USER MANUAL

LoliTrack 2.0

1. List of parts

- LoliTrack installation CD
- USB hardkey dongle (WIBU)
- LabView Vision runtime license
- uEye camera, VE10250 (**OPTIONAL**)
- User manual

2. Contents

3. Installation procedure

3.1 General

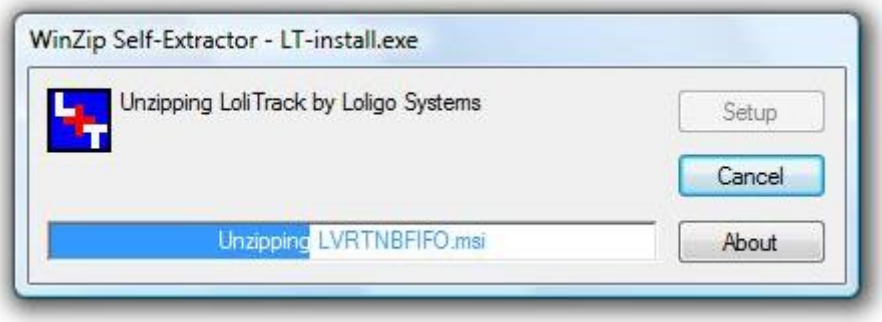
- LoliTrack is a piece of PC software for video-based tracking of an object.
- LoliTrack require Windows XP or Vista running on a PC with an Intel Pentium IV processor of 1 GHz and 1 GB RAM or better. We recommend monitors with a minimum resolution of 1024x768 pixels.
- LoliTrack requires a mouse with a scroll button.
- One free USB ports is required on your PC for connecting the hardkey dongle.
- The LoliTrack software finds the position of an object (e.g. experimental animal) on the principle of contrast between the object and its surroundings by frame-by-frame analysis.
- The software calculates:
    - Velocity
    - Acceleration
    - Distance moved
    - Active time
    - Zones (defined by user)
- The software will save all input data and calculated values to an Excel data file.

3.2 LoliTrack software for Windows

The following steps will explain how to install LoliTrack on your computer.

1. Insert the CD labelled LoliTrack and wait until you see Screen 1. If you do NOT see the screen, browse the CD and double click on the icon labelled LT-install.exe.

Screen 1

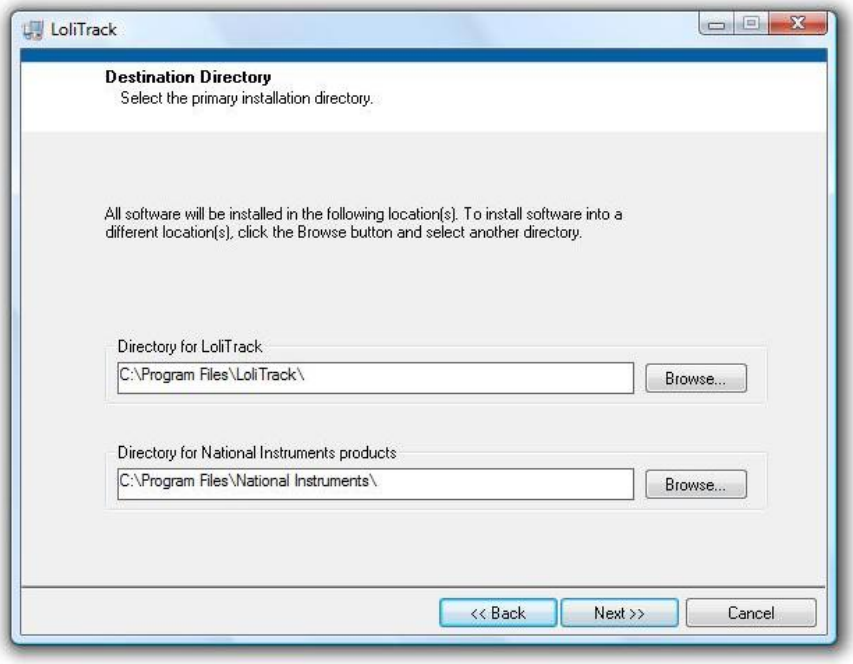


2. Click Next to start installation of LoliTrack.

Screen 2

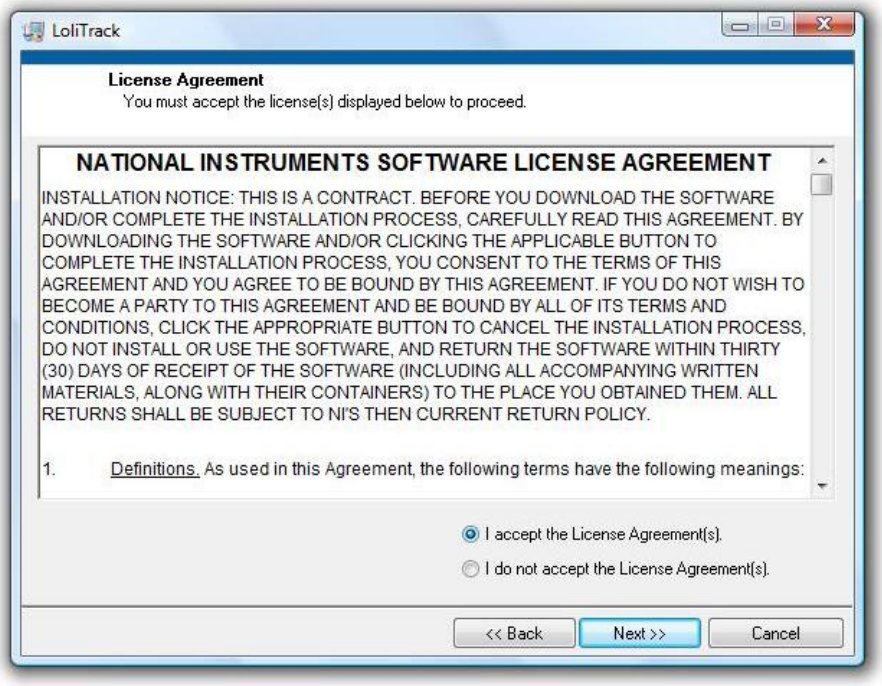
3. Select destination directory for LoliTrack and LabView drivers and then press Next.

