Phoebus Plots / Arrays

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Plots

• In display builder there are four widgets under the plots category
  – Data Browser
    ▪ Embeds the Data Browser Application
  – Image
    ▪ Displays an image/data
  – Strip Chart
    ▪ Single PV with timescale as X-axis
  – X/Y Plot
    ▪ Uses PVs for both X & Y-axis

• Following slides of each type in order of most to least likely to be used
Strip Chart

- Displays a PV with an X-axis as time given by the PV
- Configured with the widget properties
  - Can have multiple Y-axis
  - Each trace (PV) has its own properties
    - Type (line, step, bar, etc.), color, line width, etc.

From included examples (gray bar is artifact of running remotely)
X/Y Plot

- Each axis has its own PV
- Use when don’t want time displayed or data is position dependent (e.g. microscope/motor position)

From included examples (line at 50 is a single value vs the arrays)
Image

- Mainly used to display histograms or actual images
- Need array PV type or image

Interpolation

In the left image, interpolation is turned off. Each image pixel is drawn 'as is', which is useful for histogram-type images where the value of each pixel represents a distinct count.

In the right image, interpolation is on. Each pixel on the screen is based on the interpolation between data in the image, which is useful for camera images where the underlying pixelation is more necessary evil than feature.

The default interpolation mode is 'automatic':
If the image is smaller than the screen area, interpolation is disabled. If the image is larger than the screen area, interpolation is enabled. This allows zooming into pixels, while otherwise providing an adequate representation of the image when zooming out.

From included examples showing the same data with different color maps
Data Browser

• Similar to the strip chart, but uses a separate *.plt file for configuration

• Can import from other data sources
  – Historic data (needs archiver setup)
  – CSV

• More features, but more complex

• Phoebus Documentation on Data Browser
  – Example not included as it looked identical to Strip Chart
Structure - Array

- Used with array PVs
- Add the array widget to the screen, add child widget to array
  - Child widget will be copied for the array elements
  - Need to check array/widget size so all elements are displayed

From included examples (slightly modified to make string examples work)
Right-most array actually has 7 entries, but not all displayed due to array widget sizing
Array Notes ...

- Less useful when using scripts to generate a screen, but much faster than placing individual widgets if each element needs to be displayed when using the Display Editor

- Possibly only a single dimension
Conclusion

• Type of plot used is heavily dependent on the type of data to be displayed
  – Needs to be selected on a case-by-case basis
  – Generally (for DSG) increasing to decreasing usage
    ▪ Strip Chart > X/Y Plot > Image > Data Browser

• Arrays are useful for displaying PVs that are already in array form and need identical widgets
  – Not as fast to make big changes as a script, but less initial development time