The Olympus Flyer

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Traditional Photo Versus Digital Photo

Review of pros and cons

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Both standard and digital photographic products have a place in photogrammetry and engineering disciplines today.

Standard photography is still the most efficient data collection and storage system we have. Film contains more information in the most compact form available and it is truly archival.

Collection of data on film is fast. Exposures require a fraction of a second. Fifteen million bits of data per square inch are acquired. In a standard aerial negative this equals 1,200,000,000 bits of information. A digital photograph file of 4.5 gigabytes would be required to be comparable to the standard aerial photograph.

Film kept in controlled environment has been proven to be archival. Magnetic and CD media manufacturers don't guarantee their products for more than 2 to 5 years.

Continued on page 2

INSIDE THIS ISSUE

What the Camera 'Sees'

A Word About Aerial Targets

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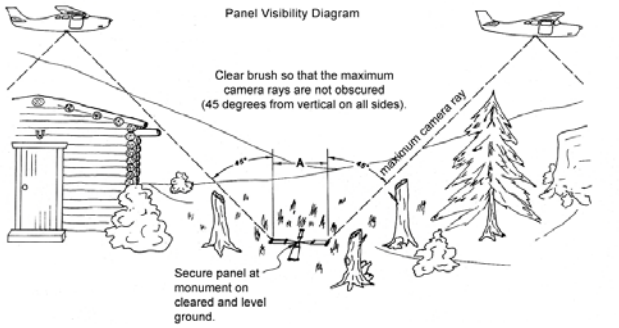
Commercial mapping technicians cannot see the top of the brass cap on a section corner. In fact, depending on a number of factors, there are times when an eight foot wide target gets lost. Target shape, size and color combined with terrain complexities need to be considered in order for the control to be efficiently utilized.



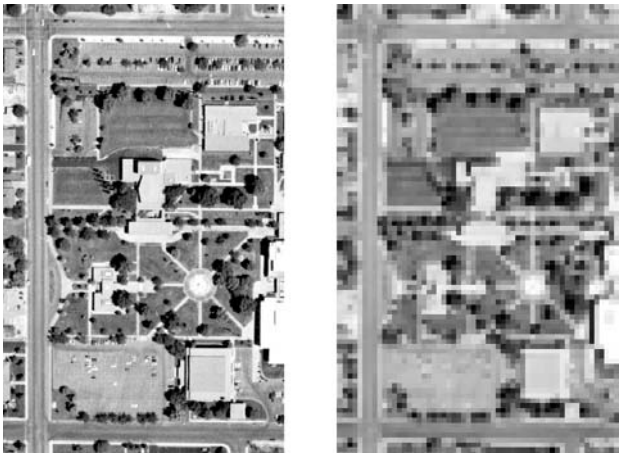
We are always available to advise you with technical data and suggestions on planning your project. Control may be accurate, but worthless for mapping, especially if we can't find it, or it is in the wrong place. Regarding target construction, the Dimensions Chart located on page 3 and the Panel Visibility Diagram above are used as guidelines by Olympus Aerial Surveys, Inc. when determining target placement.

We prefer a complete cross to the three legged variety, with the 'V' reserved exclusively for vertical only points, or not at all. Also note that it is advisable to narrow the target to a point at the monument. Doing so precisely

Continued on page 3

Continued from page 1

Photographic enlargements show the difference in the amount of data contained on film versus digital photography. At 1:1 both the film and digital hardcopy look comparable, but by the time an 8 time enlargement is made the traditional photographic enlargement is much sharper than the digital.



These two examples above illustrate the visual outcomes when enlarging actual photography on the left and digital photography on the right. During the enlargement of a digital image pixelation occurs.

For all the benefits of standard aerial photography, it's the digital photo that works in computers and makes such a useful tool. Using the software available today with high powered workstations our clients are able to make presentation prints and diagrams, background imagery for environmental impact studies, and engineering tools for design work that are more versatile and efficient than anything used in the past.

Digital photos are created from either a digital camera or a digital scan of a film negative or positive. Digital cameras are not widely used in commercial aerial mapping yet. They are very costly and not very efficient. At Olympus we scan our aerial negatives to produce the digital image.

