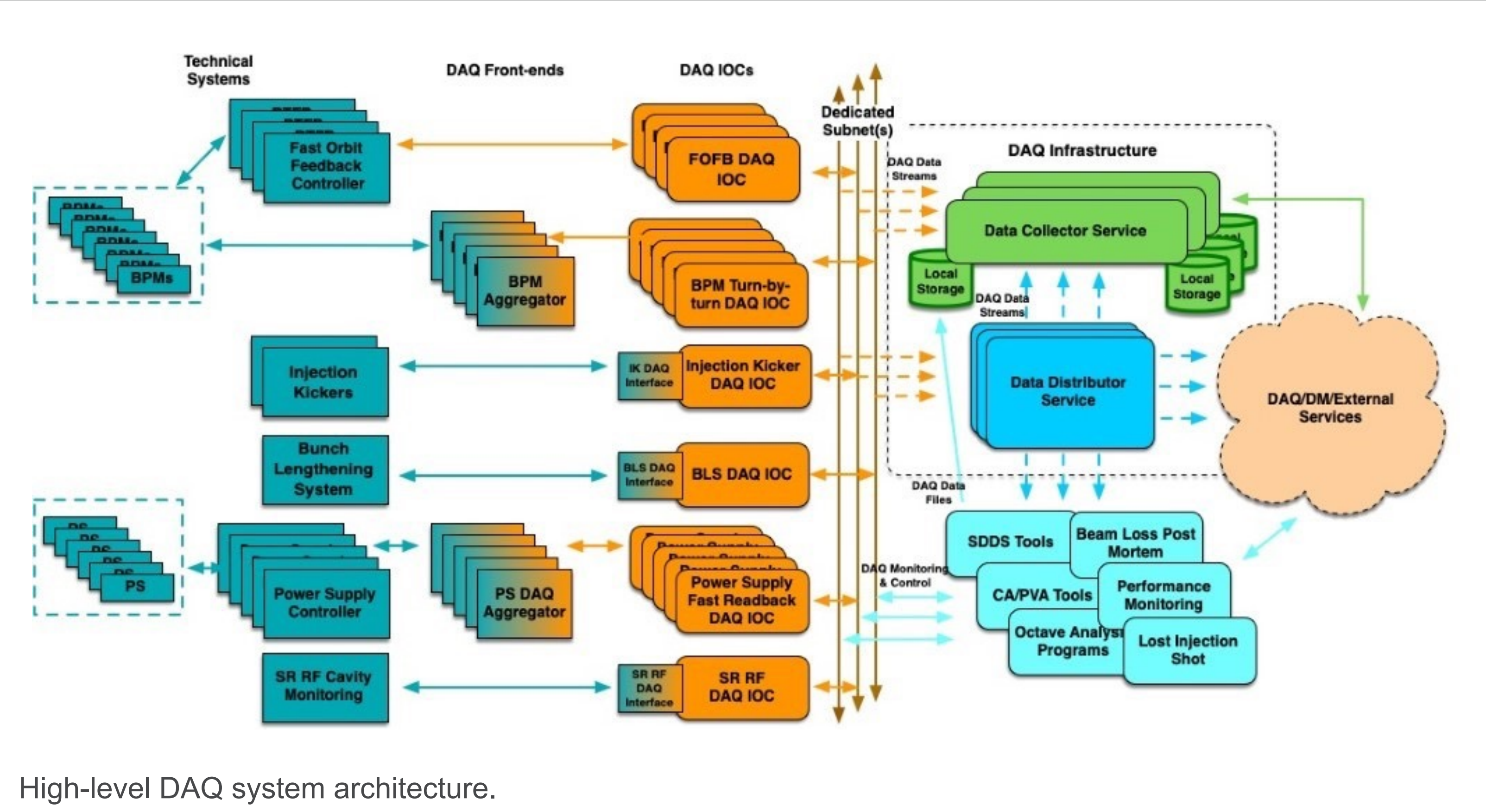


# C2 DATA VIEWER: VISUALIZATION TOOL FOR EPICS7 DATA STREAMING

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## MOTIVATION

A high-performance data acquisition system (DAQ) has been under active development to meet APS-U needs. It acquires data from various technical systems, streams it to downstream users via EPICS7 pvAccess (PVA), or saves the data into local file, e.g. Self Describing Data Sets (SDDS) file at APS. The APS-U DAQ system software framework is implemented as part of the new APS-U control system software infrastructure, which is called C2. To visualize the DAQ data and other types of streaming data in the accelerator on the fly, we implemented a new tool in Python, which is called (C2 Data Viewer - C2DV). The C2DV supports to visualizing live EPICS data streams over both pvAccess (PVA) and Channel Access (CA) and has been instrumental for monitoring, troubleshooting and diagnostics.



