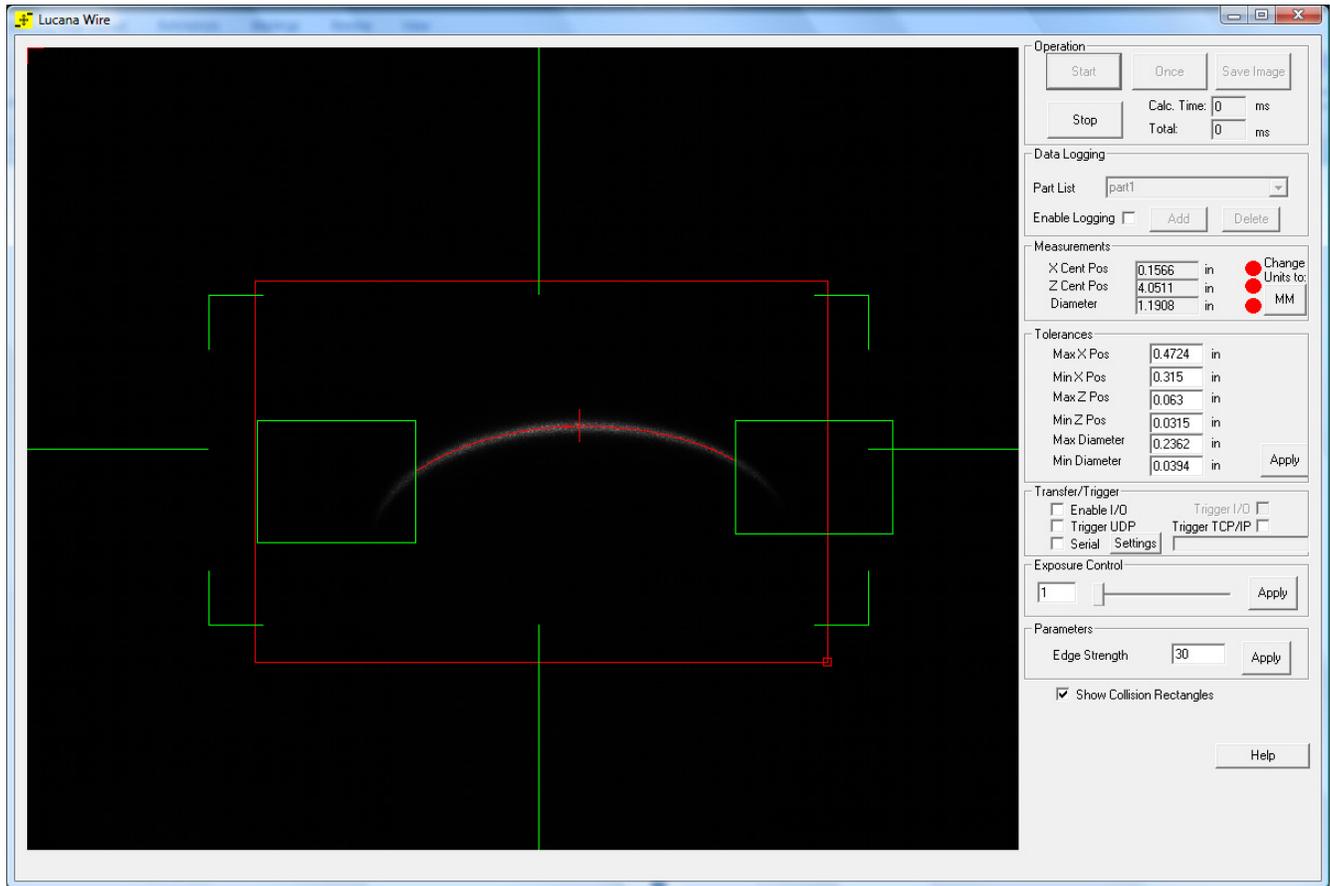


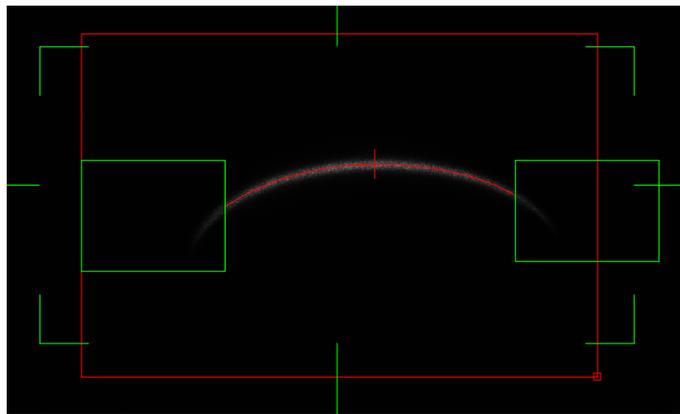
# Lucana Wire Help



## About Lucana Wire

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Lucana Wire is an affordable device that can measure the diameter/curvature, and center of a wire / pipe or curved object. Lucana Wire has the capability of performing measurements automatically, without calibration, setup, or programming.



