SOMMACT Self Optimising Measuring MAChine Tools

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1) **R** = Report, **P** = Prototype, **D** = Demonstrator, **O** = Other

2) **PU** = Public, **PP** = Restricted to other programme participants, **RE** = Restricted to a group specified by the consortium, **CO** = Confidential, only for members of the consortium

Executive summary

In the SOMMACT solution, the Self Learning Core is the central component meant to supervise the overall system, acquiring sensors data, applying the developed metrological models and self-adaptation strategies in order to support the operator to monitor the machine tool performances, support the adaptation of compensation tables and to identify the need for recalibration.

This document provides a report on the outcomes of the design phase of the Self Learning Core architecture. In particular, it fully describes specific functional requirements, data models and software structures at different levels of detail, identifying the main involved components, needed interfaces and exchanged data.

The hereby-proposed software architecture is meant to be a formalization of the software modules, their responsibilities and relationships. The objective is providing a detailed vista of the Self Learning Core system to be used as a reference both internally at the implementation stage and externally for the other SOMMACT components (CNC, sensor systems and production control system).

Chapter 2 provides the functional requirements of the Self Learning Core, highlighting, for each of the listed functions input and output definition. Moreover, a section is dedicated to specification of requirements of the Graphical User Interface that represents a fundamental module representing the access point to the overall SOMMACT solution.

Chapter 3 contains the documentation of the developed Data Model that is required in order to lay a solid communication base for the development of the internal and external functional modules. The definition of data structures has been carried out considering the connections with the other systems not only in terms of physical interfaces but also in terms of exchanged data.

Chapter 4 describes the Self Learning Core software architecture starting from the Internal Functional Schema and then detailing software modules using component diagrams with different levels of detail. A separate session is dedicated to the definition of the Extension points of the Self Learning Core, which represent the possibility to obtain a configurable software result adaptable to different types of machine tools, sensors toolkits and metrological approaches. At the end of the chapter, the internal workflows related to main functionalities of the Self Learning Core have been exploded and documented using UML Activity Diagrams.

Specific Appendixes have been dedicated to the sequence diagrams related to chapter 4 and to the fuzzy logics libraries that will be used during development.

Since this document will be the reference for the development of the complete architecture, it is provided as is for submission and then will be subject to recurrent revisions in order to keep track of the real implemented system.

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