Conversion of medm Screens to CSS-BOY, caQtDM, and edm using Makefiles

- medm is the only EPICS display manager with conversion tools to all of the other popular display managers (CSS-BOY, caQtDM, edm)
- Goals:
  - Module developers can create/edit an medm file and type `make` to automatically convert to other OPI formats producing ***good-looking, fully-functional*** displays
  - Eliminate the need for even minor edits/tweaks.

Solution

- Added yyyApp/op/Makefile.
  - Runs the conversion tools to convert the medm adl files to edl for edm, ui for caQtDM, and opi for CSS-BOY.
- RULES_OPI file was added to synApps/support/configure to support this (https://github.com/epics-synApps/configure).
  - If RULES_OPI file is not found the Makefile does nothing.
- If the RULES_OPI file is found then a CONFIG_SITE file in synApps/configure or in EPICS base must define these symbols:
  - **ADL2EDL**: path to adl2edl for edm
  - **ADL2UI**: path to adl2ui for caQtDM
  - **CSS**: path to css. Must be a recent version that supports the command

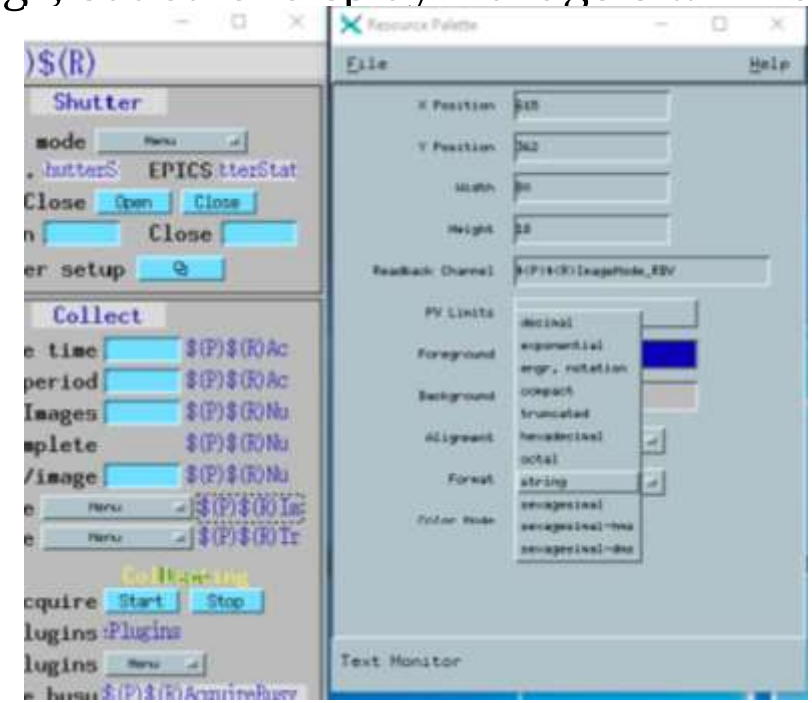
```
css -nosplash -application org.csstudio.opibuilder.adl2boy.application
```

Solution

- op/edl/autoconvert, op/ui/autoconvert, and op/opi/autoconvert directories contain new conversions of all of the medm files.
- edl, ui, and opi directories should contain only manually converted and edited files.
  - Many of the files in these directories have been removed, either because they were actually old autoconverted files, or because they are obsolete and the new autoconverted files are better.
- areaDetector, asyn, and many synApps modules now have yyyApp/op/Makefile and autoconvert directories.
  - Need to complete the job of adding to all synApps modules

medm File Improvements

- Good conversion requires a good medm adl file
- Text graphics widget sizes are set to the actual size of the text.
  - medm will display text outside the widget if it is not large enough, but other display managers will not.
- Text update widgets set to the correct datatype.
  - medm will display an enum widget as a string even if the datatype is set to "decimal" rather than "string", but other display managers will not.



