

Satellite Takeoff Tutorial--Pitched Roof

A RoofLogic Digitizer license upgrades RoofCAD so that you have the ability to digitize paper plans, electronic plans and satellite images. We think of satellite images as blue prints from outer space!

This tutorial will show you how to use a satellite image as a template from which you can create a drawing and produce takeoff quantities.

Here are some of the things you can do:

- Generate takeoff quantities for reroof bids and budgets. If you need more accuracy, though, you've got to visit the roof. Accuracy is dependent on several factors including image quality.
- Pre-draw the roof so that when you do your inspection you're not starting with a blank page. Then, on site, verify dimensions and roof top objects. Then update your drawing.
- Create professional CAD drawings for proposals. Digitizer is an upgrade to RoofCAD, so you have all the great RoofCAD tools to fine tune and polish the drawing.

This tutorial will work both for people who already own a Digitizer license and those who are evaluating satellite drawing. Just keep in mind however, it was written from the perspective of someone who does not yet own a Digitizer license. The trial version of Digitizer has certain restrictions which we will point out along the way.

So let's see how this thing works.

Acquire Image from Satellite Service

The first thing you need to do is log onto a satellite image service like Google Earth or Microsoft's Virtual Earth. Each service handles the steps for saving an image differently. You need to acquire the skills to complete these steps.

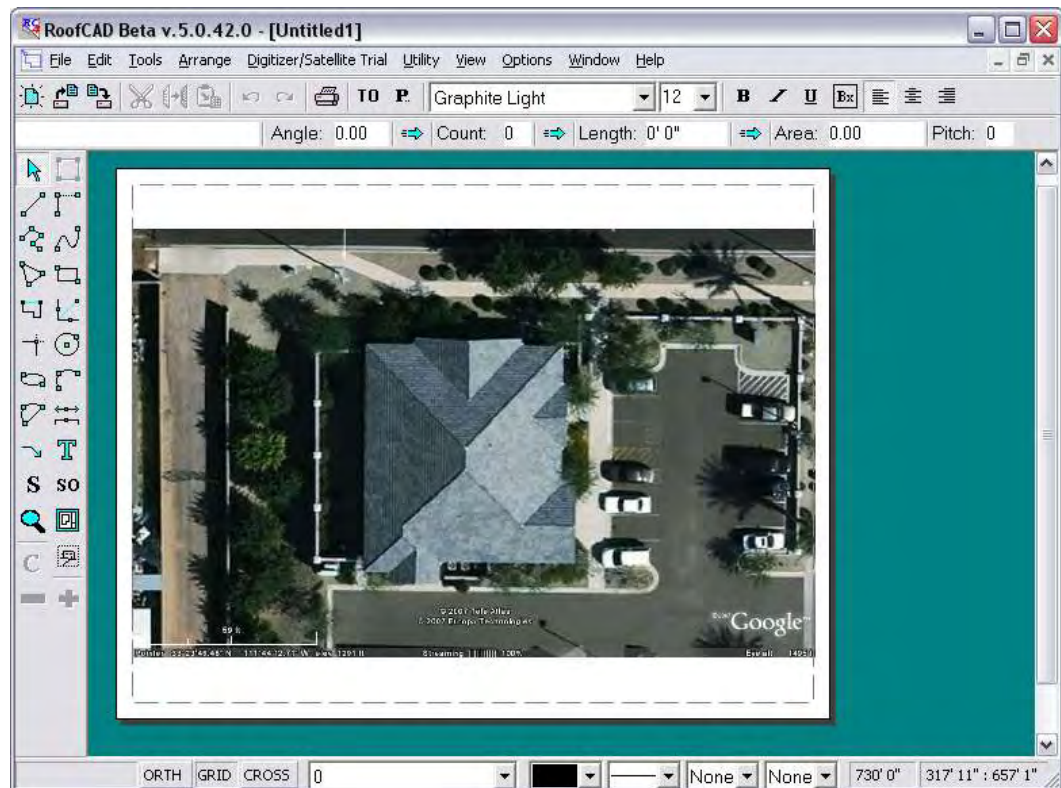
- Find the building.
- Get one linear measurement. Most services let you do this. The easiest thing to do is measure one of the perimeter walls of the roof. Measure the longest one you can.
- Rotate the image so that it is oriented properly for your drawing.
- Save the image to your hard drive.

Having done all these things you can now load the satellite image in RoofLogic Digitizer.

Load the Satellite Image

Trial Version Restriction: You can only load the sample satellite images that came with RoofCAD.

1. From the menu choose File|New|Empty. An empty page appears.
2. Choose the Digitizer/Satellite Trial|Load Eplan/Satellite Image menu option.
3. Navigate to the RoofCAD|Eplans folder and open the "Satellite-Commercial Pitched.JPG" file. The image is now displayed on the drawing page.



Satellite Tools

In order to work effectively with the drawing you need to learn these tools.

Zoom In/Out

By far the easiest way to zoom in and out on the image is to use your mouse wheel. Roll toward you to zoom in. Roll away from you to zoom out. Give it a try!

One important thing to know is that the system orients itself based on your mouse pointer location. If you want to zoom in on an object, keep your mouse pointer on the object as you roll the wheel. This takes a little practice but you will quickly get used to it.

If you get into trouble press F on your keyboard to reset the zoom level to full page view.

Mouse Wheel Zooms you in and out.

Pan

While zoomed in you will want to pan around the image. This works somewhat like a PDF document. To pan, simply hold down the P key on your keyboard and you will notice the cursor turns into a hand symbol.

With the P button held down, press and hold down your mouse button. You can now move your mouse to pan the page. When you're done release the P key and the mouse button.

P Hold down to pan.

Fit to Window

As mentioned above pressing the F key on your keyboard will reset the zoom level to full page view.

F Resets zoom level to full page view.

Refresh

As you pan, zoom and draw the screen may get a little messy with false lines. Just hit F5 at anytime to clean them up.

F5 Refreshes the screen.

Large Cross Hair

The normal RoofCAD drawing cursors display a small cross hair. Turning on the large cross hair expands the lines of the cross hair to stretch edge to edge on the screen. This is really useful when drawing roof outlines because the longer cross hair line is easier to line up over a wall.

For most other drawing operations you will probably want the large cross hair off because it tends to get in the way and can sometimes leave false lines on the screen. If you get false lines, use F5 to clear them up.

To turn the large cross hair on and off press the C key on your keyboard. Try it now!

C Turns large Crosshair on and off.

Ortho Mode

Ortho mode is extremely useful because it keeps the lines you draw straight, so you don't have to.

Ortho Mode locks your lines to predefined angles, thus making it easier to keep lines straight. RoofCAD ships with the Ortho angle set to 15-degree increments. Our experience has shown that most buildings have angles divisible by 15 degrees, so you should be able to keep Ortho on much of the time.

If the system won't let you draw a line at the angle you want, simply turn Ortho off, draw the line then turn it on again.

When Ortho Mode is on, the ORTH button on the status line is depressed. You can click this button to turn Ortho on or off. Pressing the "O" key on the keyboard also toggles Ortho Mode on and off.

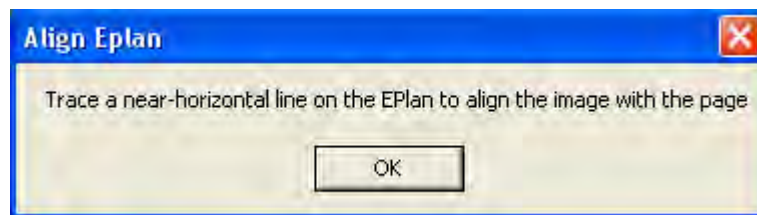
O Turns Ortho mode on and off.

Those are the core tools you need to know to start drawing with satellite images.