## Camera Connection

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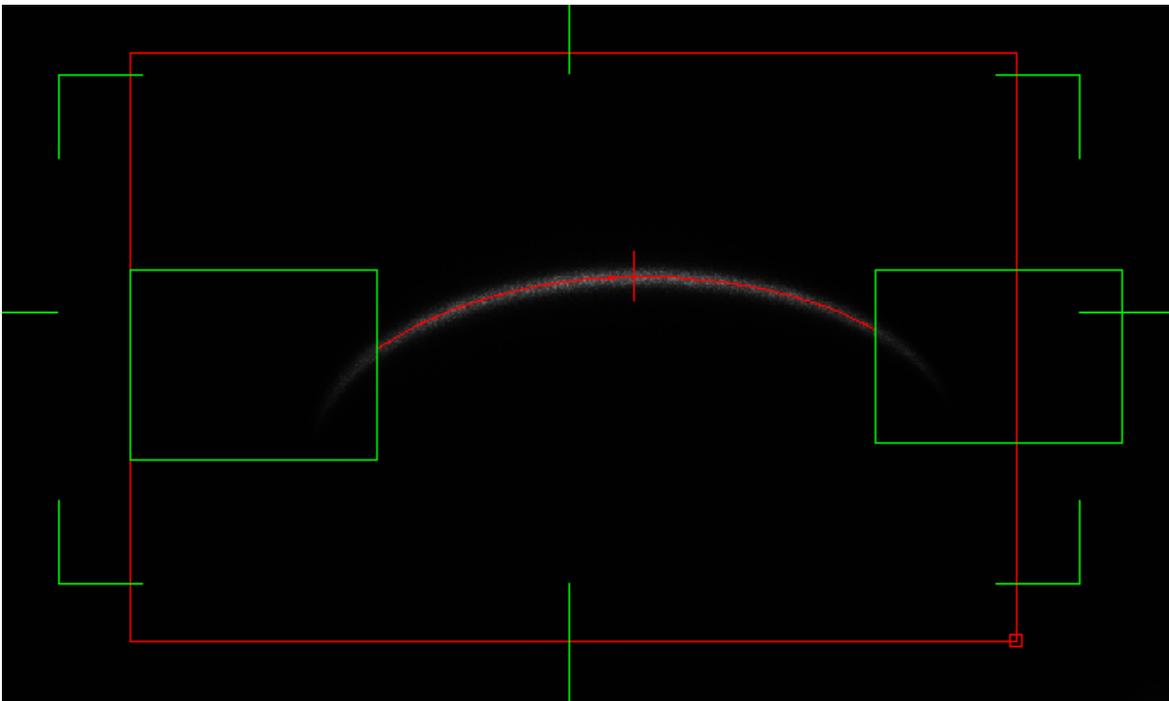
Lucana hardware can be connected to a computer through a USB 2.0 port. The application will fail if Lucana is opened without a camera connected and an error message will display. If the camera is disconnected while Lucana is running, the program will pause and you will be notified. Operation will resume when communication is reestablished.

