Stitchers

For those interested in creating very large images, a stitcher can take a number of normal sized images, perhaps from different focal lengths, perhaps with different exposures, and create a large seamless, correctly exposed image.

For example, I created a 27095x9509 resolution image of the Great Wall of China from 23 separate images. This is the equivalent of about 7 normal images wide and 3 images high! The resulting jpeg image was 90 megabytes.

And to be honest, it happened without me knowing about it!

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On the recent Rotto Weekend, I took a series of sunset images and then stitched them into a large panorama that was 40,000x10,000 pixels in size and was about 190 megabytes.

This one was done on purpose and I knew exactly what I needed to do to get these images so I could stitch them together. The resulting image could be printed at 300 dpi to make an image 3 metres wide by 1 metre high – is that right??

So how can we take these images and how can we stitch them together?

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There are a number of packages available that let you create these images, some need more work than others. Some are "drop and see" (i.e automatic production of the panorama), others need "hand feeding" - you have to do some aligning work to get a good seamless image.

For a wide but brief review of panorama stitching software,
    see http://www.steves-digicams.com/digsoftware_stitch.html

The above image shows some of the potential problems in taking panorama images. And why do we always have to take panoramas??? Can stitching be used to take stitched images of other objects? YES!

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Hugin: Available for Windows, Macs, Linux
    http://hugin.sourceforge.net/download/
    An easy to use cross-platform panoramic imaging toolchain based on Panorama Tools .

    With Hugin, you can assemble a mosaic of photographs into a complete immersive
    panorama, stitch any series of overlapping pictures and much more.
    I found it difficult to use and to get useful results. It needs hand feeding.
    But very good for free software,

Ptgui: Available for Windows and Mac. http://www.ptgui.com/
    Again, it uses Panorama Tools.
    It stitches most panoramas fully automatically, but at the same time provides full
    manual control over every single parameter. You can try PTGui for free for 30 days,
    then you must purchase a license.
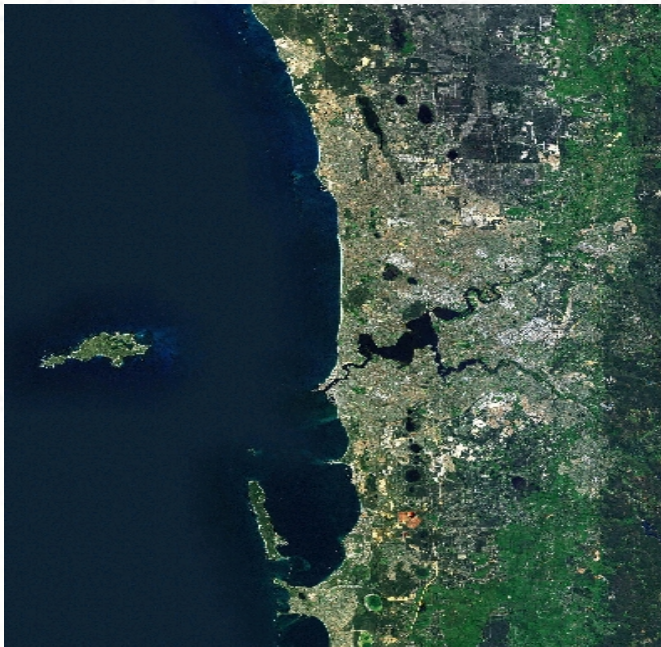
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Photomerge in Photoshop: good if you already have photoshop but not as good as dedicated software. Probably similar in Light Room.

Microsofts' Image Composite Editor: Windows.
http://research.microsoft.com/en-us/um/redmond/groups/ivm/ice.html
It is an advanced panoramic image stitcher. The application takes a set of overlapping photographs of a scene shot from a single camera location and creates a high-resolution panorama incorporating all the source images at full resolution.
It is free and works well. (Did I say that of a Microsoft product?)

Google Satellite Maps: Windows.
 http://allallsoft.com   http://www.softonpc.com

Just a tiling program for satellite maps but fun.
I created a 29440x7168 resolution image
of Perth. Not really stitching, but fun!

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Autostitch: Windows (Linux with Wine). http://www.autostitch.net
Very functional, free "drop and see" software that is highly recommended.
See review later.

AutoPano: Windows, Macs, Linux. http://www.autopano.net/
Very functional, "free" "drop and see" software that is again highly recommended.
The free version watermarks the image. See review later.