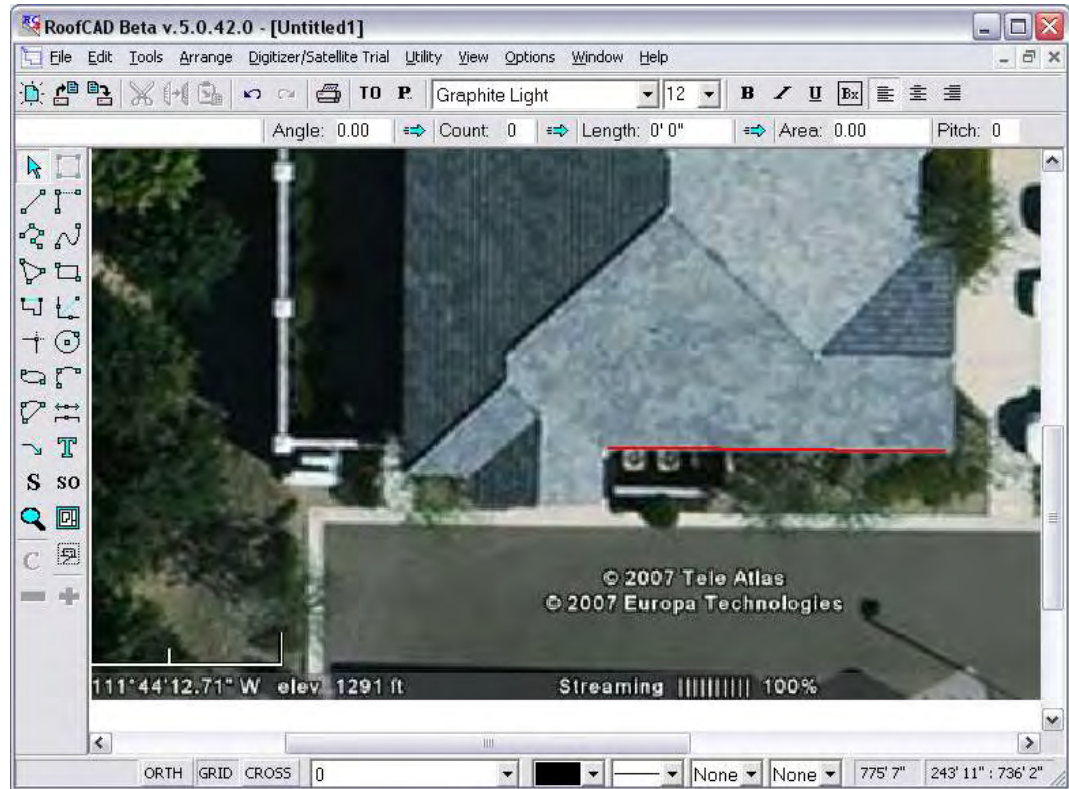
Align the Image

This step will help you square the building to the drawing page. Although, you have already rotated the image in your satellite service software, many find it hard to get the image exactly square.

1. If Ortho mode is on, turn it off. To do this, press the O key on your keyboard.
2. From the menu choose Digitizer | Satellite Trial | Align Eplan. A message appears.



3. Click OK.
4. Now find a line that should run parallel to the bottom of the page. Click your mouse at the start and again at the end point of that line, as we did with the red line in the next image.



Your image is now square with the page.

Hint: As shown in our image it can help to zoom in.

You can do a quick check to see how square your drawing is with the page, by turning on the large crosshair.

The large cross hair is turned on by pressing the C key on your keyboard or clicking the CROSS button at the bottom of the page.

Now, hover your mouse over the horizontal and vertical perimeter walls of the roof. The red crosshair line should run right along the wall. If it is skewed, run the Align ePlan option again. Having the image square to the page makes it much, much easier to draw.

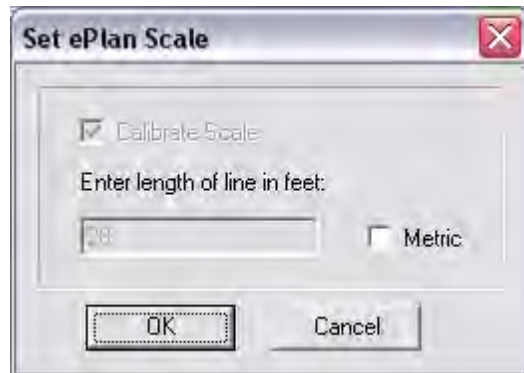
C Turns on the large crosshair.

Set Scale

Trial Version Restriction: You cannot enter a scale. You can only use the preset scale provided by RoofCAD.

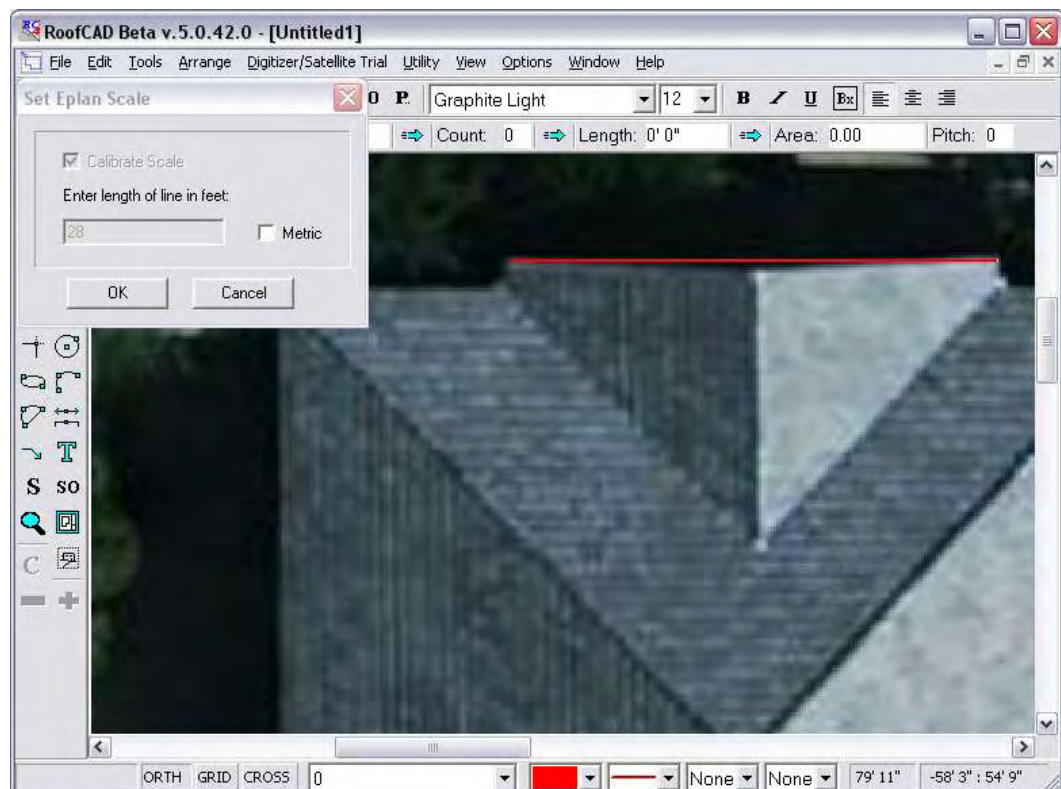
RoofCAD needs to know the length of something on the image in order to calculate the scale. The length of one of the perimeter walls is usually the easiest.

1. From the menu choose Digitizer/Satellite Trial | Set Eplan Scale. The Set Eplan Scale window appears.

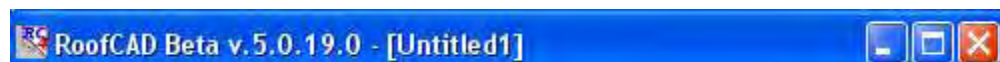


This is where you type in the length of one of the perimeter walls. In the trial version you cannot type in the length.

Now you will tell RoofCAD which wall is 28' long.



Don't click on the drawing yet or you will start the drawing process. You first need to set focus to the main program window. The easiest way is to click anywhere in the title bar of the RoofCAD window. It looks like this.



1. Now zoom in a bit on the wall. If you have trouble, use the pan tool. If you get all messed up, hit F on the keyboard and try again.
2. Click the mouse at one end of the wall.
3. Now click the other end of the wall.
4. Now click the OK button on the Set Eplan Scale window. The scale has now been established.

Hint: You do not “have” to set a scale. RoofLogic Digitizer will use a default scale if you do not set one. However, keep in mind the quantities calculated will not be accurate until you get a wall measurement from the site.

Draw the Roof Outline

Now we will draw the roof outline.

1. Click the SO button on the left hand tool bar. The Smart Object Browser will appear.

SO

The Smart Object Browser button.

Usually it is best to position the Smart Object Brower in the upper right of the window. This will keep it out of the way. You can also resize the Smart Object browser. Making it taller is helpful.

2. Expand the *****Pitched Roof***** node and click the Pitched Roof (Dig) smart object. It prompts you for a roof name; click OK to accept the default.

Hint: Where you have a choice use the (Dig) smart objects. They are made for digitizing.

We are now ready to draw the roof outline. However, let’s make life easier by turning on the large Crosshair and Ortho mode.

