SingleIPI program

User Manual

Document Version 5.6
Date: 12 November, 2008

1. Chapter 1
Scope

1.1   IPI Configuration File (SingleIPI.dat)

The IPI program uses the "SingleIPI.dat" configuration file to setup few of it parameters including the password. When the IPI programs runs the first time, or if the file is missing, it creates the "SingleIPI.dat" file with default values. The default password is no-password (an empty string).

Before using the system part of the parameters may need to be setup by a service person, according to installation conditions. Running the IPI program and entering the "Setup/Options" does this (see paragraph 4.2.6).

Camera position relative to the Laser Sensor

There are two possible ways to install the camera relative to the Laser Sensor .

a. Adjacent Installation
In adjacent installation the camera is installed such that:
(1) The camera is mounted on top of the Laser Sensor, or very close to the sensor. And,
(2) The pan axis of the camera is parallel to the scan axis of the Laser Sensor.
This is the most common case. In this case only the shift angle between the systems must be adjusted.

 b. Remote Installation
  In remote installation the camera is installed such that:
(1) The camera is far from to the sensor.
Or,
(2) The pan axis of the camera has a skew angle relative to the scan axis of the Laser Sensor.
 In this case the six values of the coordinate transformation from the sensor system to the camera system must be calibrated.

2. Chapter 2
System Operation

2.1 Control Items Description

The system controls are located in the following units:

- Operation Box
- Power Cabinet
- Video Amplifier
- Control Station (PC).

2.1.1 General Description

The control station (PC) is controlled and operated as any regular PC, using a keyboard, a mouse, control unit's controls and a monitor.

The monitor displays interactive operation screens through which most of the Laser Sensor functions are controlled.

The control station provides three main screens:

1. Operation screen (see Figure 4-1-a to Figure 4-1-c) – main screen that provides the tools to monitor the detection and track of intruders. The three figures show three possible states of the operation screen:
   Figure 4-1-a: Manual Camera without Target Traces.
   Figure 4-1-b: Manual Camera with Target Traces.
   Figure 4-1-c: Automatic Camera with Target Traces.

2. Report screen (see Figure 4-2) – allows reviewing detected targets data that were recorded during detection events that occurred in the last pre-defined period (few days).

2.1.2 Operation Screen's Windows and Controls
(See Figure 4-1-a, Figure 4-1-b, Figure 4-1-c)

This screen includes five main functional sections as follows:

a. Laser Sensor Map Window

Displays the scanned area and its boundary in polar coordinates, as well as intruders that are marked by dots.

Note

The scanned area boundary in the examples of Figures 4-1-a to 4-1-c is not round due to reflections from walls and other obstacles near the Laser Sensor location.

Sectors in which detection is hidden, according to operator's choice are also displayed (see Paragraph 2.2.2 below).

The display maximal range can be selected among three: 100% full range, or 50%, or 20% full range (see Table 4-1 below).
The angle on the screen is measured counterclockwise (CCW) from the direction to the right (see Figure 4-4).

b.   Camera Image Window

Displays the current image (moving or stills) captured by the camera. Comment: In the figures the image area is purple because the operating system can not copy the live video.
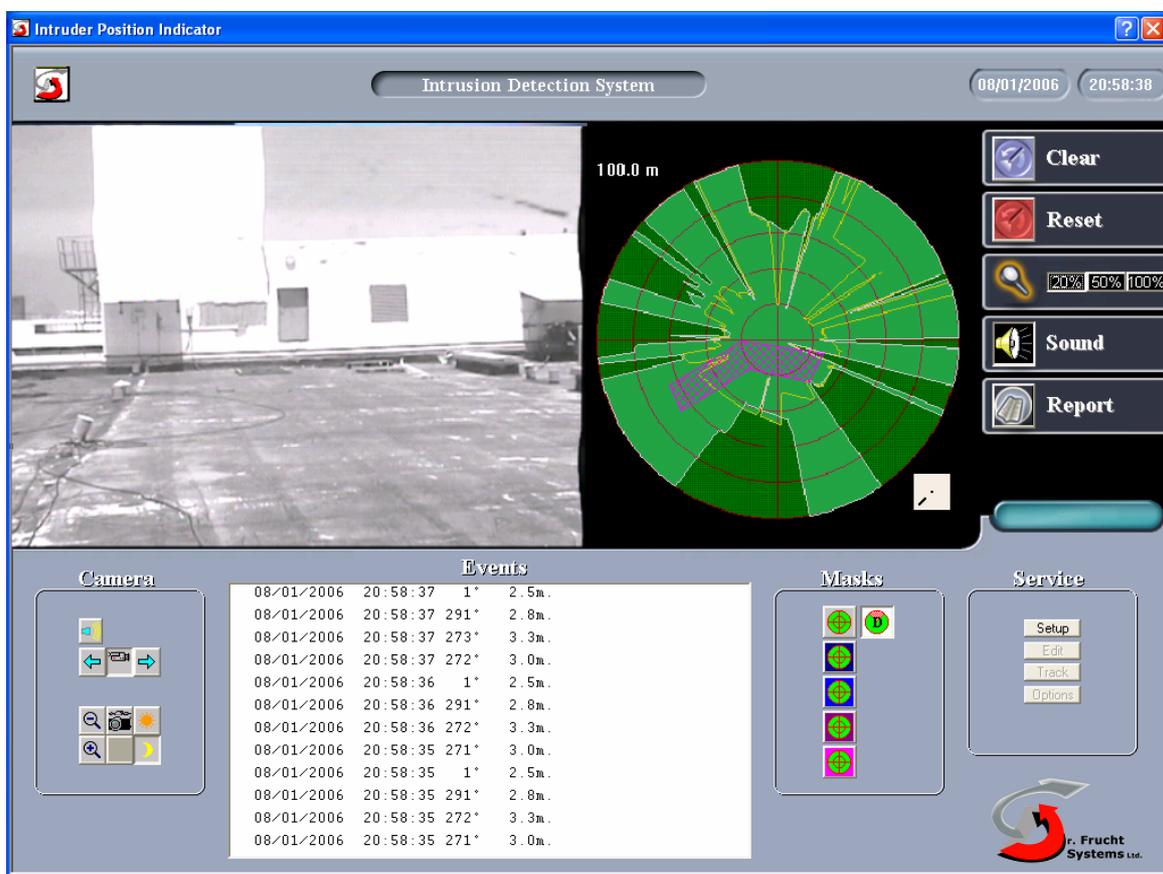

