Prosurv Imaging

Version 1.3.2

Installation
&
User's Guide

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Installing Prosurv Imaging

Insert your Prosurv Imaging CD into your CD drive. If Auto-run does not start the installation, then view the files on the CD and double-click the setup.exe file. Follow the instructions as shown during the installation process.

Using Prosurv Imaging

This guide is designed to get you up and running quickly with Prosurv Imaging. Prosurv Imaging software allows you to view any geo-referenced .tif image. Images such as DRG Quad Sheets may be viewed with Prosurv Imaging software. DRG Quads can be downloaded via the interenet at a variety of sites. Or, you can purchase digital quad images in State sets called All Topo Maps from www.igage.com. The images contained in these (All Topo Maps) sets are compressed images. Therefore, to use these images in Prosurv Imaging, it is required that you first use the All Topo Maps software and export the image (Quad sheet) as a .tif file.

The screen displayed here is found in the **All Topo Maps** program. Simply select or find the Quad sheet that you'd like to view, then press Ctrl-C to view the screen shown here. (It is found under the Edit Menu and is called "Export Map...")

Make the selections as shown, then export the file. Normally, the file will be saved in the \All Topo\User folder of your c: drive.

Once you've exported the file as a .tif image, you are ready to use Prosurv Imaging. You can now close the All Topo Maps program.

Important NOTE:
Copy the ImagingDefaults.txt file to the **\program files\prosurv llc\prosurv imaging** folder of your PC.

The ImagingDefaults.txt file is found on the documentation CD.

Running Prosurv Imaging

   First, go to File—>Open Image to load your geo-referenced .tif file. Once the image is opened, you can easily create points and do much more with Prosurv Imaging. Created points are not stored until you save them as a job. Go to File—>Save Job to save your job file. The job file will contain your points, drawing commands, sets, and data that's associated with that job.

   The image is independent from your job files. You can use the same image with many different jobs. Plotting (Drawing) that is done on the image is stored *with the job, not the image,* as drawing commands.

   Prosurv Imaging contains the following Menu items:
- **File—>**
    - **Open Image**
    - **Save Image for Pocket Quads**
    - **Batch Process for Pocket Quads**
    - **Open Job**
    - **Save Job**
    - **Save Job As**
    - **Close Job**
    - **Import—>**
        - **NGS Datasheets (text file)**
        - **Import Points (asc file)**
        - **GCDB PCCS 'c' file**
        - **GCDB GMM .cor file**
    - **Export—>**
        - **Send job to device (Pocket PC)**
        - **.asc points file**
- **Edit—>**
    - **SETS (point lists)**
    - **Drawing (plotting commands)**
    - **Settings**
- **Points—>**
    - **Add New Point**
    - **View Point List**
    - **Profile points**
    - **Delete points**
- **Compute—>**
    - **Polygon area**
    - **Divide section**
    - **Pre-determined sliding line area**
    - **Pre-determined hinged area**
    - **Inverse Report**
    - **Translation & Rotation**
    - **Intersections**

- **Datums—>**
  - **Image Datum**
  - **Job Datum**
  - **NADCON Conversion**
- **GPS—>**
  - **Start/Stop**

<u>Open Image</u>

Prosurv Imaging can open virtually any geo-referenced .tif image. Geo-referenced simply means that a text file exists with the image that contains certain information about the image itself. Generally, if the image has the .tif extension, then the georeference information will be contained in a text file with the same name that has a .tfw extension. For example, if the image name is **O44109H2.tif**, then the associated georeference (world) file will be **O44109H2.tfw**.

The georeference (**world**) file contains just six pieces of data. Two of the six pieces represent the **upper left corner coordinate** for the image. This single coordinate pair provides the reference for the entire image. When you open an image, Prosurv Imaging checks for the .tfw world file. If it exists, then Prosurv Imaging can reference the image to a coordinate system.

Image Datum vs. Job Datum

Generally, Quad Sheet images are georeferenced to a specific datum using the projection that was used by the USGS for the original map. For example, **O44109H2** uses the **UTM** (Universal Transverse Mercator), **Zone 12.** To Prosurv Imaging, this is called the **Image Datum**. Unfortunately, the **world** file for a particular Quad sheet does not contain the projection and zone information. So, they either have to be assumed (ie pre-selected by the user), or read from a different file.

Some USGS Quad Sheets are referenced to the **NAD27 projection.** Others are referenced to the **NAD83 projection. Note here that Prosurv Imaging can utilize either projection for the Image Datum. If selecting the Image Datum by hand, be sure to select a NAD27 projection, if the map has been determined to be utilizing a NAD27 projection. Datum, projection, and zone information can be found at the bottom 'collar' of each USGS Quad.**

All Topo Maps by iGage, which are available through Prosurv LLC, are complete sets of all the Quad Sheets of each individual State. **Page 2** of this guide discusses the use of **All Topo Maps** to output a georeferenced .tif image of any Quad Sheet you desire. Along with the image and georeference files, **All Topo Maps** automatically writes another file, with the **.txt** extension. Specifically, this text file contains the Projection used (**NAD27** or **NAD83)**, as well as the Datum and Zone (**UTM** 12).

Prosurv Imaging looks for the .tfw (world) file as well as a separate .txt file. If both files are found, then the complete georeferencing for the image will be achieved.

The **Job Datum** allows you to work in virtually any other projection and zone, even though the image datum is different. For example, you can use a **NAD27, UTM 12 –based** image, and yet work in **NAD83 Wyoming West Central** coordinates. A built-in ON-THE-FLY NADCON conversion is used to convert GPS and user-defined data to the Image Datum for accurate representation of the coordinates on your image.

