



SOMMACT Self Optimising Measuring MACHine Tools

Grant Agreement no.: **CP-FP 229112-2**

Start Date: 2009-09-01

Duration: 36 month



SOMMACT

Partners:

ALESAMONTI S.r.l. (IT) - Project Coordinator

API VARESE (IT)

FIDIA S.p.A. (IT)

HAVLAT GmbH (DE)

IBS PE BV (NL)

INRIM (IT)

ISM-3D SL (SP)

KOVOSVIT MAS AS (CZ)

SUPSI (CH)

TTS S.r.l. (IT)

University of Huddersfield (UoH) (UK)

WEISS GmbH (DE)

Deliverable D1.4

Specification of high level system architecture

Document title: **D1_4_HL_Archit_Draft00.doc**

Reference WP/Task: **WP1 / T1.4**

Lead Task beneficiary: **FIDIA**

Author: **Michele Sùrico**

Date: **2010-10-13**

Revision: **00**

Status: **Draft Final**

Nature ¹⁾: **P**

Dissemination level ²⁾: **RE**

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

This document describes the system architecture of the SOMMACT solution, identifying its specific functional requirements, applicability and standardization issues.

The architecture description here proposed is a formal definition of the system modules, their interfaces and their mutual interactions that is meant to provide a reference for the detailed implementation of the internal logics and data flows, and to provide a reference for sensor(s)/artefact systems development.

This document defines the requirements for creating a conformant implementation of the system.

While the proposed architecture does not specify the details for each single implementation, it does establish guidelines that must be observed in making implementation choices.

Chapter 2 provides a short overview of the high level modules that constitute the system architecture, with a description of their main functional specifications.

Chapter 3 describes and specifies interfaces between modules in terms of data exchange, frequency and reliability constraints.

Chapter 4 specifically addresses the demonstrator hardware architecture with the description and specification for relevant interfaces.

Chapter 5 provides sensors and sensors systems interface specifications and requirements that shall guide relevant research and development work.



Table of contents

Executive summary.....	2
1 Introduction	5
2 Main system modules	7
2.1 Computer Numerical Control	7
2.1.1 CNC communication interface.....	8
2.1.2 Volumetric compensation	8
2.2 IPC with Self-Learning Core	8
2.2.1 SLC Development platform	9
2.2.2 GUI Development.....	9
2.2.3 Database platform	10
2.3 Sensors and sensors systems.....	10
2.4 On-machine inspection system	10
3 Interfaces and exchanged data.....	11
3.1 CNC / SLC interface	11
3.2 CNC / Sensors interface.....	12
3.3 IPC / Individual Sensors interface	12
3.4 IPC / Intelligent measuring systems interface	13
3.4.1 IPC / <i>TempSpy</i> interface	13
3.5 SLC / Operator interface.....	14
3.5.1 Machine Operator Interface.....	14
3.5.2 Administrator Interface	15
3.5.3 Researcher Interface.....	16
3.6 SLC / Production Planning System interface.....	16
3.7 CNC / Anthropomorphic robot interface	17
3.8 CNC / Touch probe interface.....	18
3.9 CNC / Self-centring probe system interface	19
3.10 Self-centring probe system / IPC interface	19
3.11 On-machine inspection system / CNC interface	20
3.12 On-machine inspection system / IPC interface	20
4 Demonstrator hardware architecture.....	21
4.1 Sensors / CNC channel	22
4.2 Sensors / IPC channel.....	23
4.3 Intelligent measuring systems / IPC channel.....	24
4.4 CNC / IPC channel	24
4.5 CNC / Anthropomorphic robot	25



4.6	CNC / Touch Probe	25
4.7	CNC / Self centring probe system	26
4.8	Self-centring Probe system / IPC	26
4.9	CNC / On-machine inspection system.....	26
4.10	On-machine inspection system / IPC	26
5	Functional specification and requirements for sensors interfaces	27
5.1	Linear position transducers	27
5.1.1	Application of invariant scales	27
5.1.2	Application of the BiSLIDER concept	27
5.1.3	Application of thermally compensated scales	27
5.2	Extensometers.....	28
5.3	Temperature sensors	28
5.3.1	Measurement of temperature of selected machine tool components.....	28
5.3.2	Ambient temperature measurements	28
5.3.3	Measurement of workpiece temperature	28
5.4	Inclinometers (levels).....	28
5.5	Camera based sensor systems	29
5.6	Touch probe interface.....	29
5.7	Self-centring probe system interface	29
6	References.....	30