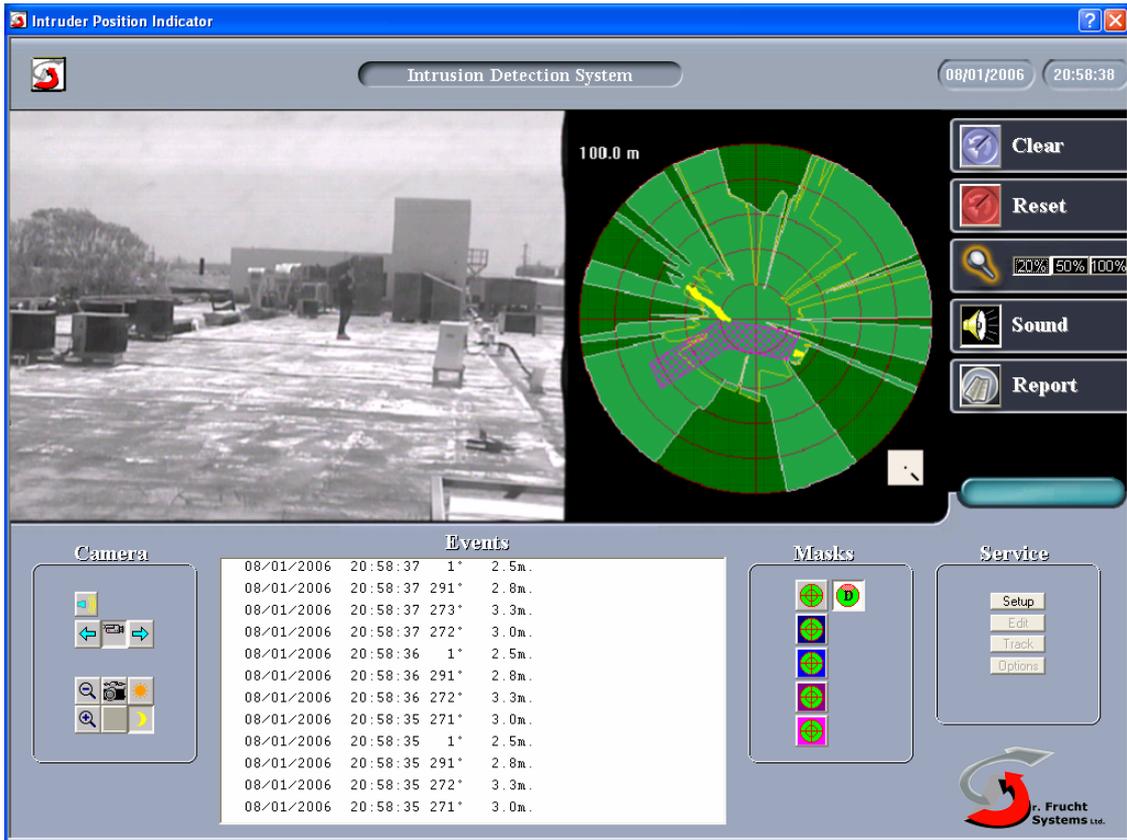**Figure 4-1-a: Operation Screen (Manual Camera without Target Traces)**

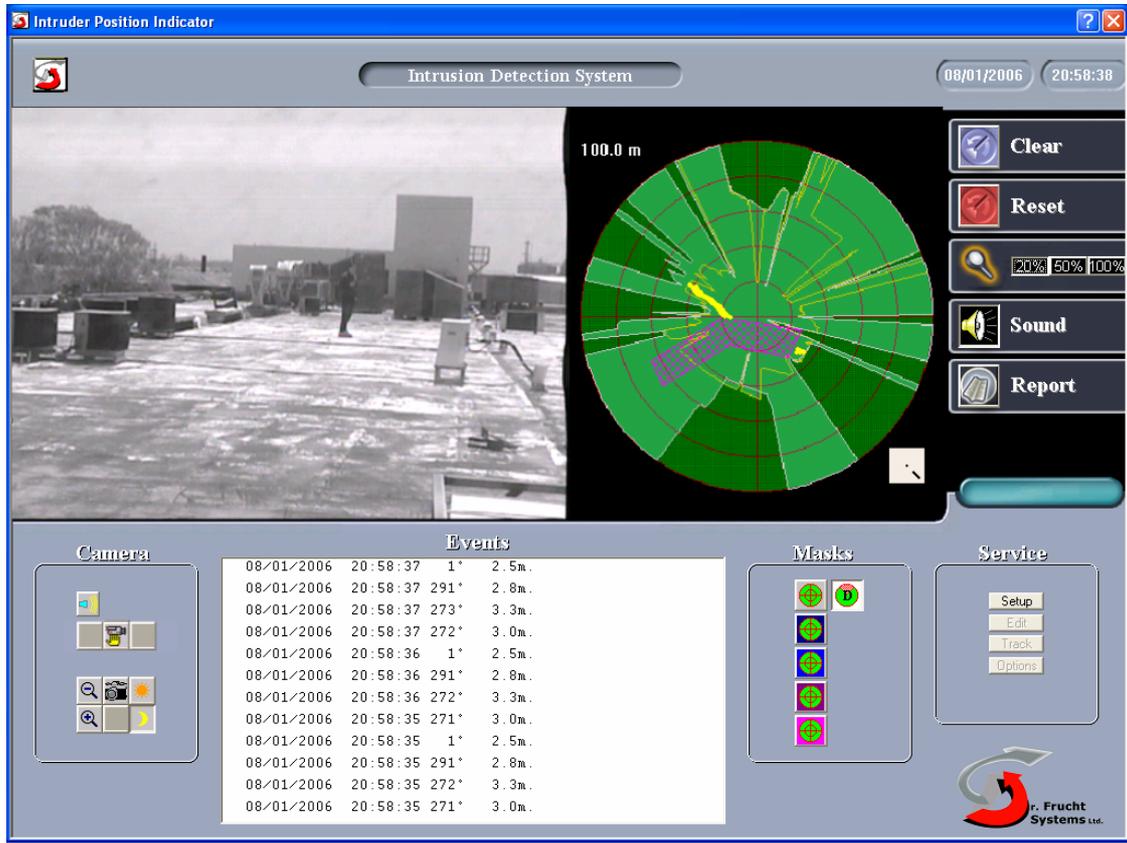**Figure 4-1-b: Operation Screen (Manual Camera with Target Traces)**

Figure 4-1-c: Operation Screen (Automatic Camera with Target Traces)

Figure 4-2: Report Screen
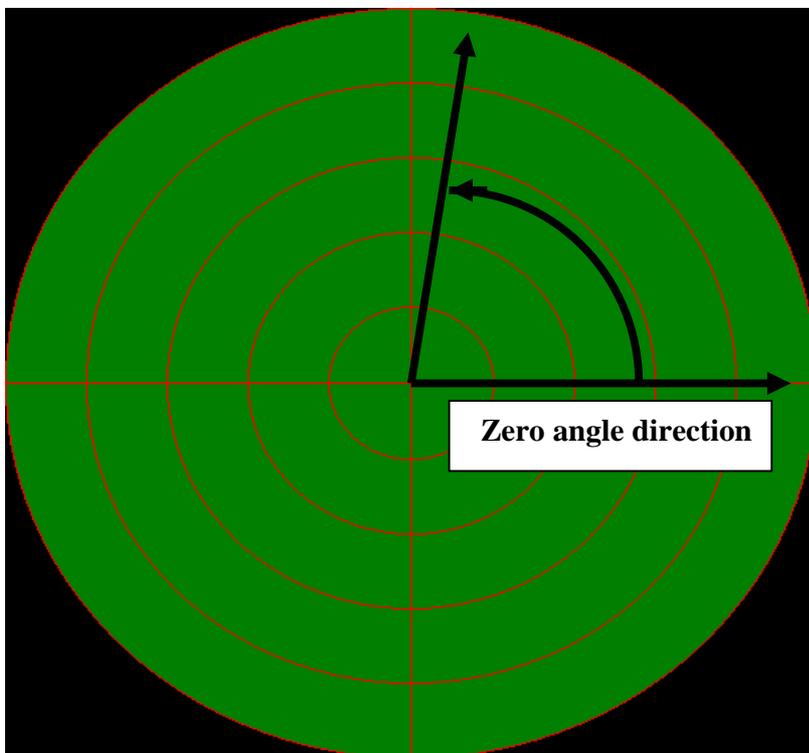

Zero angle direction

Figure 4-4: Angle Definition

c. <u>Target Data List Window</u>

Presents a list of the last detected targets; each target in a separate row. The list, including 13 targets, details the following data:

- Detection date.
- Detection time.
- Target angle relative to the laser sensor zero direction (the zero direction is marked on top of the laser sensor box).
- Target range (in meters) from laser sensor location.

d. <u>Control Buttons Section</u>

See Table 4-1.

e. <u>Message Section</u>

The message section displays the rotating icon or the no connection icon and instruction messages. The icons indicates:
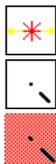
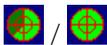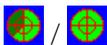|	
	No Connection
	Laser sensor operating mode
	Laser sensor adaptation mode
	"Low Voltage" of laser sensor power

f. <u>Exit Button</u>

The upper button enables to exist from the laser sensor IPI program (after entering a password). In order to resume the program, the procedure described in paragraph 4-2, using the SingleIPI icon, has to be performed.

