

The CCD Image Server

Brian J Tieman

Beamline Controls and Data Acquisition
Advanced Photon Source



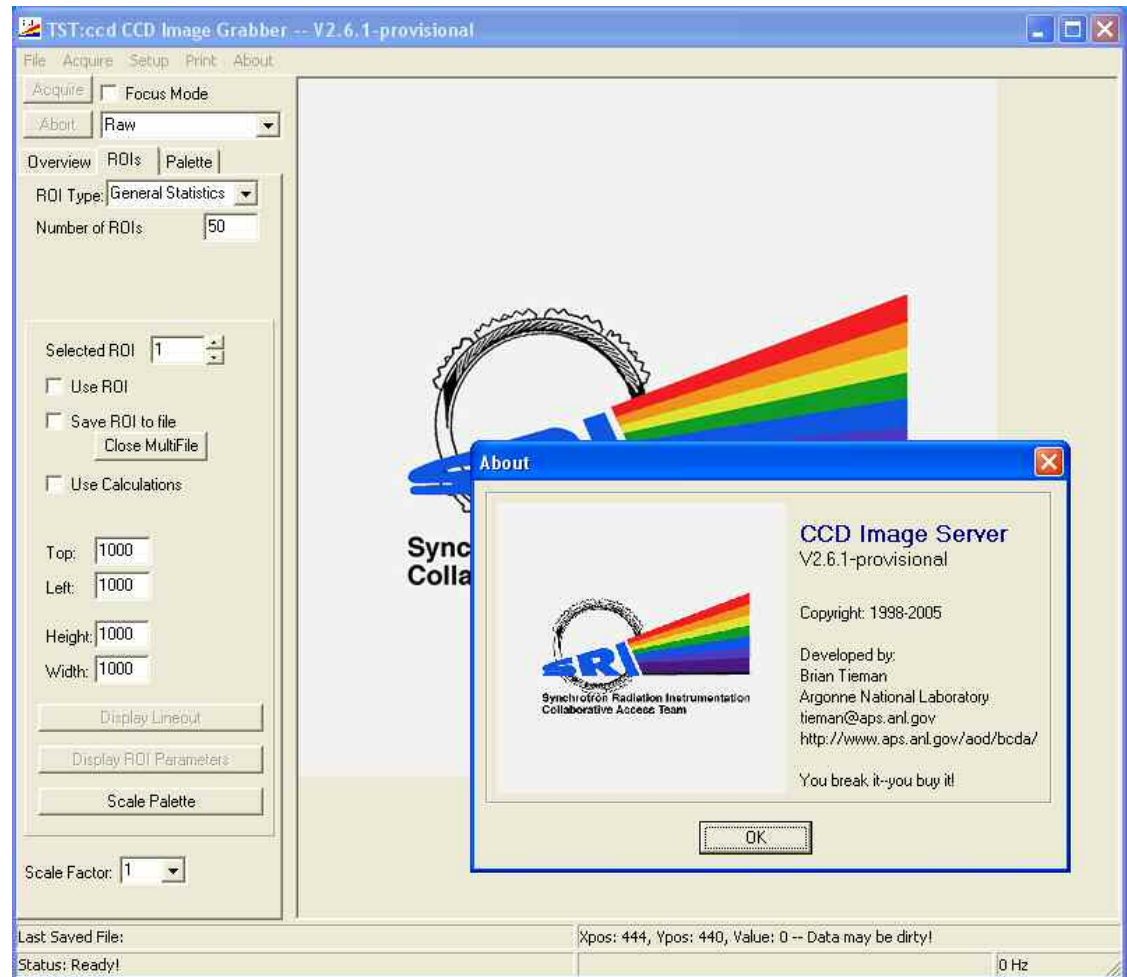
Introduction

- **History**
- **Capabilities**
 - EPICS Portable Channel Access Server
 - Camera Models
 - General Feature Set
- **Extensibility**
 - New Cameras
 - New Features
- **Contact Information**



History

- Which sector is SRICAT?
- Designed for...
 - 1 camera
 - Tomography
 - 2 beamlines
- Original Design
 - IDL
 - Camera control
 - *ActiveX*
 - *Native C Wrapper*
 - Experiment synchronization via EPICS Client handshaking
- First Major Rewrite
 - Borland C++ Builder
 - *Better GUI*
 - *Easier access to camera API*
 - Portable Channel Access Server???



History Continued...

■ Free Electron Laser

- Dropped all beamline support for 3 months!
- Portable Channel Access Server—no other choice now!
 - *20 cameras—all very remote*
 - *Roadrunner Bitflow framegrabbers—Windows only*

■ Back to the Beamline

- PCAS working very well—a new hammer!
- Other cameras?
- Other experiments?

■ Second Major Rewrite

- Class structure for camera driver support
 - *Easily add new camera support by writing new device object*
 - *Duh!*
- Class structure for ROI type support
 - *Different calculation sets*

■ Third Major Rewrite...



