

FIMS
Fastec InLine Software
User Guide
Version 3.0.4

FIMS DOCUMENTATION AND LEGAL NOTICES

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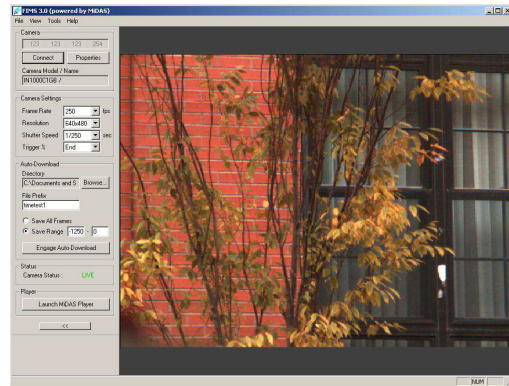
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FIMS General Overview

The FIMS software is comprised of various elements and sections. FIMS software is based on conventional Windows applications with a menu bar across the top, a series of sizing icons in the upper right corner and the standard indicators on the bottom. The FIMS software window colors can only be changed by modifying the Windows display settings.

The left section of the FIMS software window is termed the “Control Panel”. The area to the right, where camera views are displayed, is termed the “Console”.

Note: For optimum viewing area and to view images at their highest resolution, set your display to SXVGA mode – 1180x768 pixels -- with a minimum of 24-bits of color. FIMS software is designed to operate on displays as low as 1024x768 pixels and will generate an error message if your color depth is not set to High Color (16-bits) or above.



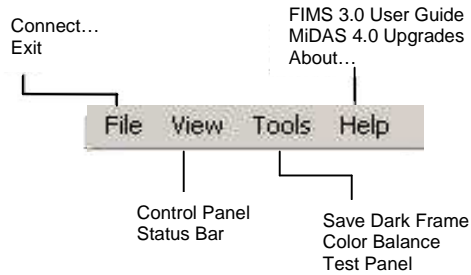
The display resolution will actively update during resizing. To resize a display window, grab any corner of the window by clicking down on the mouse, and, while holding the mouse down, drag it. FIMS software will maintain the correct aspect ratio.

Note: If your display resolution does not update in real time during resizing, you must set your Microsoft Windows as follows:

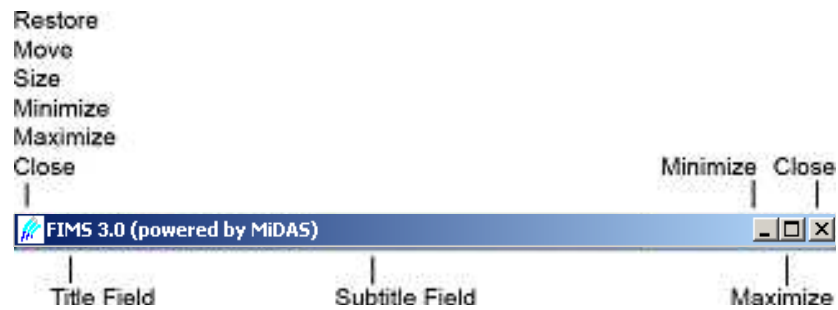
1. Click on the Windows **START** button
2. Click on **SETTINGS**, then **CONTROL PANEL**
3. Click on the **DISPLAY** icon
4. Click on the **Effects** tab
5. Make sure that the “Show Window Contents while Dragging” checkbox is selected.

Menu and Title Bars

The FIMS software menu bar spans the top of the desktop. The following shows the FIMS software menu bar options:



The FIMS software title bar is directly above the menu bar. The components of the title bar are as shown below.



Console

The image within the Console is set by the camera – it will display a live image when the camera is streaming a live image to the computer, and the size is scaled from the camera output. To collapse the console, click on the collapse button on the control panel.

Control Panel

The Control Panel is the primary means of interacting with the FIMS software program.

The Control Panel is typically docked on the left or right side of the FIMS software window. It can also be undocked and repositioned anywhere on the screen. To undock the Control Panel, double-click near the top of the docked region of the Control Panel.

To dock the Control Panel, drag the window to the left or the right side of the Console area. If you would like to move the Control Panel near the edges of the Console window without allowing it to dock, press and hold the **CTRL** button while dragging the Control Panel window.