Table 4-1: Main Screen buttons and Icons:

Button/Icon	Key	Description
Camera and Image Controls		
		Automatic/ Manual Camera mode
		Day state – stop IR illumination
		Night state – start IR illumination – The IR can be illuminate only when there isn't any light condition, such as sun or projector.
Camera Manual Controls		
	Right	Rotate camera to right
	Left	Rotate camera to left
	Down	Move camera down (note – no down arrow will be shown when the type of the track will be 3-track)
	Up	Move camera up (note – no up arrow will be shown when the type of the track will be 3-track)
		Doppler Scan Enable / Disable
	+	Near zoom
	-	Far zoom
		Capture (Stores) a picture
Display and Report Controls		
		Resets the screen and close report file
		Activates Report screen
Scale selection		
20%		Sets scale to maximal range of 20%
50%		Sets scale to maximal range of 50%
100%		Sets scale to maximal range of 100%
Alarm		
/		Enables/Disables alarm

	Space bar	Stops voice alarm

Table 41-: Main Screen buttons and Icons (continue):

Button/Icon	Key	Description
View sector		
/		Enables/disables detection hidden sector group #1
/		Enables/disables detection hidden sector group #2
/		Enables/disables detection hidden sector group #3
/		Enables/disables detection hidden sector group #4
/		Enables/disables detection hidden sector group #5
		Enables/disables detection Doppler hidden sector
Additional Sensor		
FENCE		Display additional sensor (fence) state
NO FENCE		Disable additional sensor (fence)
ALS Sensor		
		Resets the detection program in the laser sensor to its initial phase
Setup of IPI and the Laser Sensor		
Setup		Enables Shift, Edit and Options buttons (after entering a password) / disable (exit) setup
Track		When enabled by Setup, participates in camera shift zeroing (see paragraph 4.2.3)
Edit		When enabled by Setup, participates in preparing hidden sectors (see paragraph 4.2.2)
Options		When enabled by Setup, opens the setup screen to edit IPI and the laser sensor parameters (see paragraph 4.2.7)

2.1.2.1   Report Screen

This screen includes four windows that provide detected targets data stored in separate directories.

These directories are stored in the main directory *:\REPORT.
Display and operation of the Report screen is independent of the laser sensor operation, therefore it can be observed even when the sensor is OFF. However when the laser sensor rotates and the IPI program runs, the system will continue to look for targets (intruders. If a new target is detected, the Report screen is closed and the main operation screen reappears.

The first window in the Report screen presents the directory list while the others four windows display the content of four target data files located in the selected directory. These windows are:

a.   Days and Hours Directories Windows

Displays the list of days (and hours) directories as follows:

-    Double click on a day directory opens the list of its internal hour directories.
-    Double click on an opened day directory closes it (hides its hours directories).
-    Single click on an hour directory provides displays in four windows (from the directory four files).

b.   Target Files List Window

Present the list of all the targets that were detected by the laser sensor. The target data in each line:

-      Sampling date.
-      Sampling hour.
-      Angle
-      Range.

The window also contains the following data:

-      At its top: The directory starting time.
-      At its bottom: The directory closing time or reset time.
-      Events messages.

c. Target Images Window

Display the filed targets images captured by the camera (mostly less than the number of the laser sensor samples). Each image is marked with the capture day and hour as well as the angle and the range of the target. If the image was captured manually (using), the image is marked with the capture day and hour and as PHOTO. A bottom bar allows browsing among the images.

d. Laser Sensor Map Window

Display the laser sensor map with the file's target traces.

e. Close button

Closes the Report Screen and switches to main operation screen.

2.2   Operation Instructions

2.2.1   System Power-ON, Initialization and Power-OFF

(1) Verify that all system components are well connected according to Paragraph 3.3 (Electrical Installation).

(2) Switch ON power sources in power cabinet and verify that their indicators denote normal operation.

(3) Switch ON control station units (PC and monitor) and verify that the Windows screen is opened and contains, among others, the system Icon:

-        SingleIPI - Initiating the monitor and control program.

(4) Switch the video amplifier power switch to ON.

Note

If the current system initialization is the primary one after installation, refer to paragraph 4.2.6 before operating the laser sensor through the operation box.

(5) Operate the laser sensor by switching the operation box **I/O** switch to **I** (ON).

(6) Double click on the SingleIPI icon and verify that the laser sensor operation screen is opened (see Figure 4-1-a).

(7)   Wait about 1 minute from operating the laser sensor and verify that the rotating ray icon continuously rotates and is not replaced by the icon. If the icon is displayed refer to trouble shooting procedure in chapter 5.

(8)   To turn off the system:
- Exit the SingleIPI program (requires password).
- Shut down the control computer.
- Switch all power switches.

2.2.2   Masking Sectors to Hide Detection or Display

It happens that some sectors in the scanned area need masking, due to existence of frequently appearance of known not threatening "targets" in them. The IPI program includes 5 groups of display masked sectors, each one denoted with different 5 colors. Each group can be enabled/disabled with the appropriate / bottoms.

Before editing the masked sectors either turn off the laser sensor or keep the scanned area without targets. To edit or to delete masked sectors, perform the following:

(1) In the laser sensor operation screen, press the ⟨ Setup ⟩ button.

(2) In the opened password window, enter your password.

(3) Press the Edit button. Move the cursor inside the map. Verify that the mouse cursor is turned to + sign and a display of cursor position in polar coordinates (angle, range) appears.

Note
The + cursor allows to define polygons on the laser sensor map. Clicking the mouse left pushbutton when the cursor is positioned on an adjacent point in the map causes a line to be drawn between the two points. When polygon is closed, it is filled with a line net colored by the selected one. The polygon is defined as a masked sector.

(4)   Select one of the five masked sectors groups.

(5)   Draw the contour of the required sector to hidden.

- Start from any point of the polygon and draw lines between adjacent points.
- To complete the sector, bring the cursor to the starting point of the polygon and click the mouse left button.
    - Verify that the sector shape is filled with drawn net (if not, try again to position the cursor close to the starting point and click again).

(6)   Repeat step (5) procedure for the other masked sectors of the same group

(color). Repeat steps (4) and (5) for another group.

(7)   To cancel a sector masking, click the mouse right button while the cursor is within the masking shape. This cancels the sector regardless the selected group.

(8)   Select the scale before starting to draw any one of the masked sectors. If you change scale while in edit, you need to press edit again.

(9)   Exits edit (presses edit) or setup (presses setup button).

2.2.3   Video Camera Alignment (Pan Offset)

After system installation, the camera coordinate transformation should be aligned to the laser sensor direction.

a. Adjacent Installation
For adjacent installation perform this process as follows:

(1) While the system is operating, send a target (single person) as a target to the scanned area, at a distance greater than 30 meters.

(2) Verify that the laser sensor detects the target.

(3) Press   &boxed; Setup button.

(4) Enter password.

(5) Press the &boxed; Track button. A dialog box is displayed.
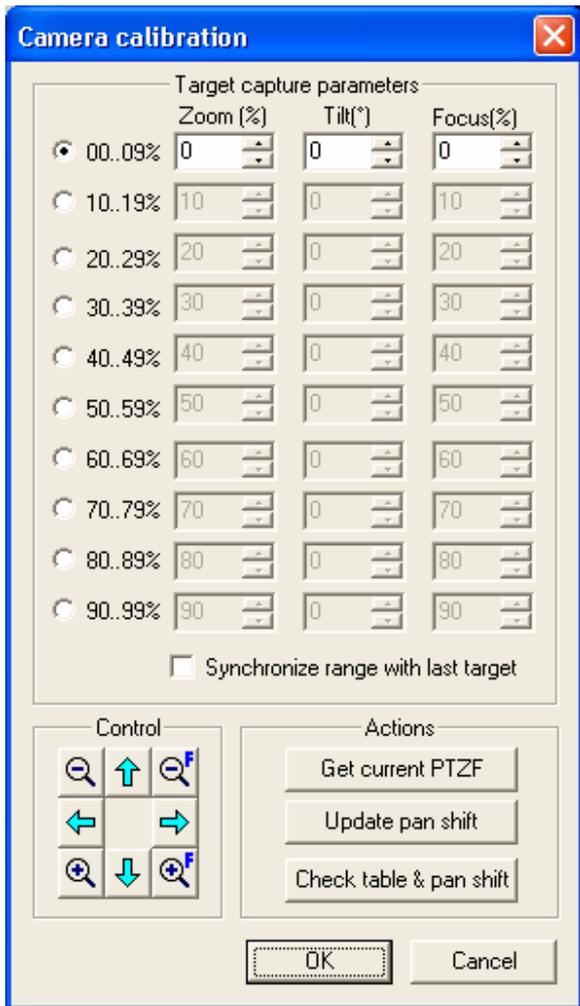
(6) Observe the image while you track the target with the camera.