Once the image is opened, you can create points, view the image, and much more.

Save Image for Pocket Quads™

Pocket Quads™ for the Pocket PC allows you to view and use full-sized 7.5' USGS Quad Sheets on a Pocket PC! Prosurv Imaging contains two special routines for setting up your Quad sheets for use with Pocket Quads™.

A full-sized Quad is too big to display all at once on a Pocket PC. So, Prosurv Pocket Quads uses pre-sliced images to display a portion of the overall Quad sheet. Therefore, this routine takes the current image and slices it into equal parts.

Along with the image slices, Prosurv Imaging writes a new file with a .pcq extension. This .pcq file contains specific information about the image, including projection, datum, and zone. Prosurv Imaging writes the .pcq file in the same folder as the currently displayed image. Prosurv Imaging then creates a new folder within that folder for storing the dozens of slices that are created by this routine. A .tfw (world) file is also created inside the folder
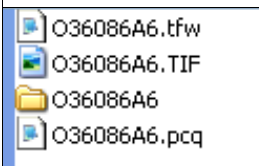
Once Prosurv Imaging has completed writing the image files, you can copy the files to a flash card or directly to your Pocket PC (using Microsoft Activesync®).

Example:
The current image is **O36086A6.tif**. Select **Save Image for Pocket Quads:**
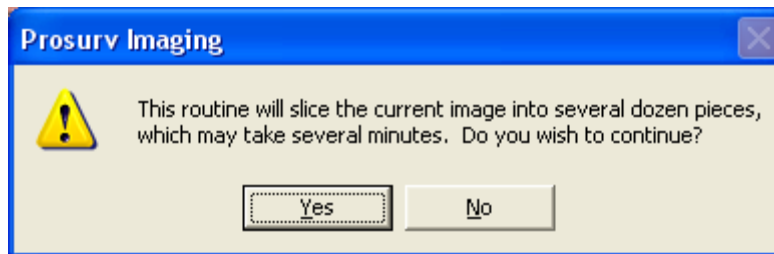
Tap **Yes** to continue.

For this image, 63 slices are created. The folder now contains a new folder, **O36086A6** and a new file, **O36086A6.pcq**. The 63 slices, and a new .tfw file are stored within the **O36086A6** folder. To use the sliced Quad in Pocket Quads™, simply copy the O36086A6 folder and the O36086A6.pcq file to your flash card, or directly onto your Pocket PC. Be sure to read the Pocket Quads™ documentation for information about your default Quad Path on your Pocket PC.

Batch Process for Pocket Quads™

Modern flash cards can store large amounts of data, and are relatively inexpensive. The **HP iPAQ 2215** Pocket PC has both an SD (Secure Digital) Card slot as well as a CF Card slot (Compact Flash). A single 512MB RAM flash card can store about 170 sliced quads (created by Prosurv Imaging). Given the fact that Yellowstone National Park is comprised of less than 70 USGS 7.5' Quadrangle sheets, there is certainly plenty of room available for storing all the Quads that you may need.

Using Prosurv Pocket Quads™ on your Pocket PC requires preparing your Quad images. The previous section explained how you can export your image as a sliced Quad sheet, one Quad sheet at a time. However, this routine can easily prepare dozens of Quad sheets all at one time.

Normally, if preparing your Quad sheets, one at a time, you would:

1. Use the **All Topo Maps** program to Export each compressed Quad (see page 2 of this guide)
2. **Open** the new .tif image in Prosurv Imaging
3. Select **Save Image for Pocket Quads**™
4. Copy the new folder (which contains the slices for the Quad) along with the new .pcq file to your Flash card or directly to your Pocket PC

However, you can use the **Batch Process** routine to select and convert many images at the same time. To do this, you would:

1. Use the **All Topo Maps** program to Export each compressed Quad (see page 2 of this guide). Export as many maps as you need. **It is recommended that you create a new folder for storing the exported maps, so that they are all in one new place.**
2. Select **Batch Process for Pocket Quads**™ in Prosurv Imaging
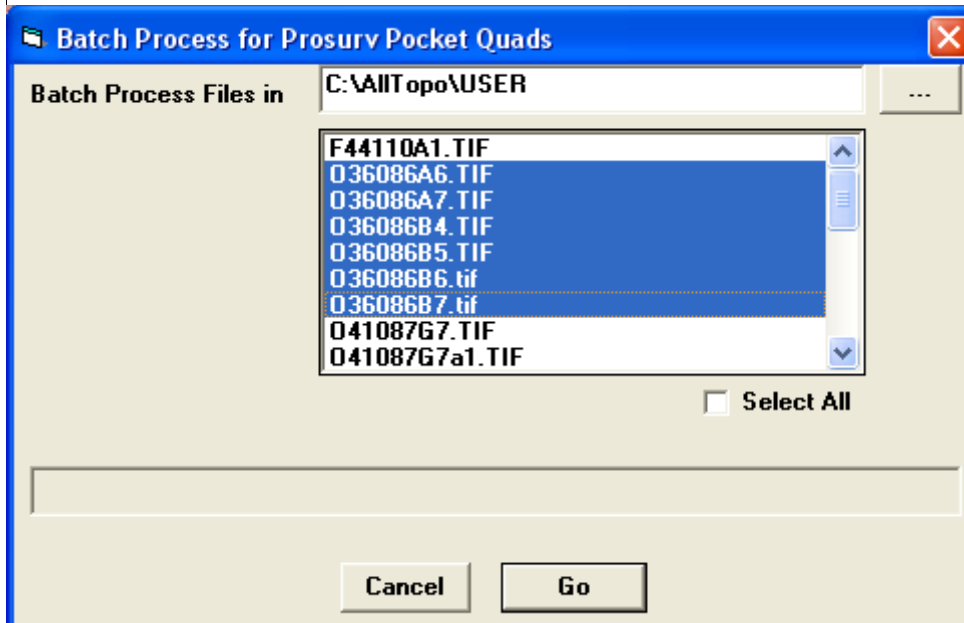
Tap the **...** button to select the folder containing your exported Quads.

