

Introduction

The following technical procedures apply primarily to the use of the AVID Forensic Video System currently in use in the Documents and Digital Evidence Section. This does not imply that this is the only video enhancement system in the Section, but rather it is the primary system in use. There may be times when it is more appropriate to use one of the other systems in the section such as the Latent Pro or Cognitec system. The user should refer to the section on use of that system located elsewhere in this manual.

SWGIT

When conducting forensic video examinations, the standards developed by the Scientific Working Group on Imaging Technologies (SWGIT) will be the general guide. Whenever possible and practical, these guidelines will be followed.

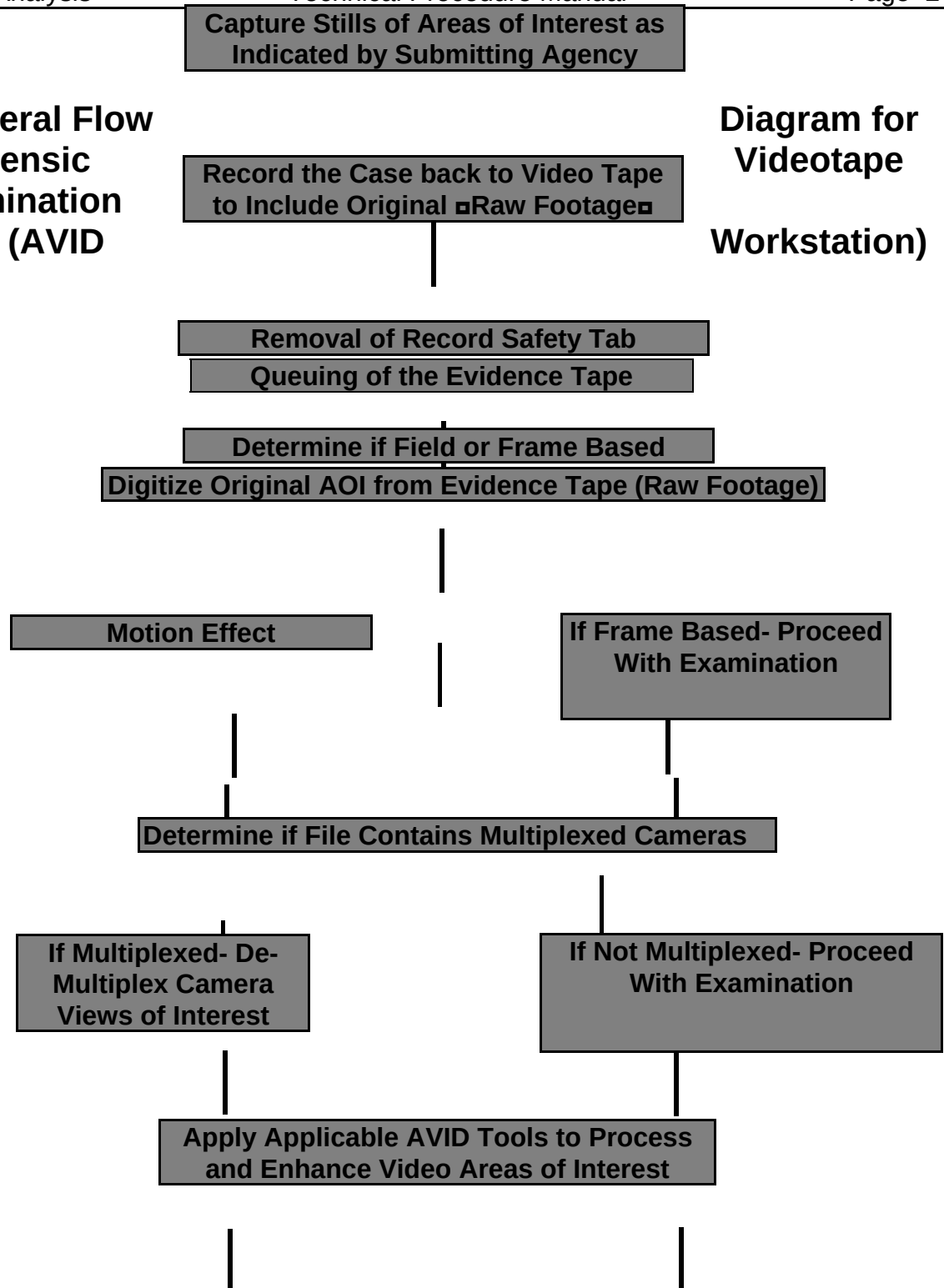
Appendix

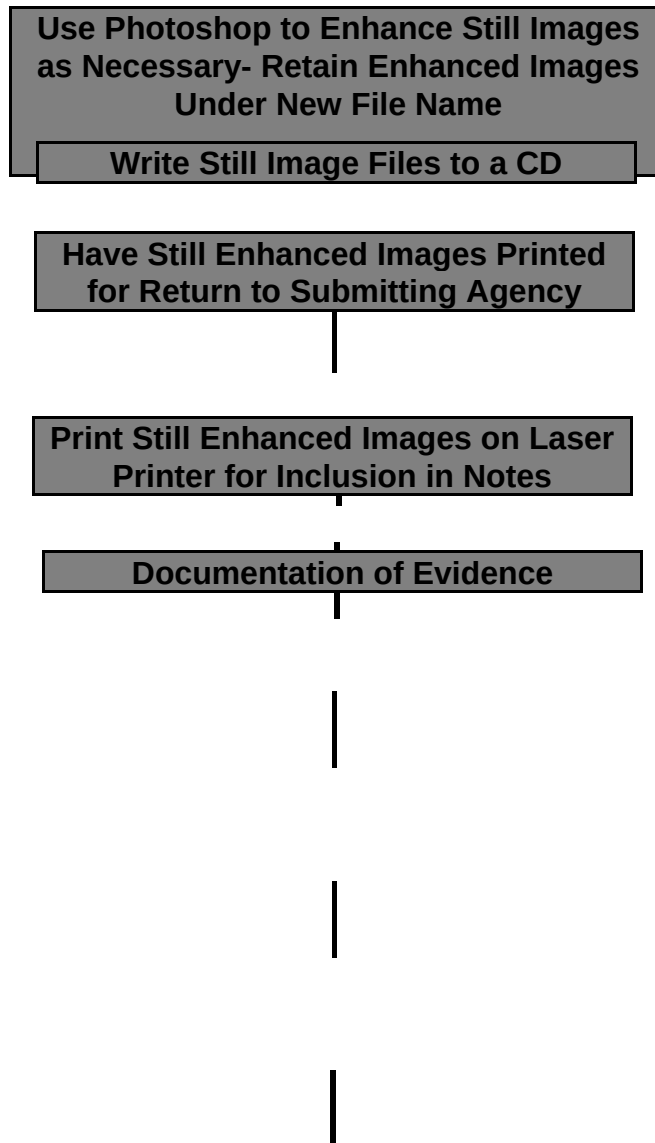
Included in this document is the following appendixes:

- Appendix A-Latent Pro and Cognitec Procedures.
- Appendix B-Ocean Systems Training Manual and related documents.
- Appendix C-SWGIT Guidelines for Video Analysis.

**General Flow
Forensic
Examination
(AVID**

**Diagram for
Videotape
Workstation)**





Inspection of Evidence Tape

The evidence tape should be inspected for damage. Any damage to the tape or the tape case should be noted. If the damage is significant, repairs should be undertaken; to include the replacement of the cassette case. See the Repairs section of this manual for repairing the tape.

Record Safety Tab