Screen 3



4. If you accept the License Agreement, please select "I accept the License Agreement(s)" and then press Next.

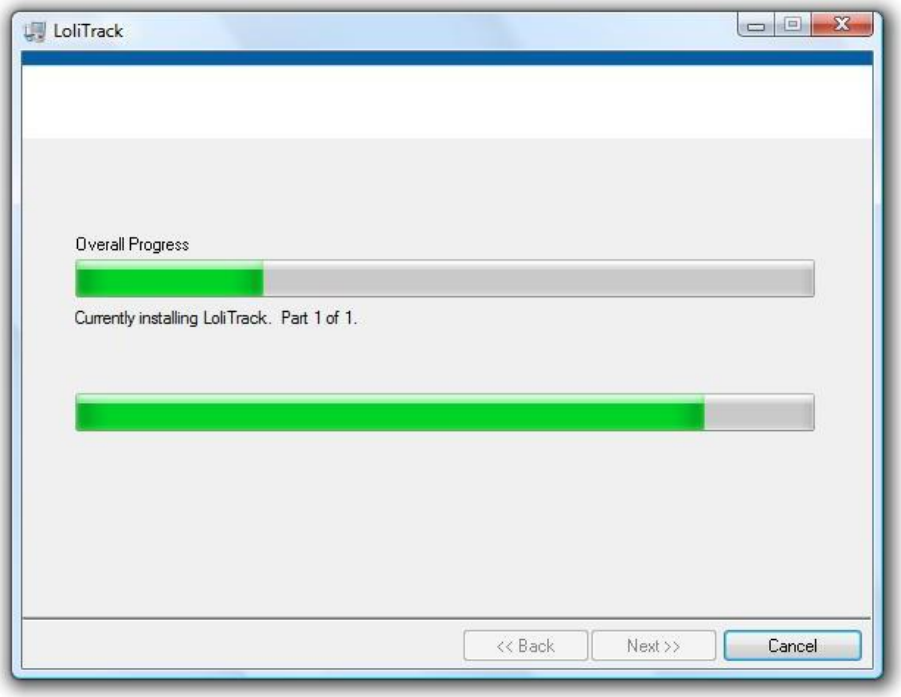
Screen 4



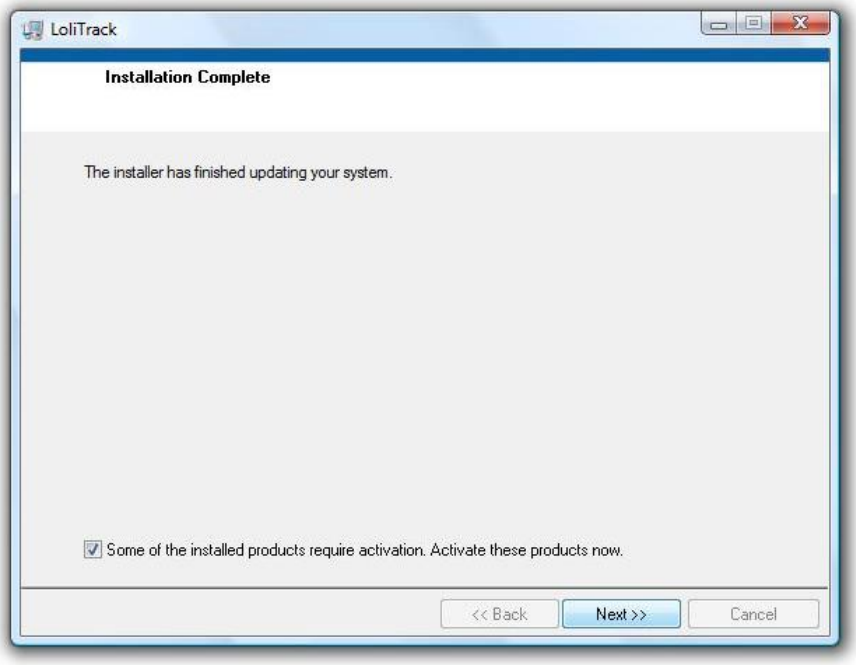
5. Click Next.

On Screen 5 the status of the installation is shown. The installation may take a while.

