MODERNIZATION OF THE PROCESS CONTROL FOR THE FREE FIELD THERMAL RADIATION SIMULATOR TRS-4

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The Thermal Radiation Simulator TRS-4, located at the Institute for Protection Technologies in Munster, Germany, is a free field simulation facility, which combusts a mixture of aluminum powder and liquid oxygen. It is used to irradiate targets, simulating the thermal effects of a nuclear weapon. The simulator has been put into operation in 1984 and therefore the hard- and software controlling the simulation process is out of date, in particular concerning error handling, process data storage and evaluation.

Hence in a cooperation between the University of the Federal Armed Forces and the Institute for Protection Technologies the approach has been undertaken to modernize the simulator.

To achieve this aim the existing hard- and software has been analyzed with regard to the required specifications. These included, amongst other factors, the process sequence, control parameters, interlock definitions and as well diagnostic facilities.

Based on this analysis a concept has been developed, which replaces the former simulator control with a programmable logic controller (PLC) and a remote user interface while maintaining the existing functionality. Additionally new features including more advanced data analyzing capabilities have been implemented. The corresponding field data acquisition system has also been taken into consideration and a new software for the evaluation of the heat flux during a simulation run has been written.