FEMTOSURF

Surface treatments using ultra-short pulse femtosecond laser

Publishable summary

D4.1 Final FemtoSurf manufacturing cell design

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Document Control Page	
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Disclaimer

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Deliverable 4.1 includes the design of the FemtoSurf machine and the integration of all the key components related to it, with the end goal of creating the FemtoSurf robotic cell. More specifically this document summarizes the activities pertaining task 4.1 - Design of FemtoSurf gantry (SUPSI, started M3, ended M6). Together with Deliverable 4.2 - which summarize the activities of tasks 4.2 and 4.3 - these documents contain all the necessary information about the design of the robotic cell as well as the integration of all the components and auxiliaries and lay the groundwork for the activities included in the demonstrations of WP7 and WP8.

The design phase started with the definition of the requirements related to process, products and equipment in order to define the design starting point. After the definition of the requirements a brief state-of-the-art has been carried out, aiming at understanding the current level of surface texturing machines and the related criticalities. Starting with the state-of-the-art solutions and interpolating such information with the requirements collected, a set of possible machine kinematics have been evaluated in order to choose the most appropriate for the FemtoSurf project purposes. Eventually a cantilever solution has been identified as the best trade-off for the application. This solution has been designed starting from the requirements and by following an iterative process between structure optimization, driving system selection and components definition.

In conclusion, a 5DoFs with a 600x600x350mm working volume cantilever solution has been achieved (Fig. 1). With a positioning precision of ±3um and a resolution better than 0.001um at a maximum speed of 25m/min the granite-based columnar machine should be able to achieve all the defined requirements.

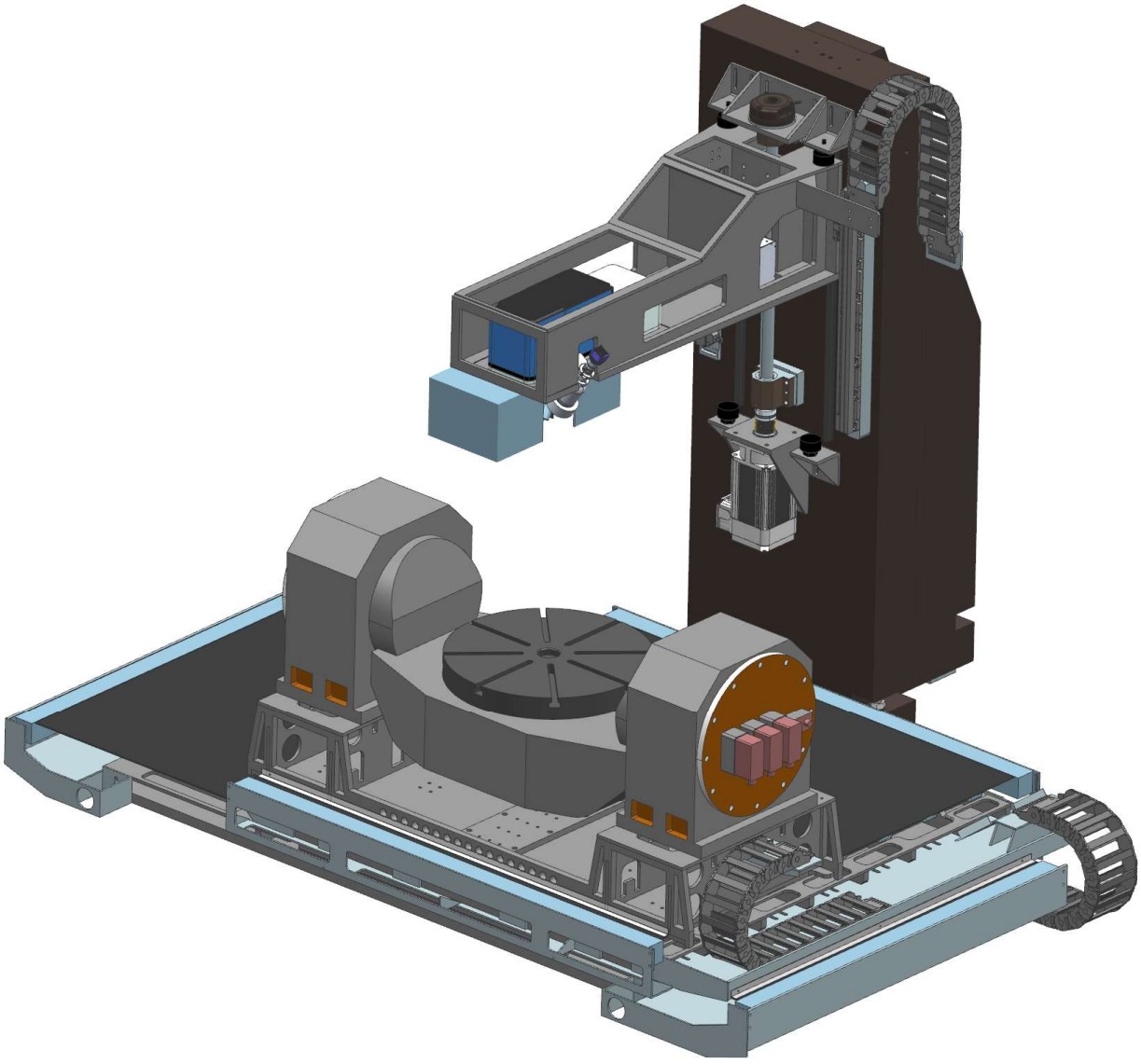

Figure 1: FemtoSurf machine final solution.