3. Press the C key on your keyboard. This turns on the large cross hair, which makes it easier to line things up.

C Turns large Crosshair on and off.

Next we need to make sure Ortho mode is on.

When Ortho Mode is on, the ORTH button on the status line is depressed. Pressing the "O" key on the keyboard toggles Ortho Mode on and off.

4. Make sure the ORTH button is pressed in now.

O Turns Ortho mode on and off.

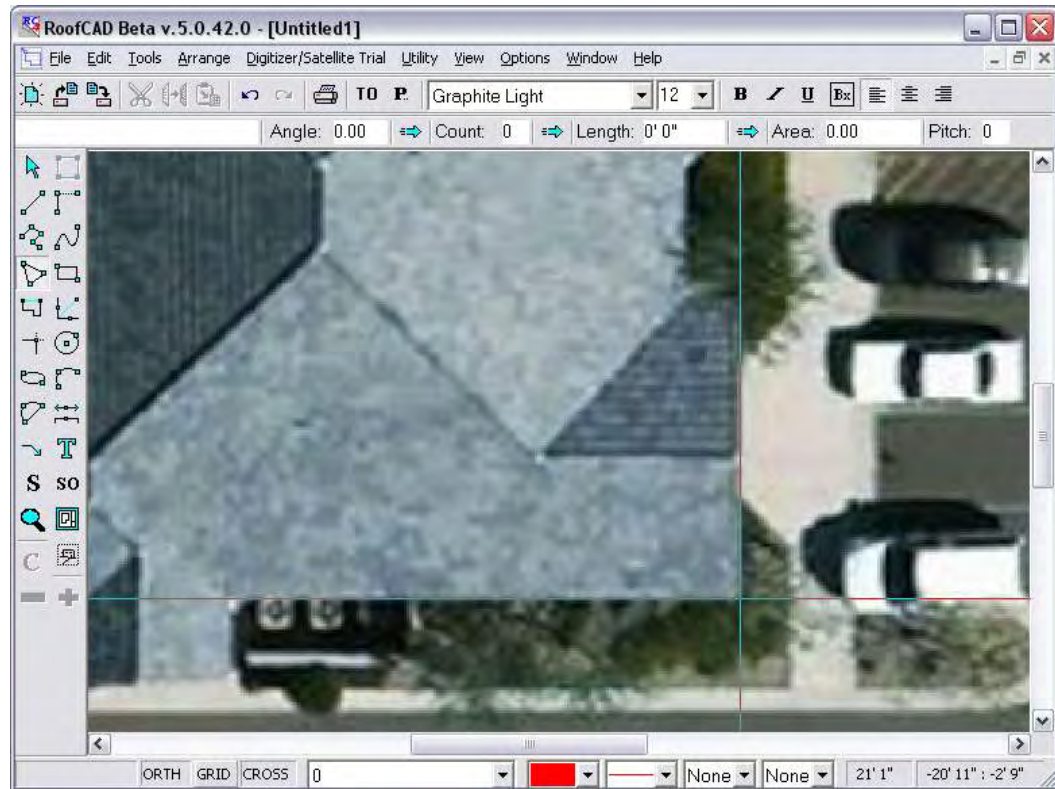
5. We also need to be sure the Grid Snap is off. Press G on your keyboard.

Grid snap forces your cursor to “snap” to 1 foot increments by default. When Grid Snap is off, the GRID button at the bottom of the screen is NOT pushed in.

G Turns grid snap on and off.

6. Press F on your key board to reset the zoom level.

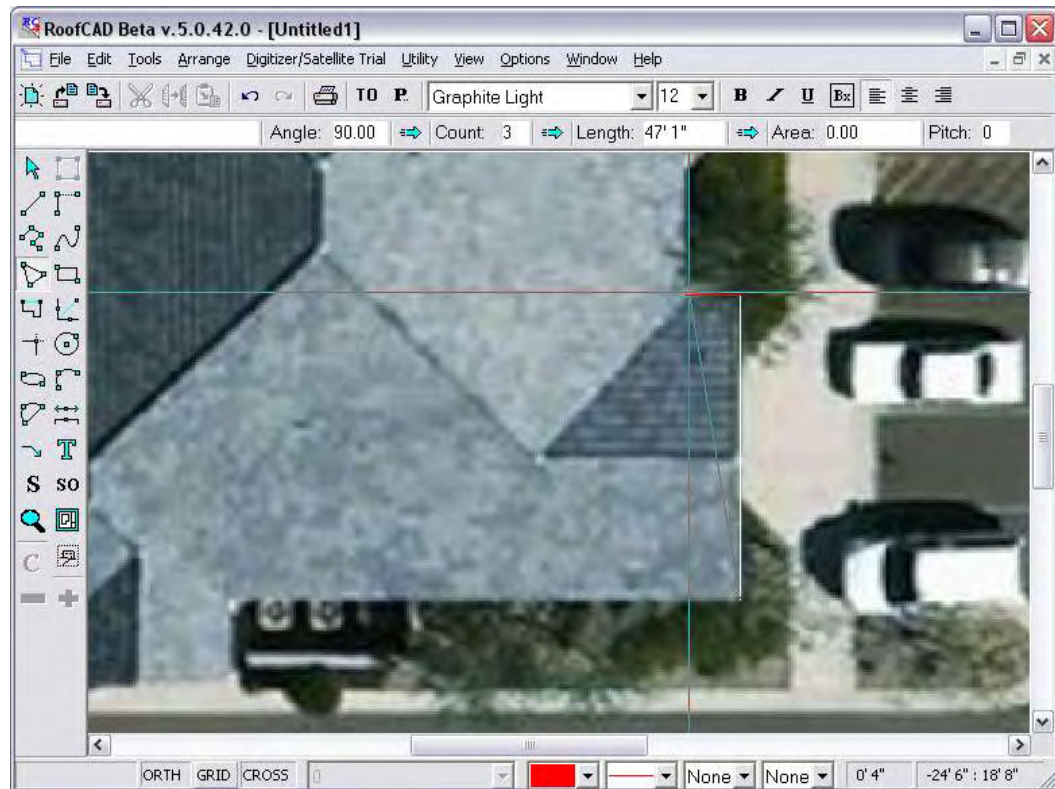
7. Now zoom in as show in the next image.



8. Click your mouse on the corner shown in the above image.

9. Now click the next 2 corners. Your screen will look like the next image.

Hint: With Ortho on all you have to do is line up the crosshair with the next wall.



10. Now pan up and click the other end of the vertical wall. Hold down the P key on your keyboard and drag the satellite image. Release the P key when you are done panning.
11. Now finish clicking the rest of the corners, working counter clockwise, using Pan as required.

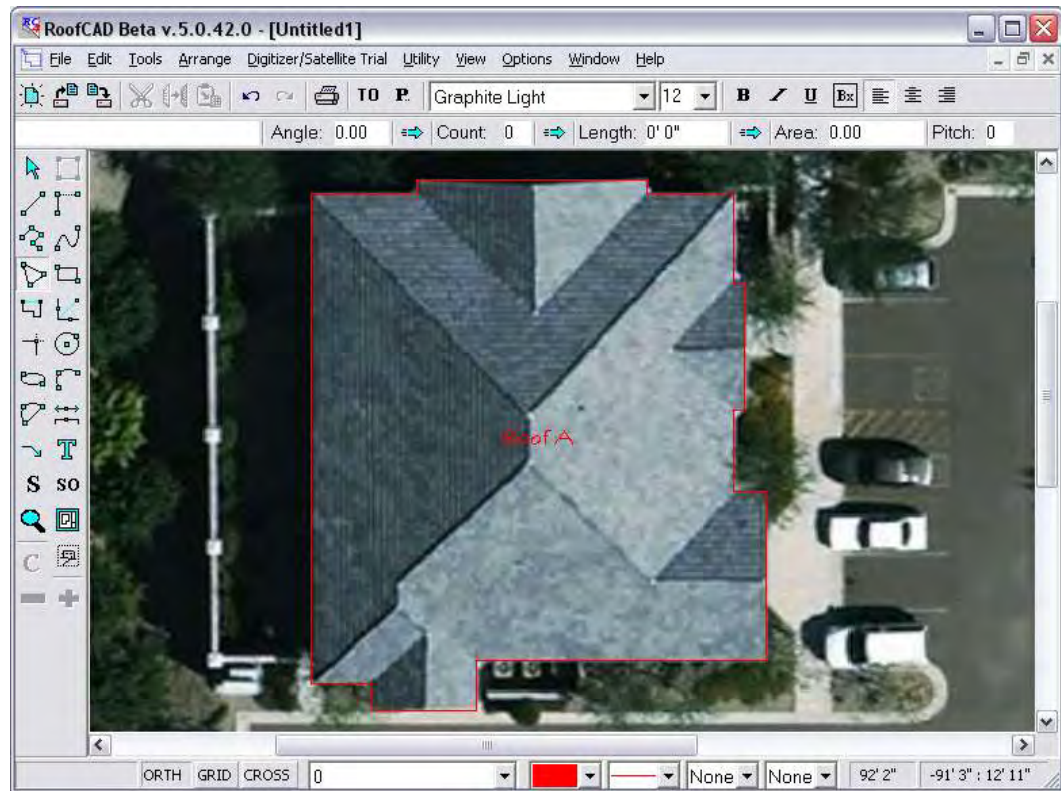
Hint: If at any time you want to start over, press Esc on your keyboard.