Screen 5



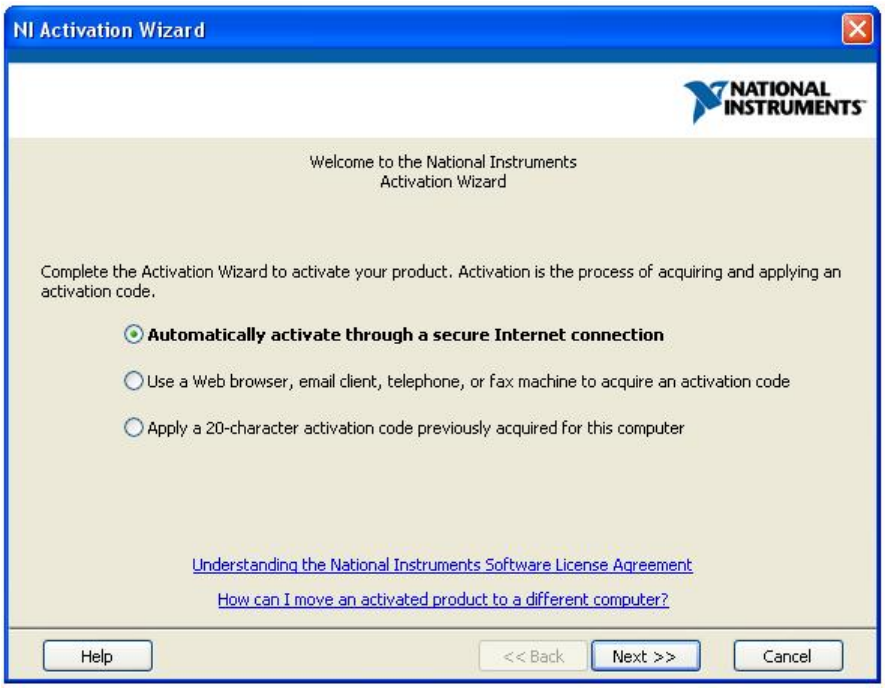
Screen 6



6. Click Next to end installation of LoliTrack and activate the product. This activation requires an internet connection.

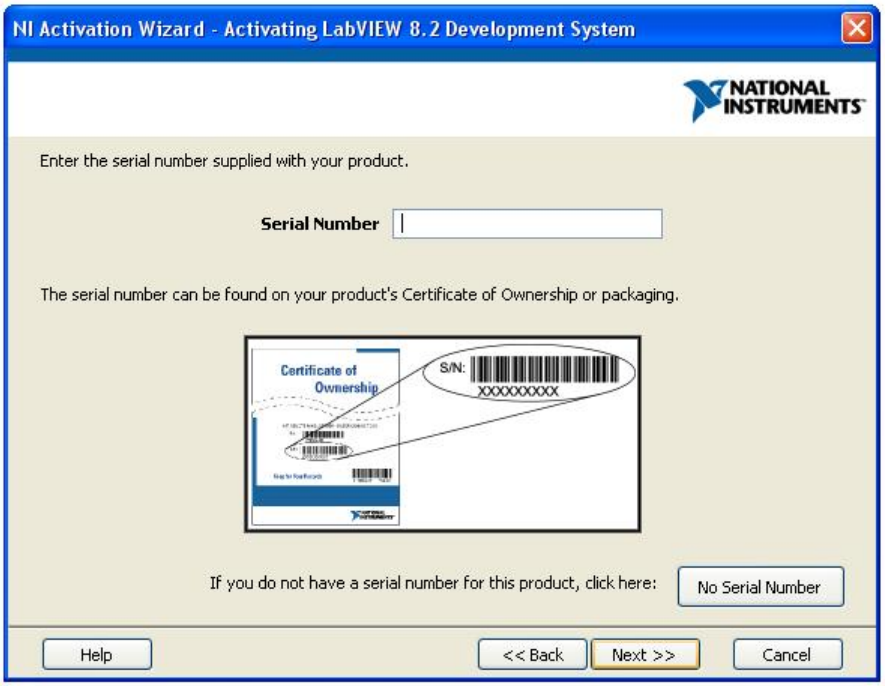
7. Choose automatic activation and click Next to activate the software.

Screen 7



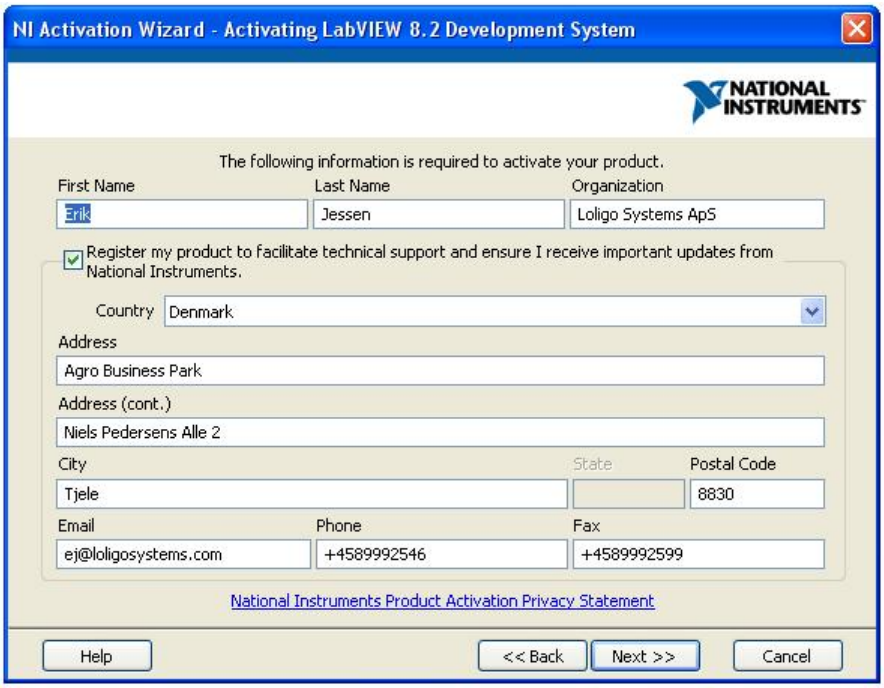
8. Enter the serial number found on the LabView Vison runtime license card. Then click on Next.