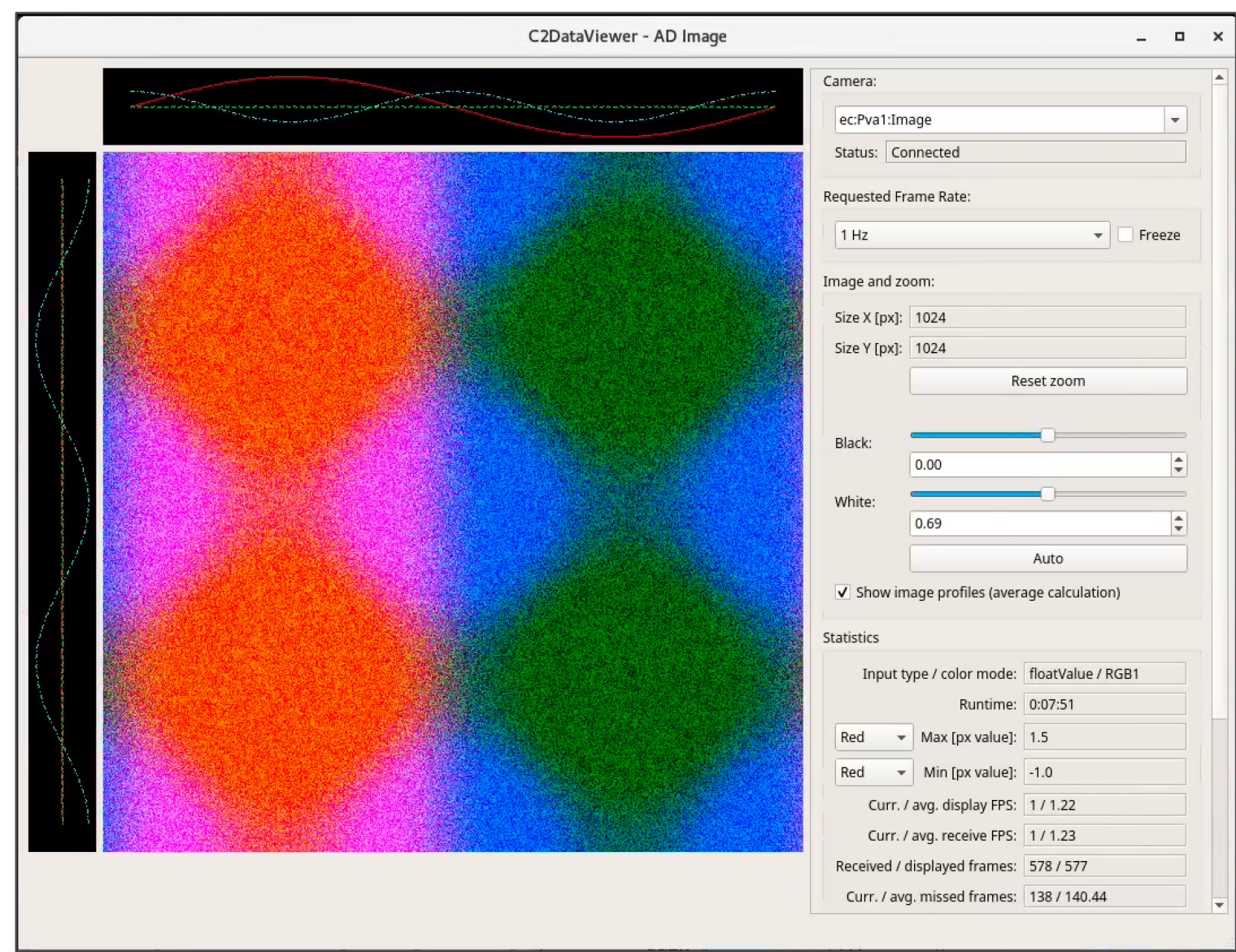