Then, use the Ctrl and Shift keys to select multiple files.

Finally, click the **Go** button to begin.

Prosurv Imaging will display the progress of each conversion.

Note that converting several files can take a while. However, once completed, you'll have all the Quads you need for your trip!

Open Job

The **Open Job** routine opens a previously saved job file. Job files are separate from the images, and many jobs can be created for use on any given image. Job files store coordinates, drawing information, SETS, and more. So lines and points that are drawn on the image are not stored with the image, rather, they're stored within a job file.

Prosurv Imaging job files have the .pig extension. To open an existing job, select **Open Job** from the pull-down menu, then select your job file.

The Job coordinate *table* consists of:
- Point #
- Northing
- Easting
- Elevation
- Feature Code (description)
- Attributes

Note: You can easily view and extract all of the data in your job file using Microsoft Access. Simply rename the file using a .mdb extension, then double-click.

Save Job & Save Job As

Select **Save Job** or **Save Job As** to store your coordinates, drawing commands, and other job-related information as a .pig (Prosurv Imaging) job file.

Saving a job stores all of your job-specific information, such as Job datum and zone, coordinates, drawing commands (lines, points), SETS (point lists), and much more.

Close Job

Select **Close Job** to close your job file without closing your image.

Import NGS Datasheets

This incredible routine can read any NGS Datasheet text file, creating one point for each sheet. The created points consist of:

- Point #
- Northing (State Plane Coordinate)
- Easting (State Plane Coordinate)
- Elevation
- Feature Code (Point designation)
- Attributes (other relevant information, such as what Quad sheet the point is on)

Prosurv Imaging automatically converts the read Latitude and Longitude to State Plane Coordinates, based on your selected Job Zone. Prosurv Imaging automatically converts the coordinates and elevations (if present) to your current job's units (such as Metric or US Foot).

Prosurv Imaging does not actually store Latitudes and Longitudes, however, you can Export your points with Lat/Long values if needed.

You can download NGS Datasheets by visiting the NGS web site at:
http://www.ngs.noaa.gov/cgi-bin/datasheet.prl

To begin, select **Import NGS Datasheets** from the menu. Select the appropriate .txt file, and click Open.

Prosurv Imaging - Import NGS DataSheets

```
1     National Geodetic Survey,   Retrieval Date = OCTOBER 27, 1999
PY1112 ***********************************************************************
PY1112 DESIGNATION - 00 MDC
PY1112 PID       - PY1112
PY1112 STATE/COUNTY- WY/PARK
PY1112 USGS QUAD  - NORRIS JUNCTION (1986)
PY1112
PY1112               *CURRENT SURVEY CONTROL
PY1112  _____
PY1112* NAD 83(1986)- 44 43 38.   (N)   110 41 47.   (W)   SCALED
PY1112* NAVD 88    -    2296.058 (meters)   7532.98 (feet) ADJUSTED
PY1112  _____
PY1112 GEOID HEIGHT-     -8.46 (meters)              GEOID99
PY1112 DYNAMIC HT -     2294.657 (meters)   7528.39 (feet) COMP
PY1112 MODELED GRAV-    979,924.1  (mgal)              NAVD 88
PY1112
PY1112 VERT ORDER - FIRST    CLASS II
PY1112
PY1112.The horizontal coordinates were scaled from a topographic map and have
PY1112.an estimated accuracy of +/- 6 seconds.
```

Select NGS Datasheet Zone

UTM 12 | Exit   Import   ☐ Plot points after import

The text file is opened, and Prosurv Imaging allows you to scroll down through the file.

Select NGS Datasheet Zone allows you to automatically convert the scanned points from one Datum and Zone to your current Job Zone. Typically, each datasheet will provide detailed information about the monument, including the datum and zone that were used for computing the State Plane Coordinates. This selection allows you to, for example, change the imported coordinates from Wyoming West Central (NAD83) coordinates to UTM 12 coordinates.

The selection indicates the zone that you're converting *from*, while your current Job Zone is the Zone that you're converting **To.**

Finally, you can select to have Prosurv Imaging automatically plot the points after they're read and created. Prosurv Imaging determines which points actually will appear on the current image (Quad sheet), and plots only those points.

Surveyors can benefit greatly from this capability by then staking out the points they need to find in the field when connected to a GPS receiver.

