

Getting Started with ATLAS 3D

The following content instructs the user on how to assembly, calibrate, and scan with ATLAS 3D.

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Software Install (BYOP ONLY)

Note: This step is for BYOP Kit backers only. All other kits have the software pre-installed on the SD card.

An ATLAS 3D software image is provided to make it easier for BYOP Kit backers to get up and running. It is located at <https://s3.amazonaws.com/atlaskit/2015-05-01-atlas3d.zip>. An 8GB or larger SD card is required. Instructions for writing the image to an SD card can be found at <https://www.raspberrypi.org/documentation/installation/installing-images/>.

Scanner Assembly

The following video shows how to assembly the ATLAS 3D scanner step by step. Printed instructions are included with the kit.

ATLAS 3D Assembly Video



Assembly of ATLAS 3D Acrylic Enclosure



Determining the Scanner's IP Address

In order to connect remotely to the scanner, the IP address of the scanner must be determined. This is most easily done by attaching a monitor, keyboard, and mouse to the HDMI and USB ports. Once prompted for login information enter the following:

- *pi* for the username
- *raspberry* for the password

If you are doing a wired connection to the scanner, insert the Ethernet cable and type the following command at the prompt.

- ifconfig

The IP address of the scanner should be listed after the *inet addr:* for eth0. For example: 192.168.0.201. If you are connecting over WiFi, plug in the WiFi adapter and follow the instructions at [Raspberry Pi WiFi Configuration](#). Type the following command at the prompt.

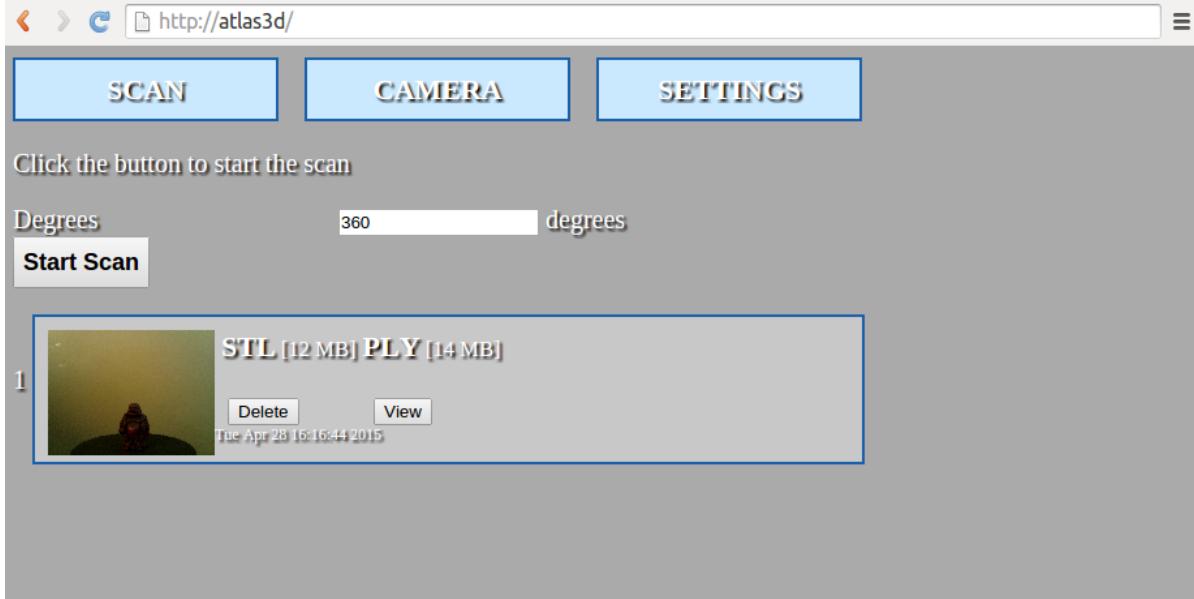
- ifconfig

The IP address of the scanner should be listed after the *inet addr:* for wlan0.

NOTE: Depending upon how your home network is setup, you may be able to simply enter <http://atlas3d> (no .com) instead of the IP address.

Connecting to the Scanner

Once the IP address is known, enter it into a web browser on the same network. For example, if the IP address is 192.168.0.6 you would enter <http://192.168.0.6> in the location bar of the web browser. You may be able to simply enter <http://atlas3d>. The main interface for the scanner should come up at this point.