Screen 8



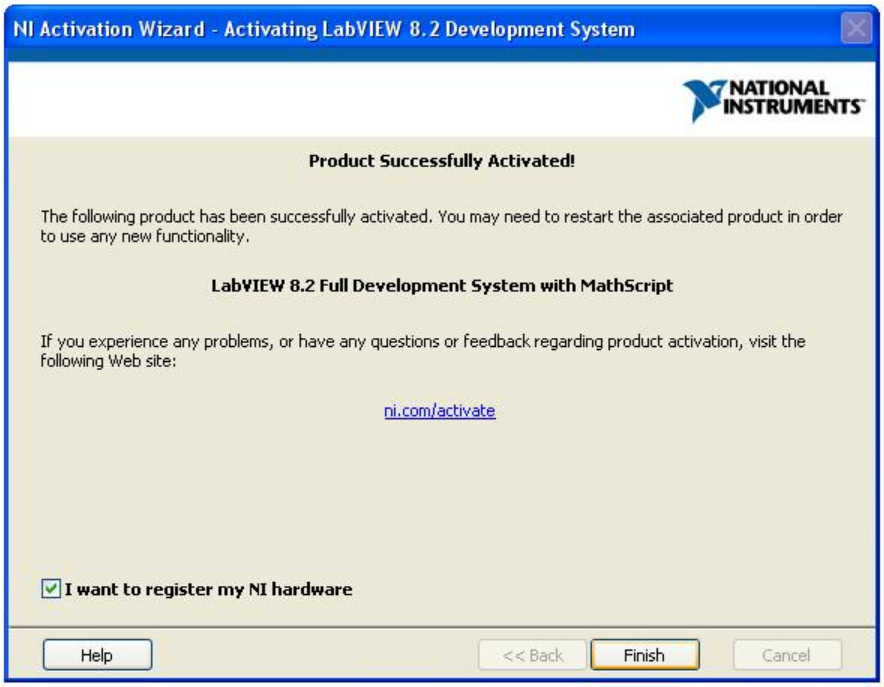
9. Fill out the fields with your information, when done click Next.

Screen 9



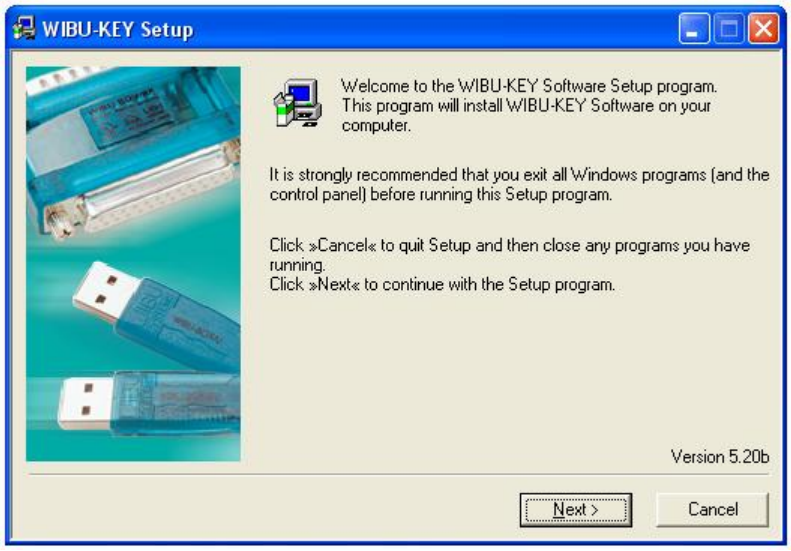
10. If activation was successful Screen 10 appears. Click on Finish to end the activation.

Screen 10



11. Now install drivers for the hardkey dongle. When Screen 11 appears, click Next.

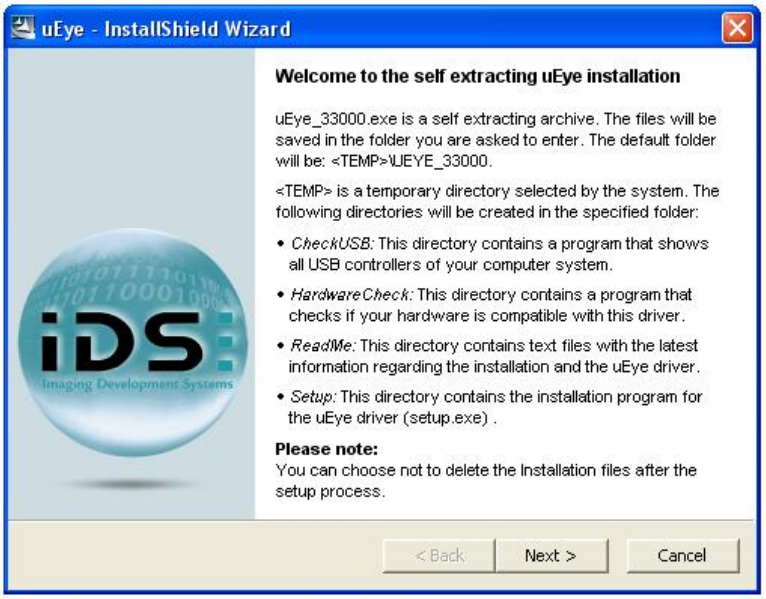
Screen 11



12. Select supported language, and click Next.
13. Click Next without changing any options.
14. Click Next again after you have accepted the summary of the installation.
15. When installation is done, click Next again.
16. Click Finish to end installation of the WiBu drivers.

