

Panoramic Photography

Why Create a Panorama?

When you see before you a wonderful building or an eye catching vista and the lens fitted on the camera cannot take in the full width of the panorama, what is the solution? Fit a wide angle lens or move further away until all is encompassed in the camera viewfinder. A slight problem may exist. It might not be possible to move further back or fit an alternative lens.

To resolve this dilemma it is possible for anyone to take several photographs and subsequently merging them together to simulate a very wide-angle lens. Another reason for taking panoramic photographs is that the more pictures that are stitched together, the more pixels and more detail is present in the final combined photograph. The best results from panoramic photography can be obtained by following a few simple rules.

Photographic Panoramas – a basic approach

For this type of photography there is no need for a special camera, a tripod or panoramic head. However there is a need to hold the camera as still as possible and to keep the camera level whilst shooting the set of photographs.

Take a photograph and then turn to the right or left to take the next photograph, make sure that the next photograph overlaps the first one by at least 25% and no more than 50%.

Try to imagine that the camera is on a tripod, thus keeping the camera in the same place and shuffle around the imaginary tripod (this process reduces the effects of parallax). Take as many photographs as are needed to create the panoramic image, remembering to ensure that the last photograph overlaps with the first, if it is proposed to create a full 360 degree image.

Use computer software to stitch the images together

If you are new to this type of photography it may be better to use free software until you find that you require more control over the stitching and the output file types. For your first steps it is suggested that you use an easy to use, free program such as 'Autostitch'. Adobe Photoshop Elements and Adobe Photoshop have a Photomerge facility which will produce panoramic images too.

Photographic Panoramas – an advanced approach

In this section a more advanced approach is considered, the process of stitching images seamlessly together from several separate photographs has become much easier with digital photographs. Most image stitching software allows for creating panoramas automatically.

Composition and Framing

Regarding composition and framing, it is wise to mount the camera on a tripod fitted at least with a pan and tilt head. This allows the camera to be kept level in the horizontal or vertical plane. Overlap each frame by between 30 and 50 per cent, the reason for this is that there is usually lens distortion at the edges of the photograph.

Overlap the photograph with the one subsequently taken by moving to the right, as most commercial stitching programs expect this. If not arranged in this way the program has more work to do in re-arranging the photographs in the correct order.

A technique that can increase the area covered by the panorama and help to reduce alignment and subsequent cropping problems is to shoot a horizontal panorama with the camera in portrait mode, similarly shoot a vertical panorama with the camera in landscape mode. It does mean more shots will be taken for any given scene.



Manfrotto Pan and Tilt Head - 141 RC

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Camera Settings and Exposure

A good rule to observe when shooting panoramas is to keep the camera settings, as far as possible to be the same for each shot. Three primary settings need to be considered:

- Exposure
- Focus
- White balance

Exposure has to be the main consideration because if a point and shoot camera is being used these have fewer manual settings than does a digital single lens reflex camera. Should the exposure not be kept reasonably constant, it will occasionally be difficult to produce convincing seamless panoramas.

If the camera does have manual exposure setting or has exposure lock between shots, it is necessary to determine the correct exposure. If exposing to show shadow detail, the highlights will tend to be blown out to white and exposing for highlights, such as sky, will mean dark objects are likely to turn out very dark with little or no detail. For a panorama decide which parts of the photographs need to be exposed correctly.

Generally choose the photograph that will be in the middle of the brightness range. Put the camera on aperture priority, point the camera at that area and note the exposure. Then set the camera exposure mode to manual, use the previously obtained settings on all photographs taken.

Focus should be set to manual too. If focus is set to automatic not only will the photographs look odd having a different point of focus between images, in addition the size of the images will differ slightly, thus making it harder to get seamless alignment in the stitching program.

White balance, this is normally the least worry, since almost every camera has a manual white-balance feature, switch it off automatic and set it to match the conditions in which the photographs are being taken.

Lenses to Use

If the camera has the facility for using interchangeable lenses and prime (fixed focal length) lenses are available, it is better to use these rather than zoom lenses for this type of photography. The reason for this is that there is less distortion in fixed focal length lenses when compared with zoom lenses.

Panoramic Head

The purpose of a panoramic head is to be able to position the camera so that when it is rotated it rotates about a lenses nodal point. By rotating the camera around a nodal point of the lens, parallax errors are reduced. Parallax errors cause adjacent pictures to differ in ways that prevents them from being stitched perfectly and can cause ghosting, blurring, or even in the worst case prevent stitching software from being able to work out where to position the pictures to be able to stitch them together. The position of the nodal points depends on the lens used, not the camera. Also, if using a zoom lens, the position of the nodal point changes as the lens zooms in and out.