Register the Scanner

Register your ATLAS 3D scanner with the included 8 character serial number at <http://www.murobo.com/register.php>. The serial number is located on the bottom of the stepper motor. Then, enter the serial number on the Setup page by navigating to SETTINGS and then clicking Setup. This will allow the scanner to receive software updates.

Hardware Calibration

This video below shows how to calibrate an ATLAS 3D scanner.

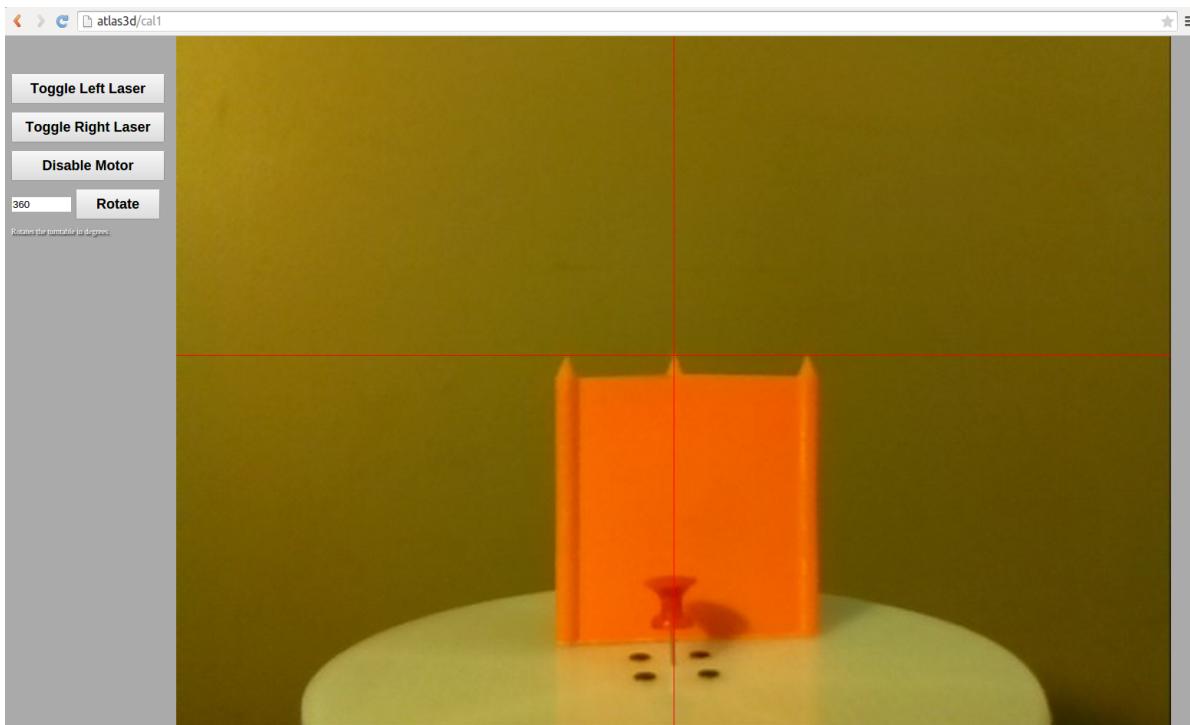
ATLAS 3D Calibration



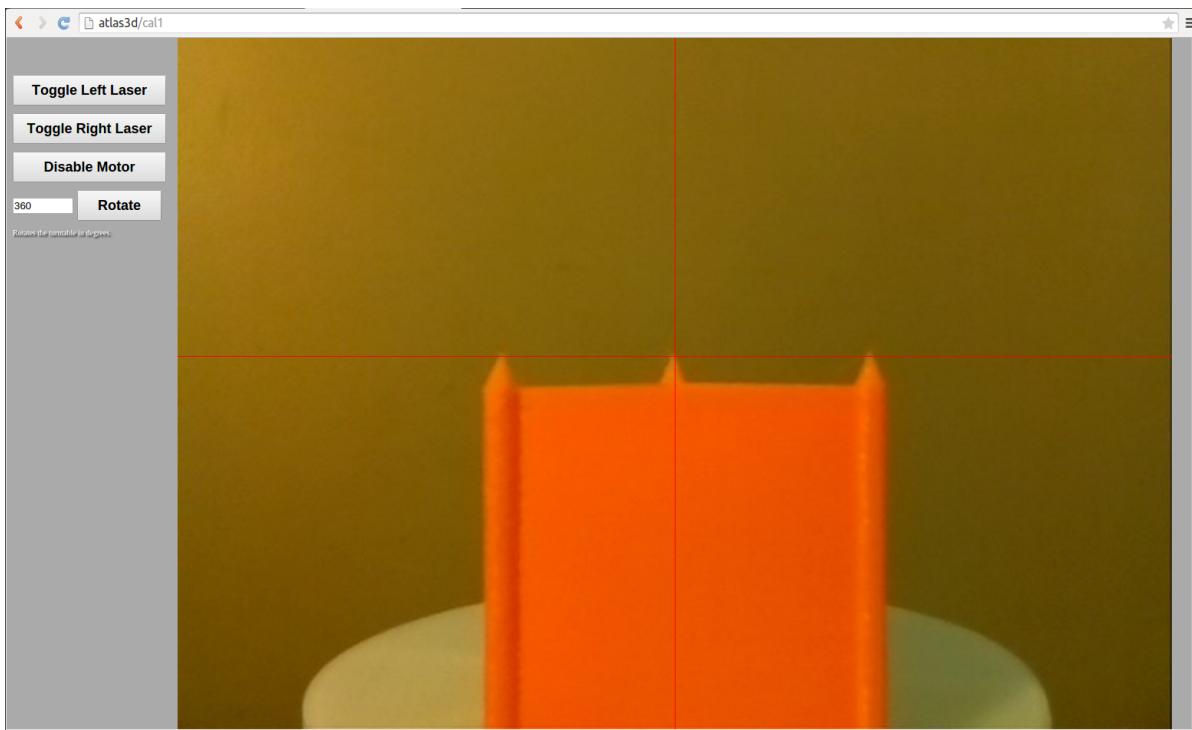
Before scanning for the first time, the hardware must be calibrated. Calibration is the process of moving the lasers and camera to the orientations that the software expects. The calibration item Model must be printed and used for the process. Calibration is performed from the Camera page.

The first step in calibration is aligning the the camera.

1. On the SETTINGS page, choose the Calibration preset which has a camera resolution of 640x480 to have faster video feedback.
2. Click the CAMERA link at the top of the page to begin calibration.
3. Place the calibration item on the table.
4. Move and rotate the camera until the red horizontal line is level with all 3 peaks of the calibration item. The horizontal line should stay at the peak of the calibration item towers whether the item is in the back or front of the table. If the line moves up or down when the calibration item is moved around the table then the camera needs to be adjusted vertically.
5. Rotate the camera side to side until the vertical red line is at the center point of the turntable. This point can be more easily seen by placing a pin the the center hole.

