



NORTH ARROW

Mapping into the Millennium

Jan - Feb 2003 Volume XXIV

North Carolina Property Mappers Association Newsletter

President's Corner

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Highlights:

President's Corner

Upcoming Events

Map Website

Digital Ortho Notes

Membership Form

Board of Officers Meeting

The December board meeting had to be rescheduled because of bad weather. We met January 30th and are now trying to make up for lost time.

Spring Workshops

Plans are ongoing for the Spring workshops. By the next issue of the North Arrow I should have dates and locations and registration information for you all.

Membership Renewals

Renewal form for your NCPMA membership is in this issue. Please make sure your information is complete and legible, as this is what we use to compile the Legend.

Nonprofit Status

We did it. We are now officially recognized by the State and Federal governments as being a nonprofit entity.

This and That

It's that time of year when most of us can slow down for a minute, last years work complete and starting up the next one. If you have an article, news item, or information of any kind that you think would be interesting to our members please send it in. It's a challenge sometimes to fill these pages so any help is appreciated. Sheila is still out of work so I am trying to plug along with this the best I can. So please get some information flowing my way.

Committee Reports

The Standards committee will be meeting this month. Rex says they are making good progress and we will have information from them later in the year.

Tammy Southern and Suzie Nicholson are already hard at work with their committee planning the NCPMA conference. Call them with any ideas or offers of help.

John Bridgers is in charge of our mapping school this year. We are back in Greensboro at the same location. He also wouldn't turn down offers of assistance. It seems like money is going to be tight again this year but we will again try to offer quality educational events at an affordable price.

Rich Elkins continues to manage and update our website. Send him an email and let him know you think he's doing a good job.

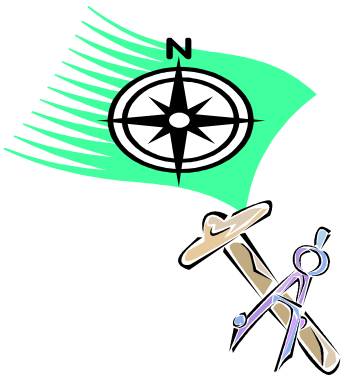
Thanks Rich

<http://ncpropertymappers.org>

Remember to contact your Board with thoughts, suggestions and ideas. This is your organization so make your voice heard.

Marie Monteith





UP COMING EVENTS



<u>DATE</u>	<u>EVENT</u>	<u>LOCATION</u>
February 20-21, 2003	NC GIS Conference	Winston-Salem, NC
March 30- April 2, 2003	IAAO/URISA Conference	Columbus, Ohio
July 28 – Aug 1, 2003	Mapping School	Greensboro, NC
Oct 1 – 3, 2003	NCPMA Fall Conference	Research Triangle Park, NC

Registration forms for the IAAO/URISA Conference are available on-line at the IAAO website. Click on “What’s New” to see program information and print forms. NCPMA member Rick Norejko is serving as Chairman of this conference this year.

North Carolina Property Tax Education Calendar – 2003

IAAO 101
March 17-21, 2003
Hampton Inn & Suites; Chapel Hill/Durham, NC

2003 Collectors Spring Conference
April 15-17, 2003
Sheraton Capital Center Hotel / Raleigh, NC

IAAO 102
May 5-9, 2003
Hampton Inn & Suites; Chapel Hill/Durham, NC

Fundamentals of Property Tax Collection
May 19 -23, 2003
Holiday Inn; Burlington, NC

Property Tax Listing and Assessing
May 19-23, 2003
Asheville, NC

IAAO 311 or 400
July 14-18, 2003
Hampton Inn & Suites; Chapel Hill/Durham, NC

2003 Joint Assessor's/Collector's Conference
July 27-30, 2003
Sheraton Atlantic Beach Oceanfront Hotel

IAAO 311 or 400
August 11-15, 2003
Hampton Inn & Suites; Chapel Hill/Durham, NC

2003 IAAO Annual Conference
September 14-17, 2003
Nashville, TN

2003 Assessor's Fall Conference
November 11-14, 2003
The Westin Charlotte; Charlotte, NC

Uniform Standards of Professional Appraisal Practice
December 1-3, 2003
Hampton Inn & Suites; Chapel Hill/Durham, NC



This is to alert you to the publication of updated 1:24,000 (7.5-minute) topographic maps in North Carolina. The North Carolina Geological Survey has responsibility for the State's topographic maps. This is a cooperative project with the U. S. Geological Survey in which each state dollar is matched by a federal dollar. National Technical Means aerial photographs from year 2002 were used to update these quadrangle maps. Please circulate the availability of these updated maps to interested parties.

