SOMMACT Self Optimising Measuring MAChine Tools
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Deliverable D1.2

Report on preferred machine tool configurations and application fields

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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

1. Executive summary

This document contains the results of a detailed investigation performed in order to select the combination of machine tool configurations and specific machining processes – considering application, workpiece size and associated required tolerances – that shall become preferred targets of the SOMMACT project, confirming and complementing the original targets that oriented it.

The application scope was identified taking into account the *measured* sensitivity of different machine tool configurations to thermal environment and load variations.

Machine tool manufacturers (ALESAMONTI, FIDIA and KOVOSVIT) (i) analysed their machine tools range characteristics to estimate their expected sensitivity to SOMMACT project outcomes and (ii) made available specific machines – in real production environment – where sensitivity to mass and ambient temperature disturbances was measured.

End users (HAVLAT and WEISS) contributed, with their machining process knowledge, to define workpiece characteristics (size and associated accuracy inspection requirements) that will better benefit from the SOMMACT project outcomes.

Baseline data – as established in B.1.2.1 of the Description of Works (DoW) were basically confirmed:

a) Ambient temperature variation:
   Measurements – performed on more that 60 hours periods – showed average daily variations exceeding the baseline expectations.
b) Workpiece mass variation:
   Significant variations – exceeding the baseline expectations (± 30 µrad) – were measured on four different machine configurations when submitted to approximately 40% and 80% of specified maximum load.

Significant R&D effort was dedicated to Design of Experiments (DoE). Such effort showed to be fully justified. Collected data are sound (as specific in-site calibration procedures and setups were developed, tested and successfully applied) and their analysis yielded very useful information for better understanding the measured machine tool configurations sensitivity, including information on the expected incidence of non-rigid body behaviour of structural components.

Measurements were performed with calibrated traditional instrumentation (electronic levels and linear displacement sensors) and results were compared with newly acquired instrumentation (laser tracer and three planes sweeping laser) measurement results.

INRIM (Italian National Research Institute for Metrology) monitored the applied measurement procedures and systems, and the associated data analysis.

Fully reported data – attached to this document – were found to be very useful for subsequent scheduled SOMMACT project tasks.

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