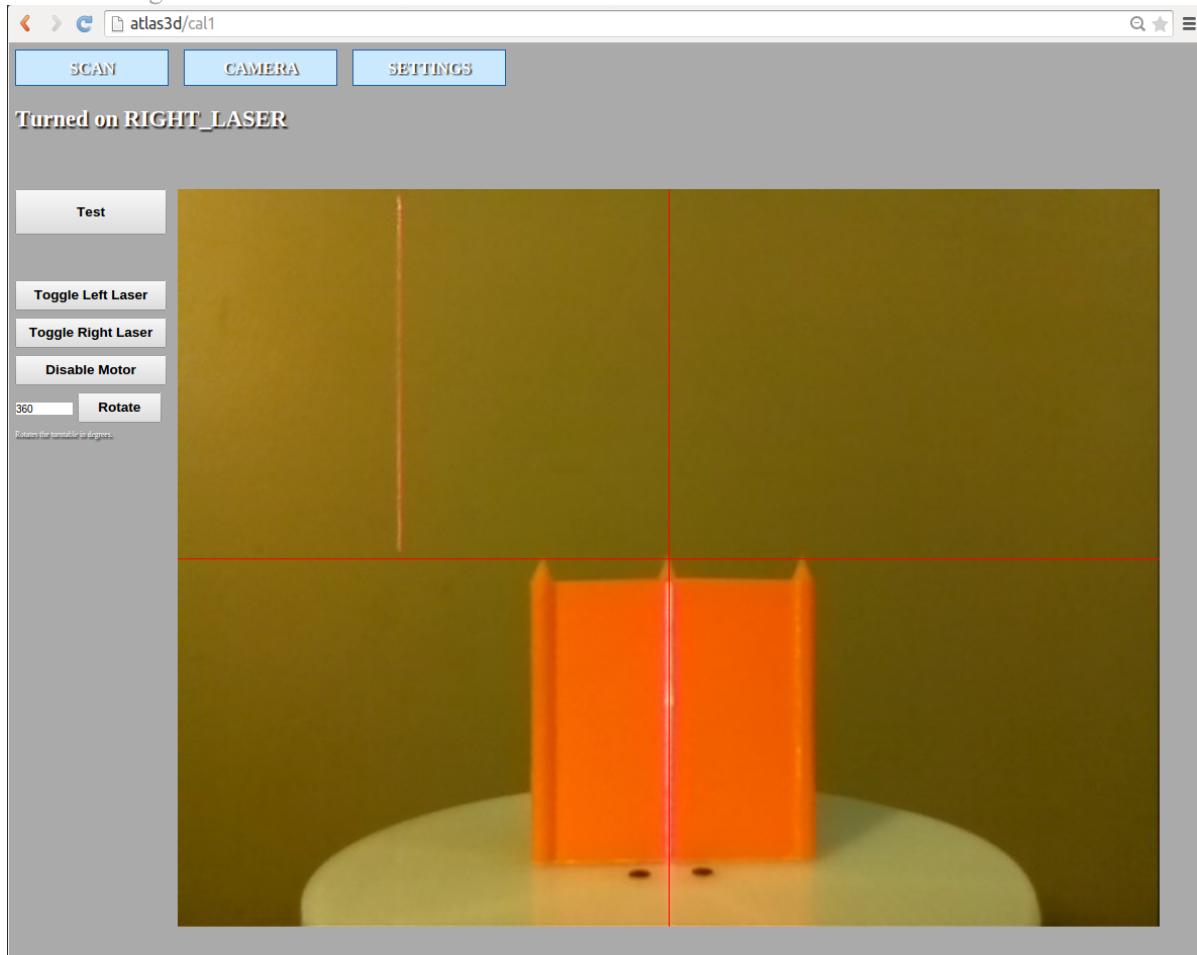


6. The horizontal red line should stay at the peak of the towers when the