Updated topographic maps for portions of twenty-four North Carolina counties are now available from the North Carolina Geological Survey. The twenty-four counties are Anson, Beaufort, Bladen, Brunswick, Bertie, Carteret, Caswell, Columbus, Currituck, Dare, Edgecombe, Gates, Hertford, Hoke, Hyde, Martin, Pamlico, Pasquotank, Perquimans, Richmond, Robeson, Rockingham, Scotland and Tyrrell. Other 7.5-minute quadrangles are being revised. Production of digital raster graphics (DRGs) of these revised maps is also in progress. Please note the recent topo map price increase to \$6.00 per map plus applicable sales tax for in-state orders.

The results and explanation of the photoinspection program that was part of this program are also posted on the NCGS' Internet site. The program so far has resulted in the photo inspections of 252 7.5-minute quadrangles over the eastern portion of the state. Of these inspections, 165 maps were found to need basic revision. A total of 58 quadrangles have been authorized for revision so far; of these 25 have been printed and 33 are in production. The accompanying digital raster graphics are also in production.

On the Internet go to the NCGS Web site at <http://www.geology.enr.state.nc.us/news.htm> for a list of the revised topographic maps and others that are in production. For an index map of North Carolina topographic maps go to http://www.geology.enr.state.nc.us/maps/nogs_main_maps_page.html and navigate to the line "Topographic maps covering the state".

The maps, which include land formations, water bodies, roads, municipal boundaries, railroad tracks and forested areas, are excellent tools for communities to use as they plan for growth. The data used to publish the maps are from 2002. The last update for many of these maps was in the

1970's and 1980's; one map was last updated in 1951. These newly-revised topographic maps are the latest update to the statewide coverage funded cooperatively by the N.C. Geological Survey (NCGS) and the U.S. Geological Survey

Local government leaders and planners, residents, interest groups and others can order the maps for \$6.00 (plus state sales tax for in-state orders), plus shipping and handling if mailed, from the NCGS at 919-715-9718. Payment can be by check, money order or VISA/MasterCard.

Other NCGS publications are available online at <http://www.store.yahoo.net/nc-maps/>.

Please contact me if additional information is needed.

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**"The character and technology of mapmaking may have changed over the centuries,...but the potential of maps has not. Maps embody a perspective of that which is known and a perception of that which may be worth knowing."
John Noble Wilford from The Mapmakers**

Notes on Digital Orthos

An orthophotograph is an aerial photograph that has been orthorectified to remove displacement caused by aircraft movement, photographic tilt, curvature of the earth, and changes in topography. Each of these components is a source of error in the unprocessed photo. Significant differences exist between the initial air photo and its orthophotograph counterpart. For example, changes in topography or elevation across the area being photographed impart substantial error to the unrectified photo. Take the example of elevation differences. Suppose there are two, 10-acre property lots located in one photo. If these lots differed in elevation by several hundred feet, the lot at the higher elevation (that closer to the camera) would appear to be larger on the original photograph than the lot at the lower elevation (that further from the camera). Photographic perspective also impacts the accuracy of uncorrected aerial photographs. Ideally, in order to minimize distortion, aerial photographs should be taken from a vertical perspective straight beneath the plane. In actuality however, it is more likely that the plane will have a slight tilt, introducing displacement of features, or objects. These are just a few examples of how the original aerial photograph becomes distorted.

Photogrammetry is able to use detailed digital elevation models (DEM), Digital terrain models (DTM), surveyed ground control locations, and analytical aerial- triangulation, together with recorded camera calibration and orientation parameters to nearly eliminate distortion and create an orthophotograph. Since orthophotography has such a high degree of error correction, it is possible to use them to measure area, distance, and location of features accurately on the Earth's surface. This is impossible with unprocessed aerial photographs. Orthophotography also can be used to overlay maps directly and delineate features.

