

A Story from Left to Right:

PANORAMIC PHOTOGRAPHY

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Panoramic format is unusually long composition with length at least twice the width, or an aspect ratio of 2 or more. Film cameras are available with aspect ratios from 2 to more than 4, the latter affording a full-circle, 360° view. In digital photography, panoramas are usually achieved by cropping regular-sized images, or alternatively, stitching together segments to create a wide perspective.



Seattle Skyline and Mt. Rainier

The Story Effect

Most panoramic images are horizontal, which fits well with the left brain-right brain theory of compelling imagery. As the explanation goes, a memorable photograph has to have two manifest qualities: bold color or imagery that immediately attracts the sensory “right brain.” And a story or intrigue to engage the reasoning faculties of the “left brain,” however subtly. Panoramic images, by virtue of their length, tell a longer story and require more time for cerebral processing—call it a double take—further stimulating the contemplative “left brain” function.

Interestingly the story effect may be more telling in horizontal than vertical panoramic photography. At first glance of an image, the eyes tend to look to the left, then shift right, imperceptibly but enough to induce some photographers to position leading or primary subjects to the left of horizontal compositions for maximum impact.

Horizontal Panoramic Photography

Owing to the “story effect,” it is difficult *not* to produce an interesting panoramic composition. From the technical standpoint, care has to be taken that images anchored to the horizon are level, because aberrations appear more exaggerated as format length increases. A tripod and spirit level should be used whenever feasible. Horizontal panoramas can be classified according to three styles: flowing, diverse, and symmetrical:

- ***Flowing images*** are by far the most common panoramic composition, typically landscapes in which foreground elements penetrate or waver about an overarching background, with the horizon providing a fixed frame of reference. In cityscapes, which are often set along waterfronts, both the skyline and/or the foreground may ebb and flow. Architectural panoramas of building exteriors or interiors may “flow” from close-up to background views of the same structure, as a means to show functionality, as in the example below, or to highlight particular details. Whatever the style, it is important that the major elements of a flowing panorama are evenly lighted, with the exception of distinct features that could be expected to be darker or in shadow, such as an outcropping of rock in the foreground or mountain valley in the background.

- ***Diverse images*** feature breaks in continuity among sections of the composition, e.g., landscapes juxtaposing forest and farmland, or pristine nature and industrial development. Associated more with illustrative, documentary or political media than artistic photography, diverse panoramas may nevertheless link conspicuously varied subjects, settings or textures of all manner.

- ***Symmetrical images*** show architecture or groups of people centered at the mid-point or structured along some other axis of the composition. Symmetrical photographs are typically done for illustrative purposes, such as to portray centerpiece architecture (e.g., full-length panoramas of the US Capitol or (on the following page) the World War II Memorial in Washington DC, just before sunrise.) Symmetrical photography is unavoidably “predictable” by design, but to some, this feature makes it no less artistically appealing.



World War II Memorial, Washington DC

Vertical Panoramic Photography

Vertical panoramas tend to frame tall buildings or geographical features, and often illustrate motion at the base of the composition (e.g., people gathered or water falling). Largely using this technique, the book *Vertical New York* by Horst Hamaan (1998) proved among the few genuinely popular books of architectural photography in recent years. What appear to have been the most attractive features of his images are:

- ***a sense of dynamic tension***, typically skyscrapers, bridges or other structures rising out of action—people, traffic, hubbub. And,
- ***“slanting verticals”*** rather than architecturally accurate parallel lines. With height three times width, an image of a building photographed at street level with straight verticals tends to look stilted—correct but as if contrived—in a narrow vertical image. In panoramic format, slanting verticals serve to accentuate height and provide anticipated excitement.



Office Building, Washington DC

Benefits of Panoramic Equipment

An image taken with a regular camera and wide-angle or normal lens can of course be cropped to dimensions of panoramic format. Yet a purpose-built panoramic film camera offers numerous advantages for the serious enthusiast:

- ❑ ***Superior lenses for wide-angle photography:*** Panoramic film cameras use viewfinders instead of reflex mirrors. Viewfinders permit use of wide-angle lenses close to the film, which can provide less distortion and better contrast compared to lenses designed to fit single-lens reflex (SLR) cameras that require additional space for mirror operation. The difference in image quality will usually not make or break a photograph, but a side-by-side comparison will typically show that images taken with a panoramic camera have less peripheral distortion, and broader tonal range (which relates to film area as well as lens design).

