Progress of TPS Control Applications Development

Y. S. Cheng#, Jenny Chen, P. C. Chiu, C. Y. Liao, C. H. Huang, C. H. Kuo, K. T. Hsu
NSRRC, Hsinchu 30076, Taiwan

Abstract

The TPS (Taiwan Photon Source) is the latest generation 3 GeV synchrotron light source which is in installation phase. Commissioning is estimated in 2014. The EPICS is adopted as control system framework for the TPS. The various EPICS IOCs have implemented for each subsystem at this moment. Development and integration of specific control operation interfaces are in progress. The operation interfaces mainly include the function of setting, reading, save, restore and etc. Development of high level applications which are depended upon properties of each subsystem is on-going. The archive database system and its browser toolkits gradually have been established and tested. The Web based operation interfaces and broadcasting are also created for observing the machine status. The efforts will be summarized at this report.

Software Environment

- The client consoles are adopted the Linux operation system. All of the EPICS base, modules and extensions are installed at the Linux system. The software versions are shown as Table 1.

Table 1: Software environment of the control consoles.

	Version
OS	RHEL 5.x (32-bit) (kernel 2.6.18.x)
EPICS	base-3.14.11
Extension	edm-1.12.8x labCA-3.3
CSS	3.1.6

- All EPICS related files at control consoles are mounted from the file server by using the NFS service to simplify software version control.
- Several file servers are established to share the loading of NFS file service. By loading testing, the NFS file service is divided into three parts. Two servers provide the NFS service for hosts of all cells; the other server is for engineer development.

Save and Restore

- The save and restore function is initially built by using the MATLAB with labCA. The various files of grouped PVs (Process Variables) list are created for saving the respective parameter values of each subsystem.
- The file with PVs and saved parameters is also selectable for resume the settings. The interface of save and restore mechanism is shown as the Fig. 1.

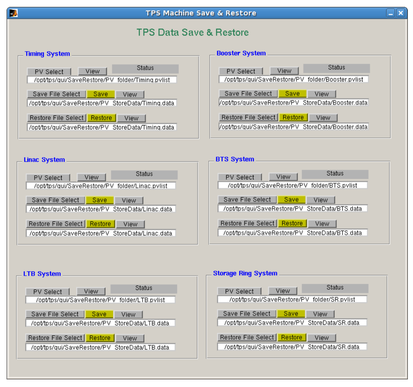

Figure 1: Matlab GUI for save and restore.

Subsystems Control Pages

- At the development phase, the GUI of TPS control system adopts the EDM (Extensible Display Manager) toolkit to develop main graphical operation interface.
- The preliminary main control page is built by the EDM toolkit shown as the Fig. 2.
- The LTB (Linac to Booster) dedicated control page is linked from the main control page for operation shown as the Fig. 3
- The control page for the TPS timing as shown in the Fig. 4

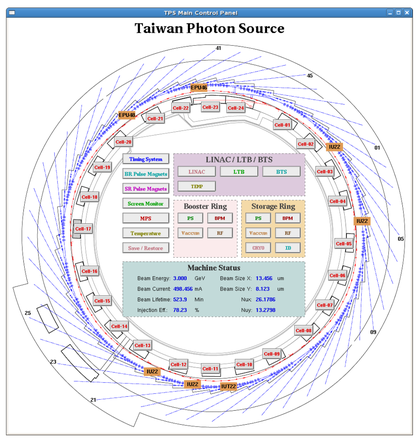

Figure 2: TPS main control page.

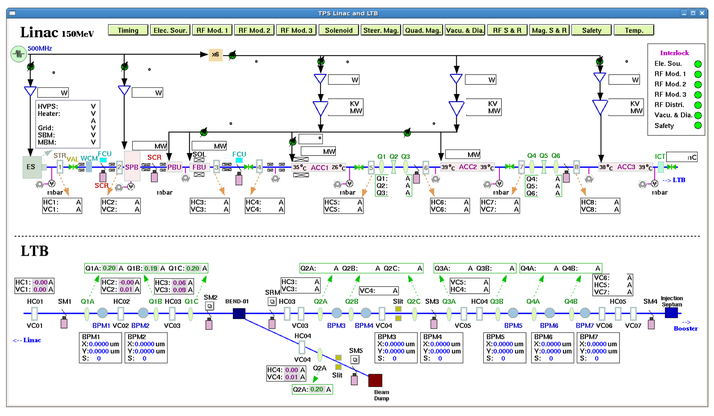

Figure 3: The Linac and LTB GUI control page.