item is in the front as well.



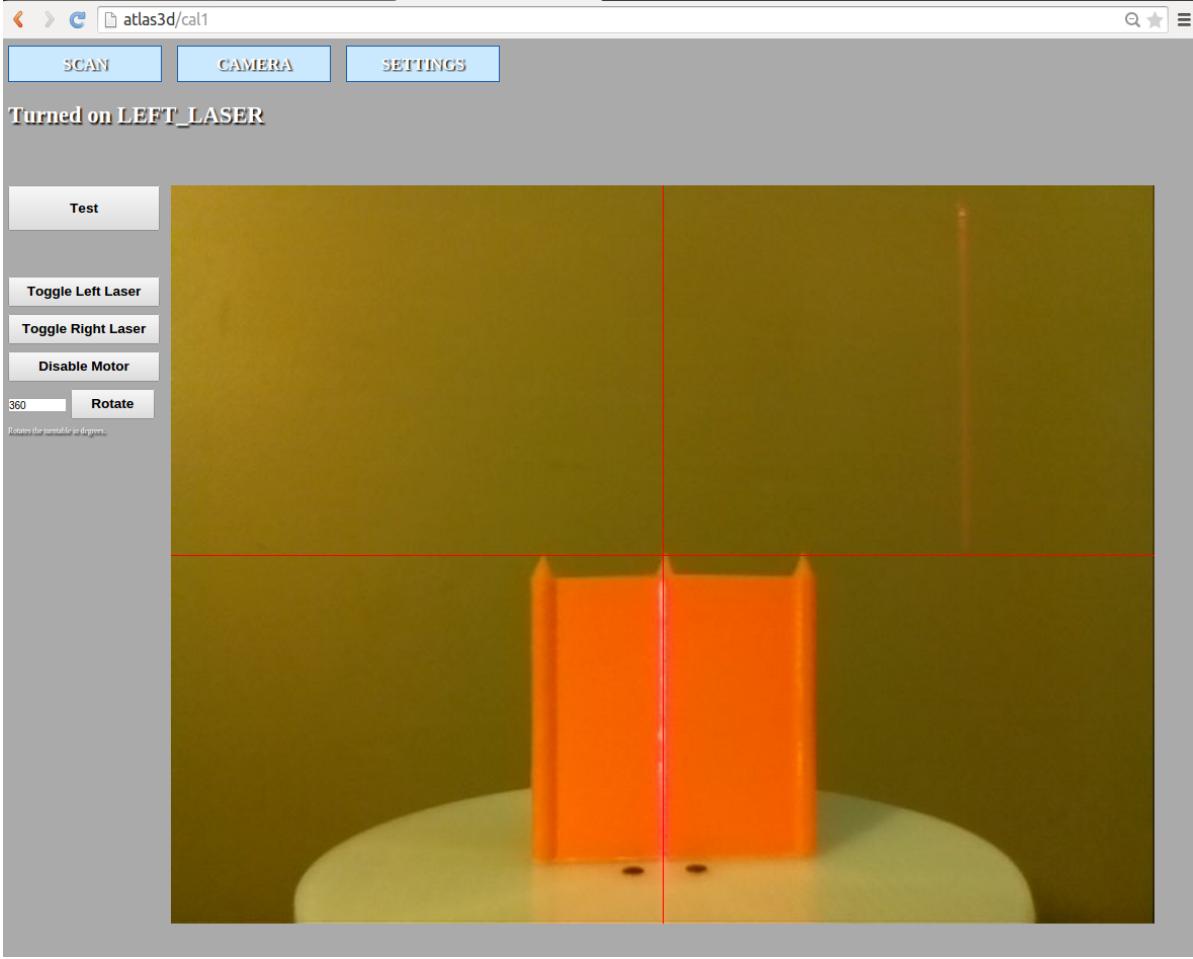
The next step is to calibrate the lasers.