Orthophotography reduces the need for digital stereo compilation. For example, if buildings are visible in the orthophotography and their dimensions can be determined from the orthophotography, then it may not be necessary to digitize building outlines during stereo compilation. It may still be desirable to capture the centerlines of traveled ways or apparent hydrography during stereo compilation because these lines will be more accurate with stereo compilation than those captured from the orthophotography. The other advantage of digital orthophotography is features that are called for in parcel descriptions may be visible and may be captured directly from the orthophotography image.

At one time, hardcopy orthophotography was the only error-corrected source of data input from aerial photography. However, with advances in computer science and technology, along with the increasing availability of digital spatial data, it has become possible to use orthophotography in digital form. Unlike hardcopy orthophotography, which is produced mechanically, digital orthophotography is created by scanning the aerial photograph using a precise, high-resolution scanner. Each pixel, or picture element, of the resulting image is then processed to remove distortion and displacement, yielding a digital version of the orthophotography.

In addition to having been corrected for distortion, digital orthophotographs are geo-referenced, meaning that they are referenced to a coordinate system such that each pixel in the image has an x, y coordinate value. The coordinate system used must be a common system to which all other data in the GIS will be referenced. Because the orthophotography is a geo-referenced image, it is frequently used to provide a background for other digital data.

Both hardcopy and digital formats provide the user with an accurate visual representation of the land base, but digital orthophotography has several advantages over hardcopy. Among these benefits are efficient data conversion, practical storage options, and more comprehensive future applications.

The computer format of digital orthophotography requires that they be stored on electronic media such as CD-ROM or on a hard drive. The size of digital orthophotography files varies as a function of the image's resolution, or size of the smallest discernible area. Modern technology is capable of producing images with very high resolutions of six inches or even higher.

One of the most notable benefits of acquiring and using digital orthophotography is the value after the initial investment. Just as the orthophotography image acts as a base for parcel mapping, it can also be used to efficiently generate supplementary data layers such as roads, streams, and land cover. Additionally, by providing an accurate representation of the real world as a backdrop, the orthophotography can be a great aid in evaluating data for accuracy and completeness. It can also impart power to hard copy maps and soft copy screen display by furnishing the viewer with a background of recognizable features.

In general, when choosing a base framework for digital parcel mapping, digital orthophotography offers a logical choice due to their accuracy of measurement and feature representation, along with their usefulness for future applications. Advances in computer technology have made digital orthophotography more readily available, while improvements in computer processing, storage, and software have made them an increasingly practical choice.

Although digital orthophotography offers significant benefits, not all digital orthophotography is created equally. In general, their accuracy and quality will vary based on the data used to process them, as well as on any problems introduced in the course of production. Influential factors include the characteristics and calibration of equipment used in the digital orthophotography capture such as the camera and/or scanner. Also important are the characteristics of other elements affecting the correction operation including ground control and DEM points, the aerial triangulation process, and the rectification method/software used. Therefore, it is essential to note that digital orthophotography should be inspected for spatial accuracy and image quality before acceptance or use.

Spatial accuracy is the location of features in the photo in comparison to their actual location in the real world. Although the orthophotography rectification process is intended to remove distortion present in the original aerial photo, the spatial accuracy of the final product is affected by the circumstances under which it was developed. For instance, one essential element affecting spatial accuracy is the DEM used to correct for fluctuations in scale and displacement across the photo. DEM elevation data collection methods can vary greatly. For

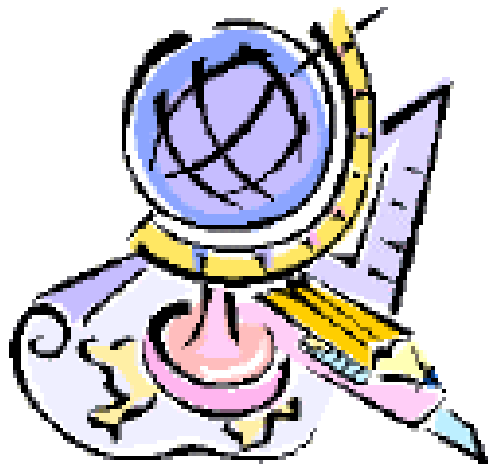
example, elevations may merely be collected in a systematic grid or may also include points for hills, valleys, and other critical areas. Sources of the data may range from very exact field surveys to less precise digitized contour lines from topographic maps.