The screen may get “messy”. When it does, press F5 on your keyboard to clear it up.

While drawing an outline, if you ever need to undo a mistake, press the Backspace key and the last point you clicked will be undone.

If you have trouble positioning the mouse, use the keyboard. You can draw by moving the mouse with the arrow keys. Pressing the space bar is the same as clicking the mouse.

11. Once you have made it all the way around the roof, right click to finish. Your screen should now look like this.



12. Press C on the keyboard to turn the large Crosshair off. We won't need it anymore.

Add Dimensions

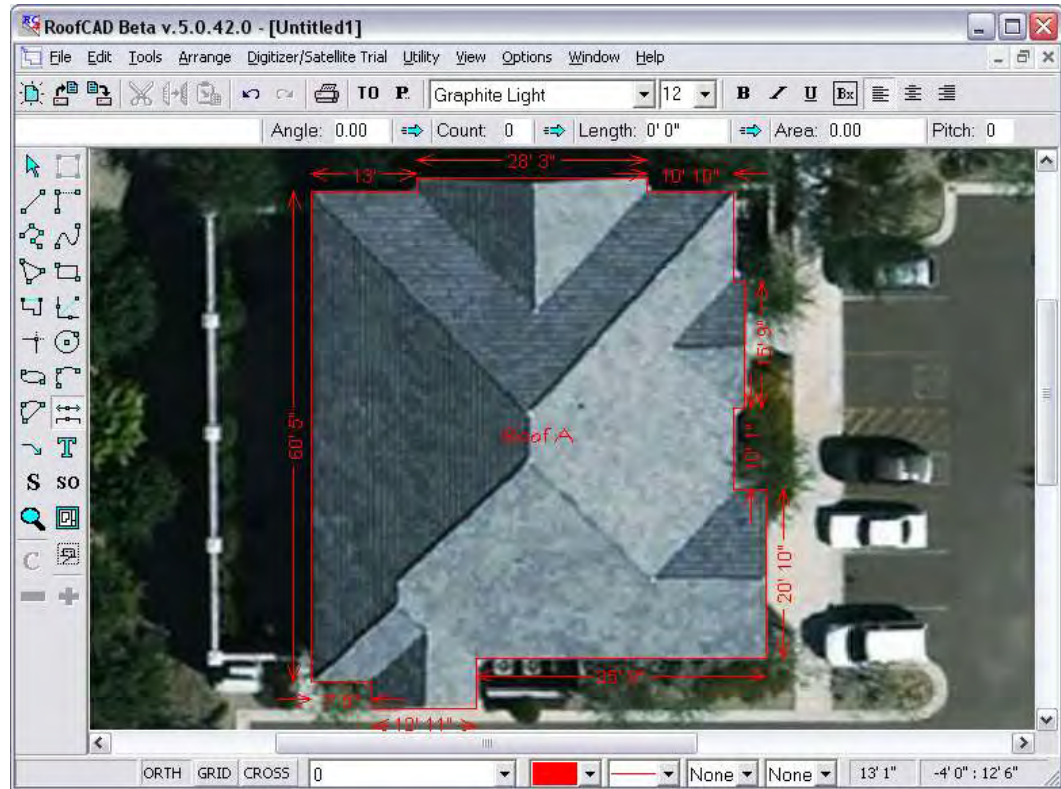
You can add dimensions at any time to your roof outlines.

1. Choose the dimensions tool from the left hand toolbar.



The Dimension Tool.

2. To add a dimension to a wall, click the wall. This highlights the wall.
3. Now click on the inside or outside of the wall and the system will place the dimension line where you clicked.



Feel free to add as many dimension lines as you like.

Move the Roof Labels

Our Roof A label is sitting right on a ridge, which is not a good spot. So let's move it.

1. On the left hand toolbar click the pointer tool.



The pointer tool.

2. Now click the tip of the cursor on the Roof A label. The text becomes selected.
3. Now drag the Roof A label off of the ridge. Find a spot where it will not be in the way and drop it there.
4. Press Esc on the keyboard to deselect the roof label.

That's how you move things in RoofCAD.

Define Perimeter Walls, Hips, Valleys, Ridges...

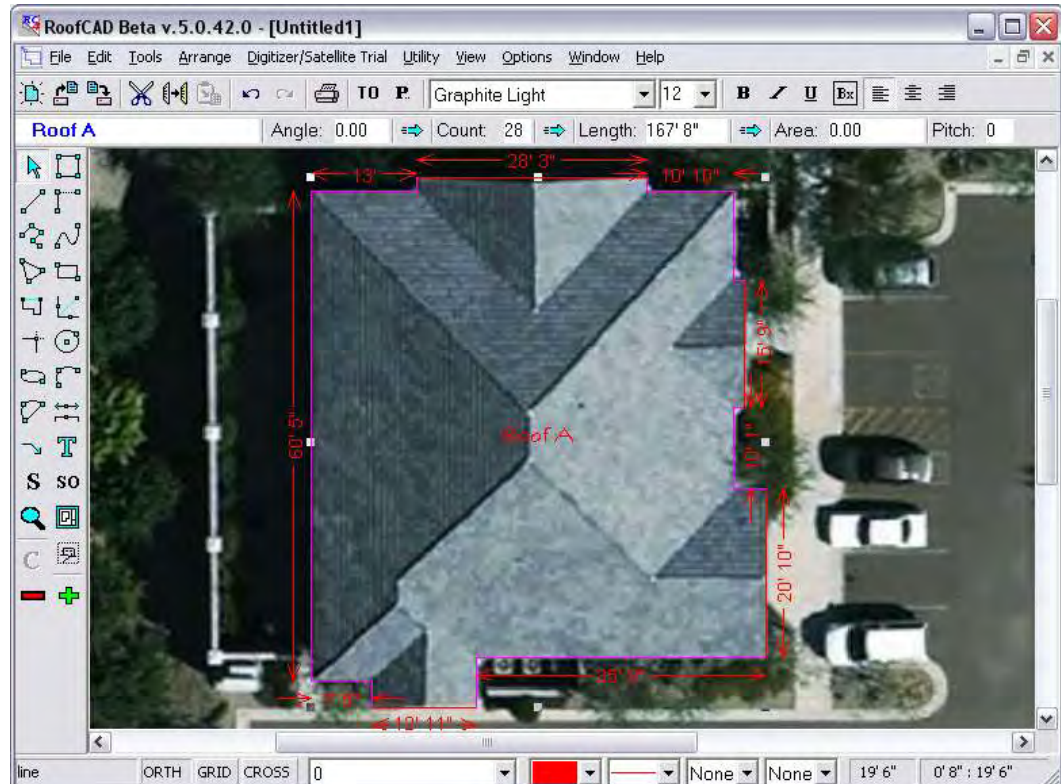
Here is where we define all the lines on the image.

Eave & Rake Edges



Get ready to use the Pointer tool.

1. The next step is to select an Eave. Click on the Pointer tool button on the left side tool bar.
2. Then, with the mouse, position the tip of the pointer, directly on an eave line and click. Do the same with all the other eave lines (not the rake edges). The walls will turn magenta in color. Your drawing should look like the next image.



Hint: The tip of the cursor arrow must be right on the line to select it. If you make a mistake and want to start over, press Esc on the keyboard.

Some of the eave lines are pretty small, so you may need to zoom in to select them.

3. In the Smart Object Browser expand the Pitched Perimeter section and click Eave. The properties window appears.
Pitch and Overhang do not apply when digitizing. They are used when drawing from site measured dimensions. However, to avoid confusion it is not a bad idea to set the pitch. You will have to guess at this point, and correct it after a site visit.