## Region of Interest

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The Region of Interest (ROI) can be moved over the desired area of the image, resulting in more accurate measurements. To select a region, first select STOP, Lucana must not be in the live image capture mode. Move the ROI by pressing anywhere within the blue box and dragging it to the desired area. To re-size the ROI, press the small box in the lower, right corner, and adjust to fit the curve. Once you are in live image capture mode, the ROI box will turn red indicating that you cannot alter the ROI until you stop the capture. For the most accurate measurements, align the laser with the horizontal green reference line displayed on screen and stay within the confines of the green box.

Note: The object of interest should be placed perpendicular to the laser.



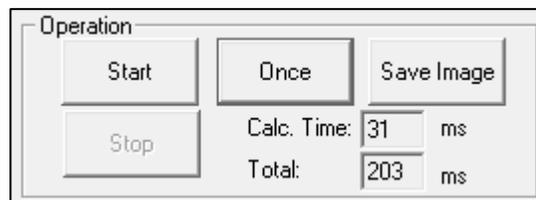
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## Camera Operation

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There are two options to view the objects. The camera can be operated in a live feed mode by choosing the START button once the ROI is over the desired curve to be measured. A continuous image feed is displayed, the ROI box will turn red and a red cross-hair should be displayed along the center of the laser line outlining the curve indicating points of measure. Measurements of the wire diameter / curvature along with X and Z center positions of the wire / pipe are calculated and displayed in units of inches / millimeters.

A second option is to capture a single image using the ONCE button. Measurements are then calculated and displayed for diameter and center position.

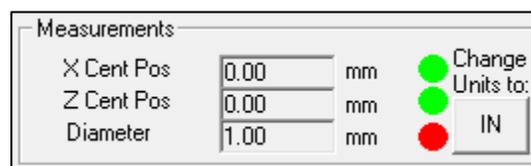


## Measurements

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The measurements can be displayed in inches or millimeters and can be adjusted by selecting the button next to the measurement display. Once tolerances are set, an indicator displays whether the measurements are within specified tolerances (red: not within specified tolerances or green: within specified tolerances). The X Center Position calculated is with reference to the center of the screen. The Z Center Position calculated is with reference to the edge of the Lucana sensor.

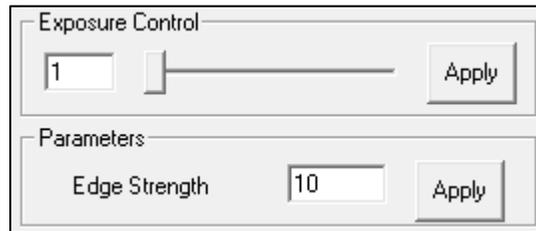
*Accuracy of Lucana Wire:* Measurements made directly on center result in an accuracy of  $\pm 0.005$  in ( $\pm 0.127$ mm). Moving off center but still remaining in the green box results in an accuracy of  $\pm 0.01$  in ( $\pm 0.254$ mm).



## Exposure Control

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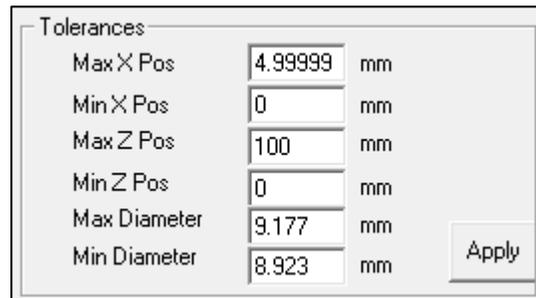
The exposure can be controlled by adjusting the slider to a desired time or manually entering a value in milliseconds. Changing the exposure until a clear image of the laser is observed will allow for better performance and more accurate readings. Edge Strength, found under Parameters, can be adjusted in conjunction with exposure control. It is important that the laser does not look saturated. It is therefore typical for a lighter object to have lower exposure time and edge sharpness. An ideal image of the laser would result in the edges being a dull gray color as shown in previous images.