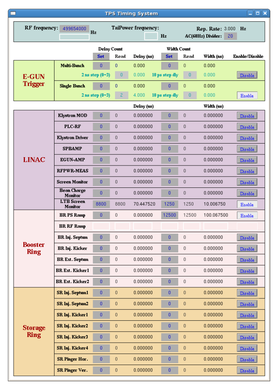

Figure 4: Control page for the TPS timing.

Subsystems Control Pages

EDM GUI for Power Supplies

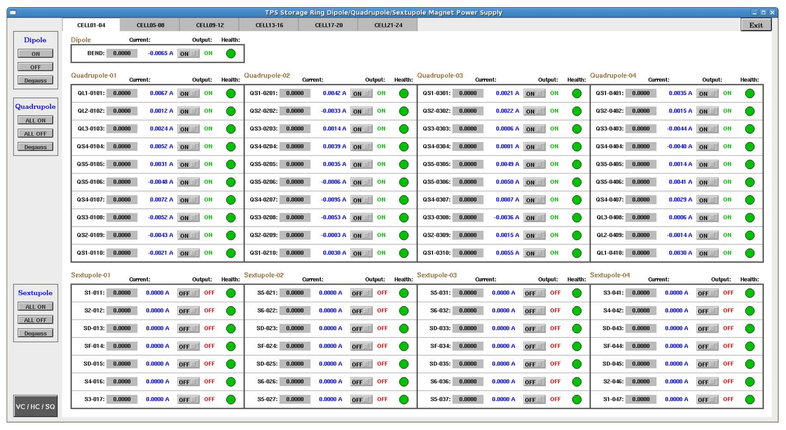

Figure 5: The control GUI of storage ring dipole, quadrupole and sextupole power supplies.

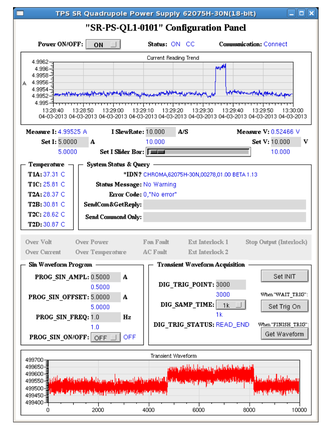

Figure 6: GUI of quadrupole power supplies control.

EDM & CSS GUI for Corrector Power Supply Controller (CPSC)

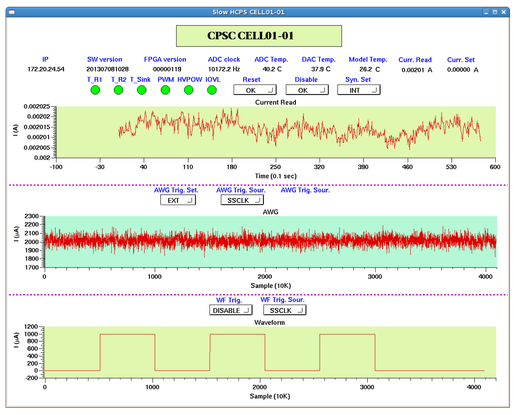

Figure 7: EDM GUI page for booster CPSC.

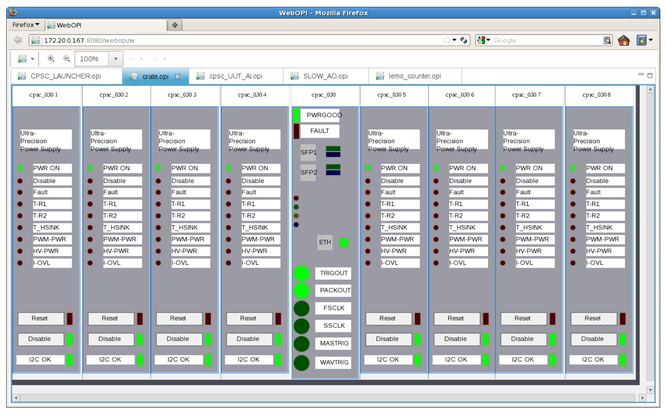

Figure 8: CSS WebOPI for controlling CPSC.