Panoramic heads are usually provided with very good documentation and lens manufacturers have tables of lens nodal points. Manufactures of pano heads: Manfrotto, Jasper, King and Nodal Ninja.

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Programs for Use in Panoramic Photography

Having now created the first panorama there comes with it the realization of how easy it is and how great panoramas can be created.

See below for a list of sites for panoramic stitching software and further sites containing additional information of a general nature.

Autostitch: <http://www.cs.ubc.ca/~mbrown/autostitch/autostitch.html> Price: free.

PTGui: <http://www.ptgui.com/> Price: €65, ~£45 Trial version available.

Autopano: <http://www.autopano.net/> Price: €99, ~£69.

Pano2QTVR: <http://www.pano2qtvr.com/> Price: Free. Pro version €36, ~£25.

GoCubic: <http://plugins.angstrum.at/cubicvr/index.htm> Price: Free. This program is used to create Cubic panoramas.

Portals and Guides

A good portal for Stitched-Mosaic Photography

<http://www.millersville.edu/~pjcooney/pano.html>

PanoGuide, this site contains a wealth of information on all aspects of panoramic photography.

<http://www.panoguide.com/howto/panoramas/>

Tips for Successful Panoramic Photography

Shown below is a reminder list for setting up a camera when taking panoramic photographs.

Cut out and keep with the camera.

Camera Setup for Panoramic Photography
• Set the ISO to manual and to a slow speed
• Manually set the white balance to the shooting conditions
• Set the camera to manual focus
• Meter the scene using aperture priority mode, set the aperture to f5.6 or f8 and read off the shutter speed
• Switch the camera to manual exposure and dial in the shutter speed and aperture from the previous step
• Take a series of photographs shooting from left to right overlapping from 30% to 50%

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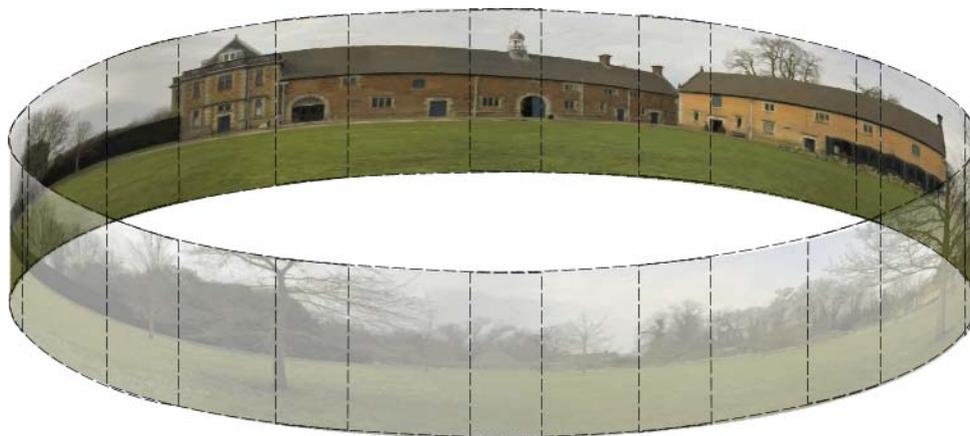
Introduction to QTVR (QuickTime Virtual Reality) Movies

Having created a 360 degree panoramic photograph using image stitching software it is then possible to use the Pano2QTVR program, which is free, to create a QTVR movie.

This takes the creation of panoramic photographs to the next stage. By shooting single or multiple rows of photographs and joining them in a stitching program, it is then possible to create cylindrical, partial cylindrical and cubic panoramas.

The output file type is .MOV which is supported by Apple's QuickTime program. This program allows the user to view photographic panoramas and explore objects within them from multiple viewing angles.

Some stationary examples of the construction of different types of panoramic photographs are shown below.