Height is optional; it has no effect on the quantity calculations.

4. Set pitch to 6 and click OK.
5. Press Esc on the Keyboard to deselect.

Hint: Notice that the eaves are now black. Perimeter lines stay red until they are assigned a Smart Object. That way you don't miss any.

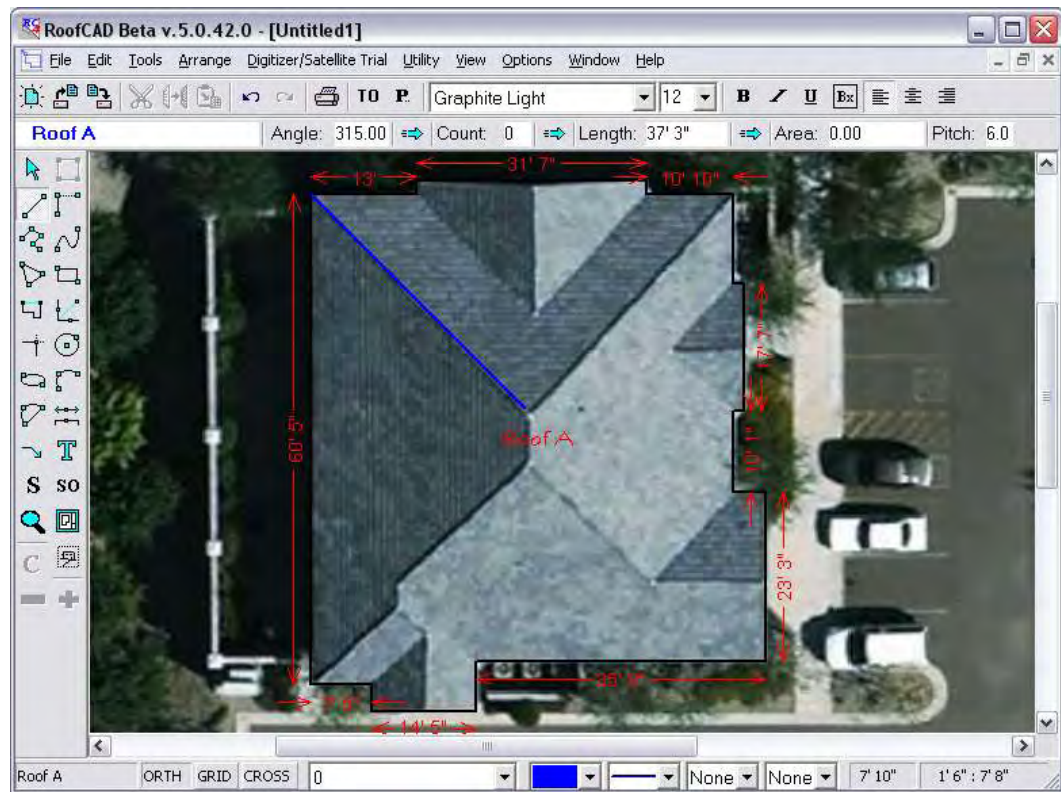
6. All the remaining perimeter lines are Rake edges. Select them now.
 7. Click Rake Edge in the Smart Object Browser.
 8. Set pitch to 6 and overhang to 0 and click OK
- Notice that the dimension lines on the rake edges have been updated to take into account the 6/12 pitch.

9. Press Esc on the keyboard to deselect the rakes.

Hint: Right clicking the mouse on the drawing will also deselect everything.

Hips, Valleys, Ridges

1. In the Smart Object Browser click Hip (Dig). The properties window appears.
2. Enter 6 for the pitch and click OK.
3. As in the following image, click the mouse once at the start and end of the hip.



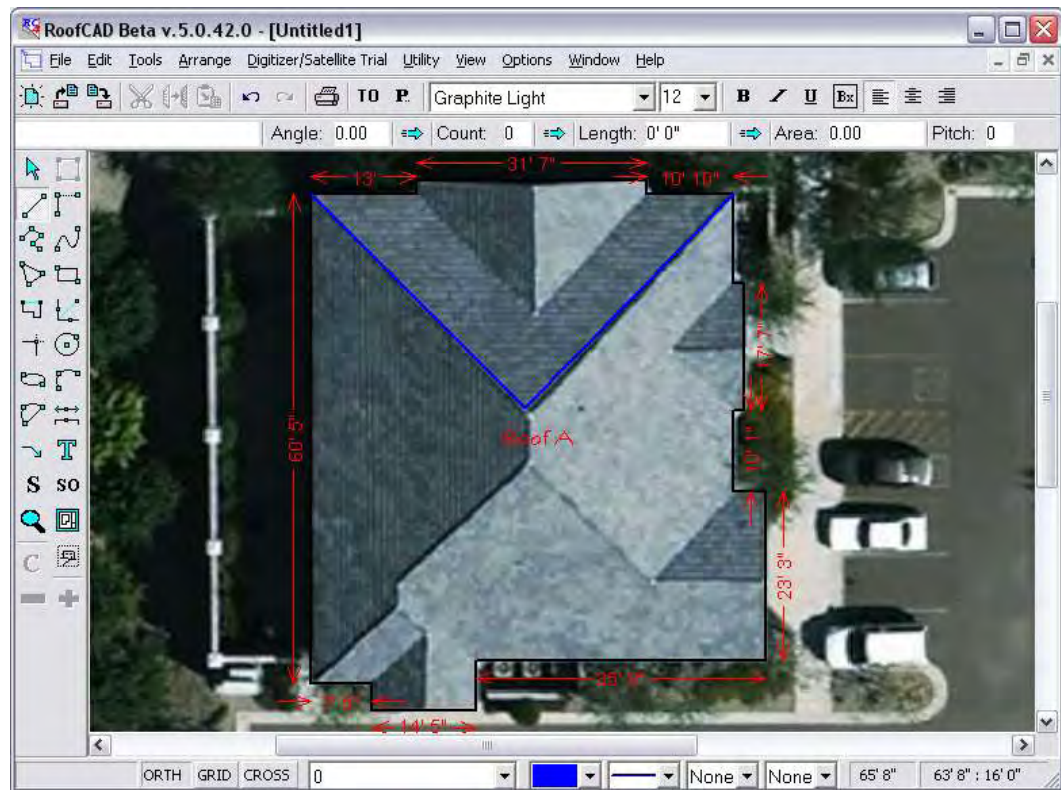
Hint: Ortho mode is still on, so it will help you draw. If you need to turn it off Press the O key.

Here is another feature that will help. It is called Snap to End Point. We will demonstrate it by drawing the hip on the other side.

4. Hold down the CTRL key and click the mouse where the two eaves meet and the hip starts. CTRL makes the end of the hip snap exactly on the corner.

Hint: If you make a mistake press Esc. This terminates the current drawing operation and lets you start again.

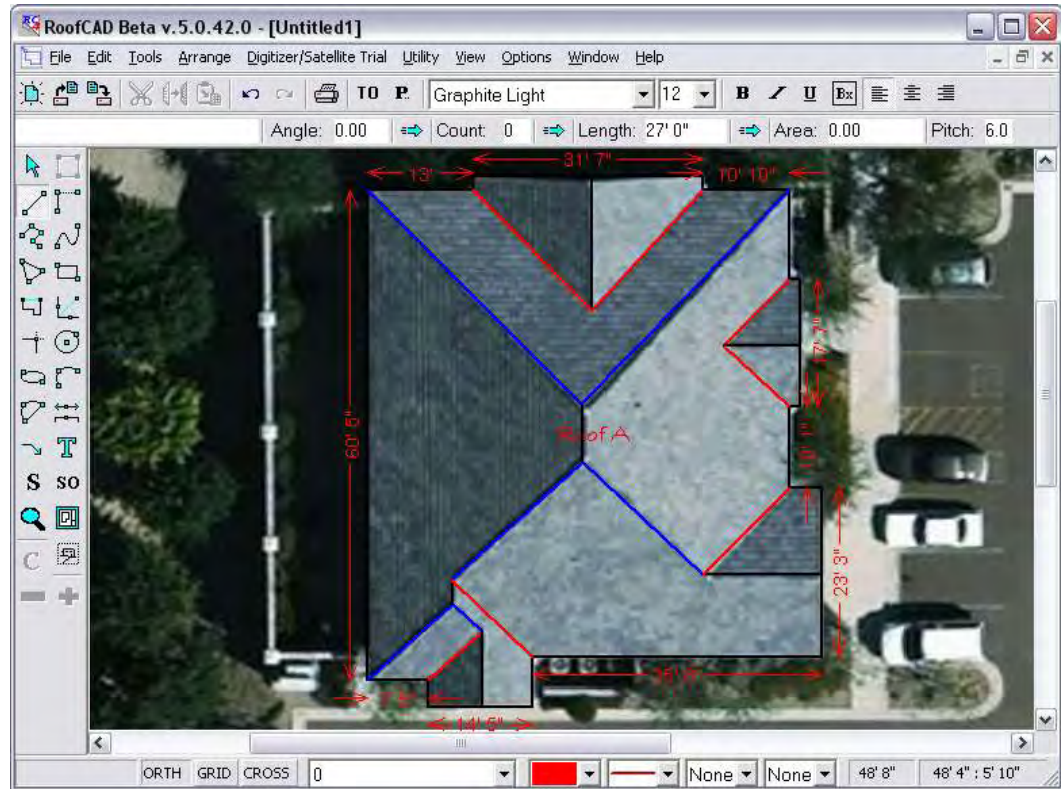
5. Keep CTRL held down and click the end point of the first hip, up at the ridge. Your drawing should look like the following image.