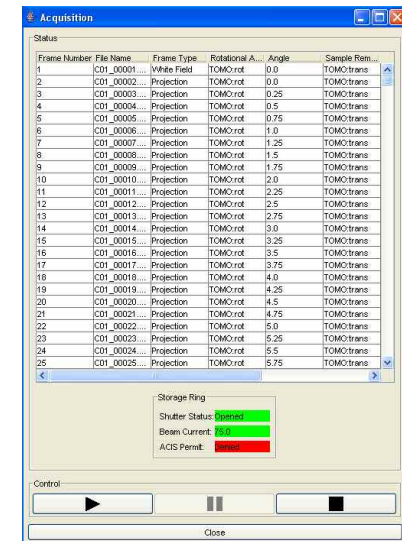
Capabilities—EPICS Portable Access Server

■ Why Portable Channel Access Server?

- Server support gives better performance
- SoftIOC wasn't available
- Application first approach
 - *Easier development path*
 - *No database support*

■ How does it work?

- Separate thread
- Turns shared application memory into PV
- Handles all EPICS communication
 - *EPICS_Get—returns shared memory value to client*
 - *EPICS_Put—passes client value to application via callback*



Capabilities—Camera Models

■ Test Pattern

- Requires no hardware
- Used for development/testing

■ Princeton Instruments/Acton

- Entire Line
 - *VersArray*
 - *CoolSnap*
 - *Quantix*
 - *Etc...*

■ Apogee

- ActiveX interface
 - *Alta*

■ Cooke

- SensiCam



■ Frame grabbers

- Epix
 - *SI1280*
- Coreco
 - *SI1280*
 - *SI3170*
 - *Sarnoff*



Capabilities—General Feature Set

■ General Feature Set

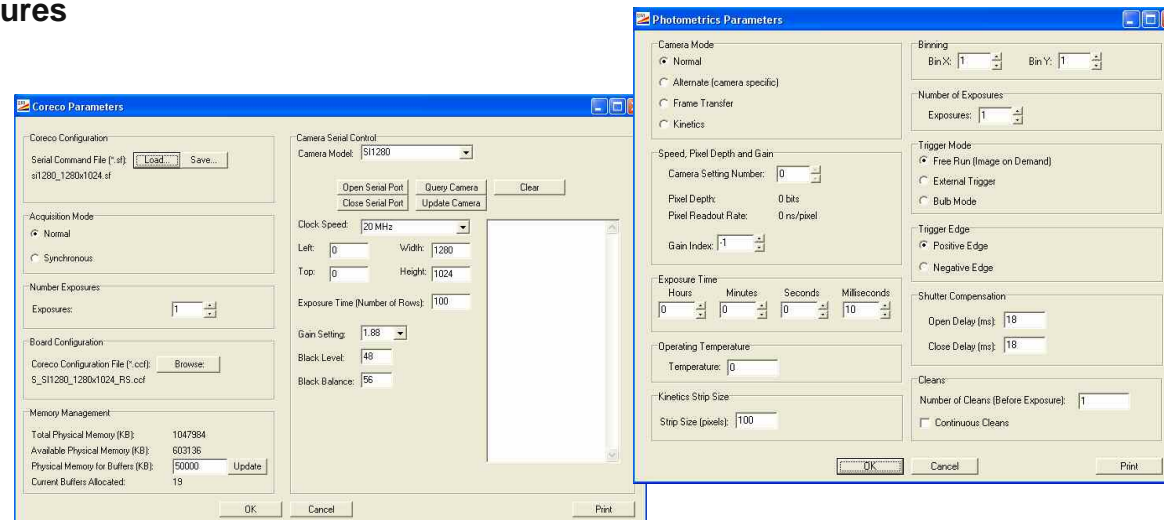
- EPICS PVServer
- Multiple ROIs
- Integrated ROIs
- Multiple Color Palettes
- Palette Scaling
- Image Scaling for Display
- Background Subtraction for Display and Calculations
- Buffered Memory Mode for Higher Performance Acquisition

■ Calculations

- Minimum Pixel Value
- Maximum Pixel Value
- Average Pixel Value
- Pixel Sum
- FWHM
- Centroid
- Center of Mass
- Background Removal

■ Specific Camera Features

- Binning
- Temperature
- ADC
- Kinetics
- Etc...



Extensibility

■ Further developments by request

- New camera support
 - *Need camera vendor interface*
 - *Need to develop a Device Driver for camera interface*
 - *Typical development time ~2 weeks*
 - ...there are exceptions...
- New feature support
 - *Lower priority than new camera support*
 - *Not all new feature requests will be supported*

■ Some planned developments

- More cameras
 - *Detector Pool cameras*
 - *Better Coreco support*
 - *XRadia*
 - *Whatever users ask for...*
- Performance tuning
 - *Been a long time...*
- Better Image display handling
 - *Additional capabilities*
 - *Less overhead*



Contact Information:

Brian J Tieman
Beamline Controls and Data Acquisition
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tieman@aps.anl.gov
(630)252-0141