Reflective scanning of photo prints is not done because the paper is not dimensionally stable and the resolution on the print is poor in comparison to the original negative film. Furthermore, scanning at a typical 1000 dots per inch tends to reflect too much of the grain of the paper and not much of what is actually on the ground.

For digital rectification's and mosaics we can scan the negative on a graphic scanner. In this process the requirement of precision scanning for auto-correlation and digital elevation model generation are not required. We only need to scale to known points and "tilt" the image for a "best fit."

The scanning of aerial negatives for orthophoto generation must be done on a high-end precision engineering scanner. This type of scanner is more geometrically accurate than a graphics scanner while still maintaining high quality black-and-white or color scans. This precision is required to make the measurements of the photo image, field control, and camera distortion that are necessary when generating an orthophoto.

We also produce what we refer to as "scan and CD's." We scan the area of interest on the aerial negative and provide the image on CD with the scanned PPI and photo scale. The client can then manipulate the image in their own software to suit their requirements.

Scanning of black and white, color, or color infrared photography is similar but there are a few differences.

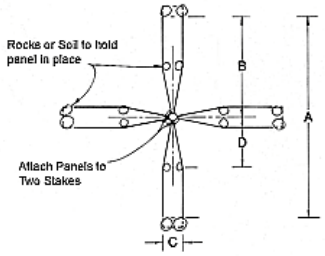
The balancing of black and white photography is comparatively simple. The scan is made to encompass the full bandwidth of information available in the image. The image is then balanced so the maximum gradient width is shown. If the image is to be plotted on a plotter or on a film imager it is then adjusted further to maximize the attributes of the output device.

To scan color photography it is best to have a photo print that has been color corrected and verified as an accurate representation of the ground by the photographer. The scanner is adjusted to reflect the photo print and the scan is made. The scan is then balanced further to maximize the 3 color band widths of red, green, and blue. Further adjustment for the output device is then accomplished. It is important to note that while a full frame scan of black and white photography is approximately 92 megs in file size, a color (R.G.B.) scan is about 280 megs – 93 megs for each color. It requires high powered equipment and software to utilize this information.

Continued from page 1

establishes where the control is and at the same time cuts down on halation (a blob of white) at the target center. This is easily done when using plastic or fabric by tying a half-hitch around one piece of panel with the other at their centers and including two stakes, driven on opposite sides of the monument, within the knot (that is, if the monument is not too large). Another approach might be to draw the panels together at the monument and tying them together to the two stakes with wire or surveyors ribbon. This affords one other benefit when there is a possibility that a wind might disturb the target before it is photographed. With the center anchored, one or even two legs might become dislodged, but the target could still be usable.

Panel Layuout and Dimensions

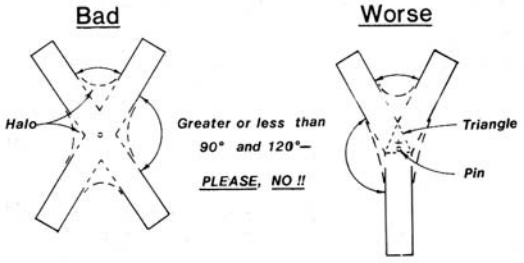


DIMENSION CHART				
PHOTOGRAPHIC SCALE	A FT.	B FT.	C IN.	D IN.
1" 200'	5	2.5	6	30
1" 400'	10	5	10	24
1" 500'	12	6	12	30
1" 600'	14	7	14	36
1" 1000'	18	9	18	42
1" 2000'	30	15	20	48

Contrast between target and ground may have to be provided using alternating legs of black and white material. If black only is used on a light background such as concrete, it will need to be about twice as wide as recommended on the chart. This is because the white background would halate out the target.

