# Online Monitoring at HERMES

R.Kaiser [a,1], K.Ackerstaff [b], M.-A.Funk [b], P.Green [c], A.Izotov [d], V.Shutov [e], W.Wander [f], K.Woller [b]

[a] *Simon Fraser University / TRIUMF, 4004 Wesbrook Mall, Vancouver, British Columbia V6T 2A3, Canada*

[b] *DESY Hamburg, Notkestr.85, 22603 Hamburg, Germany*

[c] *TRIUMF / University of Alberta, Centre for Subatomic Research, Department of Physics, Edmonton, Alberta T6G 2N5, Canada*

[d] *Petersburg Nuclear Physics Institute, Academy of Sciences of Russia, 188350 St. Petersburg, Gatchina, Leningrad District, Russia*

[e] *Joint Institute for Nuclear Research, 141980 Dubna, Moskov Region, Russia*

[f] *Universität Erlangen-Nürnberg, Physikalisches Institut, Erwin-Rommel-Str.1, 91058 Erlangen, Germany*

The online monitoring of a large particle physics experiment like HERMES[1] has to fullfill a series of requirements. The status of the experiment has to be known in detail at all times, it has to be continuously recorded and it has to be presented to the shift crew in a reliable and intuitive way. At the same time tools to analyse problems must be provided. The approach the HERMES collaboration has taken is based on the ADAMO[2] Entity Relationship database concept, the DAD[4] client-server model and the PINK[3] GUI package. This allows to store the online monitoring data in the same data model as the physics data, world wide access to the detector status for experts at remote institutes and the incorporation of expert knowledge into the rules of monitoring clients.

*Key words:* Monitoring Systems; Data Bases; Data Interchange; GUI's; World-Wide Collaboration

## 1 Introduction

There are many requirements that the online monitoring of the HERMES[1] experiment has to meet. Not only has the status of the experiment to be known in great detail at all times, but it also has to be recorded for use in the offline analysis. At the same time information has to be presented to the (perhaps inexperienced) shift crew in a reliable way that allows for quick and efficient problem identification and that points to possible causes and solutions. To this end it is desirable to incorporate expert knowledge about the different components of the experiment into the monitoring software. It is equally desirable to make the online monitoring information readily available to the component experts in their home institutes.

## 2 Online Monitoring at HERMES

The approach the HERMES collaboration has taken to provide a coherent online monitoring solution is based on three components: ADAMO[2], DAD[4] and PINK[3]. Like the physics data structures the online monitoring data structures are also based on the ADAMO entity relationship model. The ADAMO

[1] Supported by DAAD HSPII(AUFE)

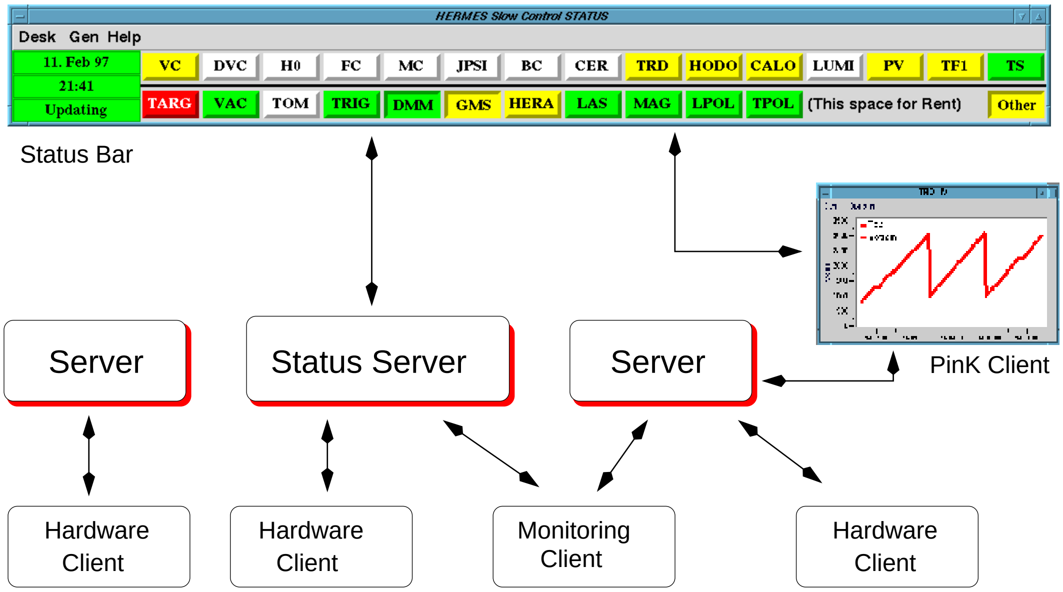


Fig. 1. Schematic View of the HERMES Online Monitoring. Information is collected in servers and displayed by PinK clients. The status information is displayed by a particular GUI, the status bar.

model is complemented by the client-server based Distributed ADAMO Database (DAD), which turns a collection of ADAMO files into a cross platform accessible database with fast I/O. DAD is a distributed ADAMO database providing the inter process communication for HERMES slow- and experimental control. Finally there are the graphical user interfaces written in PinK - a Tcl/Tk extension that allows easy access to DAD and ADAMO objects. PinK GUIs form a particular kind of DAD clients. The other two kinds of clients are hardware and monitoring clients. Hardware clients report the status of a detector component to a DAD server or communicate a command from the server to the hardware. Monitoring clients analyse the contents of a DAD server according to a set of rules and convert these into a status message (see fig.1). A particular advantage lies in the independence of the different clients from one another. Different experts can write the hardware, the monitoring and the PinK clients.

## 3 The Status Bar

A multitude of PinK GUIs is used as permanent displays in the HERMES control room, and wherever a detector expert wants to access some information. They monitor the different components of the experiment as well as the status of the HERA accelerator. The heart of the online monitoring system as far as the detector is concerned is the status server and the GUI that is connected to it, the status bar. (see fig.1). The status information for every detector component is collected in the status server and indicated in the status bar as the color of the component button. This button gives per mouseclick access to a hierarchy of additional information and to every HERMES detector monitoring GUI, thus allowing to identify the source of problems.

## 4 Conclusion

The HERMES online monitoring system meets the requirements: The status data are stored in the same data model as the physics data and can be easily combined with them in a coherent way. Expert knowledge can be converted into the rules of a monitoring client and in this way help to guide the shift crew. Any remote machine on which PinK has been installed can display the same status information as the control room monitors, allowing experts to monitor their equipment from their home institutes.

The possibility to directly include PinK interfaces in Web pages is being explored.

## References


[1] Hermes Collaboration, Hermes *Technical Design Report*, DESY-PRC 93-06, MPIH-V20 1993, 1993

[2] ADAMO-*Entity Relationship Programming System, Version 3.3*, Programming Techniques Group, ECP Division, CERN, Geneva, 1994

[3] K.Ackerstaff and M.-A.Funk, PinK*: A* Tcl/Tk *based Database Interface to* Adamo *and* Dad, Proc. of CHEP 95, Rio de Janeiro,1995

[4] W.Wander, Dad-*Distributed* Adamo *Database System at* Hermes, Proc. of CHEP 95, Rio de Janeiro, 1995