(7) When the target stands still at his place, manually change the camera direction so that the target appears at the middle of the image.

(8) Press "Update pan shift" to confirm the change in camera shift (this nulls the shift between the camera and the laser sensor directions).

(9) To check the quality of shift zeroing, press "Check table & pan shift" and check that the camera tracks a moving target while the target is kept in the middle of the image (after the slight time delay of the camera).

(10) Press "OK" to save new calibration data to program profile.
b. Remote Installation
For remote installation perform this process as follows:

(1)   Perform the remote installation calibration test. Refer to the calibration test instruction manual. Copy (on a paper sheet) of the six parameters for each LRF values (Xc, Yc, Zc, Psi, Theta, Phi).

(2)   Enter to the setup screen (Figure 4-4).

(3)   Press "Enable" button in Remote field. It instructs the IPI program that remote camera is selected.

(4)   Press Adjustment, it opens the Camera Calibration Screen (See Figure 4-4-a). Enter password, it enable the parameters fields. Write into each field the value calculated by the calibration program.

(5)   Press OK and OK again. The IPI program terminates and restarts.

(6)   To check the camera tracking, send a target (single person) as a target to walk through the whole scanned area. Observe that the camera tracks the moving target. When the target halts its image should be in the middle of the video window.

(7)   When the remote camera is enabled, the shift button is disabled (the shift corresponds only to adjacent camera).

2.2.4   Monitoring the Guarded Area

(1) In order to start a new detection event (a new directory) without earlier traces, press (clear screen) button, and verify that all windows in operation screen are cleared.
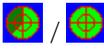
(2) Using the four / buttons, select which display masked sector to enable or disable. You can select any combination of the four groups. NOTE: After enabling/disabling laser sensor is set to study mode, therefore there will be no detection during short period of time. Connection icon () will notify you about exit from study mode.

(3) Observe the laser sensor map and verify that there are no intruders (no intruder dots are displayed).

(4) Verify that accordingly the audio alarm is not operated and that the camera image does not contain intruders.

(5) To enable/disable the audio alarm use the / button.
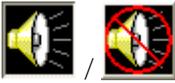
(6) If you wish to rotate the camera manually, select (manual mode) and use the navigation arrows and the zoom buttons as you need.

(7)   To change the range scale of the laser sensor map, before an intruder is detected, use the required button 20%, 50% or 100%.

(8)   If the laser sensor detects an intruder, the camera manual control is disabled. Verify that the camera enters automatic mode and tracks the intruder. The system starts to capture camera images of the intruder and stores them in the Report file. If the intruder is of a "black body" type, he is marked on the map at a constant range even if he continues advancing, and only his angle is changed according to change of location.

Note

If the following conditions occur the target is a "black body" type:
   a. The intruder reflected signal is below the detection threshold of the LRF, so that there is no range measurement to the intruder.
   b. The reflected signal from the background is above the threshold, so that the range measurement probability of the background is very high.
The intruder range is considered as the range to the background. The target is marked on the map and in the target list at the background range even if he continues advancing. His angle obviously changes according to change of location.

(9) To view the Report files on the Report screen (see Figure 4-3), press the (Report) button.

(10) If a burst of false targets is detected as nuisance alarms (e.g. due to rapid change in weather conditions), they are supposed to be deleted after few laser sensor scanning (according to system algorithm). If not all of them are deleted, perform system reset by pressing the Reset laser sensor button (this force the detection program to its initial phase and enables the system to learn the new conditions and to refer to them as permanent background). If a permanent true target appears (an intruder enters and stays in one place), and you want to stop its detection also press the Reset laser sensor.

(11) To exit the IPI program clicks ☒ and enters the password.

2.2.5   Setup the Control and Display Computer and the Camera

To change the system parameters of the PC and the camera while IPI is running, perform the following:

(1)   In the laser sensor operation screen, press the Setup button.

(2)   In the opened password window, enter your password.

(3)   Press the options button. The setup screen is open (See Figure 4-4).

(4)   Edit the parameters in their boxes. Most of them are self-explanatory, but it is recommended to consult a service person.

(5)   To enter the laser sensor setup, press the Laser sensor button.

