

Control of model using Internet

Michal Kutil

Department of Control Engineering, Faculty of Electrical Engineering
Czech Technical University in Prague
kutilm@fel.cvut.cz

Abstract. This work describes a model controlled via Internet and its visualization. The main part of this model is vertically orientated plastic tube. A flow of air from a ventilator levitates a body placed inside. The model is controlled either by a programmable logic controller PLC-5 or a personal computer equipped by special measuring card. Two types of visualization accessible through the Internet were designed. The first visualization uses the programmable controller, the second one the personal computer. Local control from Matlab's Real-Time toolbox is available too.

1 Introduction

Nowadays Internet is used in many various fields of human activity and it is also used for process control. Web pages are one of thousand Internet services applicable in this field. This paper describes a new teaching method of control via Internet and visualization using web pages.

2 Model Vznášení – Levitation

The main part of this model is vertically orientated plastic tube. A flow of air from a ventilator levitates a body placed inside. Location of the body is mainly measured by a laser sensor. Complementary sensors measure pressure in the tube, speed of the ventilator, power voltage of the ventilator, and location of the body by reflex sensors. Power voltage of the ventilator which is implicating the flow of air inside the tube can be set either manually from control panel or via remote control.

The remote control can be realized by programmable logical controller (PLC) or a personal computer with a measure card. I do use Allen-Bradley programmable logical controller PLC-5.