This tab is located on the left hand side of the front edge of the cassette housing. When in place, it allows the tape to be recorded in a VCR or other recording device. To insure that the evidence tape is not inadvertently recorded to, this tab must be removed (if it was not removed prior to the tape being submitted). The condition of this tab any its removal should be noted. In addition, any copies made of the evidence tab should have the tab removed prior to return to the submitting agency so nothing can be added to the tape and the contents will be protected from deletion.

Queuing of the Evidence Tape

The viewing of the evidence tape should be limited to an absolute minimum. Each time the tape is viewed, some degradation occurs. It is necessary, however to view the tape in order to find the area of interest. The best way to determine the area of interest is through the time stamp. Use the time that is supplied by the submitting agency as the time to queue to. Always include some lead in time when the tape is queued. If the time stamp is not included while viewing the tape, or if the time of interest is not provided by the submitting agency, it will be necessary to view the tape in an attempt to locate the describe area of interest. If the area of interest is not immediately evident, it may be necessary to call the requesting officer for additional details that will allow for the location of the area of interest. One technique that can be used that will avoid the playing of the evidence tape too much would be to digitize the evidence tape at 20:1 (see the Digitizing Section of this manual). At this setting it will allow the analyst to digitize a large section of the tape. Once this is done, the AOI can be located by using the digitized version thus avoiding the overplaying of the evidence tape. Once the AOI is located, it will be necessary to re-digitize that area (from the original submitted tape) at 2:1.