(6)   Press OK to update the setup values. The IPI program will terminate and restart. Press Cancel to exit setup screen.
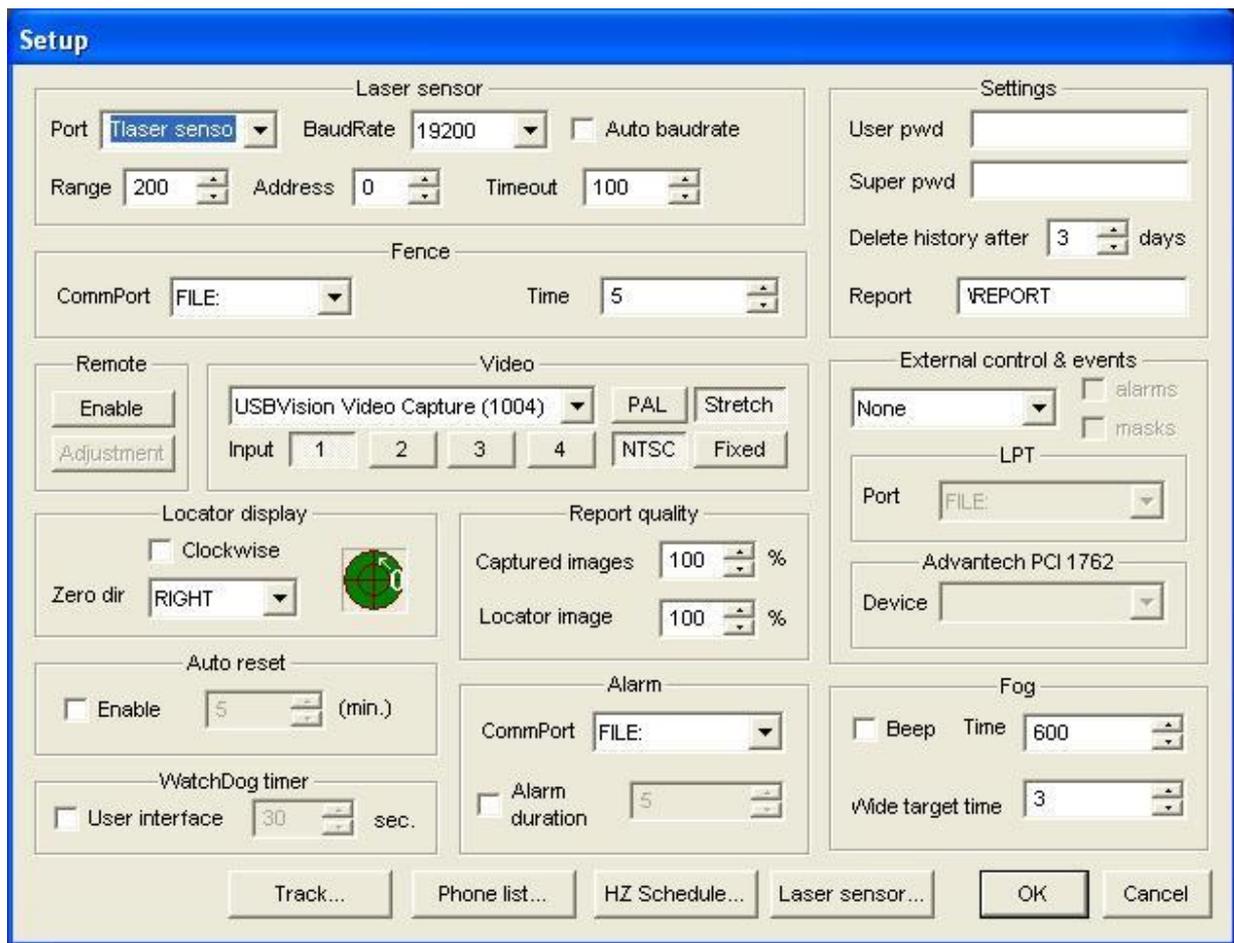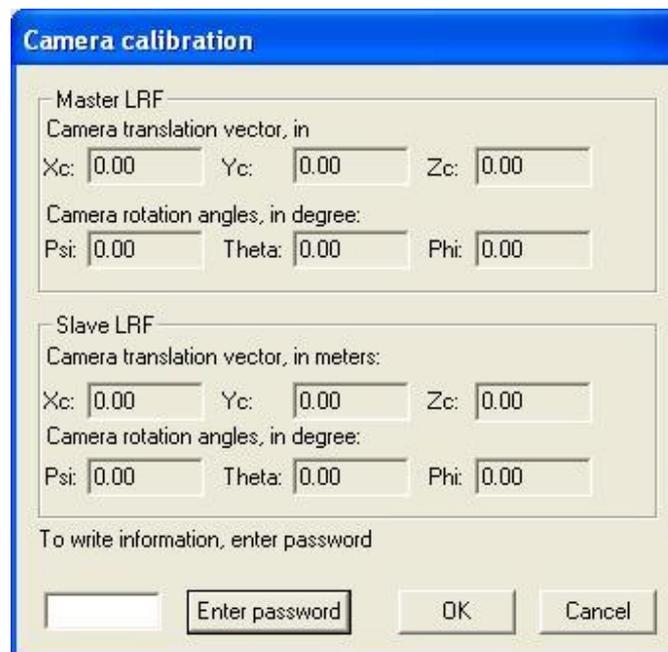
Figure 4-4: Setup Screen
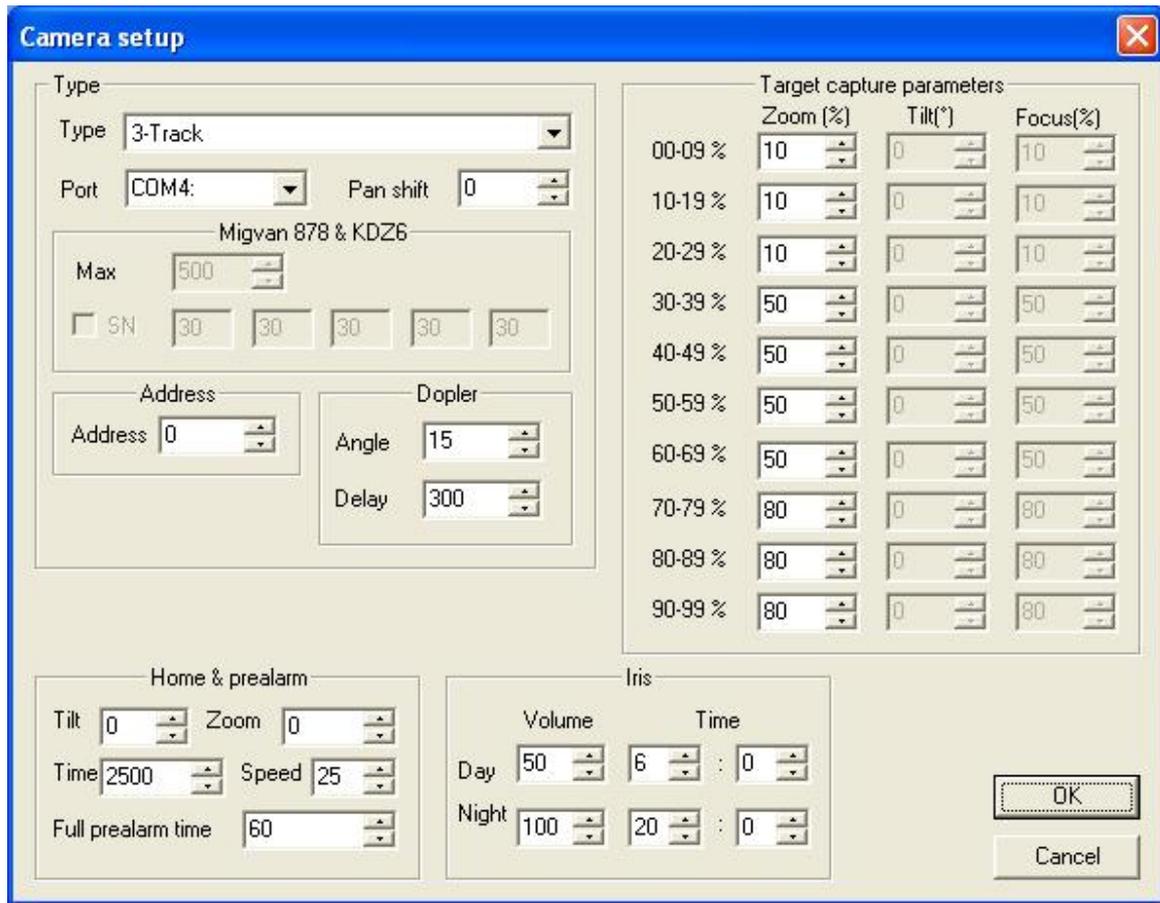