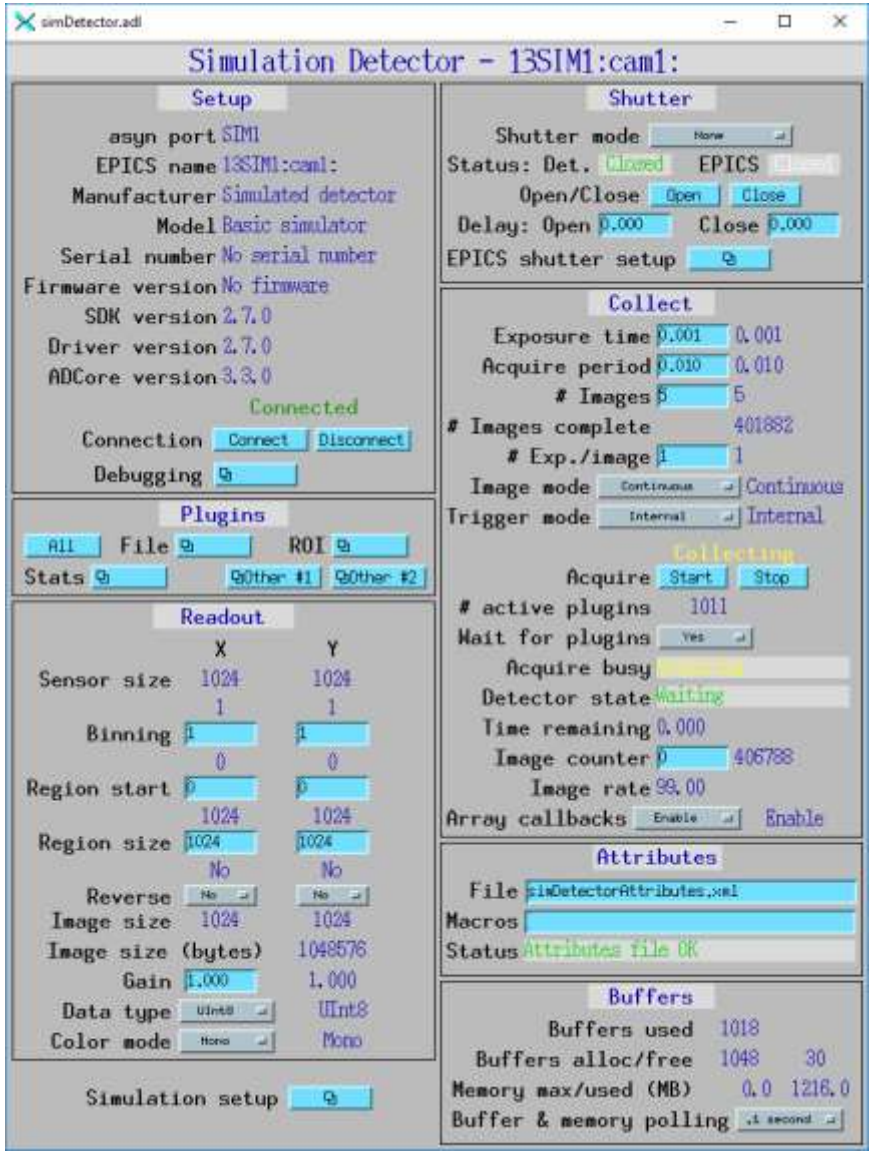
CSS-BOY

- Previously CSS provided an adl to opi conversion too, but only available from the GUI
- Kay Kasemir added a command line option to do the conversion:

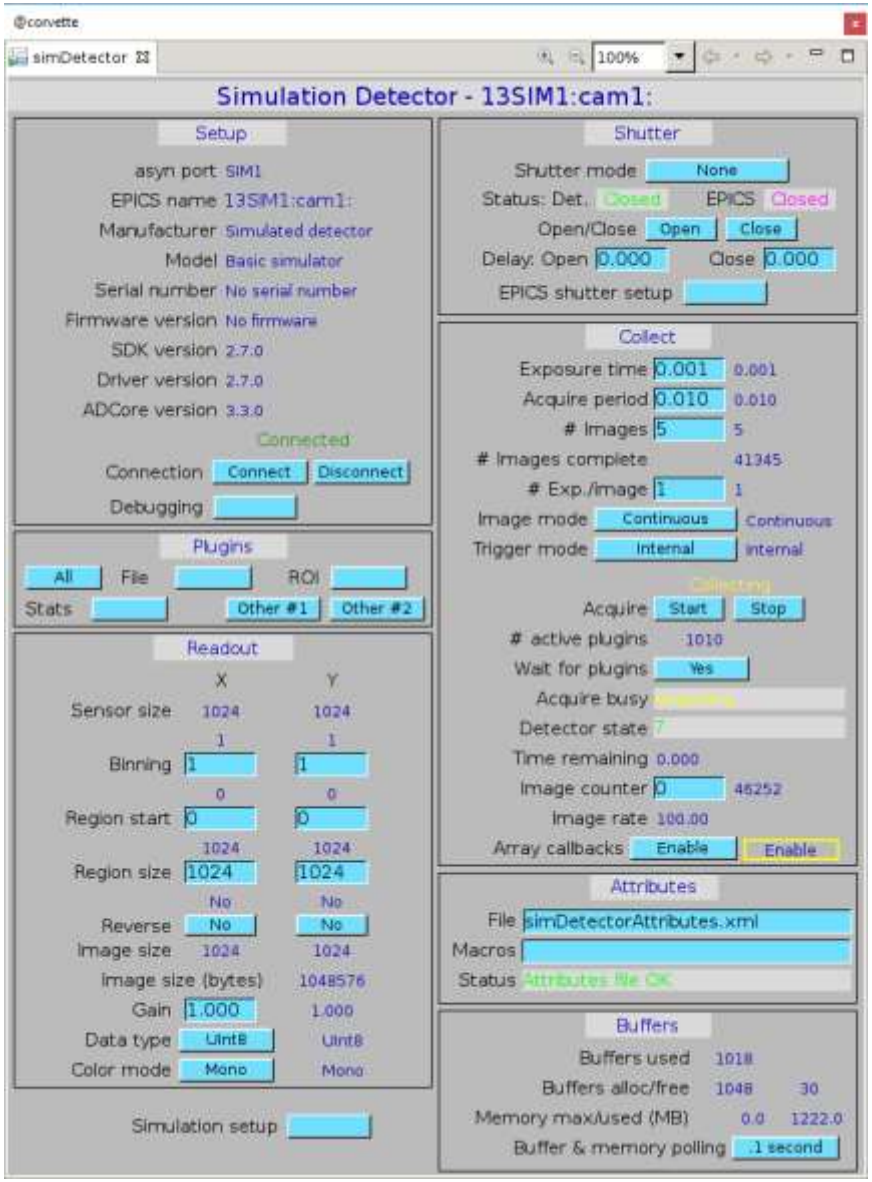
```
css -nosplash -application org.csstudio.opibuilder.adl2boy.application
```

- Kay also made a number of fixes to the conversion tool and to CSS-BOY itself to greatly improve the quality of the conversion and display.
- Works with parallel make, but there is a separate instance of CSS for each adl file to be converted.
  - Must limit with –jN (N~8) to prevent overloading system.
  - CSS supports converting multiple files with single command, need to see if RULES_OPI could be changed to use this feature

medm


simDetector.adl
Simulation Detector - 13SIM1:cam1:
Setup
asyn port SIM1
EPICS name 13SIM1:cam1:
Manufacturer Simulated detector
Model Basic simulator
Serial number No serial number
Firmware version No firmware
SDK version 2.7.0
Driver version 2.7.0
ADCore version 3.3.0
Connected
Connection Connect Disconnect
Debugging
Plugins
All File ROI
Stats Other #1 Other #2
Readout
X Y
Sensor size 1024 1024
Binning 1 1
Region start 0 0
Region size 1024 1024
Reverse No No
Image size 1024 1024
Image size (bytes) 1048576
Gain 1.000 1.000
Data type UInt8 UInt8
Color mode Mono Mono
Simulation setup
Shutter
Shutter mode None
Status: Det. Closed EPICS Closed
Open/Close Open Close
Delay: Open 0.000 Close 0.000
EPICS shutter setup
Collect
Exposure time 0.001 0.001
Acquire period 0.010 0.010
Images 5 5
Images complete 401882
Exp./image 1 1
Image mode Continuous Continuous
Trigger mode Internal Internal
Collecting
Acquire Start Stop
active plugins 1011
Wait for plugins Yes
Acquire busy
Detector state Waiting
Time remaining 0.000
Image counter 406788
Image rate 99.00
Array callbacks Enable Enable
Attributes
File simDetectorAttributes.xml
Macros
Status Attributes file OK
Buffers
Buffers used 1018
Buffers alloc/free 1048 30
Memory max/used (MB) 0.0 1216.0
Buffer & memory polling .1 second

