

Using GPM

Course Outline

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Background

GPM (General Purpose Monitor) is a program designed to monitor accelerator and beamline components as well as other elements of the C-AD controls systems. GPM displays data in a variety of graphical formats including tables, bar graphs, and stripcharts among others. The application can also store data in log files and generate alarms. GPM serves as a key gateway to controls data, and operators in the control room are likely to use a GPM display on a daily basis.

The GPM application allows a user to view various monitors, or charts of data that can include setpoints, measurements, commands, status, parameter values, and live process data stored by applications running in the controls system. These monitors are highly configurable, and, in addition, users can create their own monitors to display the data of their choosing. Furthermore, GPM provides the interface necessary to set up logging requests in which data can be stored for later review and analysis.

GPM has been a part of the C-AD controls system since the Booster was commissioned in 1989 and has been extensively modified and upgraded in the years since to handle both CLD/SLD data as well as ADO data.¹

Objective

The objective of this training module is to provide novice and intermediate users of the controls system with grounding in the basic structure and features of GPM and its role in monitoring, diagnosing, and analyzing accelerator systems, components, and data generated in the C-AD controls system. The course is specifically aimed at addressing the needs of the MCR operations staff in their day-to-day responsibilities and is designed to augment their effectiveness in using GPM in order to properly control and monitor accelerator systems and functions by exposing learners to the basic features of the GPM application. Course participants for this module are assumed to have some familiarity with the use of the controls system.

Scope

The basic features of the GPM application will be explored, focusing on those features that are most relevant to day-to-day operational activities as well as those features that are helpful for diagnosing and analyzing device status, performance, and operational activity. Not all features of GPM will be discussed in this course. However, a large variety of topics will be presented, with emphasis falling on those topics that are deemed most important to MCR operators.

¹ <http://www.cadops.bnl.gov/Controls/doc/Gpm/>

Prerequisites

Course participants in this module are assumed to have received training in the basic architecture, services, and terminology of the C-AD controls system. This includes, but is not limited to:

- ADOs
- ADO clients and servers
- SLDs and CLDs
- Asynchronous data delivery
- Archiving

Course Structure

The course will be taught in the Main Control Room and each course participant will be seated at a terminal with access to the GPM application. The course will be structured to provide an interactive experience for the participants, exposing students to the features of GPM by allowing them to explore those features under the guidance of the instructors and by providing students with small in-class exercises and activities that amplify the concepts.

Program Overview

A program overview for this application is available from the Help menu and can be found at <http://www.cadops.bnl.gov/Controls/doc/Gpm/>.

Course Outline and Topics

1. Introduction to GPM

- a. What is GPM?
 - i. What data can be displayed in GPM?
 - ii. How can GPM be used?
- b. Starting GPM –
What are the various ways that the application can be started in MCR?
 - i. From the command line
 - ii. From StartUp
 - iii. From the desktop icons in the Main Control Room

Suggested exercises and activities: Open the GPM application from command line, StartUp, and the desktop. Examine different kinds of GPM monitors and talk about their features: stripcharts, bar charts, etc. Talk about how different kinds of data are appropriate for different kinds of monitors. What plot types are best for what kinds of data?

2. Using GPM

- a. Features of the GPM main window
 - i. Pulldown menus
 - ii. Menubar colors
 - iii. Default user identification

b. Introduction to the GPM user interface

- i. File
- ii. PPM
- iii. Setup
- iv. Cellfiles
- v. Diagnostics
- vi. Help

c. The GPM tree

Suggested exercises and activities: Expand various branches of the GPM tree and discuss the kinds of monitors that are found. Discuss why different monitors are found at various branch locations and basic philosophy of organization. Discuss the kinds of monitors that are found at various locations in the tree (i.e., performance and ASE monitor found under the 'MCR' branch, machine monitors of various kinds found under the machine branches, etc...)

d. Opening existing monitors –

How to open a monitor that has already been created from a branch of the GPM tree, understanding the monitor window.

- i. Pulldown menus
- ii. Plot window
- iii. Message area
- iv. Start / Stop button

e. Searching for a monitor

Suggested exercises and activities: Open a monitor and observe all of the features discussed above. Discuss the function of these features. Open several different kinds of monitors to see various kinds of displays from different locations in the GPM tree. Also search for monitors throughout the tree.

f. Monitor types in GPM –

What kinds of plots and data displays can be created and how are they used?

- i. Strip charts
- ii. Snapshot (Profile) graphs
- iii. Correlation graphs
- iv. Bar graphs
- v. Tabular displays
 1. UI table
 2. Alpha table
 3. Custom (Free Format) Alpha table

Suggested exercises and activities: Open monitors of various types. Discuss the various types of monitors, the data displayed, the appropriate and effective use of each type of monitor.

g. The plot user interface

- i. Zooming / Zoom all datapoints / Undoing zoom
- ii. Legend
- iii. Axis setup

- iv. Hide / Show datasets
- v. Saving datasets
- vi. Copying and pasting data
- vii. Curve fitting
- viii. Property editor –
changing colors, changing point sizes, saving properties with the monitor, other fine details...

Suggested exercises and activities: Open a monitor and use the various features of the plot UI to change the properties of the plot. Display and remove data sets, change the axes, add and remove text from the plot, save data to a file and plot the data using, say, OpenOffice or xmgrace, etc...

3. Creating simple GPM monitors

- a. Selecting between AGS and RHIC devices
- b. Selecting the appropriate monitor type
- c. Entering and editing cells
 - i. Adding device parameters to cells using the device parameter selection window
 - ii. Defining and editing cell definitions and operations using the cell window
- d. Data options – collection, correlation, averaging, log output
- e. Display options
- f. Duplicating and editing existing monitors

Suggested exercises and activities: Create a new monitor and add data from various devices. Discuss the use of the device parameter selection window and the cell definition window. Discuss various data options and their meaning. Discuss display options and their meaning. Duplicate an existing monitor and edit the monitor setup, etc...

4. Simple GPM troubleshooting –

Understanding GPM application errors, using the Diagnostics menu, getting help.

- a. Why doesn't a plot update?
 - i. Data Acquisition Status command
 - ii. Monitor History command
 - iii. Checking FECs
 - iv. Polling vs. asynchronous data
 - v. Wrong PPM user
- b. Errors in cells and cell files
- c. Calling for help
- d. Using the Help menu

- e. Sending crash reports

Suggested exercises and activities: Open a GPM that is not updating and illustrate what students might see or not see. Open a GPM that has bad cell references and examine error output window, etc...

5. Logging GPM data – Using the Logging menu

- a. Start / Stop logging
- b. Logging status
- c. View latest log
- d. Submit logging request
- e. Local logging –
distinguished from logs available from LogView
- f. Starting logging applications
 - i. LogView
 - ii. LoggerInfo

Suggested exercises and activities: View logging information for actively logged monitors. Illustrate how to determine if a monitor is being logged. Discuss logging system structure, etc...

6. Concluding Remarks