Note: If you have dragged the Control Panel window off the lower portion of the screen and you cannot get it to reappear, it is likely that the window is hidden beneath the Windows Taskbar. In order to uncover the window, click and drag the Windows Taskbar to the right, left, or top of the screen temporarily. This should reveal the Control Panel window, which you can then drag back towards the center of the screen.

Note: The FIMS software convention is to show those parameters that are set by the operator in white. Items in gray are not accessible.

In addition to the configuration information, the Control Panel displays the current camera status. Status options include Idle, Live, Recording, and Triggered.

The screenshot displays the FIMS Control Panel interface, which is organized into several sections:

- Camera:** Contains an IP address field (123 . 123 . 123 . 254), a **Connect** button, and a **Properties** button. Below this is the **Camera Model / Name** field, which shows "IN1000M1GB /".
- Camera Settings:** Includes four dropdown menus: **Frame Rate** (60 fps), **Resolution** (640x480), **Shutter Speed** (1/60 sec), and **Trigger %** (Start).
- Auto-Download:** Features a **Directory** field (C:\Download Folder\), a **Browse...** button, and a **File Prefix** field (test107). It also has two radio buttons: **Save All Frames** (unselected) and **Save Range** (selected), with a range field showing -10 to 0. A **Engage Auto-Download** button is located at the bottom of this section.
- Status:** Shows the **Camera Status** as **LIVE** in green text.
- Player:** Contains a **Launch MIDAS Player** button.
- Navigation:** A double-left arrow button (<<) is located at the bottom of the panel.

Definitions

Trigger

When FIMS software is in record mode, the InLine camera is controlled by FIMS software are streamed directly to the on-board camera RAM. FIMS software controls the acquisition process precisely, keeping track of time and location of frames.

The video is collected into synchronized revolving memory buffers in a first-in-first-out basis. Therefore, the most recently streamed information is always available in the memory buffer. If one were to encode and unwrap a 10-frame buffer, the record sequence would repeat through the frames as follows:

1-2-3-4-5-6-7-8-9-10-1-2-3-4-5-6-7-8-9-10-1-2-3-4-5-6-7-8-9-10-1-...

FIMS software will continue to infinitely record into the revolving memory buffers until a trigger event is received. A trigger event is a hardware trigger sent to the camera through the event trigger input connection.

Triggering causes two events to happen:

1. Stop the recording at the desired time.
2. Isolate the exact point in time that the trigger impulse was received by FIMS software hardware.

The user sets the Trigger Percent (on the Record tab) to tell FIMS software when to stop the recording and where to put the Reference Frame 0.

In the resulting captured sequence, frames with negative numbers are BEFORE the trigger pulse was received and frames with positive numbers are AFTER the trigger pulse was received.

FIMS will only stop a recording when an external trigger pulse is received. To trigger FIMS software using an external trigger pulse from a sensor or machine output, you must connect that sensor to the camera trigger input. FIMS will automatically interpret that input as a trigger event.

Frame and Exposure Time

Most often, the time that a video camera is actually acquiring images of the scene is only a small fraction of the total time. The actual acquisition time is termed the Exposure Time or integration time, and is most often measured in microseconds.

In FIMS, a video frame is defined to be the total time between start of exposures.

For example, if the video acquisition rate is 1000 fps, the video frame duration is 1 ms. The exposure time might only be 20 microseconds in duration. Therefore, the camera is only acquiring scene information (e.g. light) for 2% of its operation time.

In FIMS, frame counting is done at the leading edge of the frame. InLine cameras have the exposure time (the time the camera shutter is open) at the beginning of the frame, as shown at right.

Reference Frame

The Reference Frame is the frame in which the external event trigger is received. Whether a trigger is received during the exposure period or during the dark period has no impact on labeling the Reference Frame. Using the above diagram, if a trigger pulse is received after an exposure period is complete, then the first post-trigger image is on frame 1, not frame 0. Consequently, the image of frame 0 was acquired prior to the event trigger.

FIMS software places the Reference Frame Oper the following rules.

If...	What is returned...	Reference Frame is ...
Buffer has been filled prior to receipt of external trigger	A full buffer of video	On the frame corresponding to when the trigger was received.
Buffer has not been filled prior to receipt of external trigger	All frames acquired prior to trigger time and the desired number of post-trigger frames.	On the frame corresponding to when the trigger was received.