Import Points

   The **Import Points** routine allows you to read points from a simple .asc or .txt file. In it's simplist form, the points file can contain:
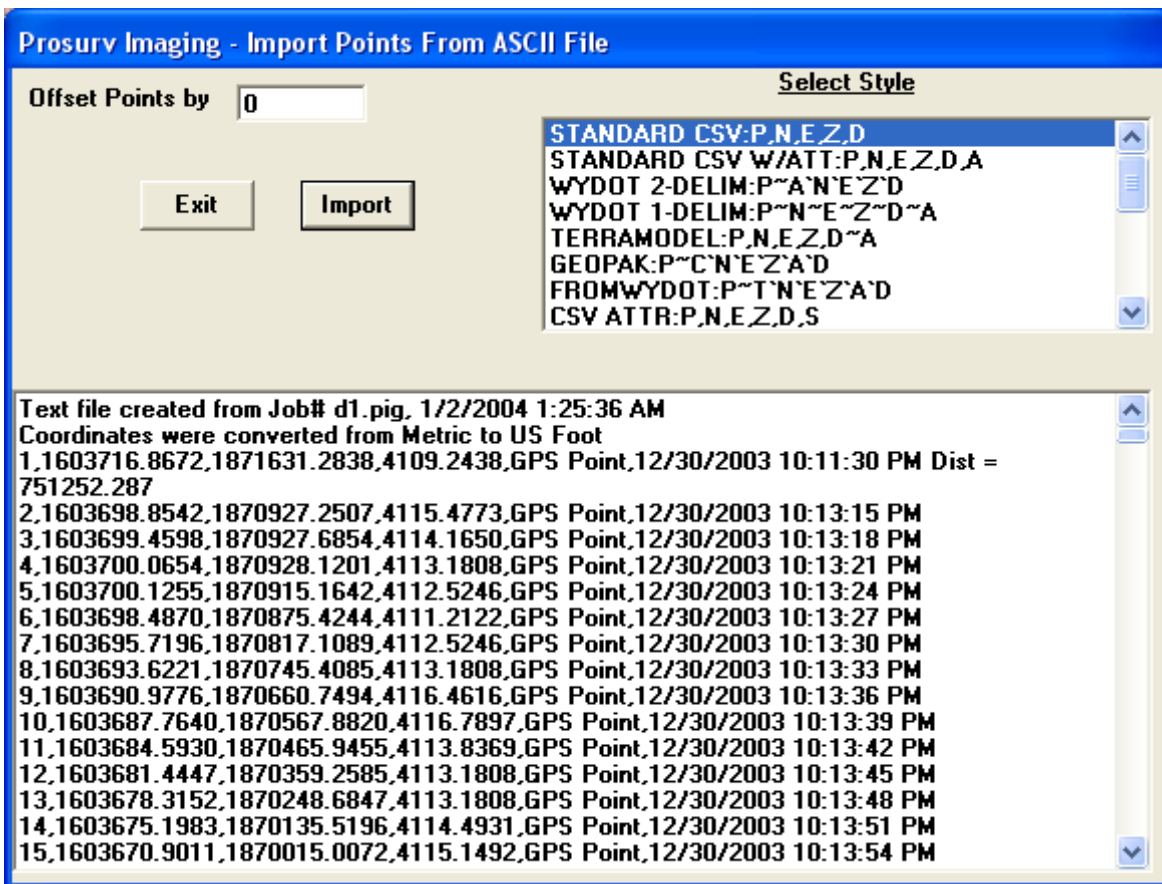   • Point #, Northing, Easting, Elevation, Feature Code

An example might be:
100,1234567.899,899489.4351,1320.55,Stone
101,1234555.799,899499.3315,1322.54,House

   The Prosurv Imaging Import Points routine is extremely flexible, and has 18 different built-in styles. And, it is very robust, in that it can ignore miscellaneous text within the file.

Prosurv Imaging - Import Points From ASCII File

Offset Points by 0

Select Style

STANDARD CSV:P,N,E,Z,D
STANDARD CSV W/ATT:P,N,E,Z,D,A
WYDOT 2-DELIM:P~A`N`E`Z`D
WYDOT 1-DELIM:P~N~E~Z~D~A
TERRAMODEL:P,N,E,Z,D~A
GEOPAK:P~C`N`E`Z`A`D
FROMWYDOT:P~T`N`E`Z`A`D
CSV ATTR:P,N,E,Z,D,S

Exit   Import

Text file created from Job# d1.pig, 1/2/2004 1:25:36 AM
Coordinates were converted from Metric to US Foot
1,1603716.8672,1871631.2838,4109.2438,GPS Point,12/30/2003 10:11:30 PM Dist = 751252.287
2,1603698.8542,1870927.2507,4115.4773,GPS Point,12/30/2003 10:13:15 PM
3,1603699.4598,1870927.6854,4114.1650,GPS Point,12/30/2003 10:13:18 PM
4,1603700.0654,1870928.1201,4113.1808,GPS Point,12/30/2003 10:13:21 PM
5,1603700.1255,1870915.1642,4112.5246,GPS Point,12/30/2003 10:13:24 PM
6,1603698.4870,1870875.4244,4111.2122,GPS Point,12/30/2003 10:13:27 PM
7,1603695.7196,1870817.1089,4112.5246,GPS Point,12/30/2003 10:13:30 PM
8,1603693.6221,1870745.4085,4113.1808,GPS Point,12/30/2003 10:13:33 PM
9,1603690.9776,1870660.7494,4116.4616,GPS Point,12/30/2003 10:13:36 PM
10,1603687.7640,1870567.8820,4116.7897,GPS Point,12/30/2003 10:13:39 PM
11,1603684.5930,1870465.9455,4113.8369,GPS Point,12/30/2003 10:13:42 PM
12,1603681.4447,1870359.2585,4113.1808,GPS Point,12/30/2003 10:13:45 PM
13,1603678.3152,1870248.6847,4113.1808,GPS Point,12/30/2003 10:13:48 PM
14,1603675.1983,1870135.5196,4114.4931,GPS Point,12/30/2003 10:13:51 PM
15,1603670.9011,1870015.0072,4115.1492,GPS Point,12/30/2003 10:13:54 PM

   Note that you can "offset" the incoming point numbers by a given amount. For example, the file contains points 1 — 79. You can enter 1000 next to **Offset Points by** and your points will be stored as 1001 — 1079.

   Click **Import** to begin.