Valleys and Ridges are drawn the same way. Of course, ridges don't have a pitch factor to enter. We will let you draw the valleys and ridges on your own. Your drawing should end up looking like the following image.

Hint: Remember to turn Ortho mode off if it is not letting you draw the line at the angle you want. Press the O key to turn it off and on.

Keep using CTRL to connect all your lines. It will make a neater and more accurate drawing.

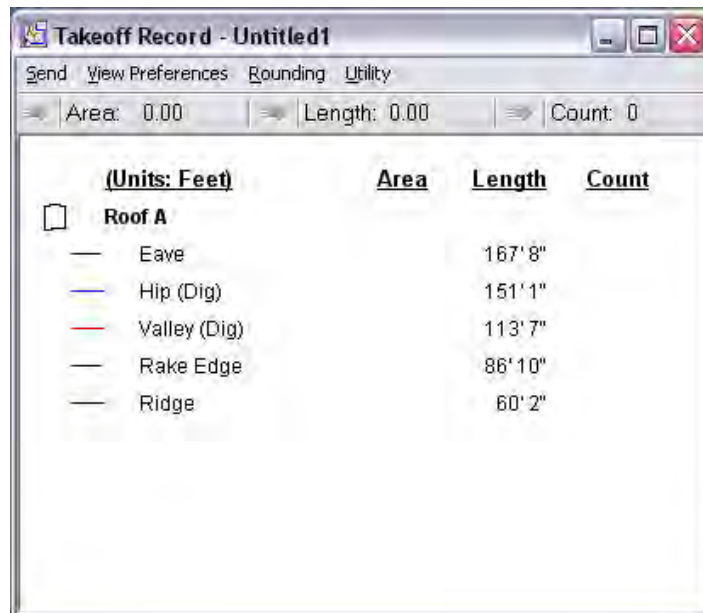


So let's see the quantities generated so far.

Click the Takeoff Record button on the top toolbar. The Takeoff Record appears like in the next image.

TO

Opens and closes the Takeoff Record.

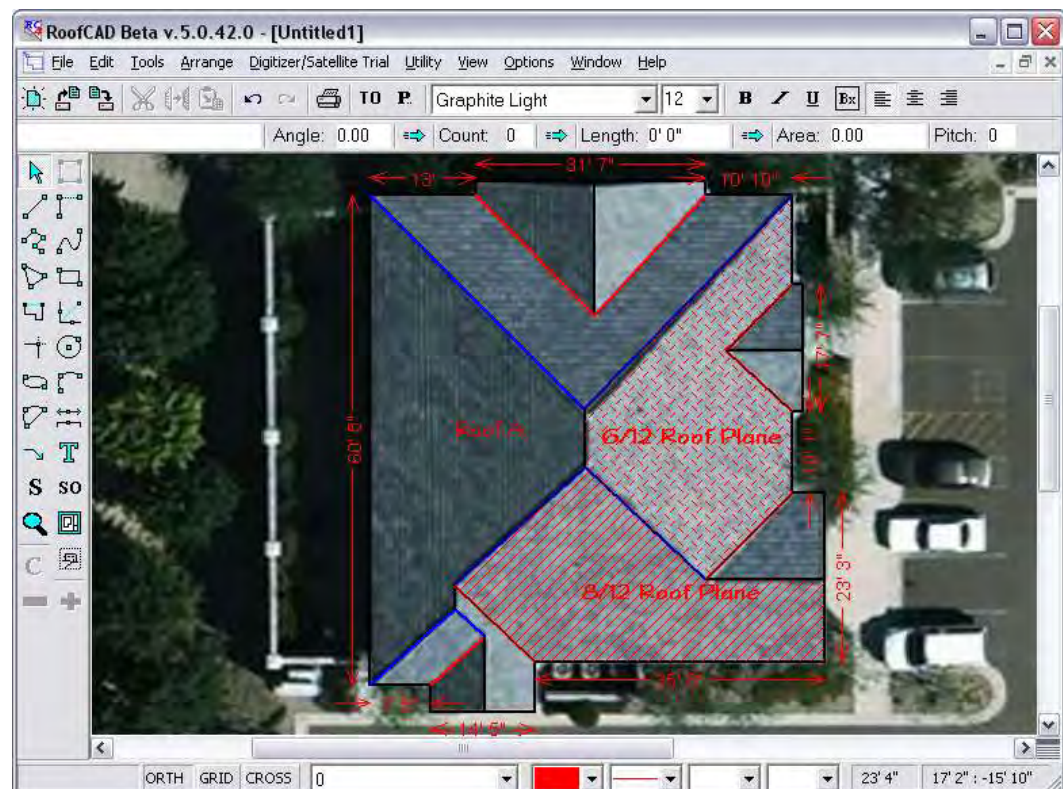


Draw the Roof Planes

Roof planes are what generate the square footage of the roof. There are two ways to draw roof planes.

1. When there are roof planes of different pitches or the roof is broken up in any way, you need to draw each roof plane individually. For example if there was a flat roof or an opening in the middle of the pitched roof, you must use this method.
2. If like our roof, the pitch of every roof plane is the same and the roof is unbroken in any way, you can select the roof outline and click Roof plane.

We will show you both methods. First, we will show you how to draw each roof plane individually. Like in the following image we will draw two roof planes of different pitches.



1. In the Smart Object Browser click Roof Plane (Dig). The properties window appears.
2. Enter 8 for the pitch and click OK.
3. Hold down the CTRL key and click all the corners of the 8/12 roof plane as shown in the above image. When we ask you to hold down CTRL here we are assuming you have drawn in all your hips, valleys and ridges.
4. When you are done, right click the mouse to finish.

5. In the Smart Object Browser click Roof Plane (Dig) again. The properties window appears.
6. Enter 6 for the pitch and click OK.
7. Hold down the CTRL key and click all the corners of the 6/12 roof plane as shown in the above image.
8. When you are done, right click the mouse to finish.

That's it. Not too tough, eh! Let's have a look at the result.

9. Open the Takeoff Record.

TO

Opens and closes the Takeoff Record.

See how we have a total area for the roof planes, even though they have two different pitches? On the menu at the top of the Takeoff Record (NOT THE ROOFCAD WINDOW) choose View Preferences | Detail.

Now you get a line item for the 6/12 Roof Plane and the 8/12 roof plane.

10. Click either one on the Takeoff Record and it highlights it for you on the drawing.

Now let's delete those planes and show you the other method.

11. Click on each roof plane in turn, in the Takeoff Record and hit the delete key. This deletes them from the drawing.
12. On the menu at the top of the Takeoff Record (NOT THE ROOFCAD WINDOW) choose View Preferences | Itemize. This sets the Takeoff Record back to the default view.

Here is how the other method works. It's real simple.

1. Select the roof outline. To do this click the pointer tool near but not right on one of the perimeter lines of the outline. If you did it correctly every perimeter line is now the magenta color. If you missed hit Esc on the keyboard and try again.

Hint: You must also not be closer to another object like a dimension line, hip or valley. RoofCAD selects whatever it is closest to.

2. In the Smart Object Browser click Roof Plane (Dig). The properties window appears.
3. Set the Pitch to 6 and click OK.
4. Press Esc on the keyboard to deselect the outline. That's it!
5. Open the Takeoff Record and you will see the area for the roof on the Roof Plane line.

