

Extended Summary of Halden Work Report, HWR-799: ProcSee - The Picasso Successor

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Abstract

This report describes the history of computer graphics and Picasso at the Halden Project. It motivates the change of name from Picasso to ProcSee. Some planned and newly added features are described. The report concludes that Picasso/ProcSee has been and will continue to be of vital importance for the HRP research programme within the fields of human-machine interface design and human-machine interaction.

1. INTRODUCTION

Since the late 1970s HRP has studied human behaviour related to human-machine interaction in complex operating environments. Although the opportunities and requirements have increased considerably in complexity and performance over the years, having access to a first-class tool for implementing operator interfaces has always been of vital importance for this research.

The name Picasso was first introduced for the HRP graphics software in 1981. Three generations of Picasso software have been developed by HRP, denoted Picasso-1 to Picasso-3. Picasso-3 is a very successful HRP software product, and plans exist to further increase its use outside HRP member organizations. Now, to boost this process, a new name is introduced for the new release of the product. The potential conflict in having a name of the product that is reserved and guarded by the famous painter's family further motivated the change of name.

From now on, Picasso will be known as ProcSee. The name ProcSee symbolizes the combination of process and visualization, and, if pronounced similar to proxy, it indicates that ProcSee is there for the operator on behalf of the process itself and that all interaction with the process should go through ProcSee. Request for registering the name as a trademark has been issued.

HWR-799 contains more details of HRP's history within computer graphics and Picasso, from the early days of in-house developed hardware to today's ProcSee as an out-of-the-box product.

2. WHY USE PROCSEE?

ProcSee is a tool for creating user-friendly HMI for advanced process surveillance and control systems. The tool supports developers throughout the application's lifetime, from the initial prototyping to the final maintenance phase. The editor allows the developer to connect to a running system, change dynamic behaviour and appearance without restarting the system. The developer can easily create custom components, but also use third-party ActiveX controls.

Much effort has been put into ProcSee during the years to improve its computing performance. Even today when computers are fast, performance is always one of the key issues when new features are added. The performance of the ProcSee system is regularly tested. These tests have proved that ProcSee has equal or even better performance compared to other comparable software tools.

With its unique flexibility and performance, ProcSee is particularly attractive to SCADA system suppliers who can establish generic GUIs for easy adoption and configuration to their customers' needs.

3. USERS OF PROCSEE

ProcSee is used internally at the Halden Project in several projects. First of all, ProcSee plays a major role in the Halden Project's research programme when it comes to testing and demonstrating ideas brought forward in the HSI design research. For instance, all operator interfaces in HAMMLAB are implemented using ProcSee. Naturally, ProcSee is also used to implement user interfaces in systems and products at HRP and IFE.

Having access to a software tool with the required features and flexibility is a premise when performing HSI research. Further, new technology and new features introduced in Picasso/ProcSee have generated ideas and inspired the creativity among the researchers responsible for the HSI design programme.

The most important feature for an HSI tool for HAMMLAB is flexibility. HAMMLAB depends on the features of ProcSee to efficiently implement its operator interfaces, and ProcSee depends on HAMMLAB to provide a controlled, challenging test environment.

ProcSee is used by many HRP members. Currently active users include: US NRC, VTT (Finland), Gösgen NPP (Switzerland), JAERI (Japan), EDF (France).

4. RECENTLY INTRODUCED FEATURES

4.1 Historic Trend

In process mimic pictures, historic trend diagrams are used to visualise history leading up to the current situation. In a modern process visualisation tool like ProcSee, it is important to have flexible and feature-rich trend functionality. The historical trend functionality has been continuously developed over the years and includes a number of advanced features.

From ProcSee version 3.2, the GUI developer can precisely control the time at the diagram's end-point, making it eg. always at exactly a minute. Similarly, the upper and lower limits can be controlled, using e.g. 1000 instead of 994.322 as upper limit for auto-scaled trend curves.

Events can be displayed in trend diagrams as shapes that follow the trend curves. Multi-coloured curves can be used to visualise curves exceeding alarm limits. Trend curves can be displayed logarithmically, and the scale shape can be used to display value labels for a trend curve.