Digitizing the Evidence Tape

Prior to the digitizing of the evidence tape the analyst will need to establish a new project. The name of the project should consist of the Laboratory Case Number. Within the project folder, a new bin should be created. This bin can also consist of the Laboratory Case Number. This bin will hold the various work files that are created as the case is being processed.

When digitizing an evidence tape, make sure that the digitize tool is setup correctly. The source must be set to S-Video and the bin you created must be selected. Always use a 2:1 video resolution when digitizing the area of interest. This is considered uncompressed. Select either monochrome or color depending on the tape. The name of the tape should reflect the Item # for the tape that is being captured. To digitize, play the tape through the system VCR and press the record button on the digitize tool. The record button is pressed again when the AOI has been captured in its entirety. Once the clip is created, it should be named. The name can be **raw footage** or **original video**. All of the analysis conducted and effects created will be based on this clip.

Once the digitization process is complete, it should not be necessary to conduct any additional analysis or play the submitted tape again. The submitted tape can be secured in the evidence locker and returned to the submitting agency when the case is complete.

The digitized clip can now be played by double clicking on the file. This will play the clip on the pop up monitor and on the NTSC monitor.

Field or Frame Based Video

An important aspect of the analysis of a video tape is determining whether the tape is field or frame based. In order to be able to record more video on a tape, many security systems record an image on each field. This allows for the recording of 60 images per second rather than the 30 images that would result if the video was recorded at the **normal** one image per frame rate. If the video was recorded at the field level, the fields must be separated (and each field assigned a frame) in order to view all of the images.

Once the keyboard of the AVID workstation is programed properly, the video clip can be advanced one field at a time. If there is a different image with each field advance, then the video is field based and it will be necessary to create a frame for each field of video.

The creation of a frame for each field of video is accomplished through AVID's Motion Effect Tool. When applying this tool, the % speed must be set to 50.00 and the VTR style effect should be used.

De-plexing Multiplexed Cameras

It is often helpful to isolate a particular camera when analyzing a video surveillance tape. Many times the subject of interest only appears in one or two of the video cameras even though there may be eight or more cameras in use. Being able to isolate the camera or cameras in which the subject appears will result in a more useful examination. In addition, once the appropriate cameras are isolated video segments can be produced and eventually recorded back to tape. This allows the submitting agency to be able to

view full motion isolated views of the subject of interest.

There are two ways to **deplex** camera views in AVID. The first is through dPlex . This is more of a manual method and is an integral part of the AVID Detective software. The other method uses dePlex Pro which is a plug in program to AVID.

When using dPlex, the user must be sure that auto detect is selected. The bounding box must be set in an area of the video that provides high contrast and in which no movement occurs. If something moves within the box, frames may be skipped when the deplexing operation takes place. The tolerance of this effect should be set to a point where it is not so sensitive that a minor change causes a skipped frame, but not so insensitive that unwanted frames are included. A starting point of 35 is recommended. Prior to rendering the effect, it is good to view the results. If frames are skipped or unwanted frames are included, the tolerance should be adjusted in the appropriate manner.

When using dPlex Pro, it will be necessary to export the video to the dPlex Pro plugin. After the video is deplexed, it must be imported back into AVID for further analysis.

Other AVID Enhancement Tools

The following are other enhancement tools that are available to the user:

Dveloper-

This tool allows the operator to complete functions such as frame averaging. Frame averaging combines the information from a user defined number of frames before the current frame and averages the pixel values together to generate an averaged frame. Frame averaging is designed for steady, non-moving shots. If used when there is a lot of movement, ghost like images are produced. The video can further be enhanced by using the sharpen controls, designed to bring out detail of the edges of the pixels in the footage.

Magnifi-

Magnifi allows the operator to **zoom in** or enlarge a selected area of the footage. The tool consists of two boxes placed in the composer screen. One box is referred to as the **target** box and it tells the magnifi tool what area of the video to be enlarged. The second box is the **output** box and it defines how large the image should be enlarged. Other settings available in the effect editor allow for such variables such as zoom, rotate, brightness, contrast, gamma and opacity. Four views can also be selected; they are quad, none (turns off the output box), full and 90%. Image filters can also be added to clarify the image, the most useful being the sinc and catrom.