CSS-BOY


convette
simDetector
100%
Simulation Detector - 13SIM1:cam1:
Setup
asyn port SIM1
EPICS name 13SIM1:cam1:
Manufacturer Simulated detector
Model Basic simulator
Serial number No serial number
Firmware version No firmware
SDK version 2.7.0
Driver version 2.7.0
ADCore version 3.3.0
Connected
Connection Connect Disconnect
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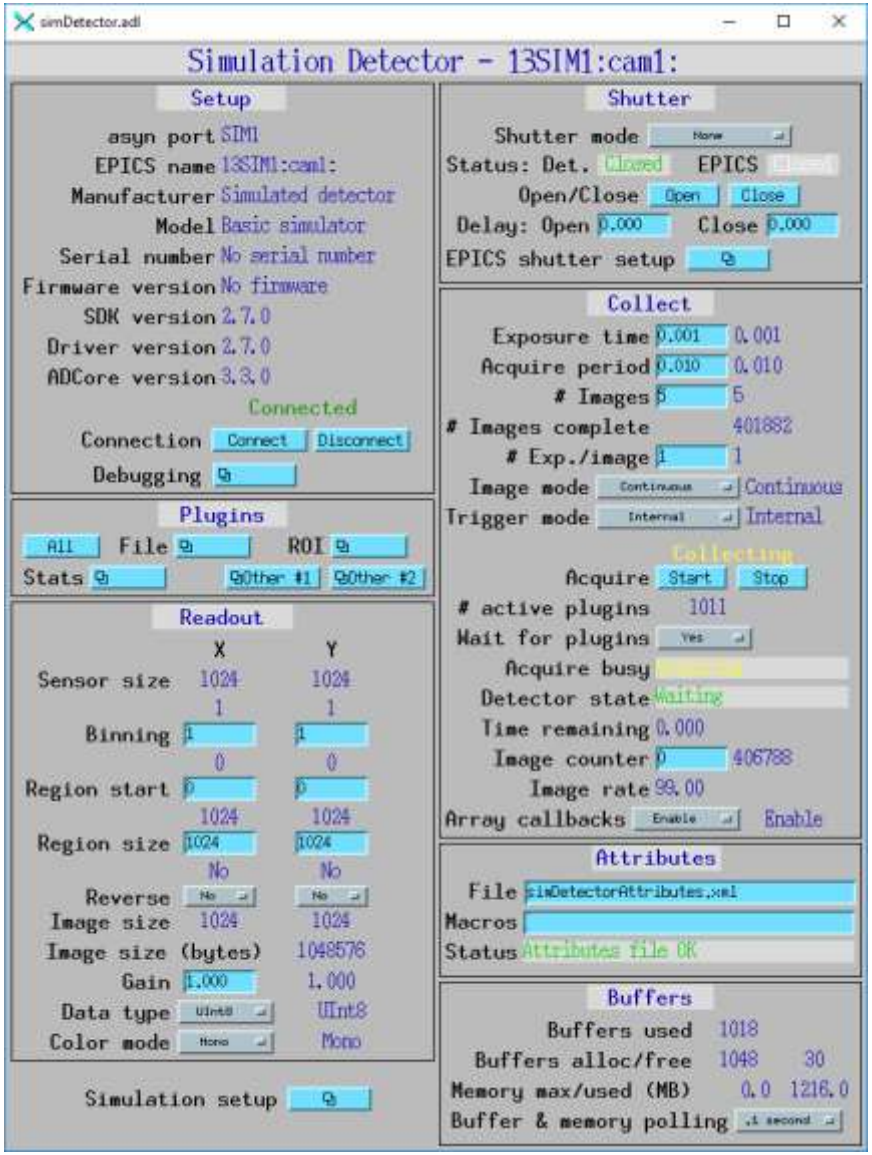
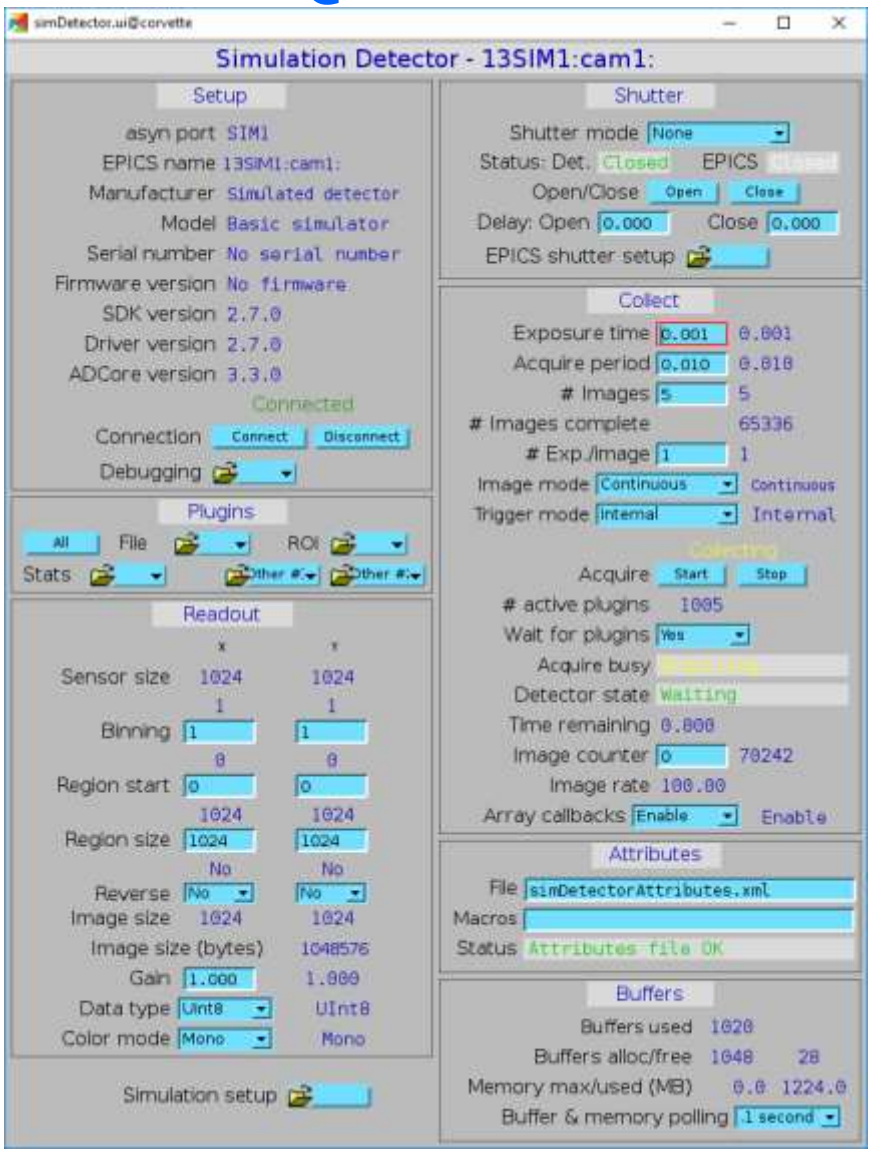
Plugins
All File ROI
Stats Other #1 Other #2
Readout
X Y
Sensor size 1024 1024
Binning 1 1
Region start 0 0
Region size 1024 1024
Reverse No No
Image size 1024 1024
Image size (bytes) 1048576
Gain 1.000 1.000
Data type UInt8 UInt8
Color mode Mono Mono
Simulation setup
Shutter
Shutter mode None
Status: Det. Closed EPICS Closed
Open/Close Open Close
Delay: Open 0.000 Close 0.000
EPICS shutter setup
Collect
Exposure time 0.001 0.001
Acquire period 0.010 0.010
Images 5 5
Images complete 41345
Exp./image 1 1
Image mode Continuous Continuous
Trigger mode Internal Internal
Collecting
Acquire Start Stop
active plugins 1010
Wait for plugins Yes
Acquire busy
Detector state 7
Time remaining 0.000
Image counter 46252
Image rate 100.00
Array callbacks Enable Enable
Attributes
File simDetectorAttributes.xml
Macros
Status Attributes file OK
Buffers
Buffers used 1018
Buffers alloc/free 1048 30
Memory max/used (MB) 0.0 1222.0
Buffer & memory polling .1 second