Import GCDB Files

 GCDB Files are generally created by a government agency, such as the BLM. The coordinates contained in these files represent section corner data, such as section corners and 1/4 corners. There are two types of files used:
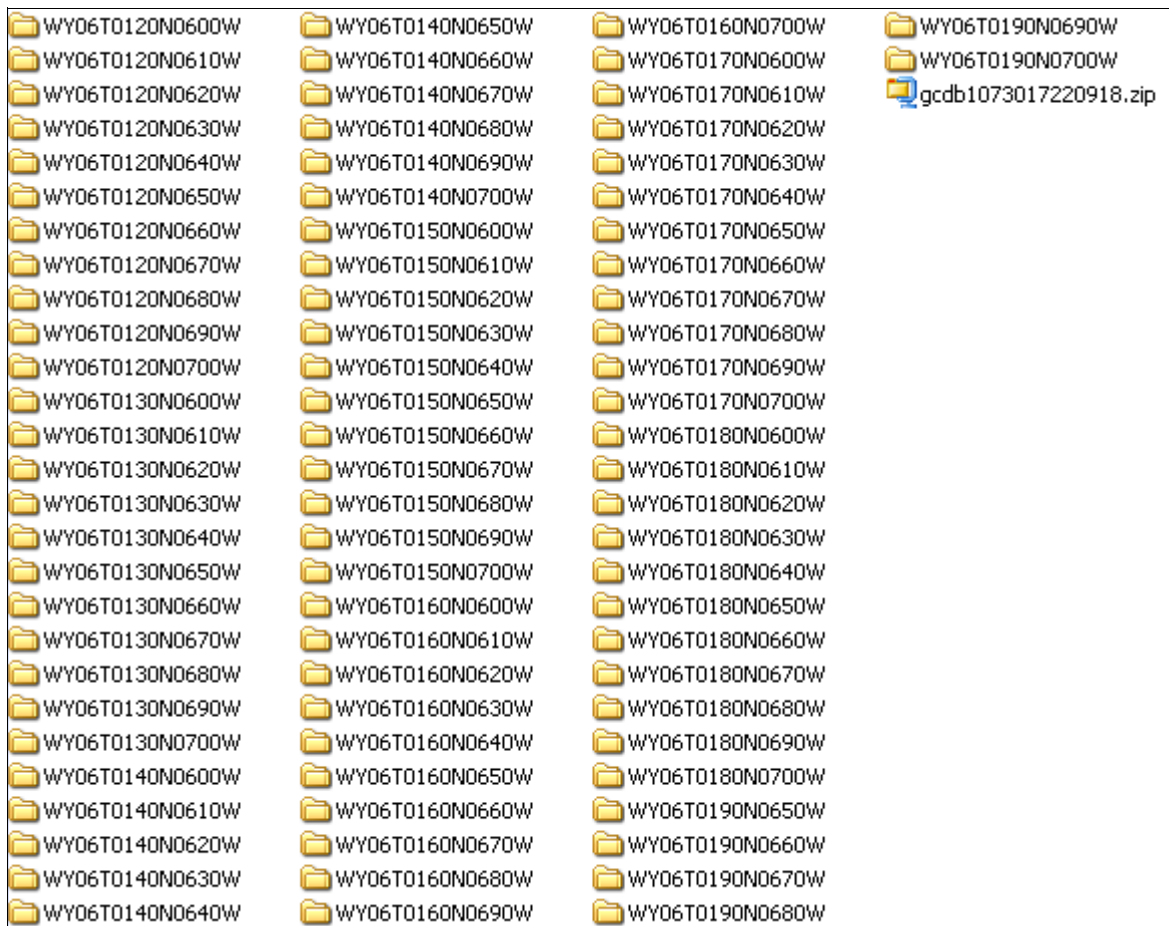
- A **PCCS 'c'** file
- A **GMM '.cor'** file

Prosurv Imaging provides a selection for each type of file.

 Importing a GCDB file means that Prosurv Imaging will create a coordinate point for each one found within the file. Then, Prosurv Imaging will plot the point on the image. This can be very useful in searching for existing section corner monumentation.

 Important Note: Keep in mind that these files may consist of very imprecise coordinate data. They do not neccesarily represent the true position of a found section corner. Rather, the coordinates are generally a mixture of digitally selected screen locations, actual GPS or instrument-located coordinates, and computed coordinates based on GLO field notes and/or Plats.

 GCDB files can be found by searching the Internet or by visiting BLM internet sites. Typically, they are provided by Township, Range, and Section. An example download of a set of GCDB files might be:

WY06T0120N0600W	WY06T0140N0650W	WY06T0160N0700W	WY06T0190N0690W
WY06T0120N0610W	WY06T0140N0660W	WY06T0170N0600W	WY06T0190N0700W
WY06T0120N0620W	WY06T0140N0670W	WY06T0170N0610W	gcdb1073017220918.zip
WY06T0120N0630W	WY06T0140N0680W	WY06T0170N0620W	
WY06T0120N0640W	WY06T0140N0690W	WY06T0170N0630W	
WY06T0120N0650W	WY06T0140N0700W	WY06T0170N0640W	
WY06T0120N0660W	WY06T0150N0600W	WY06T0170N0650W	
WY06T0120N0670W	WY06T0150N0610W	WY06T0170N0660W	
WY06T0120N0680W	WY06T0150N0620W	WY06T0170N0670W	
WY06T0120N0690W	WY06T0150N0630W	WY06T0170N0680W	
WY06T0120N0700W	WY06T0150N0640W	WY06T0170N0690W	
WY06T0130N0600W	WY06T0150N0650W	WY06T0170N0700W	
WY06T0130N0610W	WY06T0150N0660W	WY06T0180N0600W	
WY06T0130N0620W	WY06T0150N0670W	WY06T0180N0610W	
WY06T0130N0630W	WY06T0150N0680W	WY06T0180N0620W	
WY06T0130N0640W	WY06T0150N0690W	WY06T0180N0630W	
WY06T0130N0650W	WY06T0150N0700W	WY06T0180N0640W	
WY06T0130N0660W	WY06T0160N0600W	WY06T0180N0650W	
WY06T0130N0670W	WY06T0160N0610W	WY06T0180N0660W	
WY06T0130N0680W	WY06T0160N0620W	WY06T0180N0670W	
WY06T0130N0690W	WY06T0160N0630W	WY06T0180N0680W	
WY06T0130N0700W	WY06T0160N0640W	WY06T0180N0690W	
WY06T0140N0600W	WY06T0160N0650W	WY06T0180N0700W	
WY06T0140N0610W	WY06T0160N0660W	WY06T0190N0650W	
WY06T0140N0620W	WY06T0160N0670W	WY06T0190N0660W	
WY06T0140N0630W	WY06T0160N0680W	WY06T0190N0670W	
WY06T0140N0640W	WY06T0160N0690W	WY06T0190N0680W	

Each folder contains specific files relating to that Township and Range.
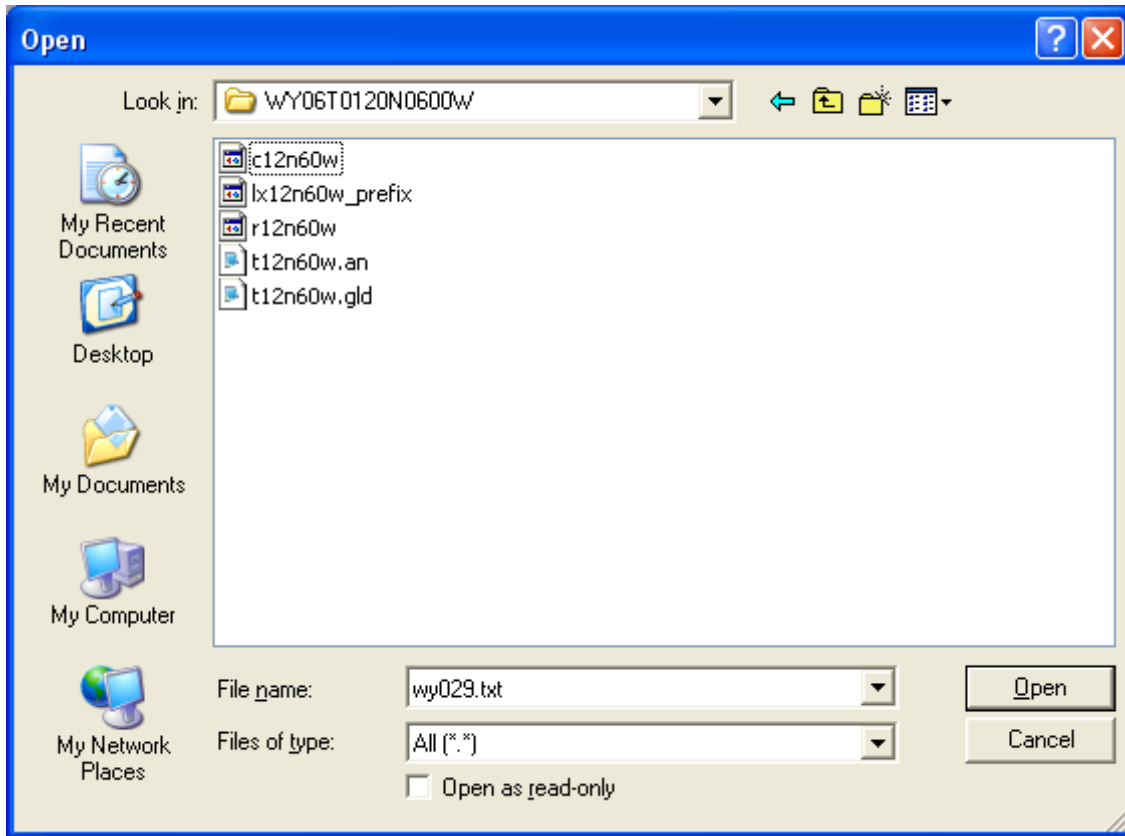
The example shown here contains a **PCCS 'c' file**. That is, the file we're interested in starts with the letter 'c' (c12n60w). The other files are supplementary, and are not needed by Prosurv Imaging. Note that there is no extension associated with a PCCS 'c' type file. Simply select the file and tap **Open**. Prosurv Imaging allows you to view the contents of the file prior to Importing.
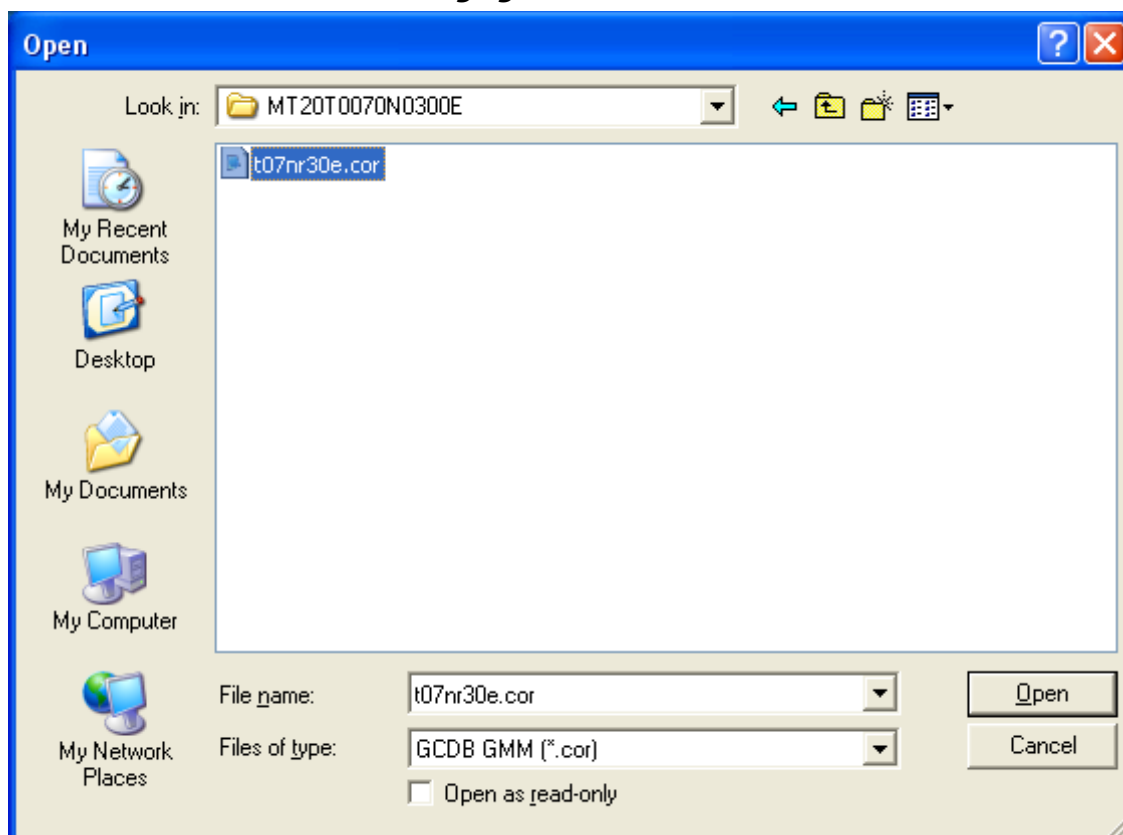
To open a **GMM .cor** file, select **Import GCDB GMM .cor file** from the menu.