## Tolerances

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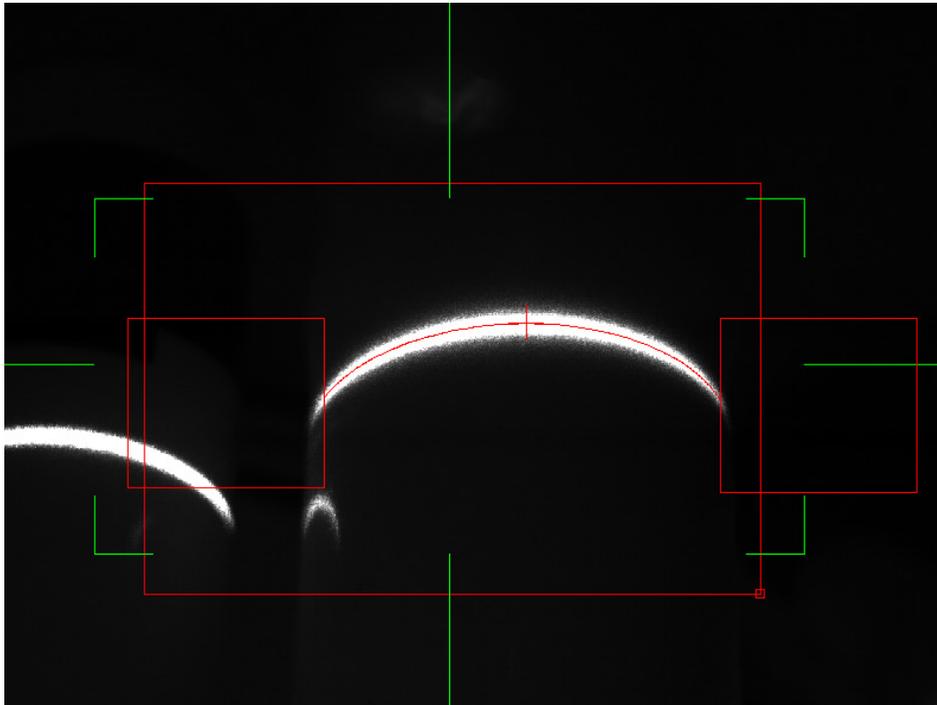
A range of acceptable values for diameter and X and Z center positions can be set by indicating the minimum and maximum values in millimeters or inches. You ***must*** press APPLY for new variables to be considered. If a single image is being captured and tolerances are changed after the image has been taken, the ONCE button must be pushed again after the tolerances have been applied for them to take effect.



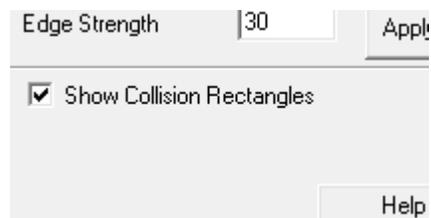
## Collision Detection

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If multiple objects are detected within a certain area the boxes at the edges of the primary object will change from green to red as a warning that there may be errors in the readings unless the secondary images are removed from view.



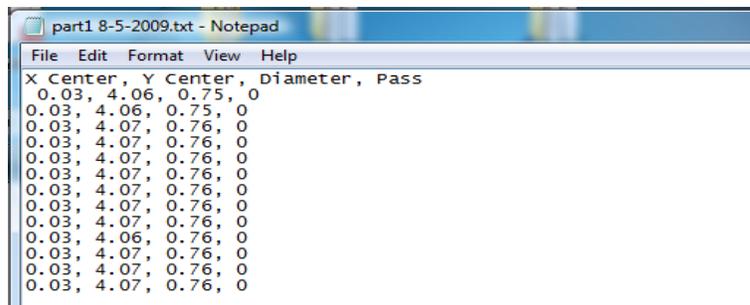
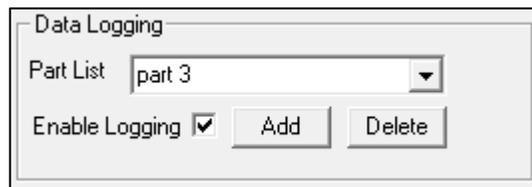
This warning may be removed by unchecking the box in the lower portion of the sidebar.