Figure 4-4-a: Camera Calibration Screen

Figure 4-4-b: 3-Track camera setup screen
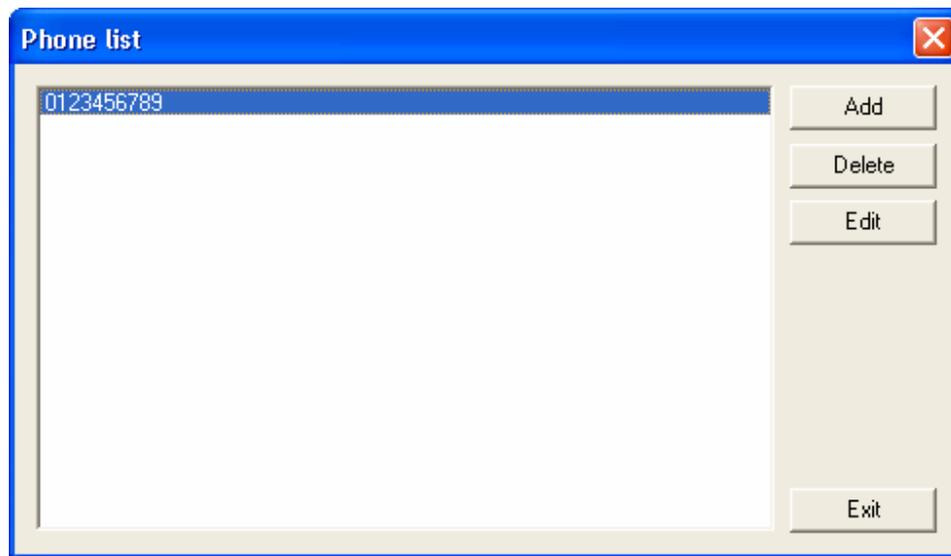
Figure 4-4-c: Phone call list setup screen
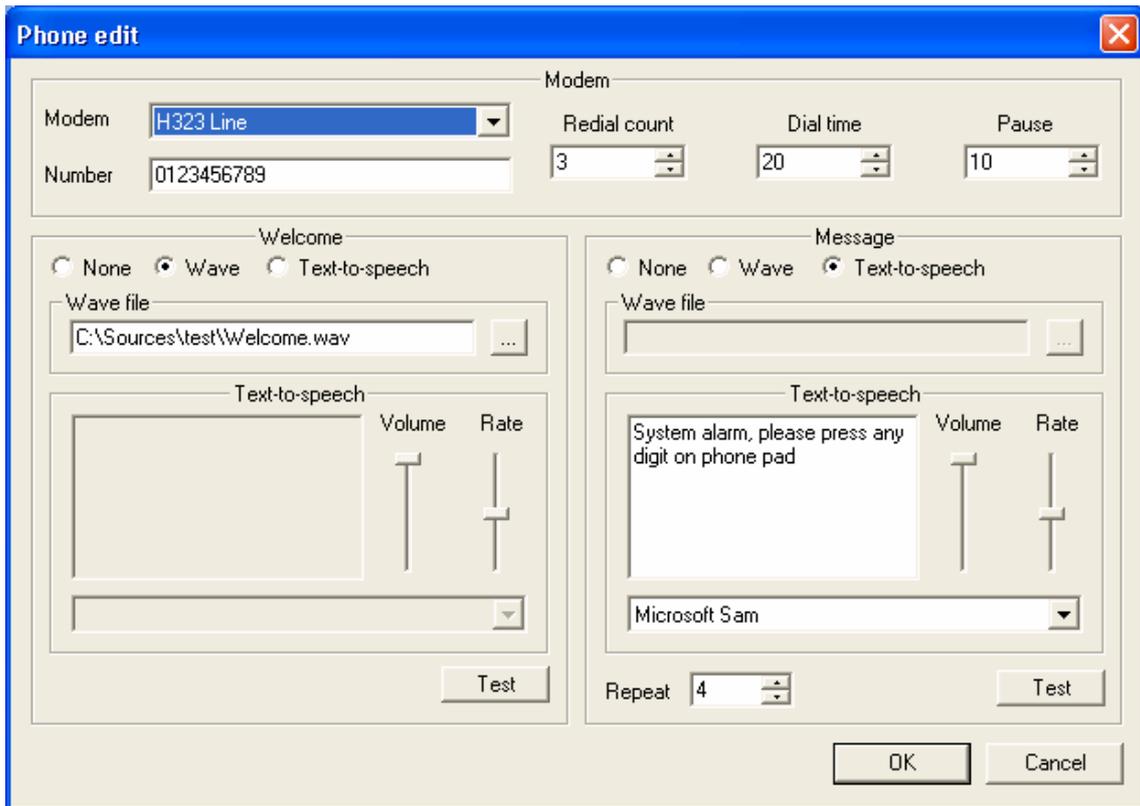
Figure 4-4-d: Phone call setup screen
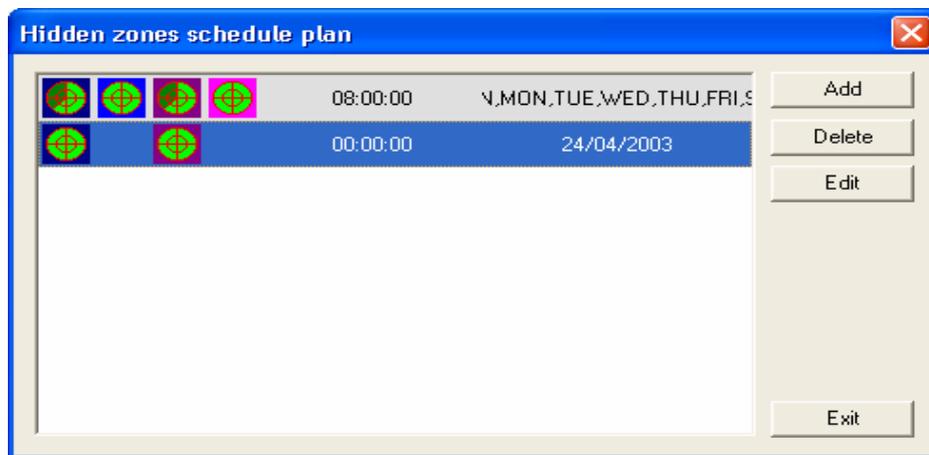
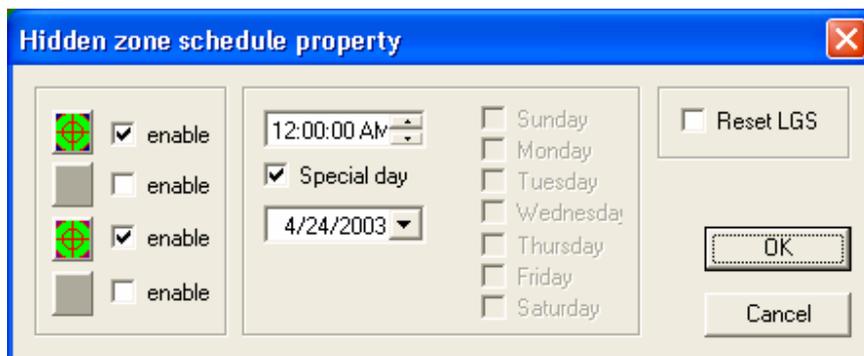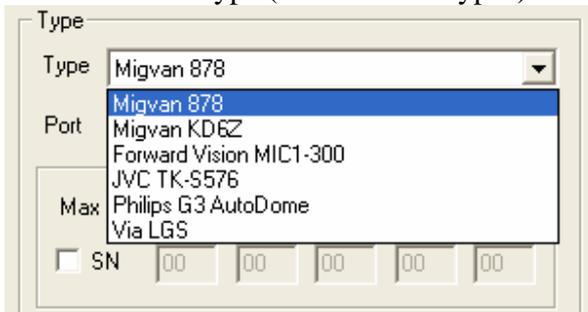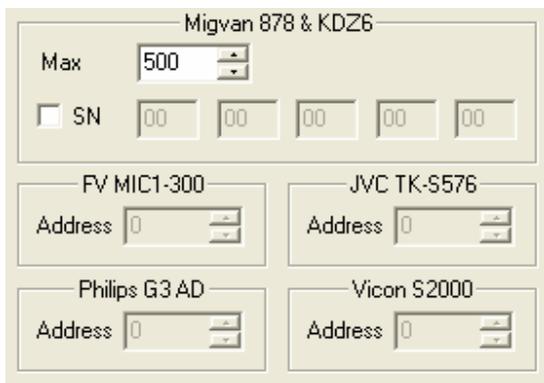**Figure 4-4-e: Hidden zones schedule setup screen**

Figure 4-4-f: Hidden zones schedule property setup screen

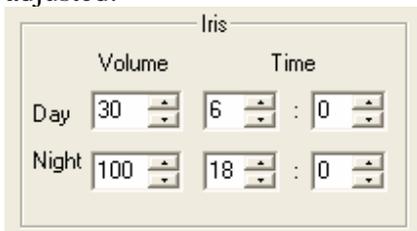## 2.2.6   Setup 3-Track camera

(1) Choose camera type (combo box "Type").

(2) Depend on camera type may be adjusted other camera parameters

(3) Program has capability to switch Camera Iris automatically by timer. These settings also may be adjusted.

(4) Zoom, Tilt, Focus parameters that are used during target tracking process should be adjusted here:

2.2.7 Phone list setup screen

Program has capability to autodial several phone numbers for alarm notification. In Phone list setup dialog could be added/deleted phone numbers as well as defined/edited their parameters

(1)   In Phone list dialog press button "Add" (See Figure 4-4-c). Should appears "Phone edit dialog" (See figure 4-4-d)

(2)   In filed "Modem" choose appropriated modem

(3)   In filed number type recipient phone number

(4)   Adjust "Dial time", "Redial count" and "Pause" between dials.

(5)   Choose type of "Welcome", it can be either sound wave file or Text-To-Speech. In case of wave file should be defined name of existing wave file. In case of Text-To-Speech, should be typed text that will be pronounced by system to recipient, and adjusted few parameters like as pronunciation speed, volume and voice.