A GMM .cor file will have the .cor extension. Tap Open to view and Import the coordinates.

Export—Send Job to Device

This function is intended for Prosurv Imaging users. Prosurv Imaging is surveying data collection software for the Pocket PC.

Once selected, Prosurv Imaging will automatically convert any Prosurv Imaging job file to a Prosurv Imaging type job file and copies the file directly to your Pocket PC. **Note—you must be connected and synchronized to your Pocket PC device using Microsoft ActiveSync®.**

Click the **Go** button to begin.

Export .asc Points File

This routine allows you to export your current Job's points to a commonly-used text file format. The standard style is:

- Point #,Northing,Easting,Elevation,Feature Code

Up to 18 different styles may be used, including exporting Latitude and Longitude in 3 different formats. A typical .asc points file (usually with a .txt or .asc extension) can be imported into many CAD and other Data collection programs.

After selecting a file name to save as, you can choose from the following options:
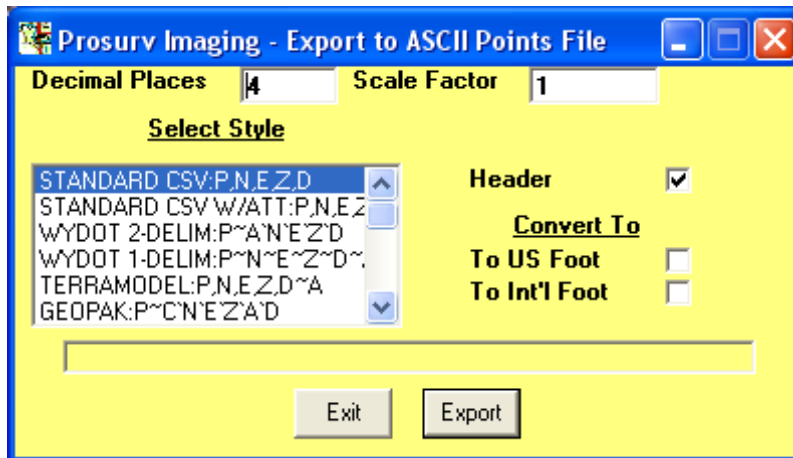
- Decimal Places—allows you to set the # of decimal places for the output
- Scale Factor—each northing and easting (coordinate) will be multiplied by this scale factor. Since the scale factor used here is normally a 1, the northings and eastings will remain the same as your job coordinates. However, you can use this capability to convert State Plane Coordinates to Surface Coordinates. For example, when converting from State Plane to Surface coordinates, you would multiply by 1 over the combined scale factor (ie if the combined scale factor for a project site is 0.99997, and you wish to convert your SPC's to surface coordinates, then you'd multiply by 1/0.99997 which is 1.00003—so you'd enter 1.00003 in the Scale Factor box).
- You can also automatically convert your coordinates (as they're exported) to different units, such as from Metric to US Foot. Note that your current Job's units are the "from" units, while your selection here indicates the "to" units.
- Select a Style

Tap **Export** to continue. Your coordinates are stored in the new file.