## Data Logging

To log the data to a text file, select from the drop down menu the part ID that you are examining. If the part is not there, you can add it by entering the part ID into the list and pushing ADD. After you have selected the part from the drop down menu, check the Enable Logging checkbox and press START or ONCE to record the data. Push STOP and uncheck the “Enable Logging” box when data logging is completed. The logs will be located in a folder in C:\wirelogs. The logs are organized by part ID and by date.

To delete a part, select the part from the list and press DELETE. Press OK on the confirmation.



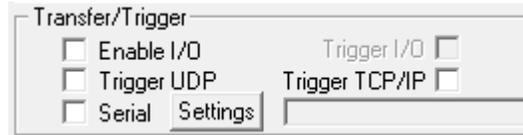
### *Sample of logged data in a text file*

Each entry displayed in the data log is displayed as shown above and in the following format:

*X Center, Y Center Diameter, whether measurements are within tolerance (1=pass, 0=fail)*

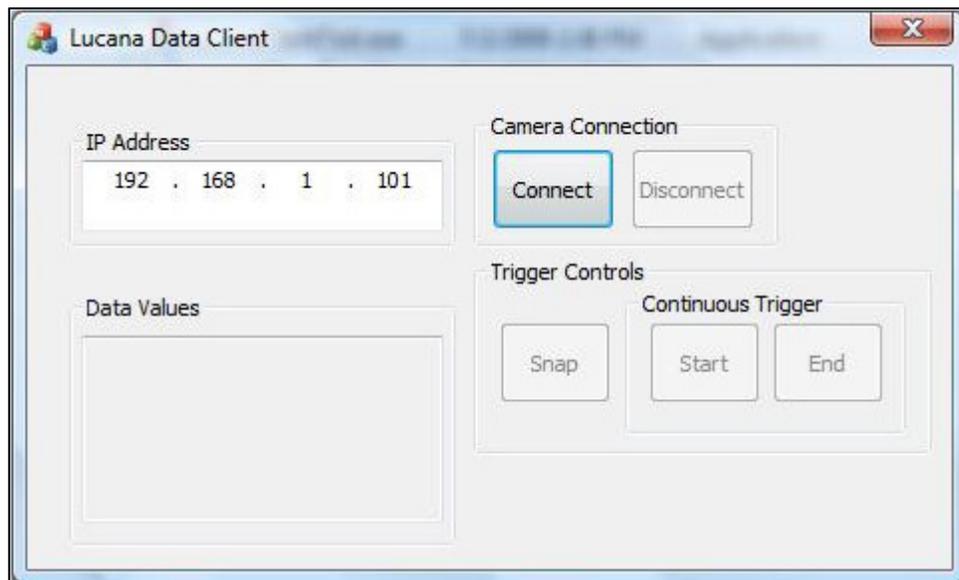
## Transfer/Trigger

These options determine in what way the data is transferred between the computer running Lucana and the computer receiving data, as well as if a trigger will be used. Data can be transferred through UDP, TCP/IP, or through I/O console.



## Transfer Client using UDP

To test the transfer of data through a UDP connection, Lucana Data Client is provided. After installing on Lucana Data Client on the “communicating” computer (client computer), Lucana Data Client will communicate with the Lucana (host computer). To connect, enter the IP address for the computer which is running Lucana (the server computer) on the client computer. NOTE: To connect properly, make sure that Lucana is running on the host computer and check the “Trigger UDP” checkbox under “Transfer/Trigger.” After you press START on Lucana GUI, press the CONNECT button on Lucana Data Client. This will establish the connection. SNAP will trigger Lucana by sending the string ‘t’. Once Lucana receives the trigger string, it will measure and send measurement data back to the client. START, in Continuous Trigger box, will cause to continuously trigger and receive data.



