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D5.1 – Definition of HW and SW interfaces

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Dissemination Level		
PU	Public	x
PP	Restricted to other programme participants (including the Commission Services)	
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D5.1: Definition of HW and SW interfaces

Nature: Report

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Contents

1 Introduction

The deliverable gives an overview on the hardware and software requirements for the integration of the laser and the polygon scanner into a multi-axis machining system. As the design of the laser and the scanner are ongoing, these are preliminary definitions subject to change according to the outcome of the R&D work in the project.

2 Laser

The physical dimensions of the laser head should not exceed

1.6m* x 1.1m x 1m   (length x width x height)

*1.4m length is preferred.

The weight of the head is currently not specified. It should not exceed 1000kg. Mounts for lifting the head onto the base with an indoor crane shall be foreseen.

A CAD model of the machine and laser will be exchanged before the design is finalized.

The cable connection should be placed on the bottom side at the end of the laser head. The umbilical cable on the head from the control unit should be detachable and have a length of 5m. The beam exit should be at a height below 350mm. Detailed CAD of the whole system will be sent around at a later date.
The laser head should be accessible for maintenance on all 4 sides. There should be no service access needed underneath of the head.

The control of the laser will be done via RS232, TTL gating signal and analogue power control (see PicoBlade User Manual) allowing also the synchronization for raster scanning. The control rack (power supply) and the chiller may be integrated if they do not exceed 19" 3HU (power supply) and 483mm x 267mm x 643mm (chiller, 42kg). Mains are 240V. Cooling requirements will be provided once the design is finalized.

A safety/process shutter (PNOZ box, 24VDC, RS232) as described in the "User Manual *Appendix* – Safety/Process Shutter Option" shall be implemented.

3 Line Scanner

The LSE170 Line Scan Engine will be used as the base model for the test and demonstration in the project with the SuperSync- and TrueRaster™ - options for high absolute grid accuracy and repeatability synchronizing the high speed rotating polygon with the laser pulses and the CNC axis. The repetition rate of the laser will be as high as 20MHz.

The preliminary physical dimensions of the scanhead will be within 200mm x 180mm x 250mm (width x depth x height) with a weight below 7kg. A CAD model will be exchanged before the design is frozen.

The laser beam needs to be centered and perpendicular to the interface plate on the back side. The interface plate may be used as fixture plate. Alternatively, it is also possible to mount a bracket. The connector positions on the head will be adapted to fit into the Z-axis-housing of the GFH machine (see Figure 1).
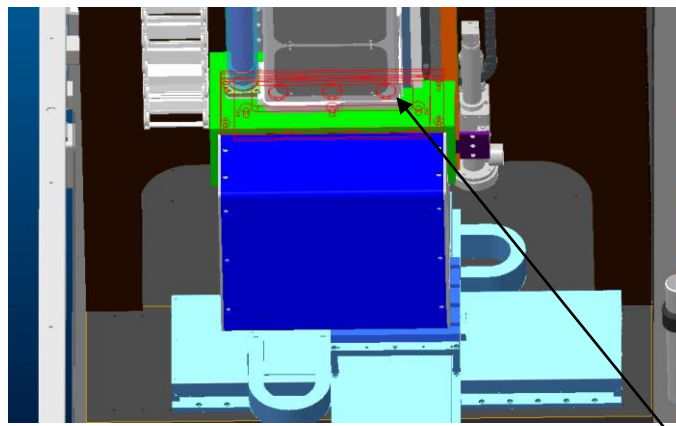

Figure 1: Model of current scan head design in GL.compact showing the connector positions

The scanner can be controlled via an Ethernet TCP/IPv4 protocol with a fixed IP address and USB3 (see also PDK-Manual V1.0). The length of the cables should be 10m. The controller is a 2U 19" rack, 455mm deep. The linear stage will be slaved to the LSE controller encoder output. The system control PC shall have a Windows 7 OS.

Wiring between the scan engine and its controller:
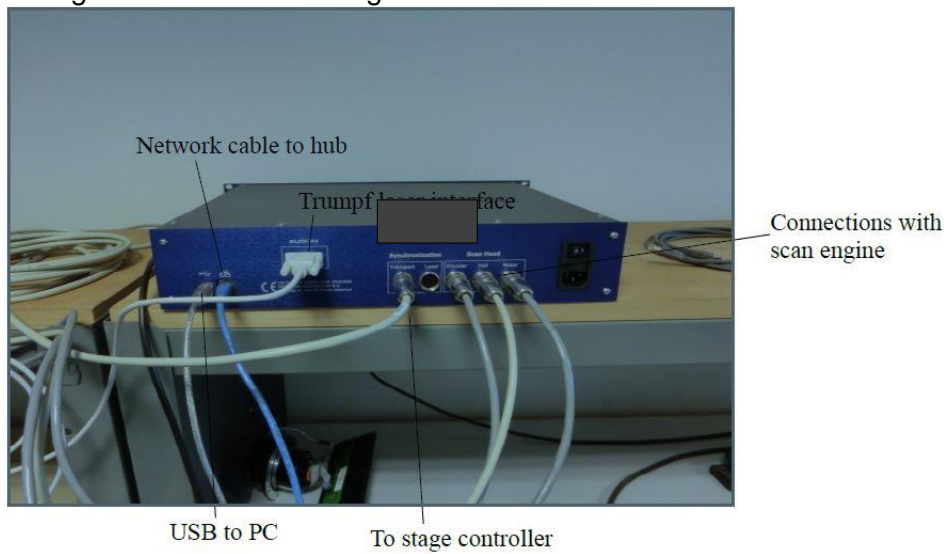
Wiring of the stage controller (240V 125W):