Matlab & LabVIEW GUI for Image Diagnostic Devices

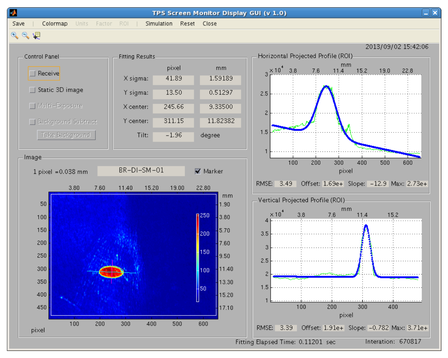

Figure 9: Matlab analysis display GUI for screen monitor.

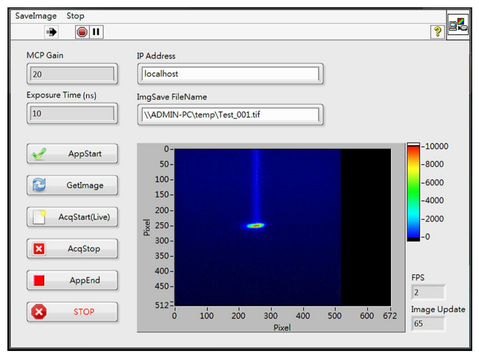

Figure 10: LabVIEW ICCD control/display GUI.

Web GUI for Machine Status

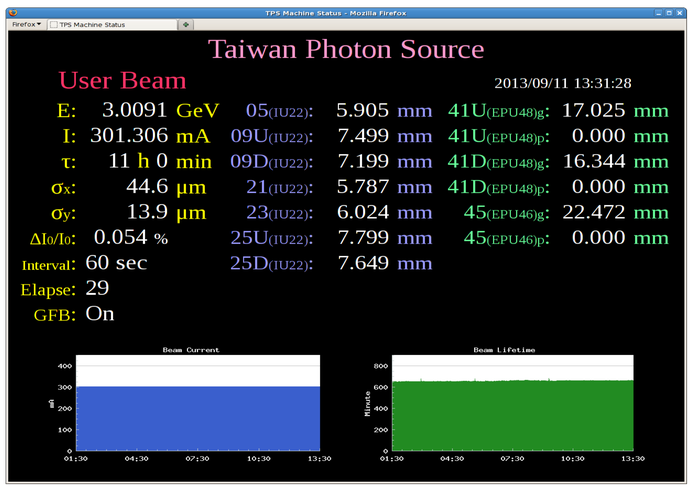

Figure 11: Web broadcasting of the simulated TPS machine status.

Matlab GUI for BPM

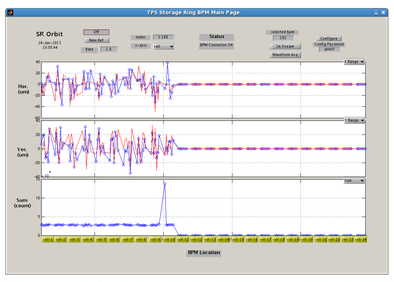

Figure 12: Matlab GUI for SR BPM.

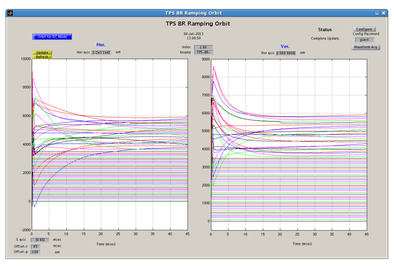

Figure 13: Matlab GUI for BR ramping orbit.

Archive System

- The archive system of CSS (Control System Studio) which named BEAUTY (Best Ever Archive Toolset, yet) [6] was built to be used as the TPS data archive system in 3rd quarter of 2012.
- The PostgreSQL (EnterpriseDB) RDB was used for the EPICS data archive system of TPS project.
- The monitor GUI to observe the temperature variation for in-vacuum insertion device baking is shown as Fig. 14.

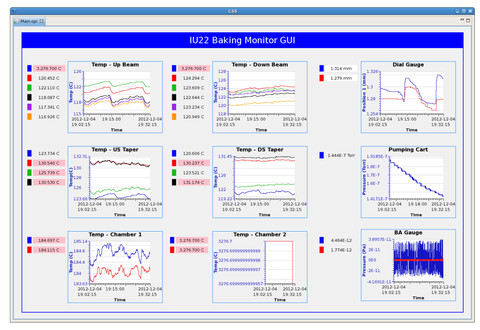

Figure 14: Archive data browsing GUI for ID baking.

#E-mail: cheng.ys@nsrrc.org.tw