(6)   Choose type of "Message". Most of adjustments should be done like described above (See 5). Parameter "Repeat" means how many times message will be pronounced to recipient.

(7)   After press "Test" to test all assigned waves/speeches.

(8)   Press "OK", you will return to dialog "Phone list"

(9)   If necessary to delete phone numbers form dial group, press button "Delete"

(10)   If necessary to edit phone numbers in dial group, press button "Edit"

2.2.8   Hidden zone mask schedule screen

Program has special capability to switch automatically hidden zones by program scheduler. Schedule items may be added/edited/deleted by pressing appropriated buttons "Add", "Delete", "Edit" in dialog box "Hidden zones schedule plan" (see Figure 4-4-e)

(1) To add new schedule item press button "Add" in setup dialog "Hidden zones schedule plan" (see Figure 4-4-e). Should appears dialog "Hidden zone schedule property" (see Figure 4-4-f).

(2) Enable hidden zones that necessary to switch by checking special check box "Enable" against appropriated hidden zone type (color). It means that these hidden zones will be involved into switching (others will remain intact).

(3) Set switching time, then set weekdays or set special day.

ATTENTION: Take into account that if exist special day, other schedule items for this day are disabled

(4) If necessary to make "Reset ALS" after hidden zone switching mark check box "Reset ALS"

2.2.9   Setup the Laser Sensor and Draw the Laser-Scanned Area

To update the Laser sensor and to draw the scanned area, as defined in chapter 1.10.3, perform the following:

(1) In the PC setup window, press the ALS button to open the ALS (setup) (See Figure 4-5).
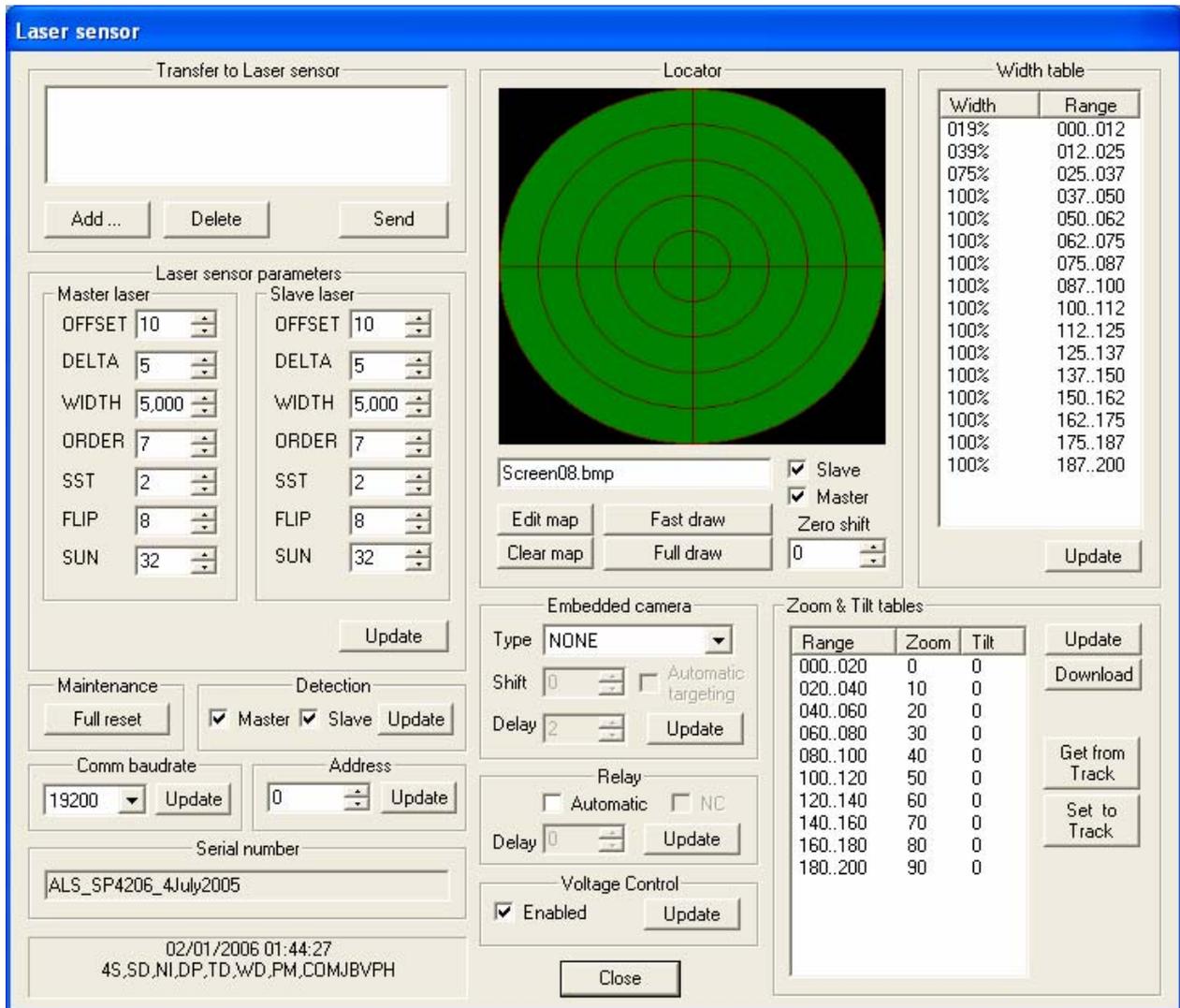
Figure 4-5: Laser Sensor (setup) window

(2) Edit the parameters in their boxes. Most of them are self-explanatory, but it is recommended to consult a service person. To send the new parameters to the Laser sensor press Send (at the bottom).

(3) To copy files from the PC to the Laser sensor computer press the Add button. This opens a regular open window (See Figure 4-6).
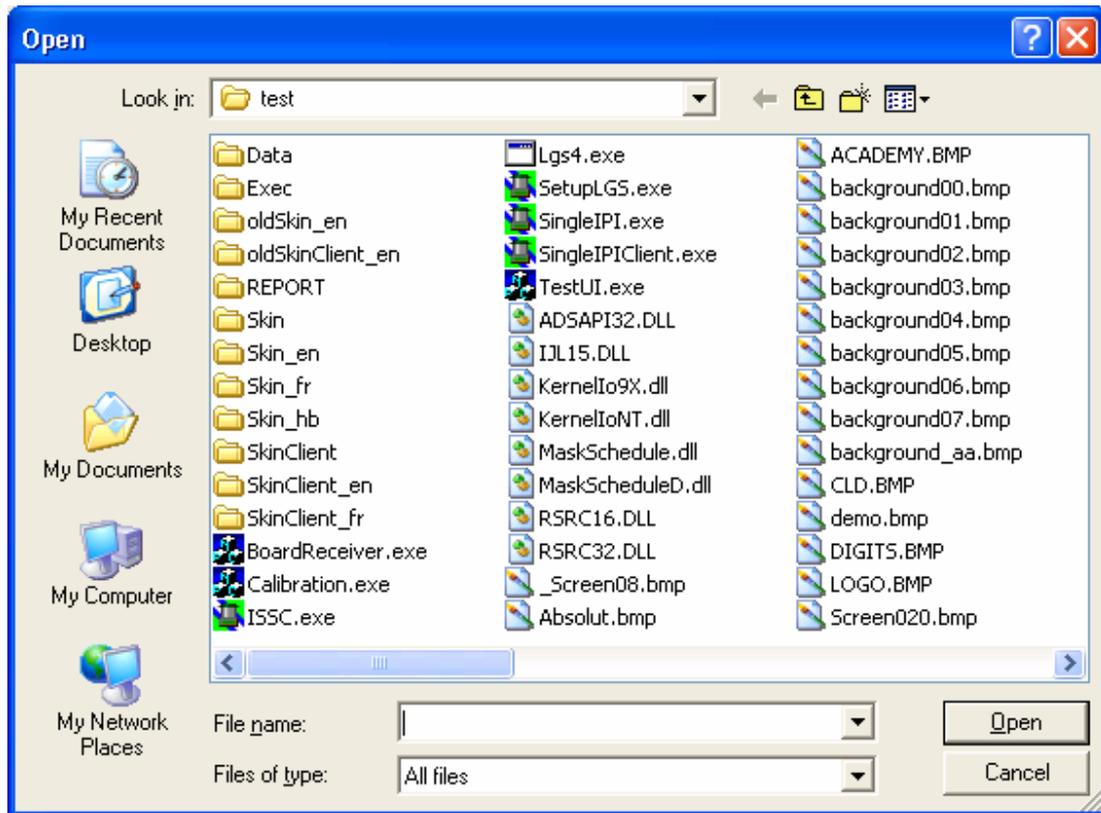
Figure 4-6: Open window in Laser sensor (setup)

(4)   Locate the files and press Open, the list of files is displayed.