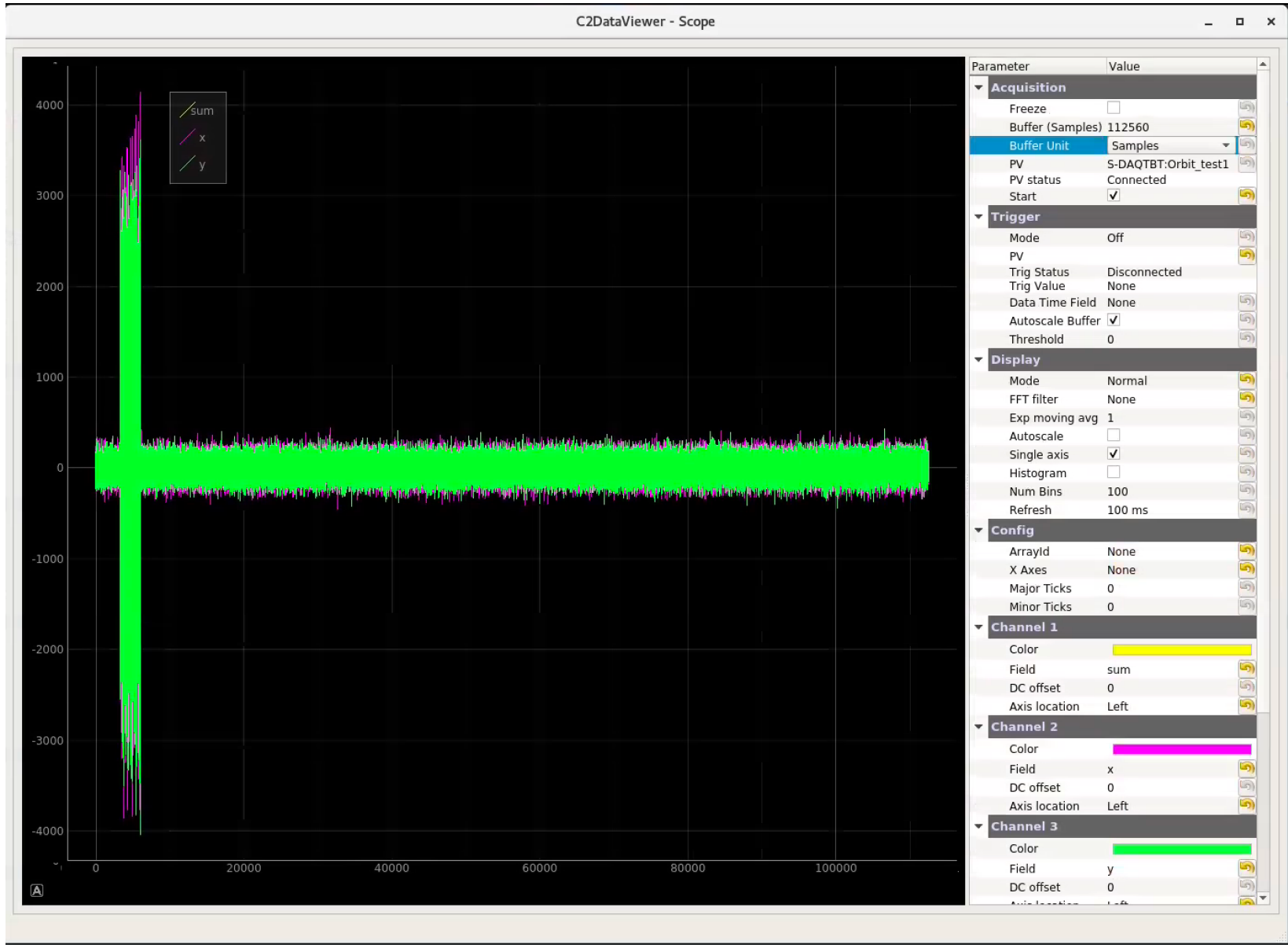
## FEATURES

