ATF Video Frame Grabber Subsystems

   - Frequently Asked Questions
   - Tips and Techniques

For ATF Staff, Operators and Visiting Users

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Part II - Saving and recalling images and their associated color maps

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(Q1) Where are the image and color map files stored?

(A1) By default, on the frame grabber PC where you originally captured the
     data, in the "C:\Images" folder. Most users create a sub-directory under
     this top level folder, giving it a name related to their experiment and
     the date.

     You are not restricted to using "C:\Images". You may use any
     device/folder for which you have write permission, including external
     devices such as your USB stick.

     Image files are stored with a file type of ".asc" and color maps
     are stored with a file type ".atf_cm".

(Q2) How can I copy my saved image data from the frame grabber PC
     on to my own PC/USB stick/other media?

(A2) You can connect your USB device to the front panel USB connector on the
     frame grabber PC chassis. Once your device is mounted, you can
     click/drag files from the frame grabber's image folder to your external
     device.

     OR

     You can connect your PC to the local private ATF network. Set your PC to
     use DHCP and an IP address will be assigned to you. You can then start
     an ftp client on your PC, instructing it to connect to the frame grabber
     PC where you captured your images. Use the network node names as
     explained in Section I of this FAQ. This method may be more
     convenient if you are transferring a large amount of data.

     Ask ATF staff for the username/password needed to access the systems
     via ftp.

(Q3) How can I reload a stored image file?
     How can I verify that a stored image file is OK?
     How can I reload a color map?
     How can I verify that a stored color map is OK?

(A3) You can recall a stored image file into the ATF frame grabber application
     by pressing the "Recall" button and navigating to the device/folder where
     you stored the image. Select the image file and it will be read into the
     frame grabber application and will be treated as a newly acquired image.
     If the image displays correctly, you can be confident the image file was
     saved correctly.

Similarly, you can reload a color map from a stored file. The color bar
        at the right of the image area should change to reflect the newly loaded
        color map.

(Q4) What's stored in a captured image file and how is it arranged?

(A4) The captured image file is an ASCII text file which contains the raw,
        unprocessed video data as digitized by the frame grabber or GigeVision
        camera.

        The data is stored in row-major order, proceeding from the top
        left of the image and moving vertically line by line, like this:

            data for video line 1 ...
            data for video line 2 ...
            data for video line 3 ...
                            .
                            .
                            .
            data for last video line.

        Each line consists of comma separated values (CSV), with each value being
        the pixel intensity level. The last value on each line does not have a
        trailing comma. Each line is terminated with two ASCII characters: <CR>
        and <LF>.

        All data captured by analog frame grabbers has been fully de-interlaced.

        Sample fragment of image file:

        6,11,13,3,3,9,9,10,7,11,1,3,5,2,4,5,8,0,11,14,6,3 ... <-- row 1 of image
        10,7,6,6,0,19,3,1,0,11,2,7,0,19,16,4,1,4,5,5,7,12 ... <-- row 2 of image
        0,1,1,4,7,8,2,6,7,3,9,0,8,0,14,0,8,14,5,17,5,11,0 ... <-- row 3 of image
        .
        .
        .
        11,11,6,8,7,0,3,0,3,0,1,0,20,4,0,2,2,6,5,2,3,10,9 ... <-- last row of image

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(Q5) Why is only the raw, unprocessed data stored in an ATF image data file?

(A5) Having the original, raw data available for off-line analysis is valuable
        since it can be re-analyzed using different color maps, gain/black level,
        etc. If we stored the processed data, you would not be able to go
        back to the original data and re-process it.

(Q6) What are the dimensions of standard ATF image files?