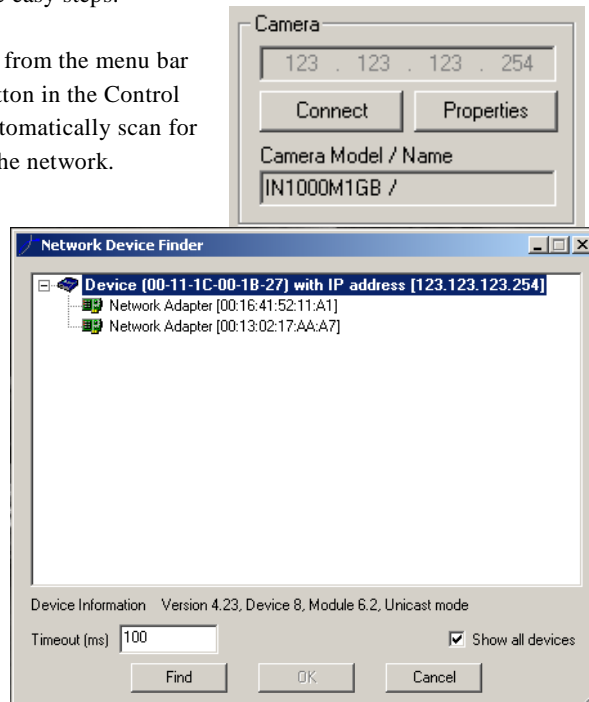
Connecting to a Camera

FIMS software controls InLine high-speed video cameras, instructing them how and when to acquire pictures and what to do with the acquired information.

Connect your InLine camera hardware to your computer per the instructions provided with your camera.

To open your camera, follow these easy steps.

1. Select **FILE**, then **CONNECT** from the menu bar or click on the **CONNECT** button in the Control Panel. FIMS software will automatically scan for all the available cameras on the network.
2. The Network Device Finder window will appear. Select the device that you are interested in opening. Only one device can be opened at a time.



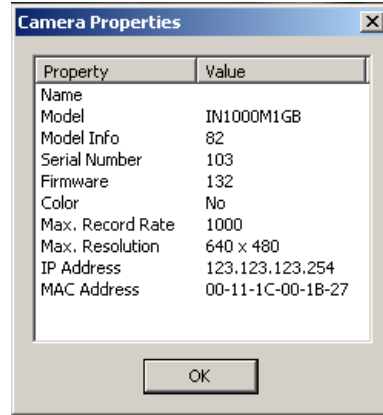
Camera Properties

FIMS software also displays pertinent information about the specific camera, as retrieved from the firmware and camera hardware.

To access the information about the camera, click on the **PROPERTIES** button in the Control Panel.

FIMS will read the camera setup memory file and return the pertinent information from the InLine camera attached to it, as follows:

- Camera model number
- Camera serial number
- Firmware revision level
- Camera IP address
- Maximum frame rate and resolution
- MAC Address of Camera

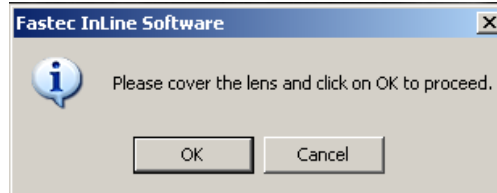
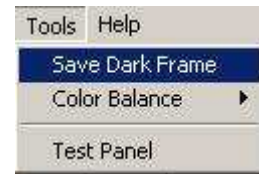


You cannot change the properties of the camera from within FIMS.

Save Dark Frame

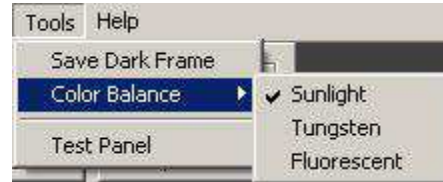
InLine cameras require users to save a Dark Frame to optimize the camera white balance. To save a dark frame, select **SAVE DARK FRAME** from under the **TOOLS** menu.

You will be prompted to cover the lens and then save the frame. FIMS will automatically store the dark frame.