With this in mind, an evaluation of the orthophotography spatial accuracy should be performed. One way to do this is to overlay another information layer known to have a high accuracy, such as roads, to make a comparison of difference in feature locations. By noting these distances, suspicious areas may become apparent. Another test of spatial accuracy can be accomplished using GPS to collect locations of features easily identified on the orthophotography. Such GPS collection and overlay may be used to inspect previously indicated suspicious areas or may be used in an independent assessment.

During the development of an orthophotograph, several images may be patched together in a mosaic to form the final orthophotography. When more than one digital orthophotograph is drawn on the screen, there may be overlap between them or there may be gaps between them. Gaps will appear as black lines, indicating areas with no data.

Orthophotography should also undergo an image quality review. Image quality can be degraded during acquisition or processing. For example, scratches, which appear as straight lines in the flight direction, can develop on the photo as film moves through the camera or during scanning. Dust or lint on the photograph at the time of scanning can result in light spots. Other image quality concerns are tone balance, brightness, and contrast. The brightness of each pixel is determined by the pixel's color value which ranges from 0 to 255. The overall tone balance and contrast is determined from balance of the image's histogram, which represents all of the individual pixel values in the entire image. The quality review should include an examination of individual images for their overall appearance and then comparison of adjacent images to ensure that there is not an apparent line caused by difference in balance between the two images. If the overall balance is not addressed, it may result in discrepancies between the representation of similar features in one orthophotograph as compared to those in another.

While a conscientiously produced orthophotograph will be devoid of most error, there are several general characteristics to keep in mind. Most displacement or variations in scale due to elevation changes and other factors are corrected during processing. However, tall features such as buildings and trees may still display these distortions to some degree. Unlike a hill or valley, trees and buildings have both a high point (the top) and a low point (the base) with the same horizontal ground location. While the rectification procedure can be applied to the ground location, there may still be a scale difference and displacement between the top and bottom of such tall features. Extra efforts to correct these distortions may result in the need to fill in "blank spots" once occupied by the displaced building in the original photo.





22003 NCPMA Membership Application

Name:	
County:	
Business Address:	
Position:	Dept.:
Phone:	Fax:
Email Address:	

To insure proper placement in the 2002 LEGEND please fill in all information and indicate correct membership applicable to your profession. Please review names in the 2000 LEGEND and advise us of employee changes. Deadline for your name to be printed in the Legend is April 1, 2002

REGULAR MEMBERS: NCPMA Bylaws Article II Section 1

Mappers, mapping supervisors, GIS personnel and department heads in charge of mapping, employed by County and City Government units shall be entitled to regular membership.

(According to G.S. 147-54-4, a person employed by a local government who is responsible for creating and maintaining large scale cadastral maps is a mapper.)

ASSOCIATE MEMBERS: NCPMA Bylaws Article II Section 2

Persons not eligible for regular membership but whom are actively involved in Land Records Management. (Other interested government workers, i.e. E911, Appraisers, and Planning & Zoning, Register of Deeds.)

SUBSCRIBING MEMBERS: NCPMA Bylaws Article II Section 3

Manager Level individuals and marketing Representatives of non-governmental firms committed to the Advancement and Modernization of Land Records.

- | | |
|---------------------------------------------------------|----------------------------------------------------------|
| <input type="checkbox"/> \$25.00 Regular Membership | <input type="checkbox"/> New Member |
| <input type="checkbox"/> \$25.00 Associate Membership | <input type="checkbox"/> Renewal |
| <input type="checkbox"/> \$50.00 Subscribing Membership | <input type="checkbox"/> Return Receipt Requested |

PLEASE MAKE CHECK PAYABLE AND MAIL TO:

**NC Property Mappers Association or EMAIL: Patricia_Pike@co.onslow.nc.us
 C/O Patricia Pike Secretary
 OnslowCounty GIS
 39 Tallman Street
 Jacksonville, NC 28540**