- ❑ ***Superior resolution as a function of film area:*** Cropping a regular 35mm slide, negative or digital image to panoramic format leaves a small usable remnant compared to 35mm panoramic film format (nearly 3 times the film area, and 5 times the sensor area of most digital cameras) or medium format. In general, panoramic cameras produce superior enlargements.
- ❑ ***Direct composition:*** Panoramic viewfinders indicate the limits of imagery together with an immediate sense of the panoramic perspective. An added convenience is built-in spirit levels, in either the camera or in dedicated viewfinders provided with ultra-wide panoramic lenses.
- ❑ ***Ultimate panorama:*** Rotating-lens panoramic cameras offer 120°-360° imagery.

Despite the extreme coverage of ultra-wide “fisheye” optics in 35mm and medium-format film photography, such lenses are not considered panoramic because the optic is designed or optimally applied for square images. Moreover, panoramas cannot be cropped out of such compositions without the significant distortion characteristic of fisheye lenses.

Panoramic Cameras

Panoramic cameras can be classified in three categories: regular and (relatively rare) rotating film models, and even rarer digital panoramic cameras. Until recently, panoramic cameras were limited to film (“stitching” together digital image segments doesn’t make a camera panoramic!) because of constraints on the size of digital sensors and a difficulty in accommodating ultra-wide lenses. But remarkably a digital “scanning” panoramic camera, the Eyescan 624, offering a 120° angle of view, has entered the marketplace. Yet the world of panoramics continues to be dominated by film.

35mm Panoramic Camera

The Hasselblad XPan is a high-quality, durable, unique-in-class panoramic camera for 35mm film. Word on the street, unfortunately, is that the XPan will go out of production in 2006, but fine used models are and should continue to be readily available. The camera takes photographs in a panoramic format of 24x65mm as well as standard 24x36mm format. The panoramic format is 2.7 times longer than height. Photographers have a choice of three interchangeable lenses: normal, wide and super-wide. The latter, of 30mm focal length, offers a view of 98° in panoramic format, equivalent to an 18mm lens in standard 35mm format but with significantly less distortion. To cover the extended dimensions of panoramic photography, the optics for the XPan are equivalent to medium-format lenses. The XPan offers electronic assists similar to most 35mm cameras, with the exception of autofocus and flash (which are hardly necessary since the large majority of panoramic images are focused at or close to infinity).

Medium Format Panoramic Film Cameras

The number of available models has mushroomed at a time when production of film cameras has been declining in other niches. Presently six models are available (the latter three are fairly recent startups):

- (1) Linhof Technorama 612 & 617
- (2) Horseman 612 & 617
- (3) Shen Hao 612 & 617
- (4) Fotoman 612, 617 & 624
- (5) Widepan 612 & 617
- (6) Gaoersi 612, 617 & 624

The “612,” “617” and “624” refer to the dimensions of the format—56x112mm, 56x168mm and 56x224mm—rounded to centimeters, more or less. The Linhof models, manufactured in Germany, have been in production for decades. Both the Linhof 612 and 617 are considered classics, and are extremely expensive. The Linhof 612 features 8mm fixed lens rise. The Horseman line, produced in Japan, offers adjustable lens rise and fall up to 17mm. The Horseman 612 camera is available with a wide variety of lenses and includes horizontal as well as vertical lens shift.

Shen Hao panoramic cameras were introduced from China several years ago, and have acquired a good reputation on photography internet forums. The remaining three models are also produced in China, and are new on the market. The Fotoman and Gaoersi 624 cameras are relatively rare; as of mid-2006, only an estimated 20-30 models had been produced.

Medium-format panoramic outfits including lens are priced in the range of \$1,000-8,000. Camera operation is completely manual. Large-format lenses have to be used to cover the extreme dimensions. As such the instruments in 617 and 624 format are among the bulkiest of all cameras, and should be used with tripods.

