



Warsaw ELHEP Group

Research Visit Summary at DESY, TESLA 15 – 21 July 2002

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Institute of Electronic Systems

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Collaboration Meeting Report

This Report concerns the involvement of the ELHEP Group from the IES WUT in cooperation with DESY. It contains time schedule of cooperation and definition of work to be performed during the next months.

Participants:

dr S. Simrock, dr Z. Golebiewski , DESY

dr R. Romaniuk, dr K. Pozniak, Mr T. Jezynski, Mr. Z. Luszczaek,
Warsaw University of Technology, Institute of Electronic Systems, ELHEP Group

Subject of meetings:

definition of participation of IES TU Warsaw in TESLA RF Control system

Dr S. Simrock presented the state of the art of the works in RF Control system of the Tesla project to be realized by the ELHEP group from IES TU Warsaw. ELHEP group has visited TTF experiment site.

The set of additional presentations and technical data sheets were given to be reviewed.

During discussion first area of co-operation where identified:

A. RF Control system: (Main goal is cost reduction, to make it more compact, and performance enhancement)

1. feasibility study on the usage of FPGA in RF Control system for TESLA project
2. PCB design of the RF Control system with needed software
3. development of RF Control system for Piezo- tuning of cavities.

B. multi-channel down converter: (Main goal is to meet full set of performance objectives)

1. acquaintance of existing solutions
2. development of novel solutions.

From side IES TU Warsaw Mr. T. Jezynski (as contact person permanently working at DESY) and Mr. Z. Luszczaek (to support Mr. T. Jezynski) will be delegated to dr S. Simrock group.

The first session of defining work task will start on the beginning of August 2002 and Mr. T. Jezynski will take a part in it.

Both partners agreed to immediately order some technical components (like Altera or Xilinx development kits, one or two PCs, etc.) and to locate delegated persons in area

of dr. S. Simrock group.

The IES TU Warsaw will see the need in short time to develop in Warsaw the same technical environment, for the reason of better work and to reduce travel and accommodation costs, using DESY funds.

Intention of both side is to begin common co-operation as soon as possible and till the middle of October 2002 to define and sign a new Annex Nr. 2 for years 2003-2004.

For this reason same next visit of other specialist from IES TU Warsaw staff are to be foreseen (ca 9 weeks/person till the end of September 2002 year).

Next visits will be defined by both sides later on.

Hamburg, 18 July 2002

for DESY

for IES TU Warsaw

dr S. Simrock

dr R. Romaniuk

Predicted visits to DESY by ELHEP staff in September 2002 (most preferably 9-20)

dr Krzysztof Pozniak – 2weeks

Mr Krzysztof Kierzkowski – 3 weeks

dr Ryszard Romaniuk – 1 week

dr Wojciech Zabolotny – 1 week

dr Aleksander Burd (downconwerter) - 1 week

dr Maciej Kudla – 1 week

Predicted purchases of parts and equipment for the RF Control project

1. Xilinx Development Kit – ca 2k€+ software 2k€
2. Altera Development Kit – ca 2k€+ software 2k€
3. PC for Development Kit – ca 2,5k€

WARSAW ELHEP GROUP

Institute of Electronics Systems (ISE); Warsaw University of Technology
Institute of Experimental Physics, Warsaw University
A.Soltan Institute for Nuclear Problems

Characterization of the task force team dedicated to realization of electronics and software for High Energy Physics experiments.

Members from ISE:

PhD Eng., D.Sc. Ryszard Romaniuk rrom@ise.pw.edu.pl, tel. (+48-22) 660-7986
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M.Sc. Eng. (Ph.D.stud.) Piotr Rutkowski, prutkows@elka.pw.edu.pl

Group of ten MSc and BSc students from ISE

Members for IFD and IPJ:

Prof. J.Królikowski (IFD-UW)
MSc Eng. Maciej Ignacy Kudla (IFD-UW) kudla@fuw.edu.pl
MSc Michal Pietrusinski (IFD-UW) mpietrus@fuw.edu.pl
D.Sc. Phys. Grzegorz Wrochna, Soltan Institute of Nuclear Physics, Warsaw
M.Sc. Karol Bunkowski, IFD-UW;
Dipl.Tech. Krzysztof Kierzkowski, IFD-UW;
A few M.Sc and Ph.D students in physics from Faculty of Physics UW

Specializations:

➤ Multichannel, distributed, synchronous measuring and control electronics systems:

- Trigger Systems
- Data Acquisition Systems (DAQ)
- Monitoring and control System
- Diagnostic and test Systems

➤ Data transmission Systems:

- Optoelectronics links together with transmitter and receiver dedicated modules
- Fast wire link transmission based on synchronous coded methods
- Synchronous compression and decompression methods

➤ Steering and support software:

- Dedicated object oriented software (C++, Scada etc)
- Cooperation with data bases (servers, client tasks)
- Steering and monitoring software based on computer network

➤ Specializations:

- Programmable circuits (e. g. Altera, Xilinx)
- Microprocessor circuits (e.g. DSP, interfaces etc)
- Analog circuits (amplifiers, converters, shapers etc)
- Parametric descriptions of electronics modules (VHDL, AHDL, Verilog)
- Fast electrical and optical data links interfaces (also synchronous)

Digest of realized projects by the group in cooperation with the Institute of Experimental Physics, Warsaw University
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ZEUS Experiment at HERA accelerator (DESY, Hamburg) 1992-2002

BAC Detektor

- BAC Trigger Service System and energetic readout (2K channels)
 - **13 VME 9HE PCBs for first stage trigger of BAC detector**
 - **15 ME 9HE – SCANNER steering boards**
 - **GFLT – GFLTBI interface**
- Position readout system for first stage trigger – 40K channels
 - **330 modules placed directly on ZEUS detector, 220 channels per each module – HIT-BOX**
 - **25 communication boards VME 6HE – CONTROLLER**
 - **5 cooperation boards with the first stage of the trigger VME 6HE - DISTRIBUTOR**
- Testing system for detector electronics
 - **12 boards for programmable testing pulses, 40 channels per board VME 6HE – PULSER**
 - **5 testing signal distribution boards VME 6HE – SPLITTER**

VETO WALL Detector

- Background noise detecting system for each e-p collision in ZEUS detector
 - **6 signal detection modules for particle transfer in time slot, 32 channels VME 6HE – CON6UR**
 - **1 programmable module for coincidence matrix discovering the paths of background particles (48 per 48 channels) - CMATRIX**
- Data Readout System for VETO WALL detector for first stage trigger – 96 channels – *VETO HIT-READOUT*
- Programmable light pulser for scintillators – 192 channels – *LED-PULSER*

CMS Experiment at LHC accelerator (CERN, Geneva) 1996-2002

RPC Detector

- Participation in the design of muon trigger RPC – 200K channels
- System of fast, synchronous data transmission - 760 links
- Data readout system for first stage trigger – 200K channels
- **Diagnostic and monitoring modules for RPC trigger - above 5K networked modules with supervision system**

TESLA Accelerator (DESY, Hamburg) 2000-2002

Participation in the design and testing of Low Level Radio Frequency (LLRF) control system for superconducting, accelerating, niobium cavities