The software comes with an 81 page french users manual, or a 43 page english user
manual!!! Well, my french is not that bad......
There is also online documentation as well as many Tips, Tricks and Tutorials
(http://www.autopano.net/wiki/action/view/Main_Page). The documentation is good,
but lagging behind the version of autopano that I had purchased.

In conclusion, I am convinced that the €99.00 that I spent buying the non-demo version
was well worthwhile.
The software not only does very fine panoramas in an automatic manner, but there are
4 or 5 extra facilities that produced value added images that I had not expected.

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Picture taking tips

☺ When taking your panorama, try to get about 20% to 30% overlap between shots.

☺ If there's a main feature in the panorama, try to centre it completely in one of the images.

☺ Check that you will shoot high and low bits of the image as you pan across the scene, otherwise there will be blank spots at the top or bottom of the final image.

☺ Meter for the most appropriate area of your panorama, and use the same metering for all images (exposure lock the images).

☺ Specify the white balance, instead of leaving it to auto.
    On big panoramas the auto white balance can change between images, giving for example a blue cast on one picture and a yellow cast on another. Think sky vs. mountains.

☺ Chimp!

☺ Turn the camera sideways!!!

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Autostitch

The demo version is very functional but very limited documentation – one README file. The initial application window of Figure 1 simply provides menus.
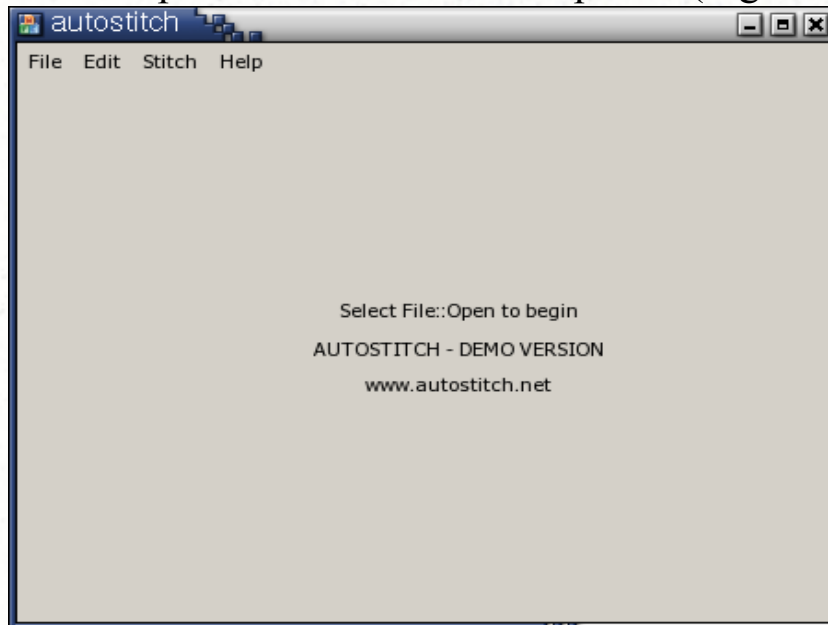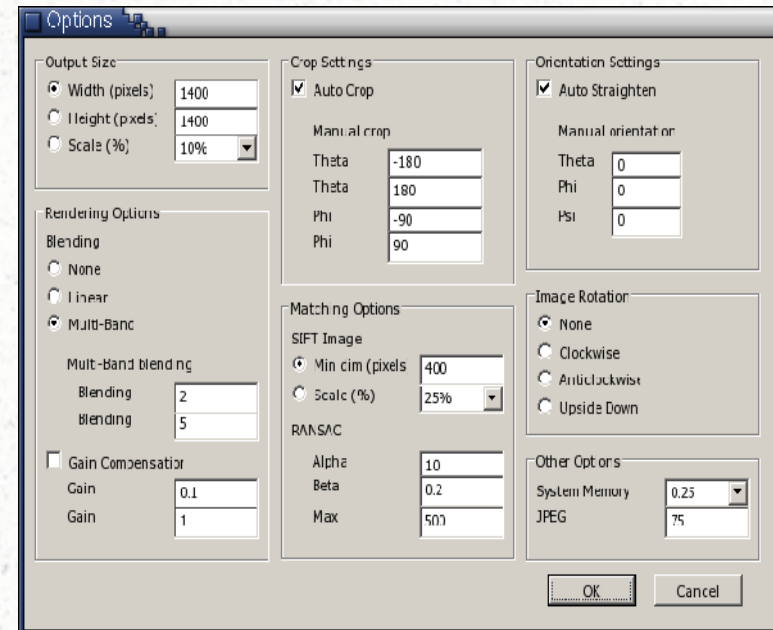The important menu is Edit->Options (Figure 2).