A good approach to this problem is to layout a black plastic drop cloth (the size of the needed target) over the monument, with the normal white panels on top of it. All targets must be visible on at least two, and many times up to six photos. This means they cannot be placed close to trees, tall buildings, or on very steep hills. It is necessary that targets be centered in a relatively flat area, away from abrupt edges such as curbs, ditches, headgates, and yes cliffs. Tall grass and sagebrush should be avoided or removed.
Care in the actual target layout must be exercised or accurate control will not help the plotter operator. A poorly laid target or one that halates into a large white blob will create problems for the individual performing Analytical Triangulation and for the compiler.
The comments above have primarily related to horizontal problems except for the information about not seeing the top of the brass cap. Unless otherwise instructed, our technicians assume that elevations you supply are ground level. That is the only surface the compiler can see. Most of our clients are in the habit of providing us with both monument and ground elevations. This allows us to map the ground as well as document your monument elevation on the final product.

"WHERE'S THE PIN ?"



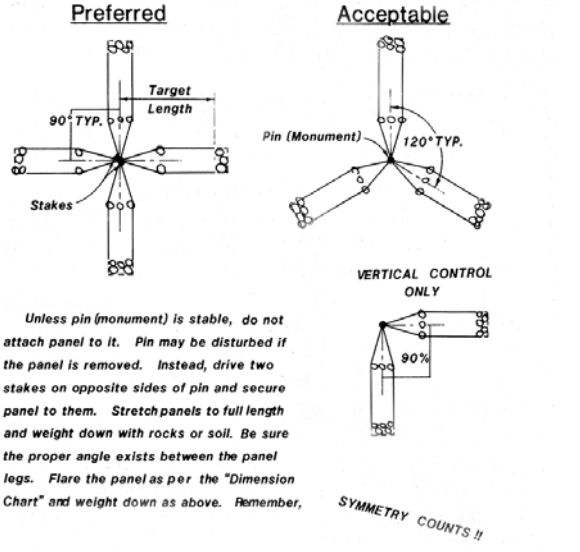
HALOS CAN KILL YA !

A target "full width" over the pin creates a "HALO", or white blur which effects the accuracy with which the point can be read. The problem is compounded if the target is shaped like the "Bad" and "Worse" varieties. A guessing game ensues —

Odd angled intersecting lines create an optical illusion, influencing the eye away from the pin to the center of the triangle as shown (>). "Halo" effect increases the influence away from the pin to nearly the top of the triangle. —

"WHERE'S THE PIN?"

TARGET LAYOUTS



Unless pin (monument) is stable, do not attach panel to it. Pin may be disturbed if the panel is removed. Instead, drive two stakes on opposite sides of pin and secure panel to them. Stretch panels to full length and weight down with rocks or soil. Be sure the proper angle exists between the panel legs. Flare the panel as per the "Dimension Chart" and weight down as above. Remember,

SYMMETRY COUNTS !!

New Products and Services

The 2002 Salt Lake Valley Mosaic is Now Available

Olympus Aerial Surveys, Inc. has prepared its new 2002 Salt Lake Valley Mosaic. This year we were able to provide this in color. The photography was taken August 5, 2001, with a final scale of 1"=2000'±. It is 48" X 68" in size, and would fit into the existing frame should you have an older mosaic. The price for a hard copy is $500.00, mounting and framing are additional. We are offering the mosaic in digital form for $2500.00. It is in a TIF format with a 5' pixel on 3 CDs. It is geo-referenced to the USGS map. It is great for general planning, and reference purposes.

Should you have any questions or would like to see the mosaic please call Anne Marie Nielson at 484-4351, or visit us on-line at olympusaerialsurveys.com.

Color Photography of Southwest Utah Scheduled this Spring

The new color mosaics of the St. George vicinity and Cedar City will be ready early this summer. Both digital and hardcopy mosaics will be available. The digital mosaics will be geo-referenced to the U.S.G.S quadrangle maps.

Airborne G.P.S

This past winter we performed the annual service on our plane, had our camera serviced at ZEISS and calibrated at the U.S. Geological Survey Optical Science Laboratory. We then had Rudy Fisher with TrackAir fly out from Holland to install and incorporate Airborne G.P.S. into our camera system. The next step was to invite Dr. Matt Stevens, Ph.D. of AeroSys Corp. to come to our office and provide training on using Airborne G.P.S.. We feel the expense was well justified not only for the knowledge gained but also for the shorter learning curve. Now with Airborne G.P.S. capability we will be able to reduce the number of ground control points on many of the mapping projects we do this year and in the years to come. This translates into saving money for our clients.

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