Spotlight-

This effect allows the highlighting (or masking) of a particular area of the footage. This can be the subject of interest or other identifiable items such as a gun, vehicle, etc. The shape and the border of the highlighted area is set by the user. Effects can be added to the area not highlighted, such as blur, so the highlighted area stands out better.

Resize-

The resize effect is similar to magnify that allows the user to zoom, crop and move a clip on the timeline. It has fewer controls than magnify and can be a quicker way to make an image larger. It can also be used to scale down a piece of video so the **underscan** area can be viewed by the analyst.

Fit to Fill-

This effect is used to convert time lapsed footage into **real time**. It works by looking at the in and out points on the timeline and creating a motion effect on a selected clip to fill in the area that was marked with the in and out points.

Color Effect-

The color effect gives basic controls over color values in the footage such as hue, saturation, brightness and contrast. This effect is useful when developer cannot be used due to motion. An image can also be de-saturated, thus converting it to black and white using this tool.

Timecode Effect-

The timecode effect allows the user to place a frame accurate time code in the footage. The operator can tell the timecode exactly where to start down to the individual frame. This gives a reference point for any piece of video.

Image Stabilization-

This effect allows the analyst to stabilize video that was taken from a camera that was moving such as a handheld or camera mounted in a moving vehicle. The stabilization effect can be applied both using automatic mode and manual mode.

Audio Effects-

The audio suite of tools can be used on tapes with audio to make the audio more understandable. These tools enhance the audio portion using filters, gain controls, pitch controls and equalizers. The audio can be added to the timeline just like video and can be edited using the same techniques that are used with video. Also, time compression/expansion can be applied to adjust the length of an audio clip to better match slowed down time lapse footage.

Title Tool-

This tool makes it possible for the operator to apply title slides to the timeline and thus to the finished video project. These titles can be used to introduce the persons viewing the final video to the different segments and effects that were used during the analysis. This would be a very effective way to show a jury and the court the way a video tape is analyzed and the results obtained. The titles should be kept simple and not distract from the overall project. This tool can also be used to draw lines and arrows and label portions of the video that are important to note such as to point out a suspect, a gun or even some defect in a piece of clothing or damage to a vehicle that may later be helpful to the investigator in the identification process.

Capturing Stills

The most common request received from submitting agencies is to have still shots produced of areas or times of interest on the submitted video. The analyst should be careful in including stills for all requested times, as much as possible.

Stills are captured using the export tool in AVID. This tool must be set up to the following settings prior to exporting any stills from a video:

File type:	TIFF
WidthxHeight:	648x486
Color Levels:	601
Field Order:	Single field

Stills can be exported a single file at a time or as sequential images. AVID can export an image for each frame of video, so hundreds of stills can be quickly exported. In addition to exporting stills, movies can also be exported. AVID can export movies in both the AVI and Quick Time formats. All stills that are supplied to the investigator must be given a sub-item or new item # in LIMS and identified accordingly. A laser print of the enhanced stills that are being returned to the investigator should be printed and included in the notes. In addition, all stills files (in their TIFF format), both the enhanced and original version must be retained on a CD or other appropriate media. This CD will be identified

with an item # or sub-item number in LIMS and will be returned to the investigating agency along with the enhanced stills that were printed. Enhancement of captured video stills can be performed, if necessary, using Photoshop software. The guidelines for the use of Photoshop software is documented in the section on Latent Pro-Cognitec procedures.

Recording to Video Tape

Once all analysis is complete, it is necessary to record the enhancements used back to a video tape for use by the investigating agency. This may not include all of the video segments created during the analysis, but should include those that are most useful in showing the areas of the video that the investigator has indicated an interest in.

To accomplish this task, you can perform a **■crash record■** that allows a quick way of recording the final segment. Press **■record■** on the VCR and play the final segment in the composer window. If more options are desired, such as countdowns, adding black at tail and other options, select the **■digital cut tool■** from the clip menu.

Importing Digital Video

In some instances, the video to be analyzed will be submitted on a CD in digital format. The format may consist of AVI files, MOV files or other movie type of files. Some of these files will have been prepared using a proprietary format. AVID may not be able to handle some of these proprietary formats unless that are first converted. To convert a non standard codex, the software must first be used to **■clean■** or convert the format to one AVID can handle.

The resulting tape must be identified with a sub item # or new item # and be handled and treated as a created piece of evidence in LIMS.