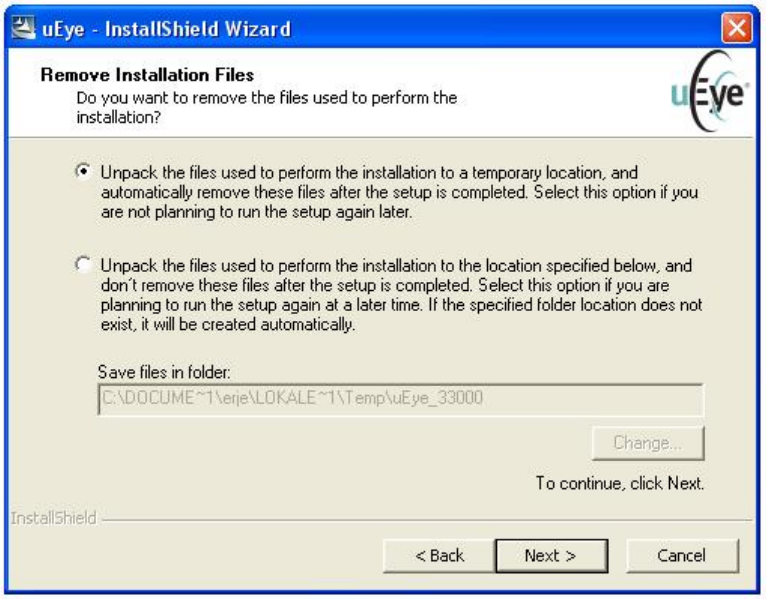
17. Now drivers for the optional uEye USB camera will be installed. This installation is required even if you want to use another kind of camera. When Screen 12 appears, click Next.

Screen 12



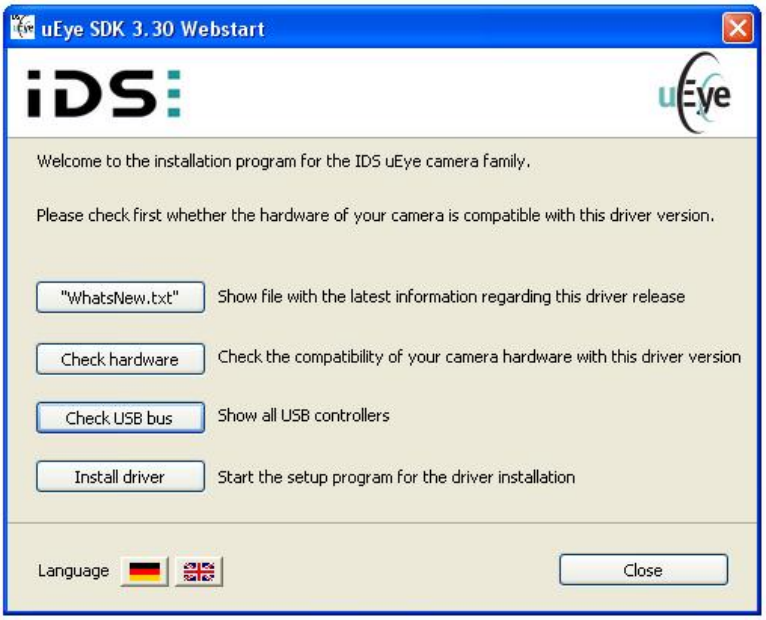
18. Select unpack and remove, and then click Next.

Screen 13



19. Wait for the files to be unpacked. The setup screen will appear when done.

Screen 14



20. Select "Install driver".

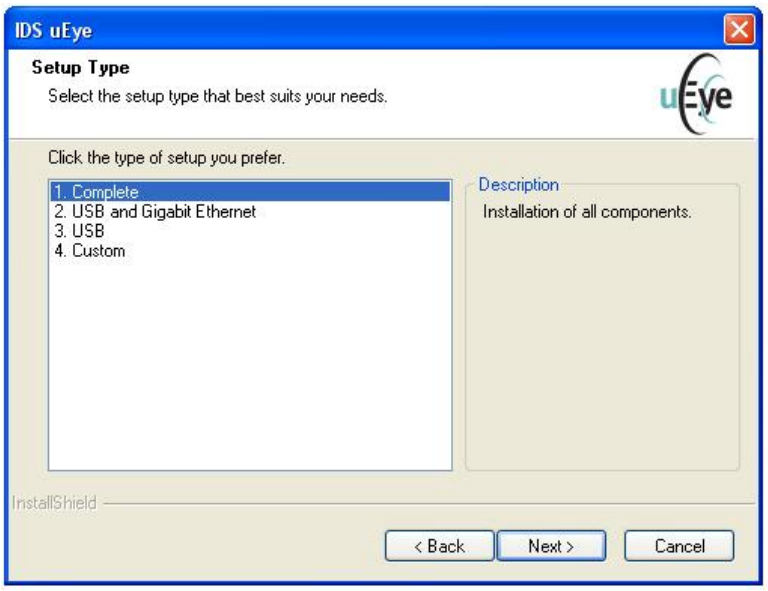
21. Choose language and then click Next.