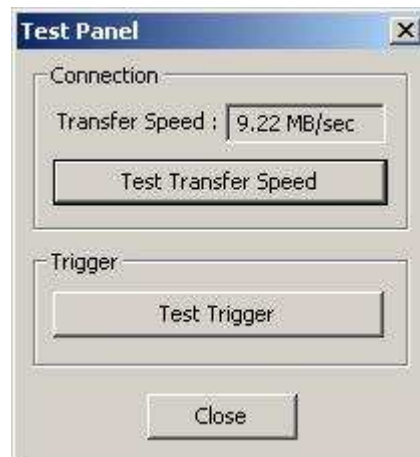
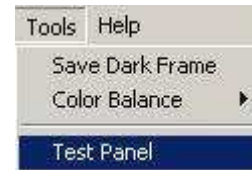
Color Balance

To optimize the color settings of your InLine cameras, select the type of lighting that is being used to illuminate your subject. This process is termed color balancing . To set a color balance setting, select **COLOR BALANCE** from under the **TOOLS** menu. The options are Tungsten, Sunlight or Fluorescent.



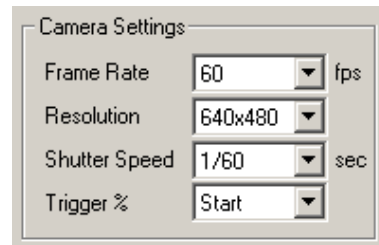
Test Panel

FIMS 3.0 includes a test panel that allows the user to test the transfer speed and trigger . Click on the **TEST TRANSFER SPEED** button to determine the speed, in MB/sec, that images will be transferred to the host computer. Click on the **TEST TRIGGER** button to test the trigger properties of the camera. The trigger test will capture a full buffer of video using the trigger settings, then display the trigger frame in the window. To test the trigger, the auto-download mode must be activated.



Camera Settings

To record a video image, you must configure the camera from within the FIMS Control Panel. The camera settings for the Control Panel are as follows:



Frame Rate	The frame rate drag-down box displays the available video frame rates. The default is set to 60 fps.
Resolution	The available resolution settings for the camera. For each frame rate chosen, only certain resolutions are available. Choose the desired resolution from the list shown. Note that lower resolutions typically result in longer recording times and more video frame. If resolution is the most important parameter, you can also set the resolution and then set the frame rate from the list.
Shutter Speed	The shutter speed denotes the amount of time that the electronic shutter of the shutter remains "open" during each frame. Shorter exposure times reduce blur within each frame, but at the expense of light collecting ability. The shutter speeds are determined by the camera hardware in the computer. The default is set to the inverse frame rate (open shutter). Shutter speeds are displayed in inverse seconds.
Trigger Percent	The percentage trigger puts the Reference Frame 0 at the desired position and dictates the amount of time prior to the trigger and after the trigger is received. The listed number is the pre-trigger percentage of the total acquisition. For example, a trigger percentage of "Start" instructs the FIMS software to (1) continue to acquire one full buffer of images (acquire 0% before the trigger and 100% after the trigger) and (2) to put the Reference Frame 0 at the beginning of the sequence. Alternatively, a trigger percentage of "End" instructs the FIMS software to (1) stop acquisition immediately upon receipt of a trigger input (acquire 100%

before the trigger and 0% after the trigger) and (2) to put the Reference Frame 0 at the end of the sequence.

The Reference Frame 0 is placed at the exact frame when the trigger input is received.

Trigger percentages include Start, 25%, 50%, 75% and End.

Persistence of Settings

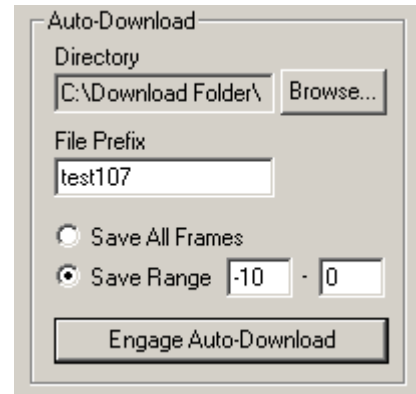
The guiding principle for the persistence of camera settings when any one of the parameters is changed is to maintain whatever can be maintained and only change those values which must be changed in order to be compatible with the new setting.

The table below outlines what may happen to the parameters listed across the top when the parameters listed down the left side are changed.

