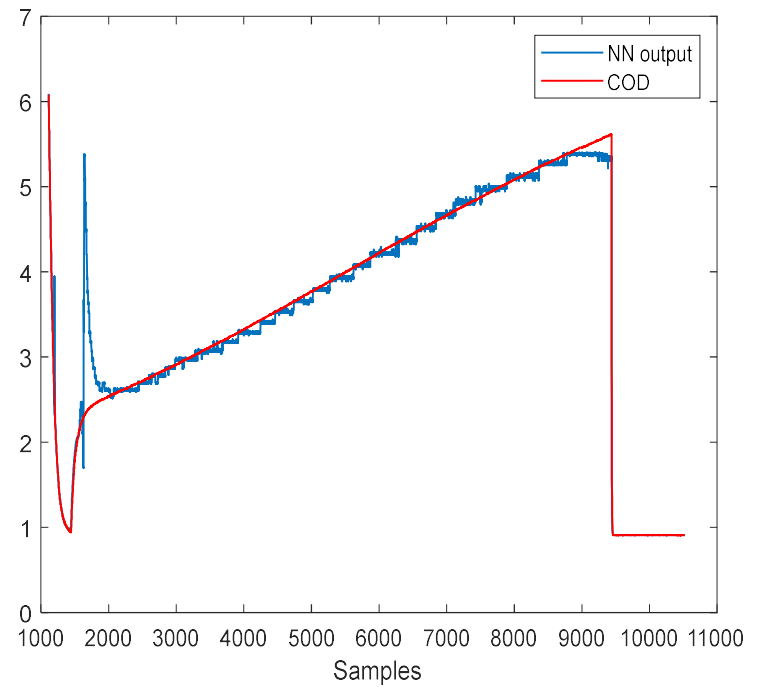


- a) Graphical representation of the variables stored on cloud;
- b) zoom on COD variable

Experimental Results (2)



Graphical representation output of the neural network NN1 compared with COD evolution



Graphical representation output of the neural network NN2 compared with COD evolution

Conclusions

- Such a platform is effective because:
 - it allows thorough testing in extreme situations, allows repeatability of tests,
 - it reduces the possibility of disastrous situations,
 - reduces time and costs compared to experiments performed on a real process.
- The platform has a built-in cloud computing component, thus allowing the storage and advanced analysis of the data acquired from the process.

**Thank you for
your attention!**