1. Place the calibration item on the table to where the longest side is facing the camera and the front of the hole in the table.
2. Turn on the right laser.
3. Rotate the right laser until it sits over the vertical red calibration line.

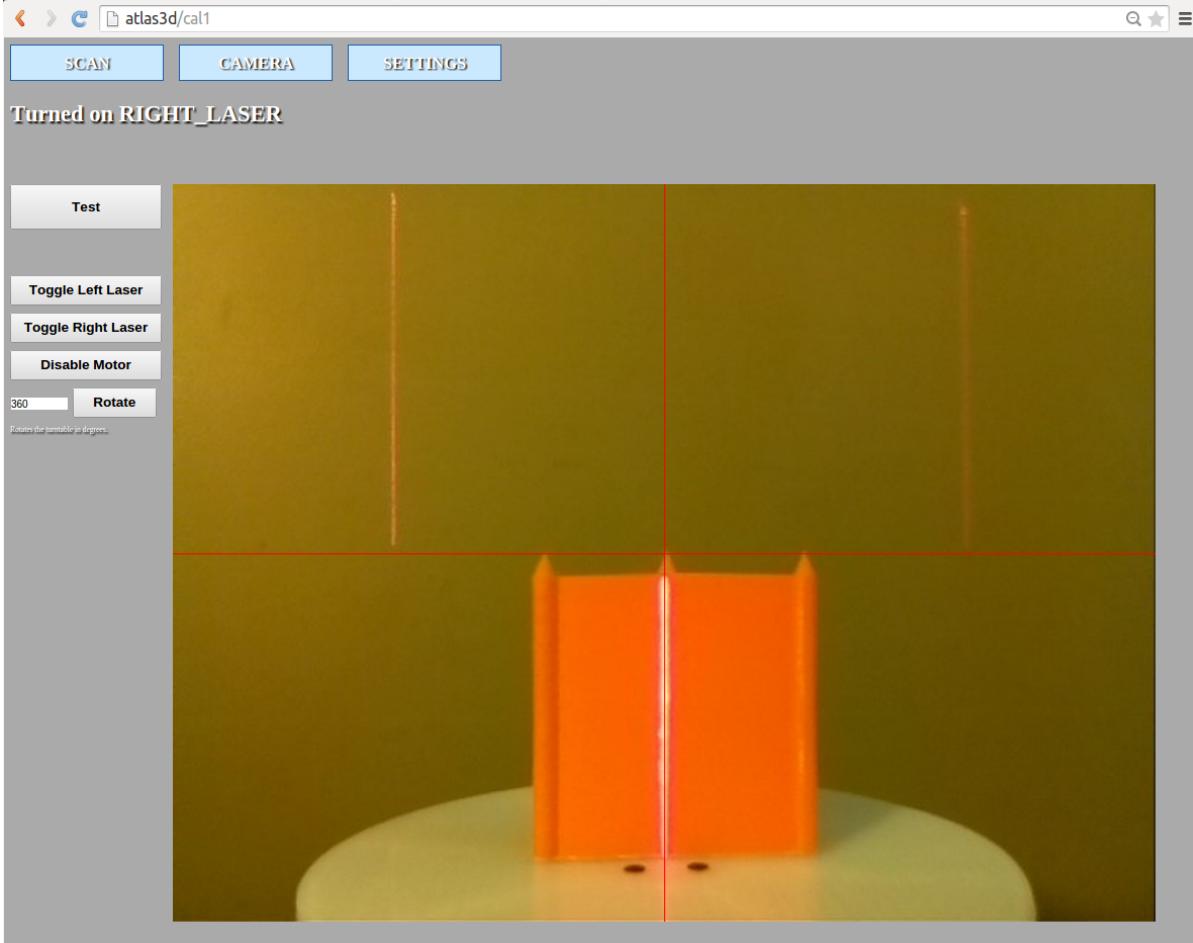


4. Turn off the right laser.
5. Turn on the left laser.

6. Rotate the left laser until it sits over the vertical red calibration line.

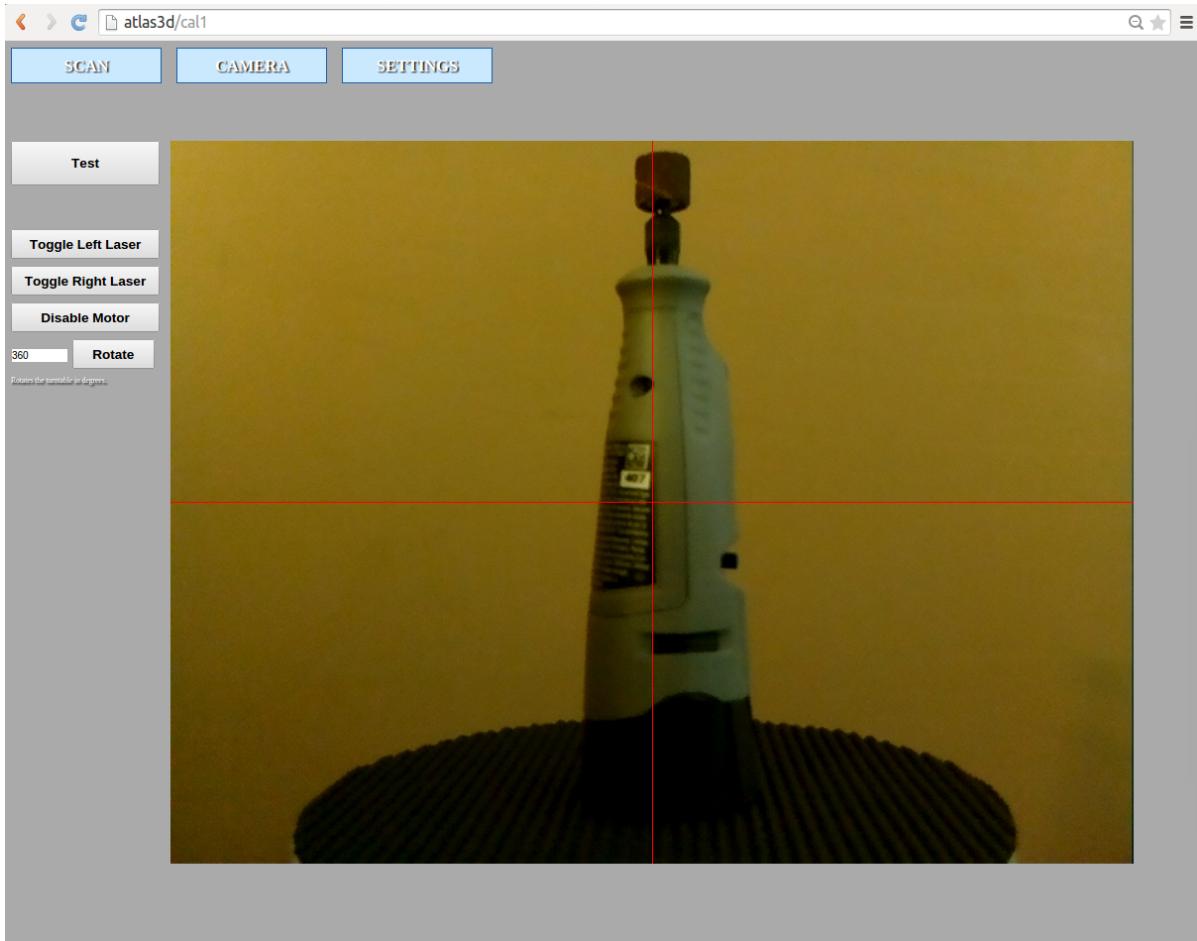


7. Turn on both lasers and recheck alignment laser.



Getting Good Scans

Once calibration is complete, the next most important part of getting good scans is balancing the lighting with the laser threshold setting. If the light is too bright then it will over saturate the laser line and make it difficult for the camera to pick it up. If the light is too dim the camera image will be noisier, the laser will appear to reflect off the object more, and the resulting scan will be much darker than the object. Before scanning an object, first select the Preset that you would like. Navigate to the CAMERA page and click the test button. Suppose we are scanning the object below...



Click the **Test** button to see if the current settings and lighting is appropriate for the object. The image below shows the resulting test image. The test image shows the detected laser line after processing the image from the camera. The gray pixels are those that are above the threshold value, while those below the threshold are yellow. The red line shows where the center of the laser was detected. To obtain a good scan, there must be a red line everywhere that the laser contacts the object. For this to occur, the threshold settings must be set appropriately. If the threshold value is too high (or there is too much direct light) then there will be gaps in the object. If the threshold value is too low then laser detection false positives can occur in the background pixels resulting in scans with lots of points floating around off the object. In the image below notice the gaps toward the bottom of the image.