Cylindrical Panorama Illustrating Overlapping Images



Partial Cylindrical Panorama

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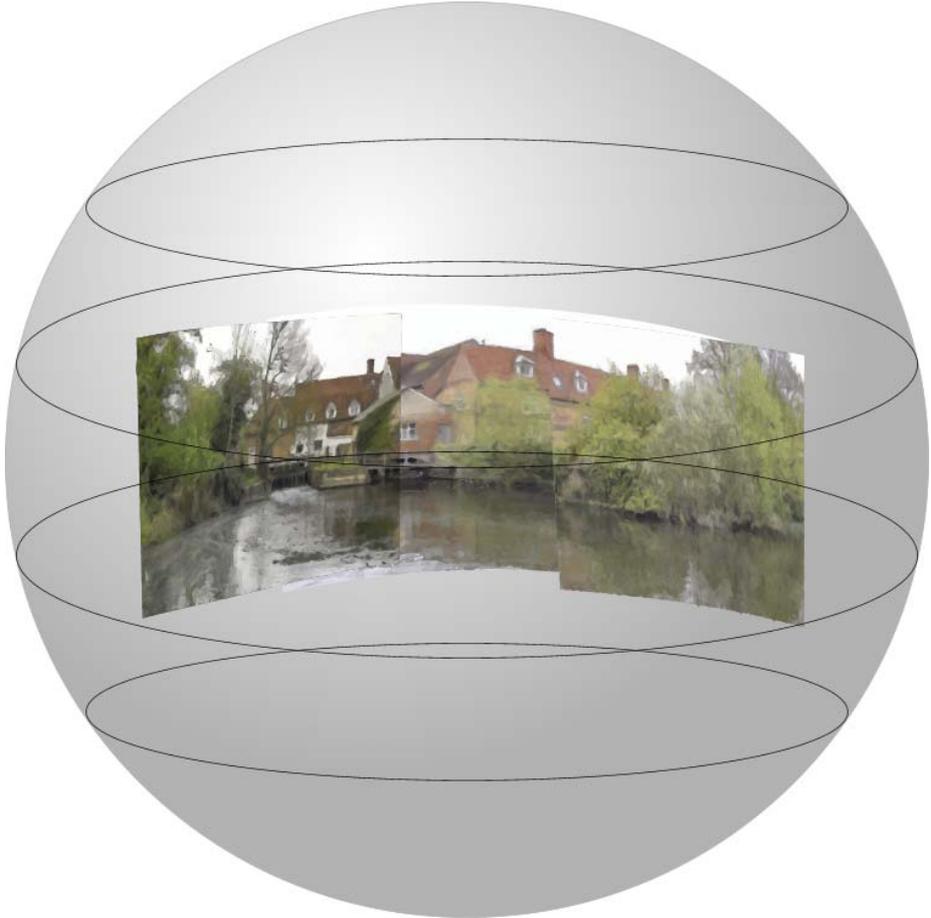
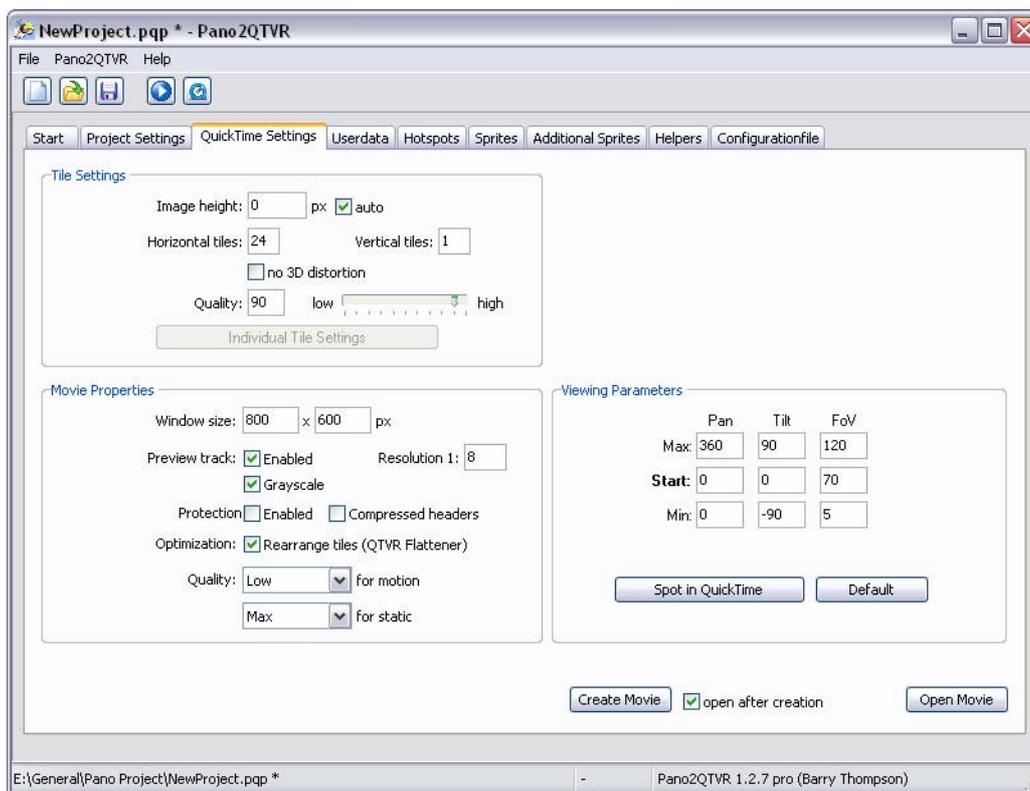
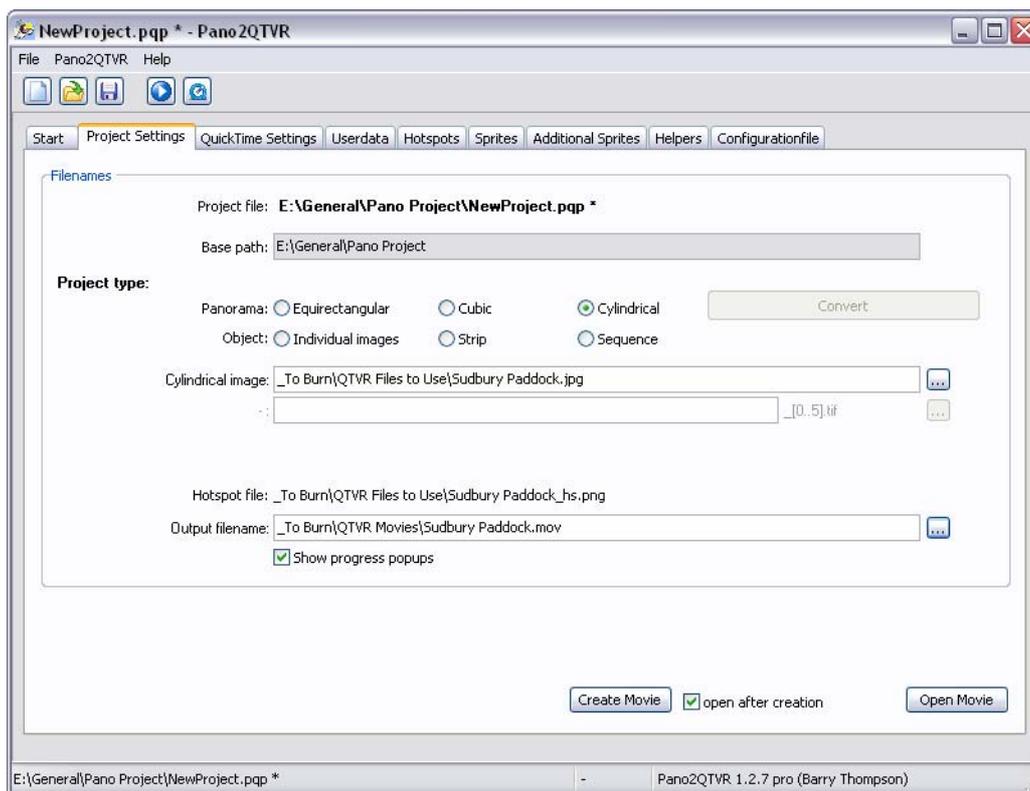