Complications of Panoramic Photography

Wide-angle optics used in panoramic cameras tend to capture disproportionately more light through the center of the lens, resulting in two complications. First is the need for a *center filter* to correct the disparity of light refraction, unless a darker periphery is desired. The center filter is technically a neutral density filter that reduces central luminance by up to 75%. Overall exposure may then be increased by 1.5-2 f-stops—with the center filter preventing overexposure at the center—to lighten the periphery, balancing central and peripheral luminance. A second inconvenience, which applies mainly to ultra-wide lenses, is that polarizing filters have an extreme effect and are normally avoided. However, ultra-wide lenses tend to darken skies without polarization because of the light falloff characteristic.

Rotating-Lens Panoramic Cameras

The 360° images of major cities that are found in books and occasionally posted on the windows of camera and souvenir shops are taken with revolving panoramic cameras. The state-of-the-art is exemplified by the Seitz *Roundshot 28/220*, produced by Seitz Phototechnik AG of Switzerland. The “28” refers to the 28mm focal length of the lens, the “220” to the length of the medium-format film.

A continuous 360° view cannot, of course, be photographed on a flat rectangular frame. Circumventing this limitation, the *Roundshot* lens and a narrow vertical exposure slit rotate around a cylinder of film that is itself in transport as the image is taken. Controlled by a micro-computer and electric motor that adjust to several variables—the camera can readily produce images at varied angles of view under 360°—the technology is among the most complex in photography. To help assure an unchanging velocity from start to finish, the lens begins to revolve before the exposure begins, and continues after completion, gradually tapering down. 180mm (about 7 inches) of film are exposed in the making of a full-circle image. The vertical view is a wide 83°. Focus is fixed at 23.5 feet; aperture may be set at f/8 or f/11, such that everything from infinity to moderate foreground is in focus with the 28mm lens. The camera must be secured still as the lens rotates, even to capture images with equivalent shutter speed as fast as 1/250 sec, taking account of the time required for the lens to make a full revolution. Examples of effective shutter speeds and corresponding times for the lens to revolve around the film are as follows:

Seitz Roundshot 360° Panoramic Camera, Model 28/220:

<u>Effective Shutter Speed</u>	<u>Lens Rotation Time</u>
1/250 sec	0.7 sec
1/60 sec	3 sec
1/4 sec	40 sec
2 sec	300 sec

Viewfinders cannot cover full-circle panoramas, but with experience a photographer is able to visualize the image of a 360° shot. Beginners tend to undervalue warnings that caution must be taken not to get in the 360° picture. Remote control is provided. The photographer may try kneeling snugly below the camera, hopefully out of the field of view. Alternatively, for a slowly rotating lens, photographers may “rotate themselves” behind the lens to keep out of the image.

Horizontal subjects in the center foreground of a full-circle view that appear straight to the eye will turn out curvilinear in the image, bulging at the center and tapering off to the sides. *Rotating-lens cameras produce substantial distortion in photographing street-level architecture and cityscapes.* Natural landscapes and distant cityscapes will appear true-to-life.

Rotating-lens cameras are available for both medium-format and 35mm film. In addition to the Seitz *Roundshot*, an advanced contemporary model is the medium-format *Hulcherama* (a family-named and produced model from Hampton, Virginia). Similar in concept and offering views from 120° to 145° are the 35mm *Horizon* (Russia), the medium-format and 35mm *Noblex* (Germany), and the 35mm *Widelux* (Japan).

A Long-Term Investment

Panoramic cameras are expensive, being highly specialized and produced in relatively minute quantities. However these instruments retain substantial value, more so than regular 35mm cameras and far more than digital cameras. Historically, resale value of manual medium-format panoramic cameras tends to rise from about 35-50% of the acquisition cost in the first several years, to approach the level of original investment after 10-15 years (although some value will have been lost on account of price inflation). Contemporary electronic 35mm and rotating-lens panoramic cameras might not retain the same proportion of value because of technical advances that tend to be introduced in later models, but retain substantial resale value.

Panoramic photographers have their own organization, the International Association of Panoramic Photographers (IAPP), with magazine, educational website and an annual convention.

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