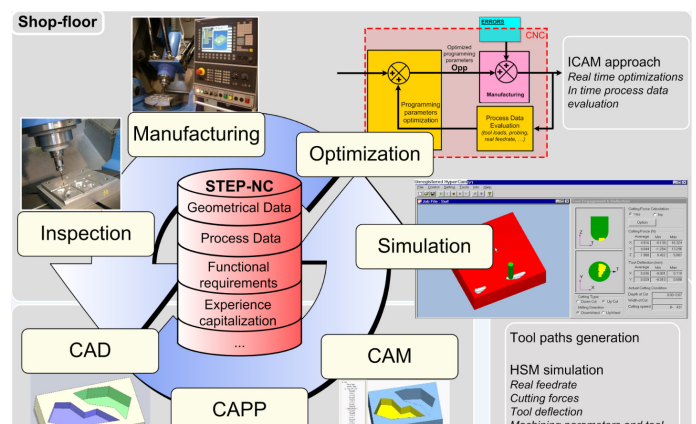


## July 2013 - The Smart Machine Controller: is it the next generation controller?

In today's industry we do not have a unique and clear definition of what a Smart Machine Controller (SMC) is or should be. In other industrial fields, the consumer market mainly, a smart "device" is a component that generally presents more advanced computing capability and connectivity than a contemporary basic device. A recent survey confirms for instance that the trend for machine tool industry instead is unifying different machine functions on a single controller and lowering overall total installed costs.

The FoFdration project consortium is trying to investigate what the next generation machine tool controller should look like. The project consortium shares the opinion that the next generation SMC should address productivity and sustainability issues in global manufacturing through a fresh and agile concept. Therefore the next generation controller deals with micro optimization (machine condition monitoring, easy adaptation and flexibility, etc.) and macro optimization based on additional features for simplified connection with factory Manufacturing Execution Systems.

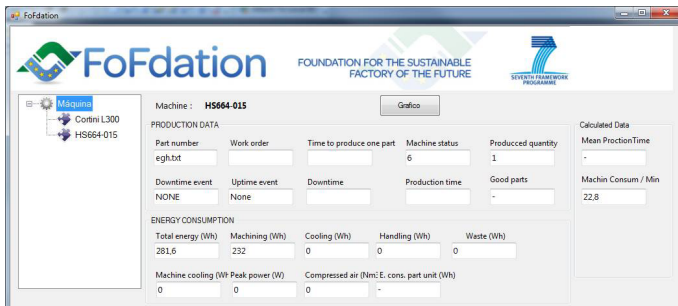


*Benefits of a Step-NC numerical chain*

About the micro optimization, the original vision in FoFdration for the SMC was to implement an advanced machine controller based on an open-architecture and standards enabling data access, and data visualization application. The STEP-NC standard has been seamlessly integrated to bring CAD-CAM data down to the shop-floor level; "closing the gap" between the designer, manufacturing engineer, and the shop-floor. This innovation allows a production machine to be able to quickly cope with variations ranging from design changes for an existing product to the introduction of a new part. Intelligent planning based on richer information (STEP-NC) has been also reached. The ambition of such an SMC is to support the paradigm of producing the "first part correct" every time and "making a part better".

The second objective of FoFdration, dealing with macro optimization, is the implementation of sustainability and green machining related applications which can deliver sustainability related parameters. Regarding the sustainability issue, FoFdration has also defined desired functionalities that the SMC should have in the future to cope with challenges related to "green" sustainable manufacturing and to provide the required information to optimise the efficient use of machines in the production facilities. This approach considers energy and resource consumption optimization leading to "green" manufacturing.

The provision of information on the efficient use of machines and systems in the production facility, including use of consumables such as coolant, etc., has been achieved using both an HW driven approach (based on the installation on new monitoring sensor devices using external signals) and an SW driven approach (based on the use and elaboration of already existing internal controller signals).



Screenshots of the developed SW tool for sustainability

The interoperability enabled by the FoFdration SMC can provide the mechanism for process and system monitoring and optimization with respect to productivity, energy and resources. This particular project defines a unified and open IT architecture in order to enable both progressive and breakthrough innovations for industry. The research group is convinced that the next generation controllers will still use and propose currently available tools and additional components compatible with legacy systems, thus supporting the industry transformation by introducing new technological elements into conventional and existing processes for better optimization of manufacturing.

For more information about the FoFdration project visit <http://www.fofdation-project.eu> and the project's social media pages, including Facebook ([#fofdationproject](#)) and Twitter ([@FoFdration](#)).

### Acknowledgements:

This project is co-funded by the European Commission as part of the European Economic Recovery Plan (EERP) adopted in 2008. The EERP proposes the launch of Public-Private Partnerships (PPP) in three sectors, one of them being Factories of the Future (FoF). Factories of the Future is a EUR 1.2 billion program in which the European Commission and industry are collaborating in research to support the development and innovation of new enabling technologies for the EU manufacturing sector.

For further information please visit:

[http://ec.europa.eu/research/industrial\\_technologies/factories-of-the-future\\_en.html](http://ec.europa.eu/research/industrial_technologies/factories-of-the-future_en.html)