Figure 1: Initial Window

Figure 2: Edit->Options window

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I set the System memory to the maximum, the jpeg quality to the maximum (bottom right), and the output size (top left) to be 100%. This may mean you run out of memory when stitching large images though. I drop down the size to 90%, 85%, etc until the stitching succeeds.

Other options are described VERY briefly in the README.txt file. Once these are set, use the File->Open menu to open up the series of images and then sit back and wait. The images are stitched automatically, blended nicely and it does not take too long.
But the stitching of images automatically is not trivial so you must be prepared to wait. The results are definitely worth it for a free piece of software. So "drop and see", you will be pleasantly surprised at how easy and how good.
Under Linux using Wine, large stitches severely impact the machine even if it has lots of memory.
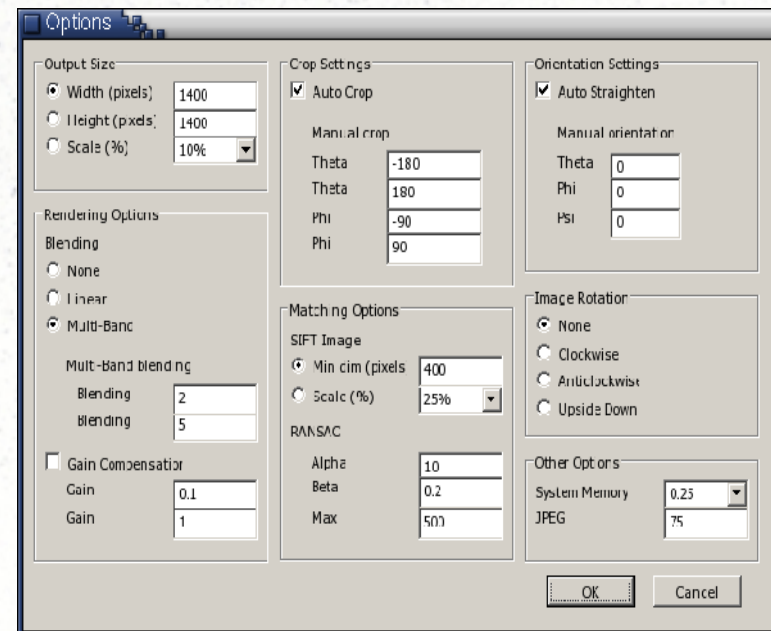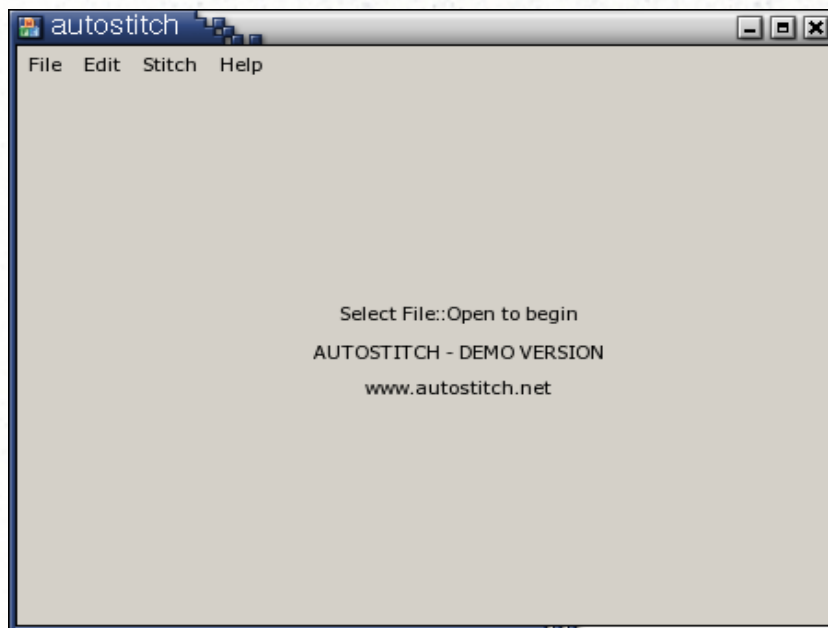
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Autopano

This software has licensed the Autostitch code above and added a proper graphical user interface. They have also added a lot more functionality. The free version does almost everything but also puts a watermark into the final image. This can be cloned out but is time consuming.