## **Transfer Client using TCP/IP**

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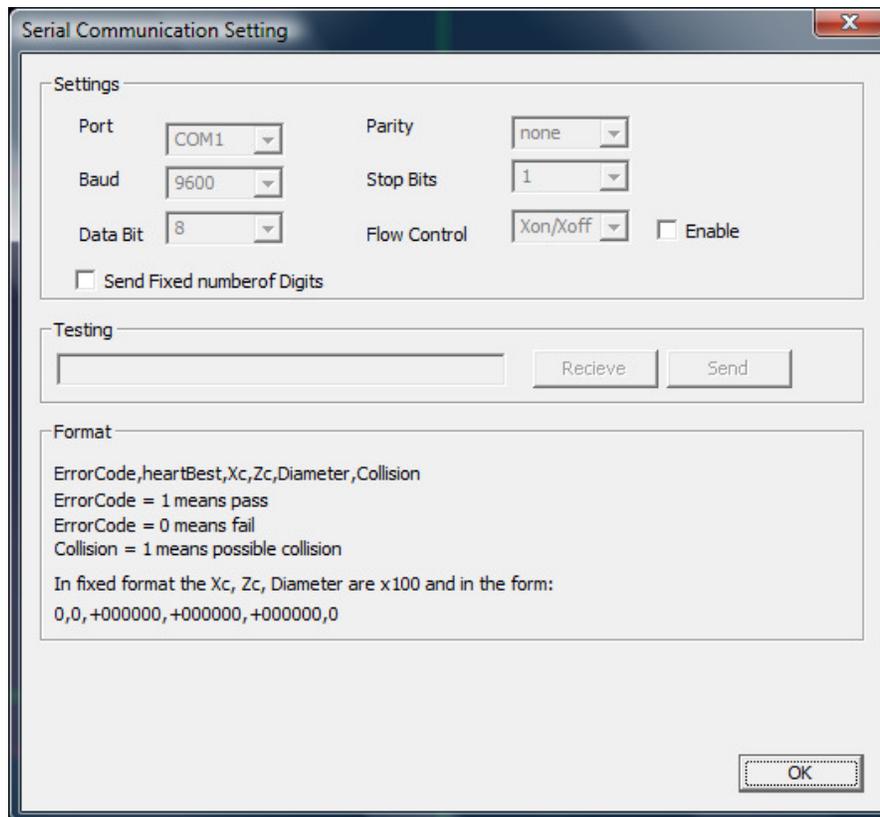
To transfer data via TCP/IP connection, you must first set up a TCP/IP connection between the server and client computer. NOTE: Use port 9000 for connection. Press the “Trigger TCP/IP” check box before establishing a connection. After connecting, send “t” to the server. The configuration is network specific. Please advise your IT staff if you encounter any problems.

## **Using an I/O device**

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To use an I/O device, plug in the device so it is on the network. Change the IP address of the I/O device to 192.168.0.100. After the device is on the network, check the “Enable I/O” check box and press START. NOTE: Be sure to check the “Enable I/O” checkbox before pressing START.

## Serial Communication



Lucana Wire supports serial communication. Settings allows you to set the port, the parity, the baud, stop bits, data bit, and flow control option. You also have the option of sending a fixed number of digits (value \* 100). The information is transfer as so: **ErrorCode, heartbeat, Xc, Zc, Diameter, Collision**

**ErrorCode:** 1 – PASS      0 – FAIL

**HeartBeat:** 0-9

**Xc:** X position of center

**Yc:** Y position of center

**Diameter:** Diameter of line

**Collision:** 1 – Possible collision detected

## TROUBLESHOOTING

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*Image is frozen or no image is displayed:*

- Check to confirm that START is selected and you are in live-image capture mode.
- Check that a camera is connected.
- If a trigger was selected when Lucana Wire was closed, Lucana may be waiting for a trigger. If this is the case, “Waiting for Trigger” will be flashing. Either send Lucana a trigger, or uncheck “Trigger UDP” box.
- If the above suggestions do not help, try closing out of Lucana Wire and re-opening the application.