(5)   To delete (in case of wrong selection) a file from the list, mark the file and press Delete.

(6)   To transfer the files to the Laser sensor press Send (below the files list). Observe the transmitting in the setup window. As the IPI_Indicator starts to rotate again the process is completed.

(7)   To draw the lasers detection boundaries press Draw and wait for IPI_Indicator starts rotate again. Before select whether to draw the slave LRF by marking its box.

(8)   Use the Edit map or Clear map to draw objects on the map or clear them (see chapter 4.2.8).

(9)   To enable/disable detection by master/slave laser check/uncheck appropriate check box within "Detection" group box (Figure 4-7), and press "Update button"

Figure 4-7: LRF enable/disable

(10) If you want to monitor power supply voltage you have to mark "Enable" within group box "Voltage control" and press button "Update" (Figure 4-8).

Figure 4-8: Voltage control

(11) For enable 3-Track control via laser sensor choose in "3-track camera setup screen" (Figure 4-4-b) camera "Type" –"via Laser sensor" option and press "OK". After program restarted back to "Setup laser sensor" screen, choose a corresponding camera type (Figure 4-9) and press "Update". For automatic tracking (directly from Laser sensor) – enable "Automatic targeting" option, adjust "Shift" and "Delay" (delay between targets) and press "Update".
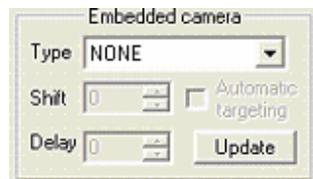

Figure 4-9: Embedded camera control

(12) For enable Dry contact output (Relay) – enable "Automatic" option in Relay frame (Figure 4-10), adjust "Delay" time (relay activate time in sec.), normally open or closed (NC) and press "Update".

Figure 4-10: Dry contact output

(13) In case "Automatic targeting" option, adjust Tilt and Zoom by regular table (Figure 4-4-b: 3-track camera setup screen) with 3-track camera controlled via laser sensor. After adjustment procedure, go back to laser sensor setup screen and press "Get from 3-track" button. Check values and press "Update" button. For check current laser sensor values press "Download" button and then "Set to 3-track".
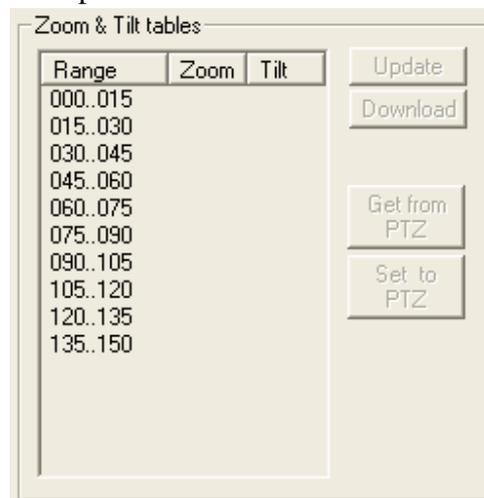

Figure 4-11: Dry contact output

(14) Press Close button to return to the PC setup window.

Adding Objects to the Drawings of the Scanned Area

In some situation it is required to add the location of some physical objects to the drawing of the scanned area. This is done manually using the paint program activated from IPI. The Objects will appear only on the 100% scale.

Perform this process as follows:

(1)   In IPI program press Setup, Options, laser sensor, Edit map buttons.

(2)   The paint program runs with the basic map for 100% scale (Screen 08).

(3)   To add the objects edit the picture and draw the objects (see Figure 4-12). In this example a red flag is positioned at 80% range and angle 180°.

(4)   Save and Exit the paint program.

(5)   Response to the dialog box "Update screen now?". Press Yes or No.

(6)   To use the new map with the objects draw again the lasers detection boundaries (chapter 4.2.7).

(7)   To clear the map press Clear map and draw again lasers boundaries.

Be aware to sketch the object according to the system scale (range parameter). A suggested method as follows:

(1)   Print the original maps.

(2)   Operate the laser sensor and the IPI program.

(3)   Guide a target (walking person) close to the required object. If the object is large repeat it for several points at different location along the object.

(4)   Mark on the print the location of the object according to the detected points of the target.

(5)   Repeat steps 3 and 4 for all objects and the 3 scales. Separate to several events with the clear button .

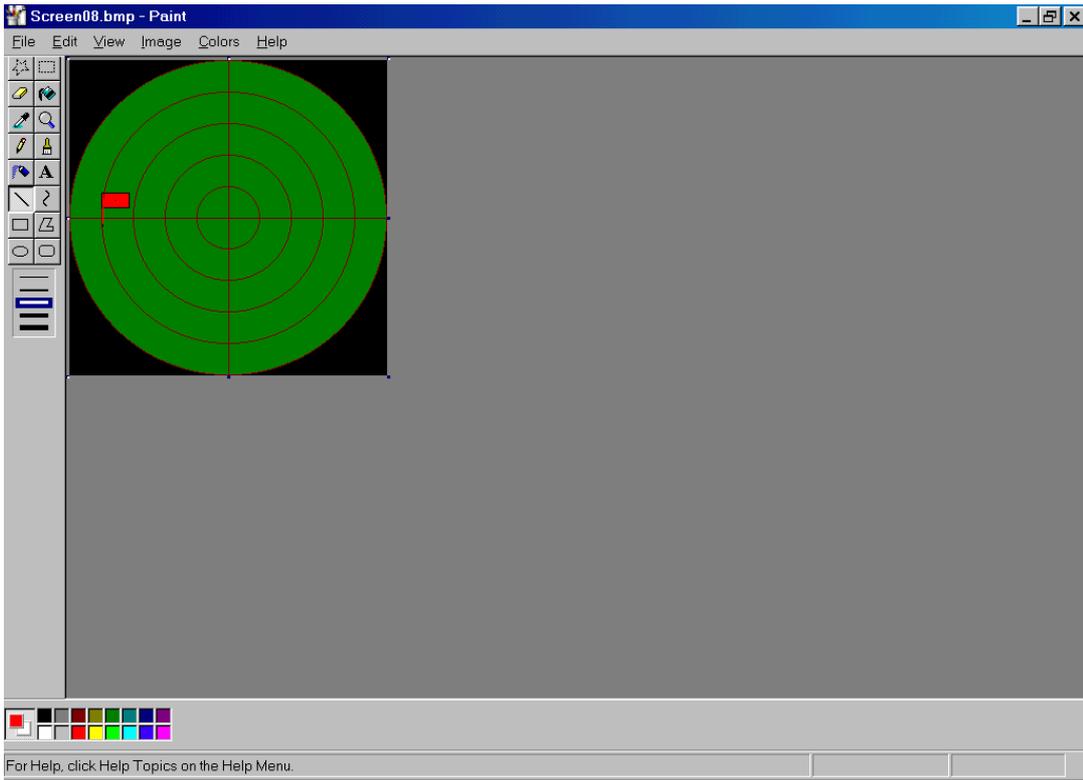(6)   Edit the map and save. You can use the "locator.bmp" file or lock in the report that corresponds to each event, to determine the target locations in bitmap coordinates.

Figure 4-12: Paint Program