We can correct for this by lowering the laser threshold value. The laser threshold value is close to the top of the SETTINGS page. Lower the value by half, save the preset, and generate another test image.

The screenshot shows the atlas3d/settings software interface. The top navigation bar has tabs for SCAN, CAMERA, and SETTINGS. The SETTINGS tab is active. Below the tabs, there are buttons for Preset (Default), Save, and Delete. A list of three presets is shown: 1. Default, 2. High Resolution, and 3. Calibration. The main configuration area includes:

- Laser Selection:** Right Laser
- Camera Mode:** 1.9 Megapixel (video mode, 1600x1200)
- Frames Per Revolution:** 800
- Laser Threshold:** 5 (highlighted with a red box)
- Ground Plane Height:** 0 in.
- Laser Delay:** 180000 μ s
- Stability Delay:** 0 μ s
- Max Laser Width:** 80 px.
- Min Laser Width:** 5 px.
- Generate PLY File:**
- PLY Data Format:** Binary
- Generate STL File:**
- Generate XYZ File:**
- Separate the Lasers:**
- Licenses:** (link to license information)

With the new laser threshold setting there is now a much better line at the bottom of the image. The object is not ready to be scanned. From the SCAN page click *Start Scan* to scan the object.



Once the scan is complete, click on the file link (STL, PLY, etc) to download it from the scanner.

A screenshot of the ATLAS 3D software interface. At the top, there is a navigation bar with icons for back, forward, and refresh, followed by the URL <http://atlas3d/>. Below the URL are three tabs: SCAN (highlighted in blue), CAMERA, and SETTINGS. In the main area, there is a message "Click the button to start the scan". Below this, there is a "Degrees" input field containing "360" and a "degrees" unit indicator. A "Start Scan" button is located below the input field. To the right of the input field, there is a preview image of a scan showing a small object on a surface. Below the preview are two download links: "STL [12 MB]" and "PLY [14 MB]". A timestamp "Tue Apr 28 16:16:44 2015" is also present. At the bottom left, there is a "Delete" button and a "View" button.

Support Forum

Support can be found on the ATLAS 3D forum at <http://www.sol3dforum.com/forum/29/atlas-3d-forums/>.