Add Roof Top Objects

As you can see in the Smart Object Browser there are many other things you can draw. We will leave you to experiment with most of them. However, to give you the flavor, let's add some plumbing stacks and an HVAC unit.

If the satellite image is good enough you can identify some roof top objects. However, in some cases the objects will be too blurry.

Tip: The satellite image in this tutorial is from a newly launched satellite. The company says all images will soon look like these. This one is from Phoenix, AZ.

On our sample drawing there is possibly one object but it is not clear enough to make out so for our example we will pretend there are some objects on the roof.

1. In the Smart Object Browser, expand the Pitched Curbs section.
2. Click on Pitched Curb (HVAC). The system prompts you for the dimensions. Enter 4 for the length and 4 for the width. Leave Height at 1'6". This is the flashing height.
3. Now choose a place on the roof and click. The HVAC unit appears.

Hint: The area under the unit can be deducted from the roof plane it sits on but this is not done automatically. To do this you need to draw an opening with the Pitched Opening (Dig) Smart Object.

4. Expand the Pitched Penetrations section and click Pitched Plumbing Stack. The Properties window appears. Click OK to accept the defaults.
5. Click on the drawing to add a plumbing stack.

It's that simple.

Our Drawing is Complete

There are many other objects you can draw. It is up to you how much you want to do, before heading out to the site.

Click the Takeoff Record button to see the quantities that have been generated so far.

TO

Opens and closes the Takeoff Record.

The next image shows how our Takeoff Record turned out.

	(Units: Feet)	Area	Length	Count
	Roof Plane (Dig)	3626.42	245' 4"	
	Eave		167' 8"	
	Hip (Dig)		151' 1"	
	Valley (Dig)		113' 7"	
	Rake Edge		86' 10"	
	Ridge		60' 2"	
	Pitched Curb (HVAC)	24.00	16' 0"	1
	Pitched Plumbing Stack			2

Print or Download to RoofCAD Mobile Device & Head to the Site

Note: Printing is not allowed in the free trial version.

Print

Before you print, you need to decide whether to leave the satellite image on the drawing or not. To hide it, choose the menu option Digitizer/Satellite Trial | Hide Eplan.

Now all you have to do is click the print button or choose File | Print | Print Drawing.

Note: Some people like to take two drawings to the site, one with the satellite image displayed and one without.

RoofCAD or RoofLogic Mobile

This option allows you to take your drawing with you on a small handheld device. The advantage to this is that you will make corrections to the drawing right on the roof top, so when you get back to the office your work is done.

For a demonstration of how this works please contact us at (416) 778-0843

On Site

On site you will verify the dimensions of each perimeter line. You will also determine the pitch of the roof planes.

RoofLogic has a unique Rescale feature that allows you to correct the entire drawing by updating just one perimeter line length on the drawing. So check a few lines to see if there is a consistent difference between the satellite image lines and the real lines. Mark on your drawing the real length of the lines.

Hint: You don't have to measure every line. It depends on how confident you are with your drawing. If you measure a few lines and they seem to be accurate or proportionally off by the same amount, that may be all you need to measure. If in doubt, we recommend you measure every line.

Next you need to add objects that were missed on the satellite image. Mark them on your drawing.

Hint: With our Mobile applications you update the drawing live, right on the roof top.

Back at the Office

Now we will apply the finish touches.

Rescale

The rescale feature corrects every line on the drawing and recalculates all quantities. To use the feature you enter the true length of a single line that you measured on site.

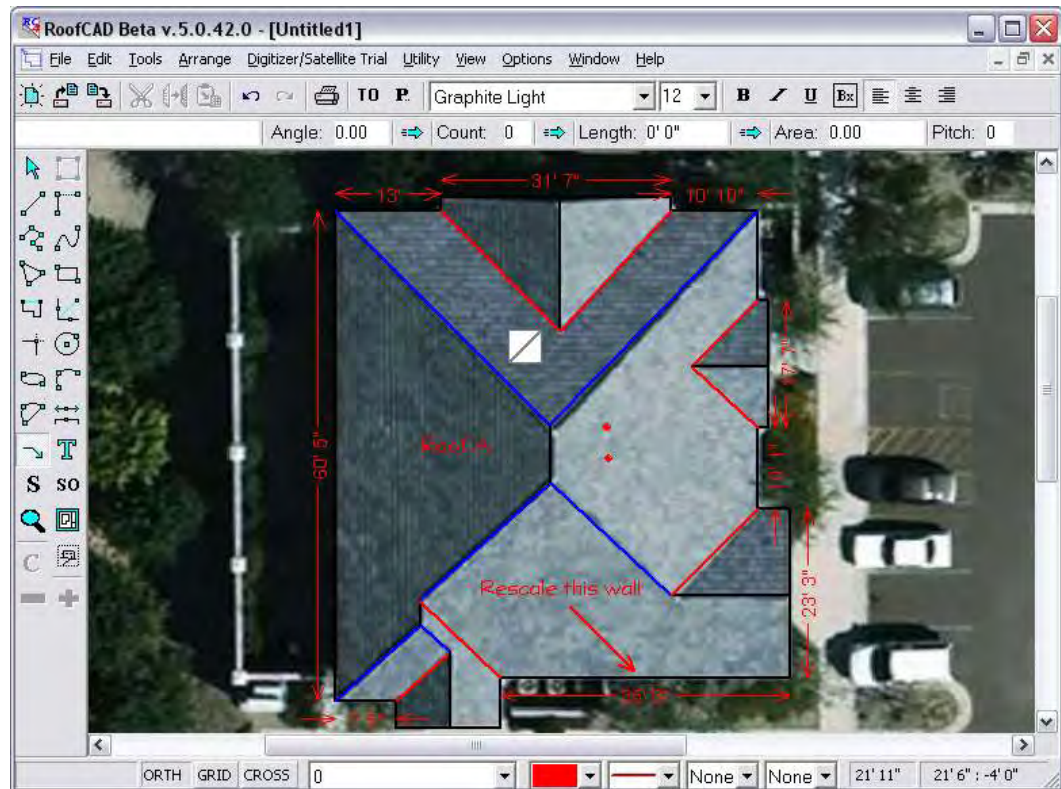
Before we begin, click the Takeoff Record button on the top button bar. This is so you can see the roof quantities before the rescale.

Hint: Only flat lines with no pitch, like eaves, can be used for rescale. If you use rescale with a rake edge or a hip, the number you enter is assumed to be the flat length which is not what you will get from the site.

TO

Opens the Takeoff Record

Now choose an eave line on the drawing to correct. We will use the same one we used to set the scale in the first place, as indicated in the next image.



1. Get the pointer tool.



The Pointer tool.

2. Now click the tip of the pointer tool right on the line. You must do this accurately or more than one wall will be selected. If you need to try again, right click to deselect all, then try again.
3. With the target wall selected choose the menu option Digitizer/Satellite Trial | Rescale Drawing.

In the demo version you cannot enter the line length. You have to accept the hard coded value.

We are telling the system that the 28' long wall from the satellite image is really 52' long. Your satellite drawings will normally be nowhere near this far off but we are doing it so the effect is more dramatic.

4. Click OK.

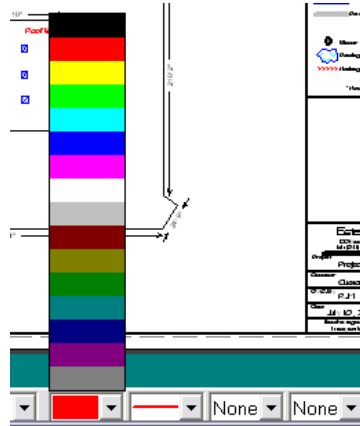
The system has redrawn every line in proportion to the one you changed. Notice that all the dimensions have been updated as have the quantities in the takeoff record.

Hint: You don't have to use rescale. You can update each line manually with the layout wizard but rescale is much faster.

Change the Color of your Dimensions

If your dimensions are red and you want to change them to black (or any color), do this.

1. With the pointer tool select all the dimensions.
2. Click the color pallet button at the bottom of the window as show in the next image.



3. Choose a color.
4. Press Esc on your keyboard. The dimensions are now the new color.

Update Roof Pitch

On site you figured the pitch was 8/12 instead of 6/12, so let's update the drawing. You can update each object individually and when you have multiple pitches you will need to do so. This entails selecting all the objects that have the same pitch, opening the Properties window and updating the pitch. You have to do this object by object; change all hips with the same pitch, then all valleys. You can't select hips and valleys together.

