

MEC Data Analysis Tutorial

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(a) Access to the analysis GUI:

- ❑ Users can launch the GUI by clicking the “**mecana**” desktop icon on any workstation machine in the control room (mec-monitor, mec-console etc.) with a valid Unix account and password
- ❑ Alternatively GUI can be launched on user's laptop by logging into the SLAC computing system:
 - ❖ `ssh -Y yourUnixname@pslogin.slac.stanford.edu` (pslogin serves as the login pool from external network)
 - ❖ `ssh -Y psana` (login to the psana machines)
 - ❖ `~mecopr/scripts/mecana_userlaptop.sh`

The screenshot shows the MEC Data Analysis GUI. At the top, it says "MEC Data Analysis". Below that, there are input fields for "Experiment" (mecg0614) and "Run" (1), with "RUN" and "QUIT" buttons. A "Select algorithms:" section contains several checkboxes: "Extract tiff images from raw xtc files for all detectors in the diagnostic system, only cspad images are calibrated (tiff files saved to the default path: /reg/d/psdm/mec/<exname>/scratch/)" (checked), "Interactively browse images from raw xtc files for all detectors in the diagnostic system, only cspad images are calibrated" (unchecked), "HDF5 translator with calibrated cspad images included" (unchecked), and "Sorting algorithm for two color experiment" (unchecked). Below this, there are options to "Generate table for PV's (epicsarch motor positions), gas detector, diodes readout (IPM2/3, PIP diode etc.)" and "Browse or generate text files for Acqris waveform measurement". At the bottom, there is a console window showing the output of the analysis, including the path "/reg/d/psdm/mec/mecg0614/scratch/run1/" and a list of TIF files.

Experiment name and run number (users have to be added to the experiment in order to access the data)

Click “RUN” and “QUIT” to start and stop the analysis

List of some common data analysis tasks. Select the ones you intend to use.

Console gives information on where the analysis results are saved

(b) Examples of some common analysis tasks:

- ❖ Extract all detector or camera images, they are saved as **TIFF** format under:
`/reg/d/psdm/mec/experimentname/scratch/runnumber/`
Here only CSPAD images are background subtracted, all other detector images are raw readout from camera.
- ❖ Generate **HDF5** file from raw data. Here CSPAD image is already calibrated and background subtracted in the HDF5 file.
- ❖ Generate a table for all **EPICS PV** values (these PV contain motor positions, X-ray photon energy and other beam parameters)
- ❖ Generate a table for all beam line device readouts such as **gas detector**, **IPM2/3 diode** (relative shot-by-shot intensity), **PIP diodes** etc.
- ❖ Generate a table for EVR data which shows a list of recorded event codes and time stamps. **Event code 162** can be used to check if the beam is taken away from MEC.