Even with large stitches, this software works well and does not impact on the machine. It does not run out of memory even at full resolution and full jpeg quality. But of course, it still takes time. And hence you need to develop a workflow to use the software.

The initial screen (under Linux) is perfectly standard with regards to menus and also has toolbars for the common tasks. Probably there are two features that are immediately useful for stitching. The first is the File->Browse Folder functionality, and the second is the Batch mode.

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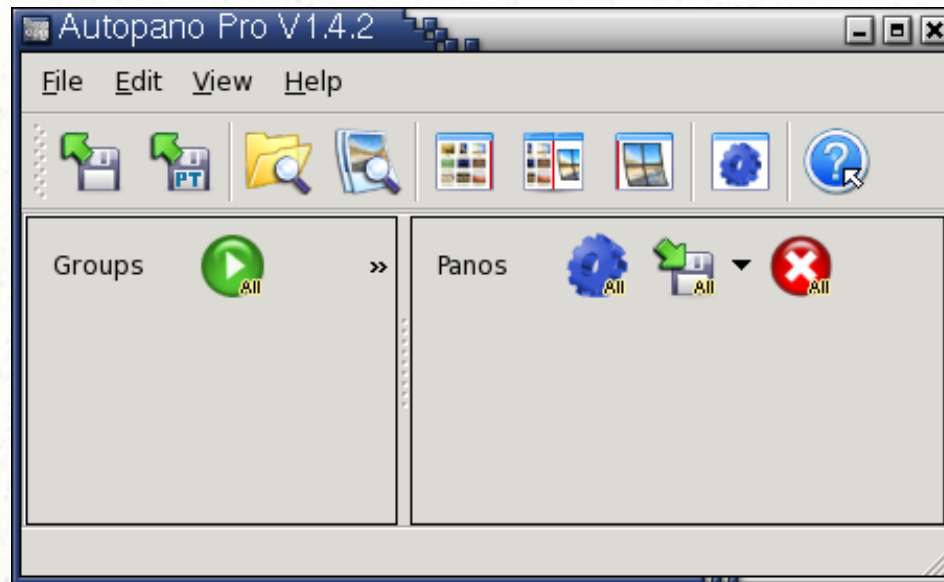
The Browse folder facility just lets you point the software at a folder, and it will look at all images, group them as possible panoramas, and then start checking those groups for stitching. With batching turned on, it will also render a small preview and add the images to the batch full-scale renderer. So typically, I open up a folder (eg Day 6 of the photo shoot) and then do other things whilst it does all the work for me. This may take a few tens of minutes, or all night if it finds lots of images to stitch together (such as the 59 panoramas it found on the day I was at the Great Wall of China, including the previously mentioned 90 megabyte image).
It is that simple.

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There are several extra features that surprised me with autopano (but probably are similar in other stitching software).

You get new images!

This image was never shot. It is a stitch of 5 separate images as I tracked the boatman down the river. What a surprise that the stitching software created this totally new image.

Why did it do that?

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You get the best of both worlds!

This image again was never shot. It is a stitch of two images where the software took the best from both. That is, the most in focus because those pixels provided the best contrast.

I have many "new" images where the focussed bits have been combined.

What a surprise!!

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Atmospheric "noise", i.e smog, is reduced when multiple images are combined, again because the software chooses the highest contrast pixels, and hence gets rid of the "noise". This is probably part of the blending process, but again was a surprise on some images where the effect of the smog was noticeably reduced in the stitched image.

Autopano also has a Panorama Editor window which lets you :
- ☺ use High Dynamic Range(HDR) to combine images,
- ☺ level horizons as well as straighten leaning buildings,
- ☺ perform manual vs. Automatic cropping of panorama,
- ☺ choose colour blending and correctness.

This is good for correcting an automatically generated panorama that is not quite correct.

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Sometimes the software will try to stitch two images and assume that they form a 360 degree fish-eye image. This seems to happen when the images are only slightly different and may have a different exposure.

In this case, you get a bizarre but sometimes interesting effect that may win prizes in some competitions!

The software does allow you to deal with fish-eye images and will let you construct very, very wide angle panoramas. The software is **not** just a single-row linear stitcher but will stitch images taken with different focal length lenses and in any order.

However, follow the tips indicated so you can get consistent good stitches.

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Examples....

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