The C2DV includes three different applications:

- A scope viewer for plotting PVA waveforms
- An image viewer for displaying streaming Area Detector image data
- A striptool for monitoring CA and PVA scalar PVs

### Scope Viewer

Scope viewer plots PVA waveforms in real-time. It supports plotting a stream or plot on a PV trigger, displaying multi-axis, and plotting data as FFT, moving average, or histogram. Scope viewer is used extensively for supporting operations of APS Radio Frequency (RF) systems, and development of future RF and DAQ systems for the APS Upgrade.

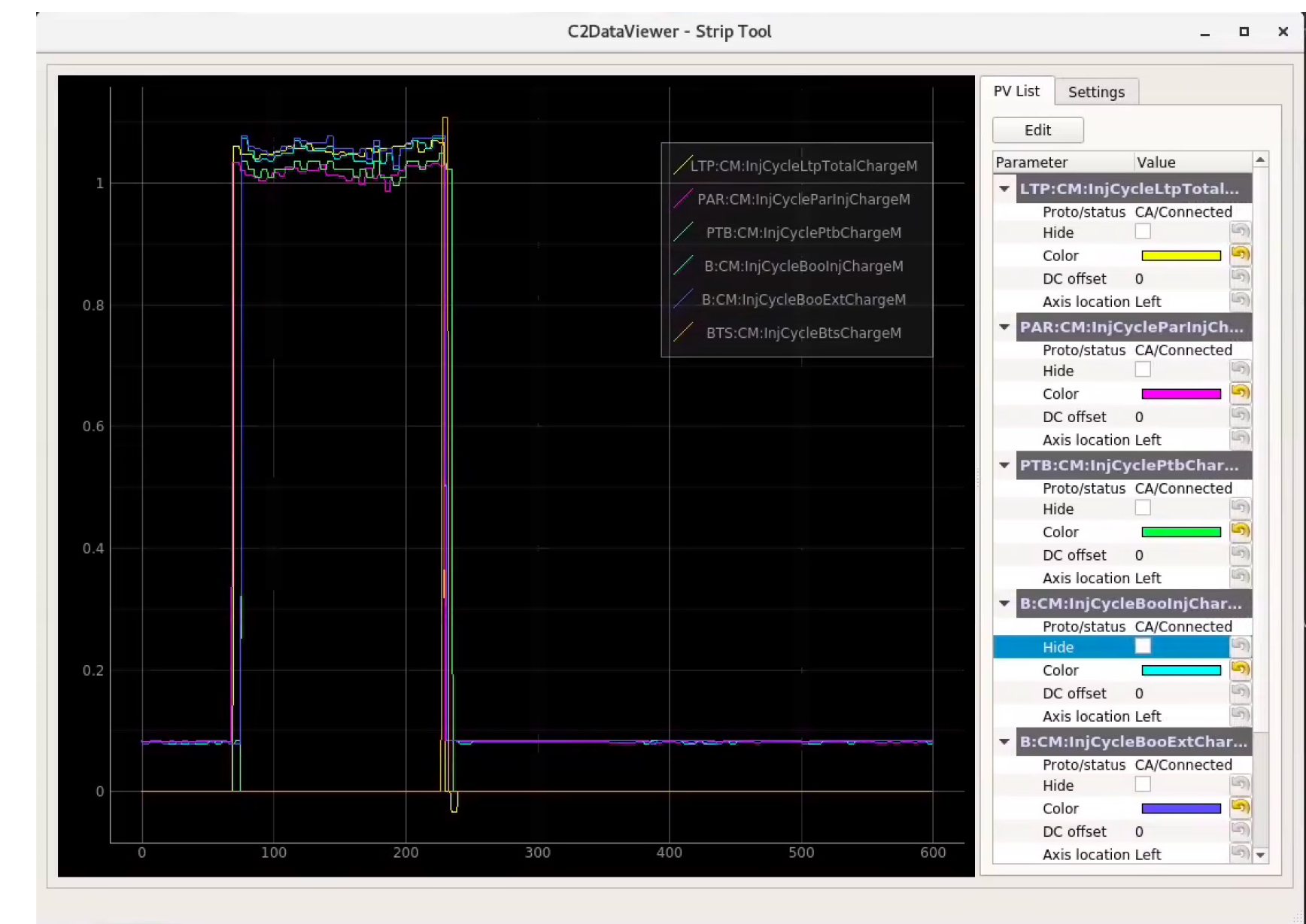


### Image Viewer

Image viewer displays detector or camera images from an EPICS areaDetector driver. Viewer is designed to handle data streaming at high rates, and automatically adjusts processing rate based on CPU and network usage. Image viewer is used by both accelerator and x-ray science divisions for monitoring and troubleshooting beamline data.

### Striptool

Striptool can plot both CA and PVA scalars simultaneously. Has a simple and easy-to-use UI. Supports plotting data as FFT, moving average, or histogram.



## IMPLEMENTATION

- C2DV is a Python QT based application. It uses pyqtgraph for generating the plots and UI and pvpy to communicate with pvAccess and Channel access protocol.
- Tool can be downloaded as a pip package  
`pip install c2dataviewer`  
`c2dv -h`

## ACKNOWLEDGMENT

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