Our roof is all one pitch so it is easier. Here is a convenient method.

1. Open the Takeoff Record.

T

Opens the Takeoff Record

2. Click on Roof Planes. All the roof planes become highlighted on the drawing.
3. Open the properties window.

P

Opens and closes the Properties Window.

4. Highlight the Roof Planes (Dig) item.
5. Click Properties inside this window.
6. Update the pitch to 8/12.
7. Click OK.

On the Takeoff Record the Roof Plane quantities have been recalculated using the 8/12 pitch.

8. Now, in the Takeoff Record, click on the Hip (Dig) item. All the hips on the drawing get highlighted.
9. Open the properties window.
10. Click Properties inside this window.
11. Update the pitch to 8/12.
12. Click OK.

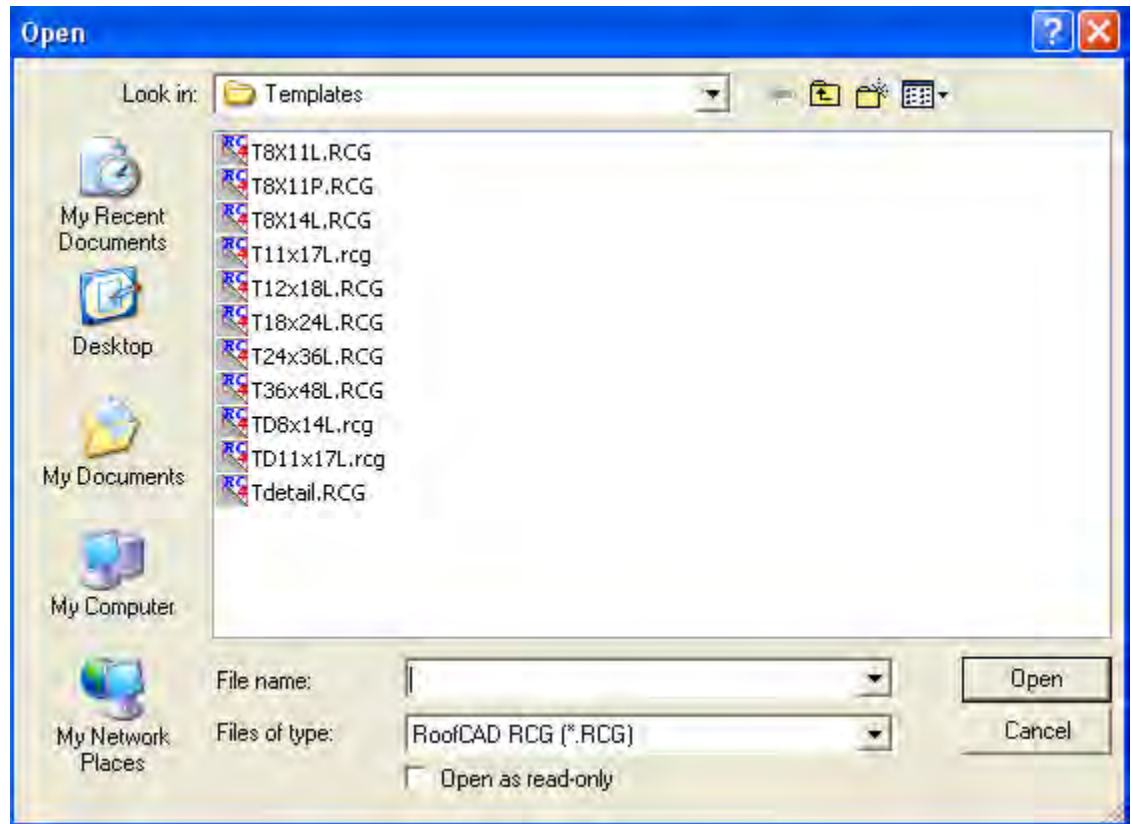
Repeat this for all Smart Objects with a Pitch property and you're done.

Hint: **If you have multiple pitches you need to switch the Takeoff Record View to Detail. This shows a line item for everything on the drawing. Then you can set the pitch individually for each item.**

Apply a Template

Now we're almost done. You can make your drawing complete by applying a template.

1. First hide the satellite image by choosing Digitizer/Satellite Trial | Hide ePlan from the menu.
2. Now, from the menu choose File | Apply Template. Navigate to the RoofCAD\Templates folder. The system displays the available templates.



3. Select the T11x17L.rcg template and click Open.

Applying a template means choosing a paper size, in this case 11x17, and adding a legend to your drawing.

The legend and title block can be customized for your company. For example you will want to get your company name or logo on every template.

Hint: The templates shipped with RoofCAD are flat roofing templates. They can however be modified. See Section 40; Template Setup in the User Guide.

To improve the look of your drawing you will probably need to change the drawing scale and center the roof on the page.

Center Drawing on Page

1. From the menu choose Edit | Select Layer.
2. Drag the roof to the center of the page so that it looks right.

Hint: You can also select by choosing the pointer tool, then dragging a rectangle around everything you want selected. If you make a mistake, hit Esc and try again.

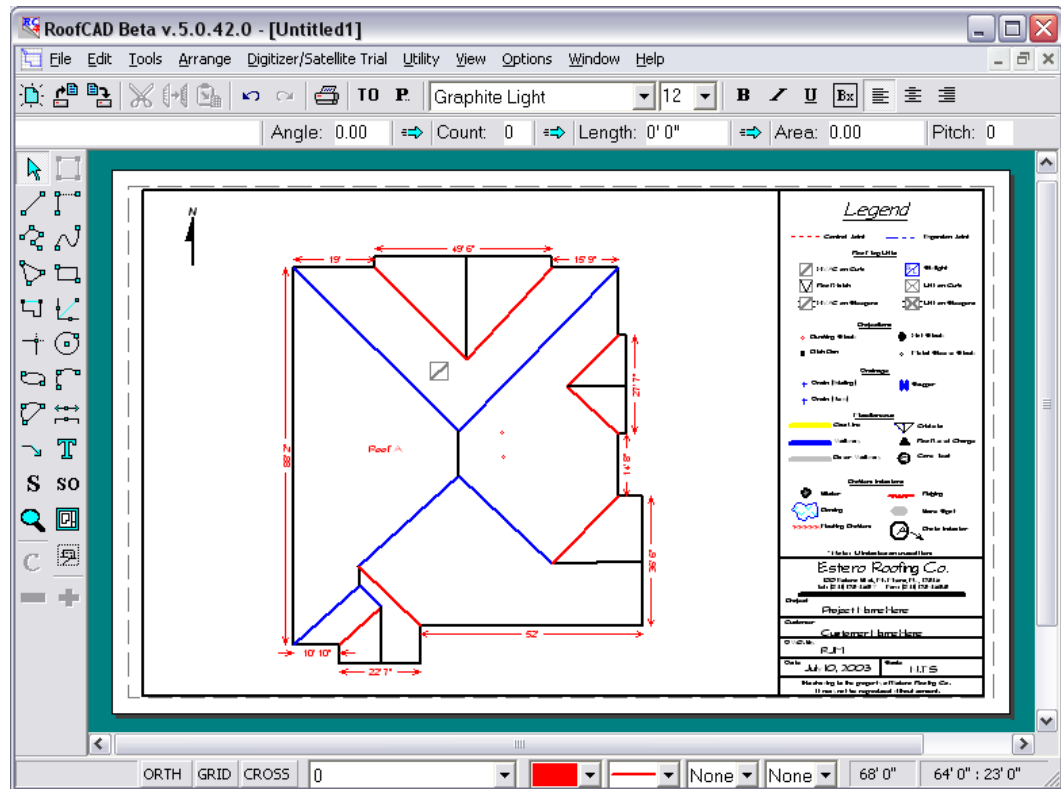
Change Scale

1. From the menu Choose Options|Drawing Settings
2. In the Scale area change the feet side of the scale. For example enter 30 and click OK to see the effect. Repeat until you get the scale you want.

Hint: A higher number decreases the size of your roofs on the page and a lower number does the opposite.

You're Done!

Here is an example of a completed drawing.



Hint: We **HIGHLY** recommend you read Section 31; Advanced Pitched Roof Topics. It will explain how to identify pitched roof sections. This tutorial had only one section, but you will also need to understand how to handle facilities with multiple pitched roof sections.

This completes our tour. For more information or a live presentation over the Internet please call us at (416) 778-0843.