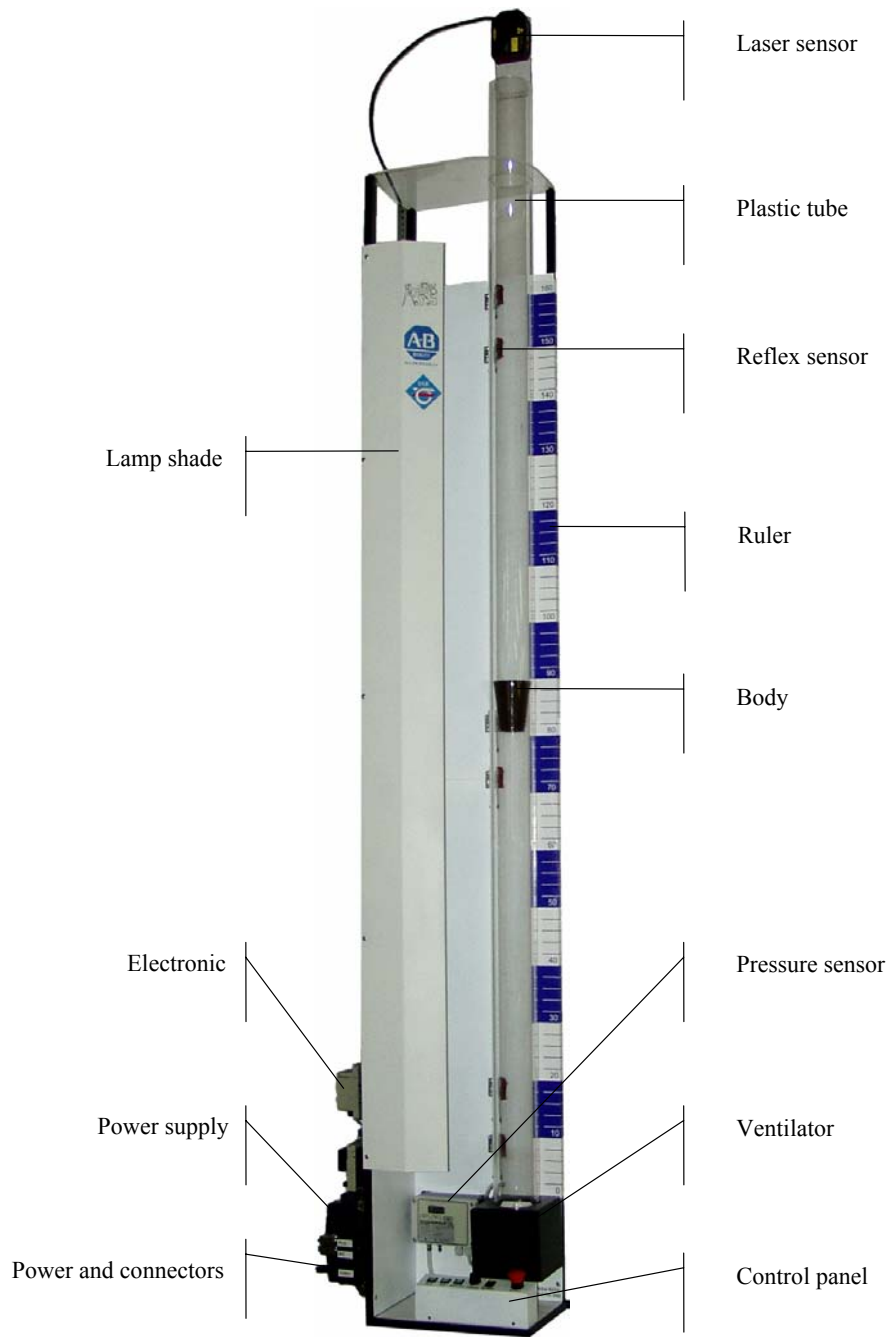


Fig. 1. New model for control of using Internet

This PLC has got an Ethernet interface with implemented simple web server. The web server is used for Internet visualization by special web pages. The server doesn't support processing web forms that don't allow us to set parameters of controlling model. Data for the visualization on web pages are sent by the web server "Apache". Web pages are generated by a script written in PHP, which also communicates with the database. Use of the database brings us the advantage of making storage of historical data possible. The other advantage is a personalized connection to the model for each user.

Secondary remote control is the personal computer with a measure card. To handle this card the program Matlab with Simulink and Real-time toolbox is used. Matlab is used to identify the model and is design a suitable control.

The whole model is monitored by a web camera.

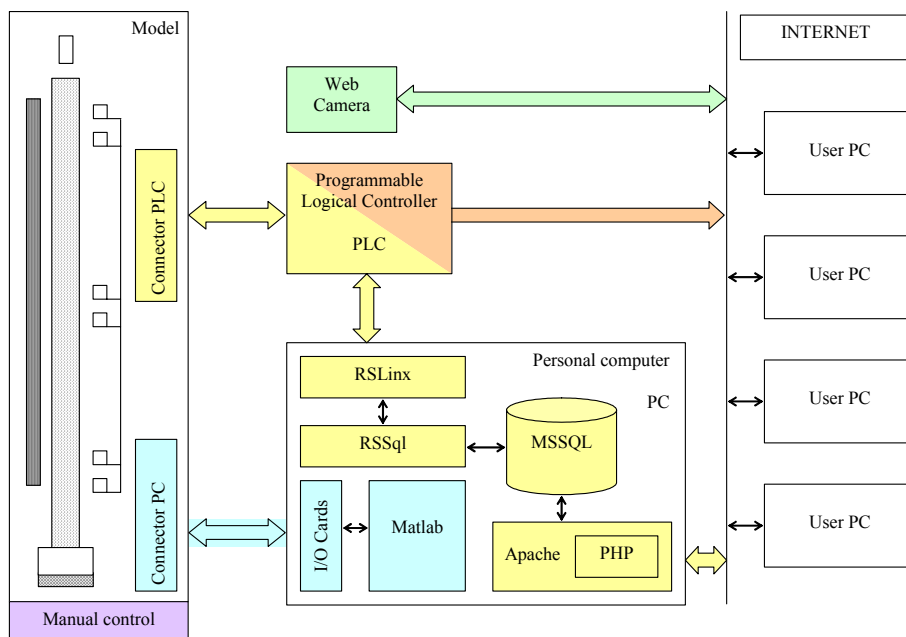


Fig. 2. Global interconnection of system

3 Conclusions

Presented model is usable to develop algorithms and methods of control using the Internet. The model is relatively slow and so we can monitor its state via web pages. Mobile part of the model is big enough to be monitored by a web camera. There are two control systems: the programmable logical controller (PLC-5) and the personal computer. There is a web server with http protocol in the processor of the controller. This enables us to create the web pages directly for the server. The Personal computer is used both as a control system and as server to fully visualize the model.

References

1. Kutil, M.: Řízení modelu s využitím Internetu. Diploma thesis CTU FEE. Prague (2004)
2. Noskievič, P.: Modelování a identifikace systémů. Vol. 1. Montanex, Ostrava (1999) ISBN 80-7225-030-2
3. Harold, R.E., Means, S.W.: XML v kostce: Pohotová referenční příručka. Vol. 1. Computer Press, Praha (2002) ISBN 80-7226-712-4