22. When Screen 15 appears click Next.

Screen 15

23. When Screen 16 appears select Complete and then click Next.

Screen 16



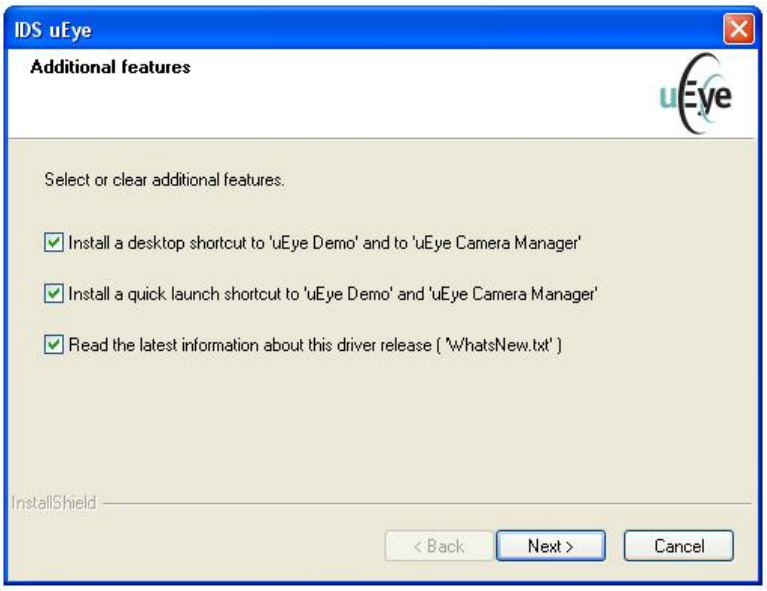
24. Choose a destination and then click Next.

25. Select a program folder and then click Next.

26. Click Install to start the installation.

27. Select the additional features you want, then click Next

Screen 17



28. Select Click Finish to end the installation of the uEye software package.

29. Remove the CD labelled LoliTrack from your CD drive.

30. Restart the Computer. You have now finished the installation of all the software.

3.3 uEye USB camera (OPTIONAL)

1. Connect the uEye USB camera to the PC. After a few seconds the software installation will start automatically.

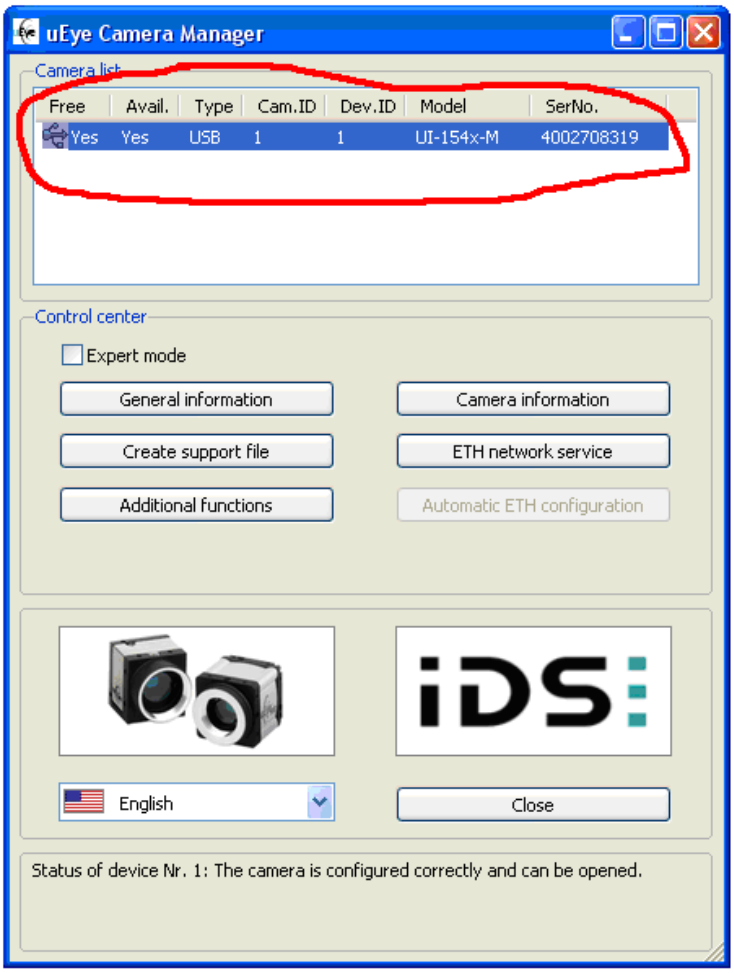
2. Click on "Install the software automatically (Recommended)" and then on Next.