medm

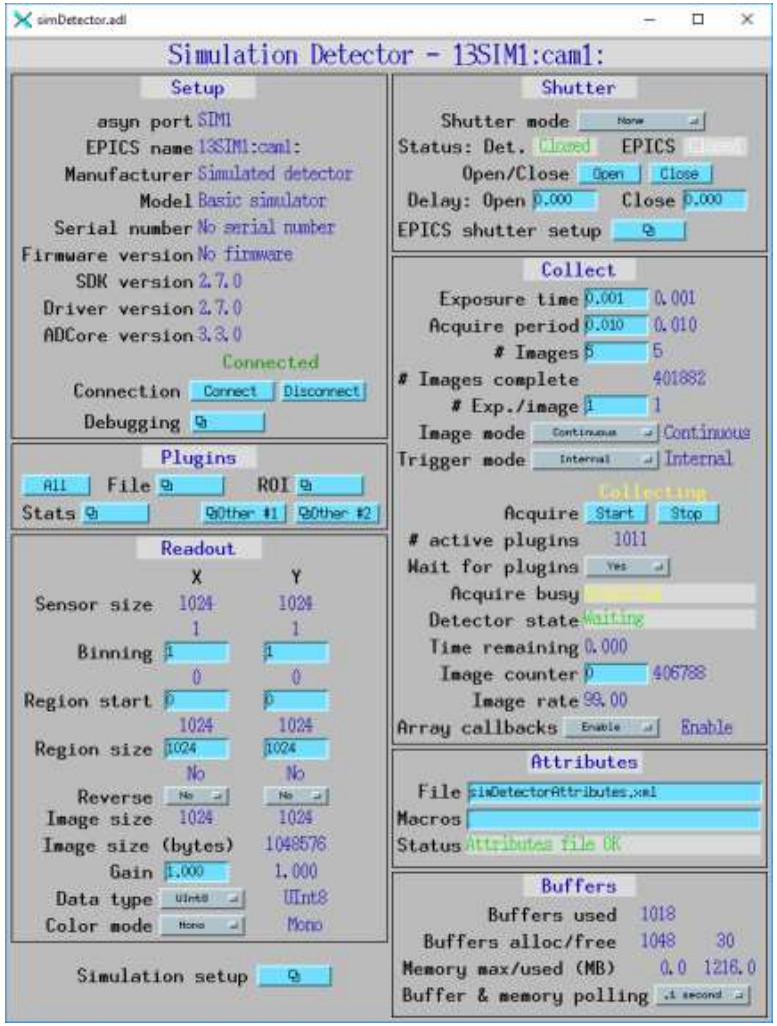


caQtDM

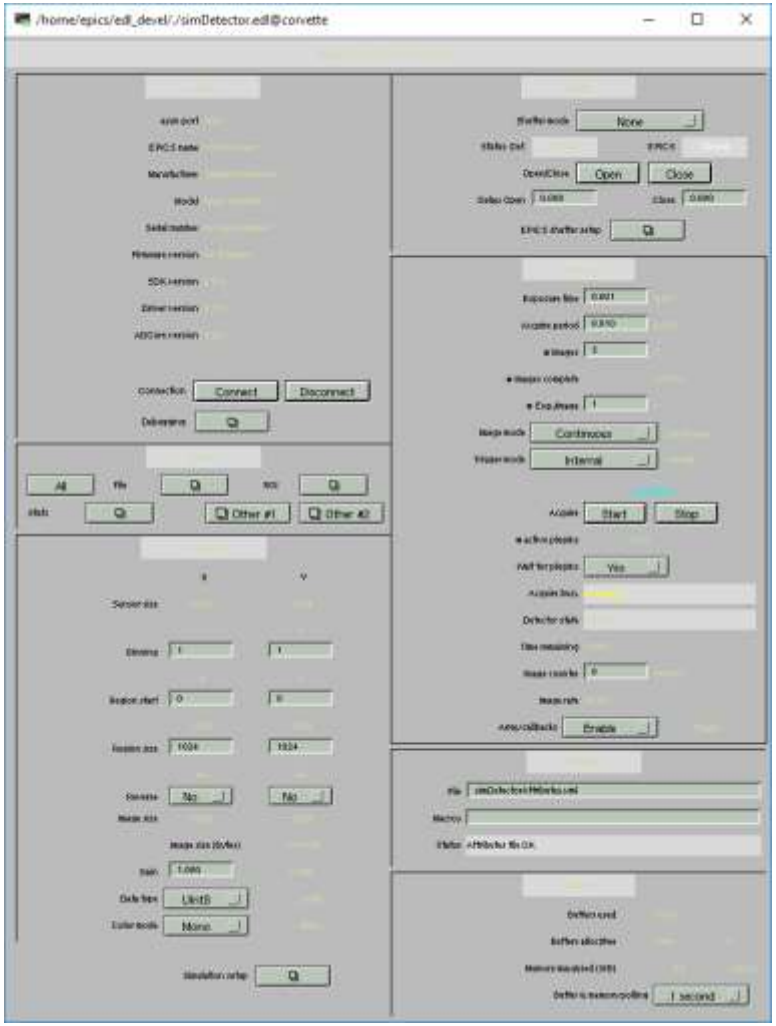


- caQtDM comes with a good adl to ui conversion tool, no changes needed

medm



edm



- adl2edl required changes for parallel make because it used a hardcoded temporary file name (where to push fix?)
- Quality of conversions is poor. adl2edl needs work.