

Drop-Down Menu for Hall C High Voltage EPICS Screens

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This note describes the drop-down menus of the Hall C high voltage EPICS screens for the Hall C High Momentum Spectrometer (HMS) and the Super High Momentum Spectrometer (SHMS).

The independent spectrometers, HMS and SHMS, comprise eight and thirteen detectors, respectively, Table I.

#	Detector	HMS	SHMS
1	Cerenkov	✓	✗
2	Drift chambers	✓	✓
3	Hodo-1-X	✓	✓
4	Hodo-1-Y	✓	✓
5	Hodo-2-X	✓	✓
6	Hodo-2-Y	✓	✓
7	Shower counter A	✓	✓
8	Shower counter B	✓	✓
9	Shower counter C	✗	✓
10	Shower counter D	✗	✓
11	Heavy gas Cerenkov	✗	✓
12	Noble gas Cerenkov	✗	✓
13	Aerogel	✗	✓
14	Pre-shower counter	✗	✓

TABLE I. List of detectors in HMS and SHMS.

Two EPICS screens, list-view and histogram, monitor high voltage and current of each detector. Originally, these screens were created with Tcl/Tk, an outdated format that is slow generating screens (~90 s/screen), and which regenerates screens each time the program is opened.

The new screens created in CSS load process variables (PVs) and graphs faster (~3 s); additionally, CSS does not regenerate the screens every time the program is opened [1].

The developed Python script converts the configuration file's text data, in *csv* format, to the *XML* data structure and stores it as an *.opi* file extension. To generate the CSS screens, *XML* data structure is used to create screen graphics for the list-view and histogram screens, such as text boxes, labels, and buttons. The screens are generated with the values of the PVs using the *.opi* file with CSS-BOY.

The same Python script provides a drop-down menu feature, which allows the user to select the screens for a certain detector. Figures 1 and 2 show the list-view screen and histogram screen, respectively, for the HMS Hodo-1-X detector, in *Runtime* mode. When the button at the top right of the screen

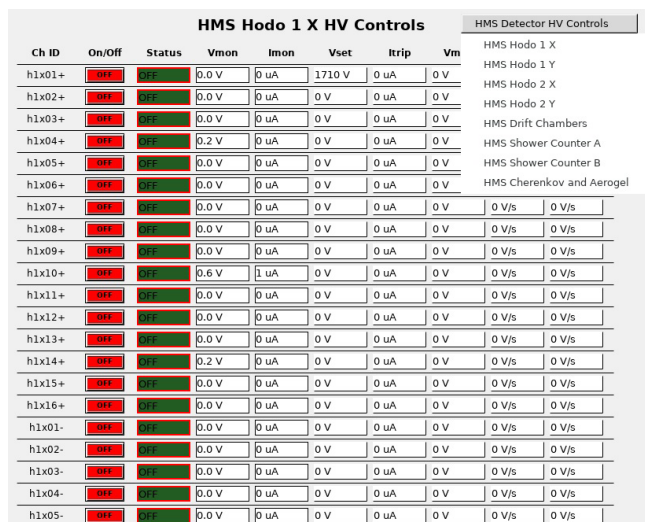


FIG. 1. List-view screen in Runtime mode for HMS Hodo-1-X, with drop-down menu selected.

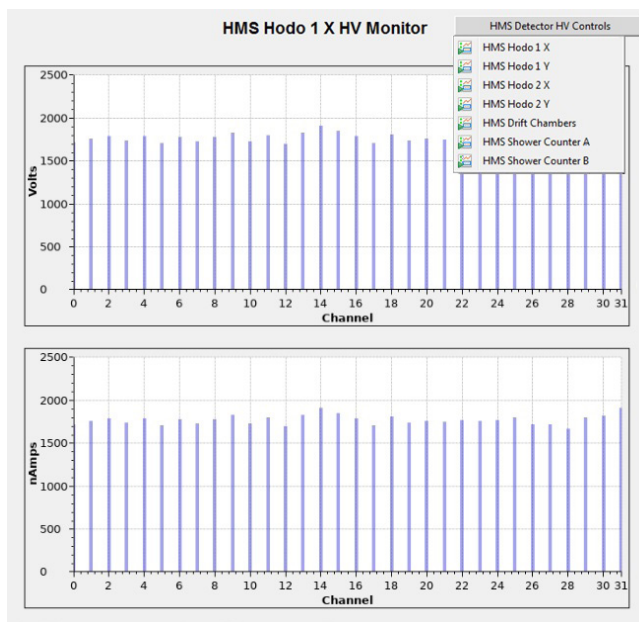


FIG. 2. Histogram screen in Runtime mode for HMS Hodo-1-X, with drop-down menu selected.

is selected, a list drops down containing all of the eight detectors (for HMS) and thirteen detectors (for SHMS) to choose from.

Figure 3 shows the high voltage and current values for all detectors, as displayed by the original Tcl/Tk screen (top), and as displayed by CSS-Boy (bottom). Each detector is represented by a different color on the Tcl/Tk screen.



FIG. 3. Voltage and current values for all detectors, as seen from Tcl/Tk (top) and CSS (bottom). Each detector is represented by a different color on the Tcl/Tk screen.

To conclude, the python script that creates the CSS screens automates the process of creating screens from *csv* files and can be used with other process variables that require EPICS screens. The drop-down menu feature to toggle between detector screens facilitates voltage and current monitoring.

[1] Amanda Hoebel et.al. *Displaying with CSS-BOY EPICS High Voltage Process Variables of the Hall C High Momentum Spectrometer*, DSG Note 2019-11, 2019.