3. Click on continue anyways.

4. Click on Finish.

5. Open the uEye camera manager by clicking Start→All Programs→IDS→uEye

Screen 18



6. If installation was successful, the uEye camera is now shown here.

7. Mount the lens on the uEye camera.

8. The uEye camera is now ready for use with LoliTrack.

4. Using LoliTrack

4.1 Start up

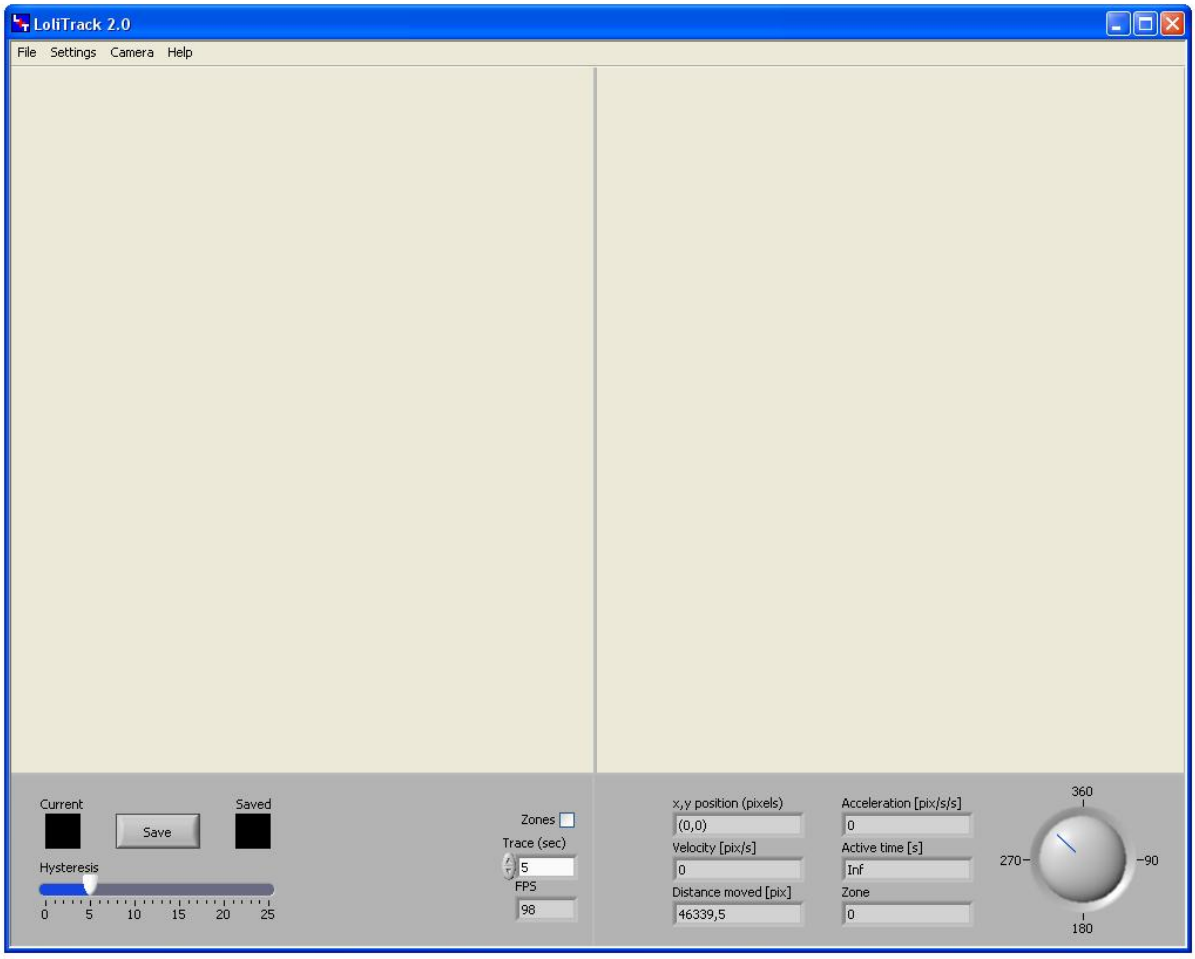
Start LoliTrack by clicking Start→All Programs→LoliTrack→LoliTrack.

If the USB hardkey dongle is not connected to the PC, an error dialog box pops up, see Screen 19.

Screen 19

Connect the USB hardkey dongle to your PC and wait for the device to be recognized, then click on Retry. Then Screen 21 will appear.

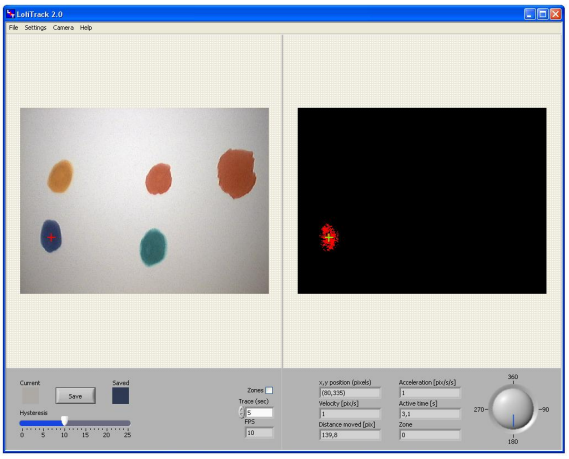
Screen 20



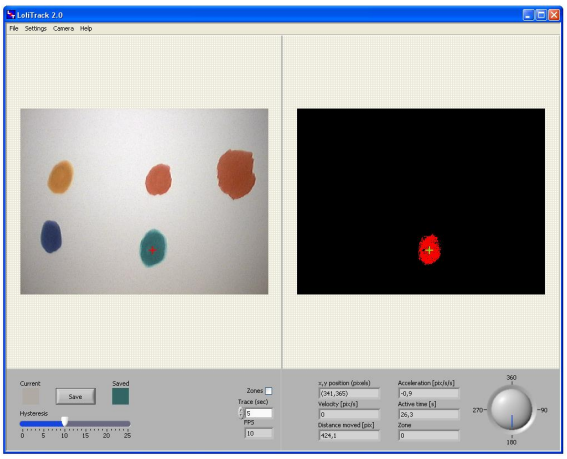
4.2 Quick start

Open either an existing video file (*.avi) from File→Open AVI file or start analyzing live video images from an USB camera, Camera→Open camera.

Place your mouse cursor on the object that should be tracked in the left side screen.. Then click the Save button to store the colour of the particular object. In the right screen you will now see pixels of that colour only and marked with red. The Hysteresis bar below can be used to choose a range of colours to account for changes in lighting and reflections.



