HEIDELBERG INSTRUMENTS

Heidelberg Instruments
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09th January, 2018

To Whom it May Concern

LETTER OF COMMITMENT

We hereby certify, that Heidelberg Instruments Mikrotechnik GmbH ("HIMT") intends to participate in the SMARTHEP network, should the network be selected for funding by the European Commission. In this commitment letter, on behalf of HIMT, we specifically indicate the level of involvement of our company to your programme.

HIMT recognizes the importance of fostering fruitful exchanges between academic research and industrial applications, in the strongly rising field of Data Science. HIMT also acknowledges the importance of offering to early-stage researches a programme in which they can learn the skills needed for our sector, from a rigorous academic perspective as well as for connecting fundamental research with industrial applications.

HIMT will participate in the SMARTHEP network as associated non-beneficiary partner in the following ways:

- HIMT will provide a work place and training for one student
- HIMT personnel will participate to network events and contribute with lectures and talks to workshops organized by the SMARTHEP network on topics of detectors and trigger instrumentation and industry best practices

The participation of HIMT in the research and training programme of SMARTHEP is in line with the research work described in the proposal (see Appendix).

HIMT looks forward to participating in SMARTHEP, and wishes to express a strong interest in furthering the collaboration between academic research by the network participants with industrial applications. In particular, HIMT recognizes that its participation in SMARTHEP will establish connections with high-energy physics researchers, which are of interest for the possible future career development of the latter in the industrial market after completion of their studies within the academic institutions.

It is understood that all costs incurred by HIMT, related to the implementation of the practical research and/or complementary training, will be reimbursed by the relevant beneficiary of the Grant Agreement. HIMT shall invoice these research training costs to the appropriate full network partner(s).

Konrad Rößler
CTO

Steffen Diez
CSO

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Appendix: Proposal "Automatic Intensity Correction"

Heidelberg Instruments Mikrotechnik GmbH (HIMT) is a supplier of laser based pattern generators used for mask making and direct patterning of various substrates. For a different market, HIMT offers an optimized system concept. This different concept uses single beam laser writers for low cost applications, multi beam systems to write 3D topographies with high speed and quality, or images up to 2 million pixel spatial light modulators for high throughput industrial systems.

The HIMT Laser lithography systems need to have a uniform intensity distribution along the writing field. To achieve this, an 'Automatic Intensity Correction' process was established. This process is called AIC, it requires appropriate hardware and software to collect information about the current intensity distribution to generate a set of data to correct the intensity profile. The AIC process uses several iterations to generate the final set of correction data. Therefore the data acquisition hardware should work in real time using the exposure process control signals. These signals are used to trigger the acquisition and the data processing.
Because of the different writing strategies with different laser sources the AIC hardware has to be fully programmable. Trigger signals are generated by the position of the stage system, other trigger signals depend on the laser pulses, the number of samples and the sample rate has to be adapted to the system type. The trigger rate will be up to 300,000 events per second, the data volume per trigger event will range from 10 up to 10,000 per sample.
The raw input data from a high resolution analog to digital converter will be processed in real time inside a hardware module. The processing steps will include filtering and statistic calculations. This hardware module will be realized by programmable circuits, FPGA's. Main part of the project will be the adaptation and optimization of the FPGA code for different systems with different requirements in speed and accuracy.
The AIC hardware will act as server in a multi client architecture. The server software will run on an embedded Linux board, using LAN to connect to the system. The clients should be able to start measurements or transfer of acquired data.

During the project the student will gain experience in programming embedded devices as well as developing a code for programmable hardware to realize high speed data processing.
Basic knowledge about Linux, C-language and a hardware description language could be helpful. The student will work in an industrial development environment and will be able to test his project on real systems.