Illustration of a Partially Created Cubic Panorama

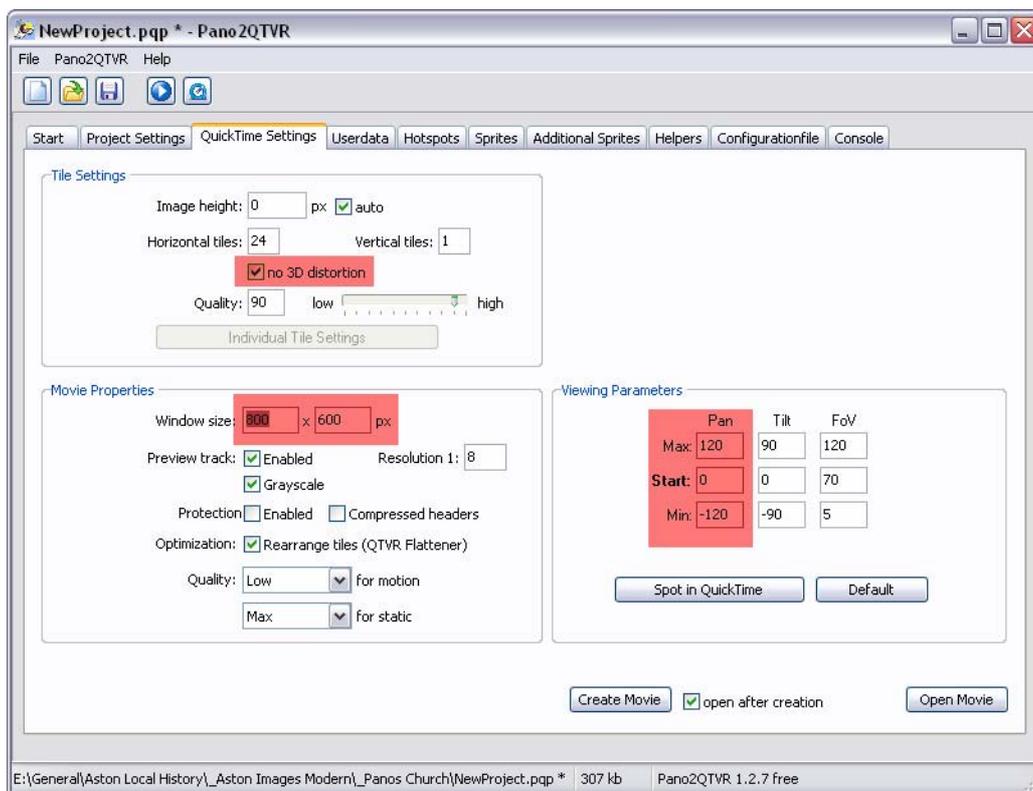
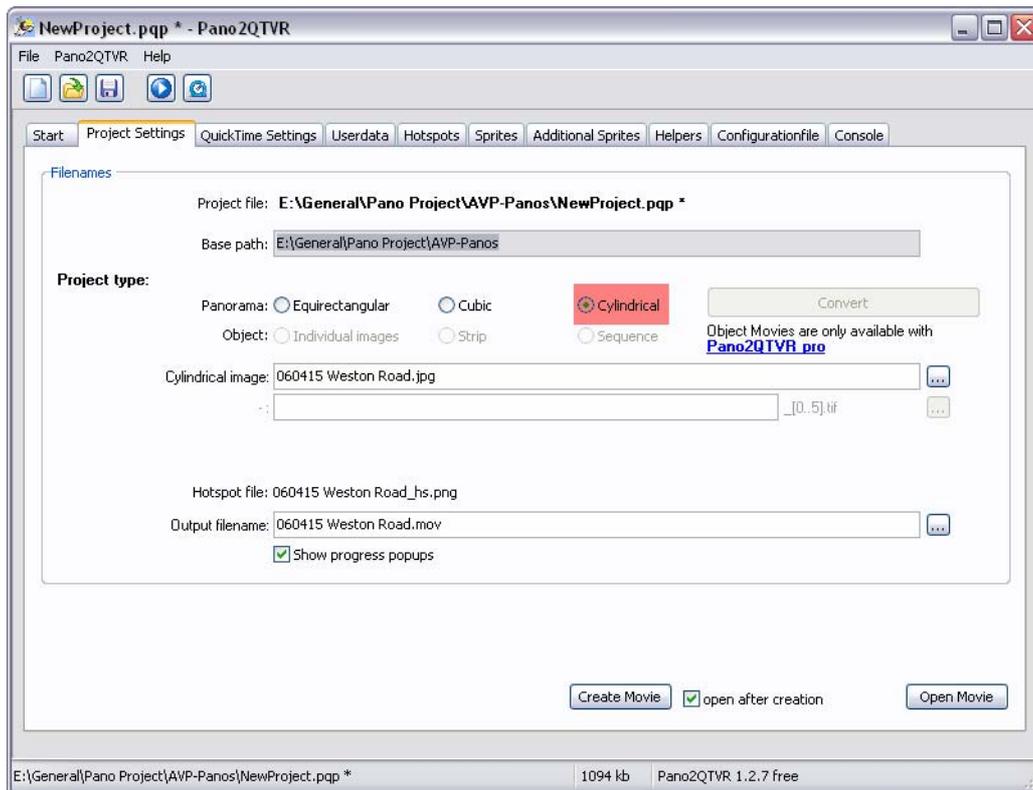
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PTGui – Typical settings used to create a cylindrical panorama.



Panoramic Photography

PTGui – Typical settings (highlighted) used to create a **partial** cylindrical panorama.



Panoramic Photography

Various Items of Equipment Used In Conjunction With A Camera For Taking Panoramic Photographs



Manfrotto 300N Panoramic Head



Manfrotto 055 Pro Tripod



Manfrotto 303SPH QTVR Multi-Row Pano Head



Manfrotto 338 Levelling Base



Jasper Pano Head



Nodal Ninja Pano Head



King Pano Head