EPICS Slow Control Prototype

(Fiber tracker ROB)

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Slide 1: High-Level Architecture

From Hardware to Web Browser

Project Goal

To create a robust, network-accessible system to monitor critical detector temperatures (FPGA, Board, FEB) and trigger automated actions based on alarm conditions.

1. EPICS IOC Layer

Hardware (Sensors)

↓

`gosipcmd`

↓

EPICS IOC

↓

PVs (on Network)

2. Data Service Layer

`data_logger.sh`

↓ `caget`

`history.jsonl`

↓ Serves File

Web Server

`web_server.py`

3. Presentation Layer

User's Web Browser

↓ Fetches data

`status.html`

↓ Draws charts

Live Dashboard

(Chart.js)

Slide 2: The Core – EPICS IOC

The "Source of Truth" for Hardware State

Process Variables (PVs)

The IOC exposes all hardware features as network variables (PVs):

- `...:TEMP:FPGA` (Read-only Temperature)
- `...:DARKMODE:SET` (Write-only Control)
- `...:DARKMODE:STATE` (Read-only Status)
- `...:TEMP:ANY_MAJOR` (Logic-driven Flag)

Custom C Device Support (The "Driver")

Custom C code links the EPICS records to the hardware:

- `devAiGosipTemp.c`: Connects temperature `ai` records to `gosipcmd -r` to read sensors.
- `devDarkMode.c`: Connects `bo`/`bi` records to `gosipcmd -w` (control) and `gosipcmd -r` (status).

Slide 3: Web GUI

The Data Logger: `data_logger.sh`

A simple background `sh` script that:

- Uses `caget` to poll all EPICS PVs every 5 seconds.
- Gathers values, alarm severities, and alarm limits.
- Appends the data as a single JSON line to `history.jsonl`.
- Trims the `history.jsonl` file to the last 720 lines (1 hour).

The Smart Web Server: `web_server.py`

A standard Python script that requires no installation. It has two jobs:

- **Serves Files:** Serves the static `status.html`, `style.css`, and `script.js` files.
- **Provides an API:** Listens for commands from the dashboard button (at `/api/darkmode`) and executes `caput` on the server to control the IOC.

Epics GUI

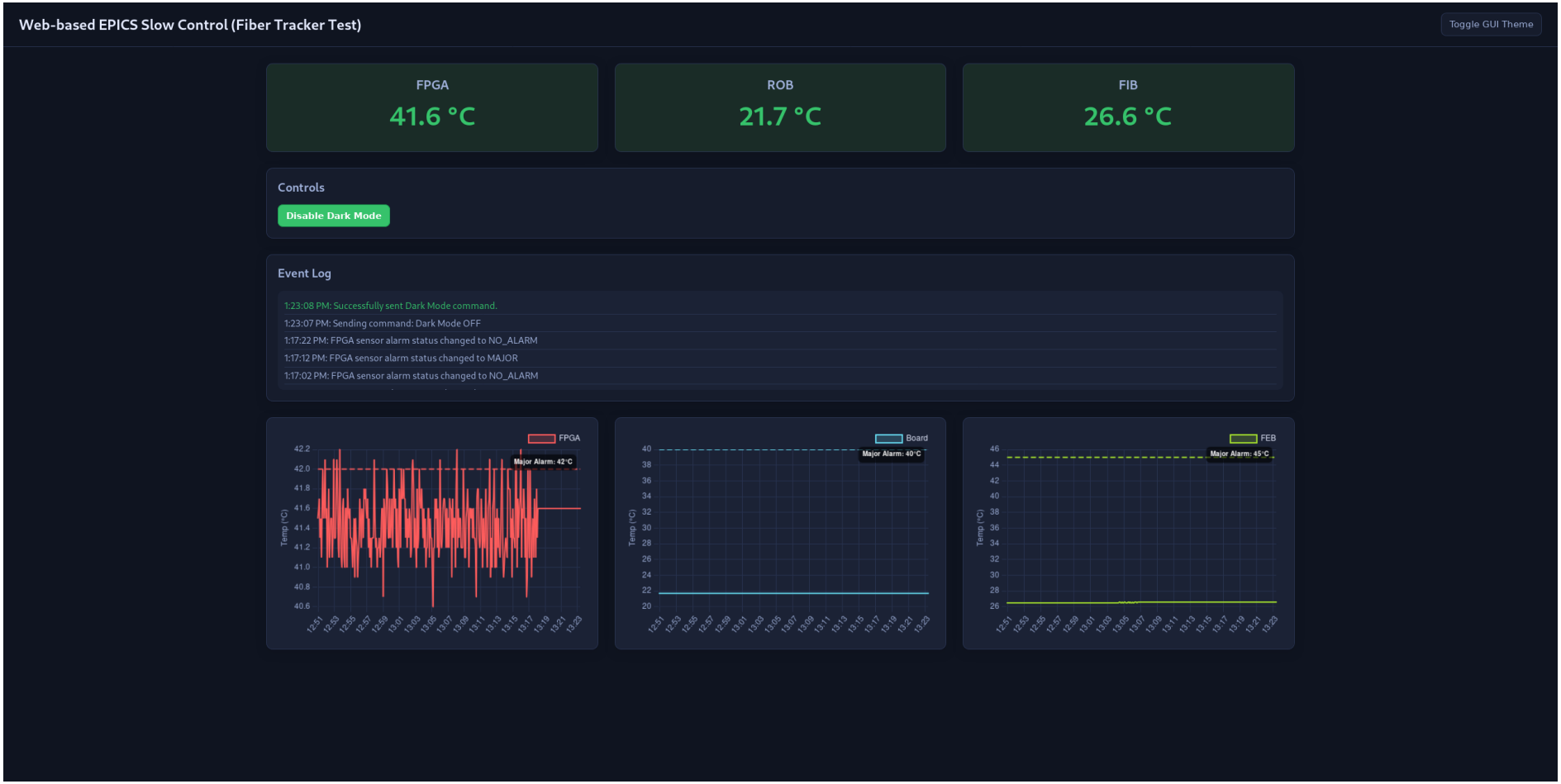

Figure:https://web-docs.gsi.de/~aali/sfrs/epics/schematc.html

Questions?

Thank you for your attention.