<u>Then...</u>			
<u>If you change...</u>	Frame Rate	Resolution + Active Area	Shutter Speed
Frame Rate	Sets the frame rate to the new setting.	Resolution is maintained if it is compatible with the new frame rate. If the resolution must be changed, the center of the active area is maintained	The shutter speed multiplier (1x, 2x, etc.) is maintained as the frame rate changes.
Resolution + Active Area	Changes of resolution and active area do not affect the frame rate setting. .	Changes to resolution will attempt to maintain the center of the active area.	Changes of resolution and active area do not affect the shutter speed setting. These settings are completely independent.
Shutter Speed	Changing the shutter speed does not affect any of the other camera settings.		

Auto-Downloading your Images

FIMS will automatically save your video captured by the InLine camera to a hard drive upon receipt of an external trigger. This process is termed 'auto-download' of video. In FIMS, video is always downloaded in a proprietary Fastec Imaging RAW file format for faster downloads. Video can then be saved in Windows video (AVI) format or as a series of JPEG, Bitmap (BMP) or TIF images using the MiDAS Player .



The user must configure the download using the following information:

Directory	The folder location on the hard drive or network to which the RAW file will be downloaded.
File Prefix	The Microsoft Windows compatible file name. FIMS will add a number to this file name. This counter is incremented automatically for each recording..
Save All Frames	Download all the frames from the current recording in RAW file format to the designated folder location.
Save Range	Download a range of the frames to the designated folder location, as defined by frame numbers. .

With each FIMS software measurement you make and save, FIMS software creates a **CFG** file on your hard drive that contains all the configuration information about your recording so that when you open a measurement back, MiDAS Player knows the frame rate, shutter speed, etc. of the original recording.

To engage the InLine camera in auto-download mode, click on the Engage Auto-Download button. The button functions are as follows:

ENGAGE AUTO-	Pressing the ENGAGE AUTO-DOWNLOAD button puts the
---------------------	--

DOWNLOAD button

InLine camera into Record/Auto-Download mode. When in this mode, the InLine camera will respond to an external trigger and record a video using the settings in the Camera Settings box. The video will be auto-downloaded to a file per the settings in the Download box.

**DISENGAGE AUTO-
DOWNLOAD button**

Pressing the **DISENGAGE AUTO-DOWNLOAD** button takes the InLine camera into Idle/Live mode. While in this mode, the InLine camera will not respond to any external trigger. While in this mode, the camera will only stream live images to the console.

Playing Recorded Videos

To view the video images that have been downloaded to a hard drive, you should use the free MiDAS Player, which is available from the Xcitex web site (<http://www.xcitex.com>). You can launch the MiDAS Player directly from the FIMS Control Panel by clicking on the **LAUNCH MIDAS PLAYER** button.



You can use the MiDAS Player to convert the RAW files that are saved by FIMS into standard Windows video formats or sequences of standard still images such as:

AVI	Standard Microsoft Windows Video format. .
BMP	Standard bitmap file format.
TIF	Standard tag image file format.
JPG	Standard jpeg compressed file format.

FIMS Specifications

Record:

Frame rates: depends on InLine camera model
Shutter: depends on InLine camera model

Event Triggering:

Adjustable Trigger: 0 to 100% adjustable pre- or -post trigger event
Software Trigger: Not available in FIMS (available in MiDAS 4.0)
External Trigger Input: 0-5V, 10 mV threshold, rising or falling edge, contact closure

Auto-Download:

Download Format: Fastec Imaging RAW file format
Saving Options Save All Frames, Save Range of frames

Recommended Computer Specifications:

CPU Pentium 4 minimum (or equivalent).
Display Adapter 24-bit color (30 bit color preferred)
Display Resolution 1280x1024 resolution minimum (1180x768 preferred)
RAM 1 GB minimum (2 GB preferred)

Service and Support

Before requesting technical support for your copy of FIMS software, you should update your software to the most current version. Technical support is only available on the most current version of software.

You may receive support for FIMS from the following sources:

Internet support:

Sales support: <http://www.fastecimaging.com>

Technical support: <http://www.fastecimaging.com>

Email: support@fastecimaging.com

Telephone support and customer service:

Phone: (USA) +858-592-2342 (worldwide)

Warranty support:

email: support@fastecimaging.com

Phone: (USA) +858-592-2342 (worldwide)

Fax: (USA) +858-592-2615 (worldwide)

Mailing Address:

Fastec Imaging, Inc.
17150 Via Del Campo
Suite 101
San Diego, CA 92127 USA

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