4.2 COM/ActiveX

The success of the COM/ActiveX technology has been the main reason for implementing support for COM components and ActiveX controls in the Microsoft Windows version of ProcSee. Today, thousands of different COM/ActiveX components are available on the market. These components are available from commercial vendors, non-profitable organizations and private persons. Many of these components can be downloaded from the web, installed immediately, and directly used in ProcSee. By using these ready-to-use components, user interface developers may save time and money compared to implementing them on their own.

5. NEW AND PLANNED FEATURES

5.1 ClassGUI

ClassGUIs will make development of user interfaces easier, faster and less error-prone. A ClassGUI is a class-specific, design-time user interface to be used by GUI designers when inserting objects into pictures. It provides helpful information about the most common ways to configure a component. When a class designer creates a class in ProcSee, a design time user interface (ClassGUI) of the class can be implemented as well. ClassGUIs will be available in GED, as wizards, and as property editor in the selected properties window.

5.2 Plugins

Support for plugins enables application developers to add features directly to the RTM without using the API and Software Bus for data communication. With plugins, communication links to external data sources like process data, simulators, databases etc. can easily be added to ProcSee.

5.3 OPC plugin

OPC is a widely used industry-standard for communicating with process equipment. Most vendors of process equipment support OPC.

The newly introduced plugin concept is an excellent option for making the OPC connection a generic ProcSee module without affecting the Unix and Linux versions of ProcSee. When developing the OPC plugin, performance and robustness were the most important design criteria. Currently, the OPC plugin can communicate with OPC Data Access 2.0 servers, using the COM custom interfaces. Using this feature, application developers can access data from the majority of OPC servers currently available. Further, no programming, only configuration, is required to access the data.

In the future, the OPC plugin will probably be extended, or new plugins will be created, to handle additional OPC protocols, like OPC Historical Data Access, and OPC Alarms & Events. Further extensions is also planned to make it even easier to configure the OPC plugin.

5.4 Wizards

The purpose with a wizard will be to help the designer getting started by providing ideas and examples. Comprehensive use of wizards in all steps in the development cycle simplifies and reduces the costs to create ProcSee applications. When using wizards to create the main application, the designer can either select among a set of predefined example applications or customise the application settings in several steps from alternative choices.

5.5 ProcSee on Handheld units

The ability to visualize dynamic ProcSee displays on a variety of handheld units would be an attractive feature and provide operators with access to process data at any location within a wireless plant network. The planned implementation strategy is based on a server running a standard version of ProcSee, with a plugin module containing a communication link between the server and the handheld units. The GUI designers will use his/her ordinary office workstation to implement the displays for the handheld units.

6. CONCLUSION

ProcSee is today a feature-rich and well-functioning product. It has been continuously updated and improved, and is a vital component in HAMMLAB and the HRP research programme on HSI design. However, in order to continue the development at the current level, and preferably increase the development efforts, increasing the number of users is a primary objective.

Recently, focus has been put on how to attract new users and thus generate additional financial revenue to fund the further development of ProcSee. For instance, the newly implemented support for integration with OPC makes ProcSee more attractive for the large number of systems based on OPC technology. Similarly, classGUIs, and wizards make the implementation of pictures easier and faster.

Human behaviour related to human-machine interaction in complex operating environments has been a research topic at HRP since the late 1970s. Full control over the development tools for computer graphics has been a premise for efficient research within this field and has given HRP a competitive advantage. This was the case in the 1980s, and we experience that this is still the case today.

The development of Picasso, now ProcSee, and the continued ability to adapt to changes and new opportunities in technology, has given HRP and HRP member organisations access to a sophisticated and flexible software product capable of supporting the ever-growing set of requirements raised. Further, the introduction of new features in Picasso/ProcSee has triggered creativity and new ideas in the HMI design research teams. Finally, an in-house developed software tool offers possibilities to influence the development directly in ways that no commercial off-the-shelf product could ever match.

Current plans for the further development of ProcSee focus on simplifying the development process and making the product attractive to a larger number of users.

7. REFERENCES

ProcSee web-page, www.ife.no/procsee