Tracking the blue object



Tracking the green object

Now click Calibration→Pixel and use the mouse to draw a line along an axis of a known distance in the image. Then enter this distance and unit of measure. The pixel-to-meter ratio is now calculated. Click OK when done.

Now LoliTrack will find the position of the animal, and calculate its velocity, the distance moved etc.

To start writing experimental data to a file, click File→Save data file. Choose a destination for the data file. A raw and a calculated data file will now be written until the user stops saving data or exits the program.

To exit LoliTrack, click File→Exit.

4.3 Details

4.3.1. General

Image
Here the video images are shown. When maximizing LoliTrack on your PC monitor, the image will scale accordingly. Move your cursor over the image and zoom/unzoom by using the scroll button on your mouse.

Binary image
Here the binary image is shown according to the threshold values. When maximizing LoliTrack on your PC monitor, the image will scale accordingly. Move your cursor over the image and zoom/unzoom by using the scroll button on your mouse.

Current
When clicking on image objects the colour reading in the position of the mouse cursor is shown.

Save button
Clicking on this button will save the current pixel colour and use this to threshold video images.

Saved
Shows the saved colour value.

Hysteresis
This field is used to allow a range of pixel colours in order to account for multi coloured objects and/or changes in light conditions during the experiment.

Example:
The Loligo Systems logo has a blue colour with a value of 16860. Separating this value into RGB will result in red=0, blue=220 and green=65. In the binary image to the right all pixels with this exact value will be shown as red pixels on a black background. If the Hysteresis value is then set to 10 using the slide bar, all pixels with a colour between red=0-10, blue=210-230 and green 55-75 will appear as red pixels.

Zones
Enable to view any zones of interest defined by the user.

Trace (sec)
Set trace length in seconds.

FPS
Shows current frame rate in frames per second. Frame rate depends on camera settings, the PC and filter methods chosen.

X,y position (pixels)
Shows current X and Y coordinates object. The upper left corner is defined as 0,0.

Velocity
Shows calculated velocity. Velocity will be calculated in either pixels/s, m/s, cm/s or mm/s depending on the unit of measure chosen in Calibration.

Distance moved
Shows the distance moved by the object from the tracking was started. Distance moved will be calculated in either pixels, m, cm or mm depending on the unit of measure chosen in Calibration.

Acceleration
Shows the calculated acceleration. Acceleration will be calculated in either pixels/s/s, m/s/s, cm/s/s or mm/s/s depending on the unit of measure chosen in Calibration.

Active time
Shows the active time of the object from the tracking was started.

Zone
Shows the current zone of the object. When the object is not in a defined zone, a zero will be shown.

Angle
Shows the calculated angle (or direction of movement) of the object.

4.3.2. File Menu

Load AVI file
Use this menu option to open an AVI file for analysis.

Save data file/Stop data file
This will open a dialog where the user can enter name and destination of data files. Two files will be written, a calculated data file and a raw data file. On stop both files will be closed and can be opened in e.g. Excel.

When analyzing AVI files users are prompt to enter the time and date for the first frame. In this way the software will keep track of the real time instead of using the pc clock when time stamping X and Y coordinates.

Exit
On exit the software will close the camera input and save all settings and then close LoliTrack.

4.3.3. Settings Menu

Mask
Opens a dialog box, where users may create a mask to avoid analysis in certain areas. Use either one of the upper buttons to draw a closed figure in the image. Then decide if you want to include or exclude the enclosed area by pressing either one of the two upper buttons in the lower group of buttons. Below there is a button to undo the last step, and one to clear the entire mask and start over. Also it is possible to invert the drawn mask. Created masks can be saved or loaded as bitmap files.

When maximizing the dialog box, the image will scale. When moving the mouse over the camera, it is possible to zoom/unzoom the image via the scroll button on the mouse.

Zones
Opens a dialog box where users may define zones of interest in which the presence of the tracked object will be scored automatically by the software. Start by drawing a closed figure. Then dedicate the closed figure as a zone by clicking on one of the numerated buttons.
When finished drawing zones LoliTrack will ask if user wants to save the zones. A dialog will open and choose current folder. Zone 1 will be saved as Zone1.bmp etc. When maximizing the dialog box, the image will scale. When moving the mouse over the camera, it is possible to zoom/unzoom the image via the scroll button on the mouse.

Filter
Opens a dialog box where user may set several filter options to improve image analysis. The pixel noise can be used to avoid scoring activity or movement due to image noise.

Example:
If pixel noise is set to 2x2, the x,y position of the object must change with more than 2 pixels in each direction before LoliTrack counts the change in position as a real movement of the object.

Object
Opens a dialog box where users may set object tracking settings. Also the time for calculated data can be set here.

Calibration
Opens a dialog box where users may convert image pixels into mm, cm or metres. Change the length and/or position of the green line to match any known distance in the image, e.g. a ruler. The length of the green line will show. Then choose the desired unit of measure and enter the known distance. A pixel ratio will now be calculated and used for all calculations.

When maximizing the dialog box, the image will scale. When moving the cursor over the image, it is possible to zoom/unzoom the image via the scroll button on the mouse.

4.3.4. Camera

Open camera
Opens the uEye camera connected to the PC. If no uEye camera is found or the camera is already in use a dialog will open and show all available USB cameras connected to the PC. The user can then choose on of the USB cameras.

Video settings
Opens a dialog where user can set the video settings for the camera.

Image settings
Opens a dialog where user can set the image settings for the camera.

4.3.5. Help Menu

About
This menu will open a dialog box, showing the version number of the LoliTrack software and contact information for Loligo Systems.