(A6) The dimensions depend on both the type of frame grabber and camera in use
        when the image was captured:

            For Frame Grabbers 5, 6, 7 and 8:

                Camera type : Analog RS-170
                Dimensions : 480 rows x 640 columns

            For Frame Grabbers 10, 11, 12:

                Camera type : Basler Scout scA1400 17gm GigE
                Dimensions : 1040 rows x 1392 columns

        Note: At present, the only GigE Vision cameras at ATF are the Basler
                Scouts with 1040 x 1392 image data. Future GigE Vision cameras
                may be added to ATF's inventory which most likely will have
                different dimensions. Any analytical software you plan to
                write and bring to ATF should be prepared to dynamically

determine the appropriate matrix size from the CSV image files.

(Q7) Why do the dimensions I get when reading in an ATF image file differ from
     those specified by the camera manufacturer on their data sheets?

(A7) Matlab (and other matrix/mathematically-oriented packages) declare matrix
     dimensions in the standard "rows x columns" form while camera
     manufacturers state image dimensions in "y-direction by x-direction"
     (i.e., "columns x rows") form.

(Q8) How is the color map stored?

(A8) The color map is stored as an ASCII text file, with one line per possible
     pixel intensity level.

     Each line consists of 3 comma-separated values in the closed range [0,1].
     The last value in the line does not have a trailing comma.
     The line is terminated with two ASCII characters: <CR> and <LF>.

     Each value represents the fraction of red, green and blue (RGB)
     needed to form the desired color.

     Example: Sample fragment of 12-bit color map file

     0,0,0.50098 <-- pixel intensity 0: Red 0, Green 0, Blue 0.50098
     0,0,0.50195 <-- pixel intensity 1: Red 0, Green 0, Blue 0.50195
     0,0,0.50293 <-- pixel intensity 2: Red 0, Green 0, Blue 0.50293
          .
          .
          .
     0.50195,0,0 <-- pixel intensity 4093: Red 0.50195, Green 0, Blue 0
     0.50098,0,0 <-- pixel intensity 4094: Red 0.50098, Green 0, Blue 0
     0.5,0,0   <-- pixel intensity 4095: Red 0.5,   Green 0, Blue 0

(Q9) What are the dimensions of ATF color map files?

(A9) The dimension of the data contained in an ATF color map file depend on
     the level of digitization which was in effect at the time the color map
     was captured:

         For 8-bit digitization: 256 rows x 3 columns
         For 10-bit digitization: 1024 rows x 3 columns
         For 12-bit digitization: 4096 rows x 3 columns

(Q10) Why does my computer report different file sizes for image files I
      know I captured from the same frame grabber and at the same digitization
      level?

(A10) Data items recorded in image capture files and color map files are not
      written in fixed-width formats. Instead, each data item is written using
      just enough characters to record the desired value without any leading or
      trailing blank/zero characters. The goal being, of course, to keep the
      file size as small as possible.

      As an example, when digitizing with 12-bits, a 1040 x 1392 image captured
      by a Basler camera containing all zero pixels would require 2,894,320
      bytes of storage, while one with fully saturated pixels would require
      5,787,600 bytes.

(Q11) Is it important to capture and save the color map?

(A11) Maybe. If you find yourself needing to edit the default startup ATF
      color map so that you can bring out features in your image which would
      not otherwise be visible, you should probably save your color map after
      each significant edit. Keep a log of what color map file had been used
      with each captured image.

(Q12) What is the default ATF color map?

(A12) The default ATF color map is the Matlab color map named "jet",
      with the number of levels determined by the digitization level:

         For 8-bit digitization, "jet(256)"
         For 10-bit digitization, "jet(1024)"
         For 12-bit digitization, "jet(4096)"

(Q13) In addition to capturing the raw image data to a file, is there any way
      to capture/print the current screen image so I can keep a copy with my
      lab notes?

(A13) Yes. Press the ALT and PRINT_SCREEN keys at the same time to
      bring up the screen capture utility (Print Screen 2000).
      Save the screen image in the desired format (.BMP, .JPG, etc.)

      CAUTION: A screen capture can not take the place of a true image
      data file, particularly for any image analysis application. This is
      because pixels in the screen capture do not have a one-to-one
      correspondence with the pixels of the frame grabber image.