Edit—SETS

SETS are point lists that you can use elsewhere throughout Prosurv Imaging. Here are some examples of valid SETS:

- 1.52,1254,1792
- 43.35
- 1,4,6,9,12.15

SETS can be numbered so that a point list can be used over and over, without having to retype the list each time. For example, SET #1 might contain the first point list shown above; 1.52,1254,1792, where a decimal (.) means "through", and a comma (,) means "and". So, SET #1 would be described as "1 through 52 and 1254 and 1792".

You can have up to 2000 SETS per job, and up to 500 points described in each SET. Note that the second SET above shows that you CAN have decrementing point lists (that is, 43 **down** to 35).

The Edit SETS selection allows you to create, edit, view, and delete SETS of points.

SETS are used to draw lines between points, and much more, in Prosurv Imaging. Note that there are seven ways to create a new SET. Each method is fairly straightforward.

Prosurv PC - SETS

SET #	Point List	Description
1		1.15 Sample 1

Exit   Clean   Find   Copy   Create

Delete From [　　　] To [　　　] Go

Delete SET when tapped ☐

Create SET by
- ◉ Point #
- ○ Feature Code
- ○ Feature Code and Range
- ○ North/East Range
- ○ Elevation Range
- ○ Radius From Point
- ○ Text in Attributes
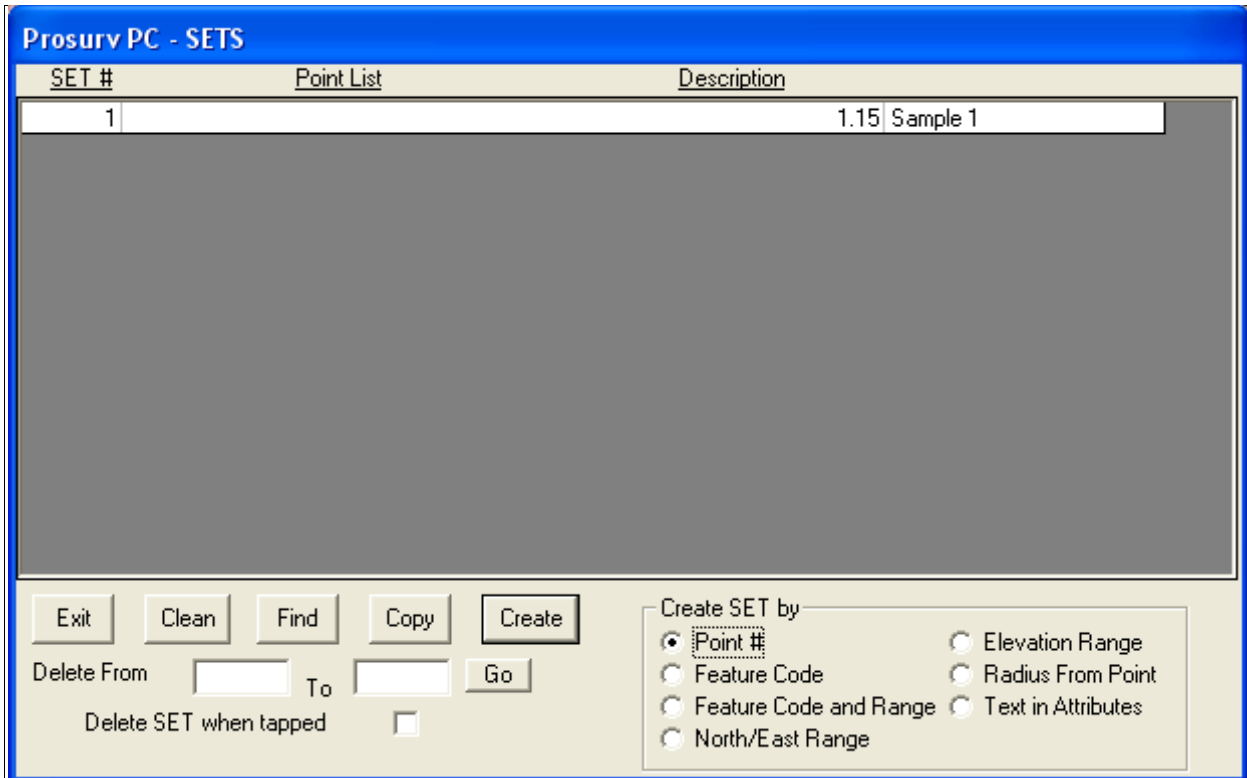
Once the SET has been created, you can use the SET anywhere in Prosurv Imaging where you see the words **"Include #'s"**. At the Include #'s prompt, you can enter a point list, or a SET number.

Prosurv Imaging - Inverse Go-Around Report

Include #'s *1

Current units are Meters

Meters ▼

Compute Arcs ☑
Show Closure ☑
Save As Text File ☐

Exit

View
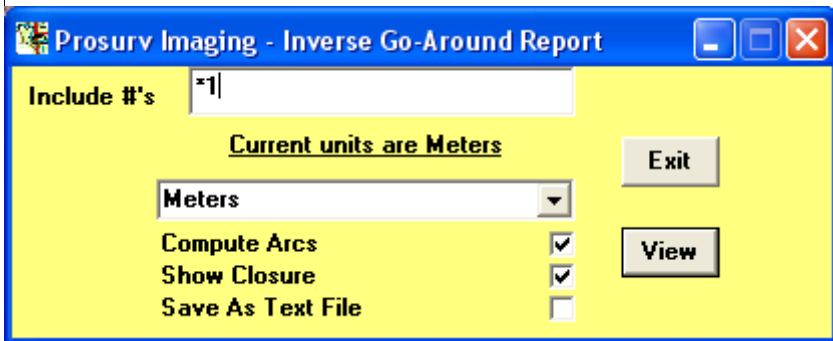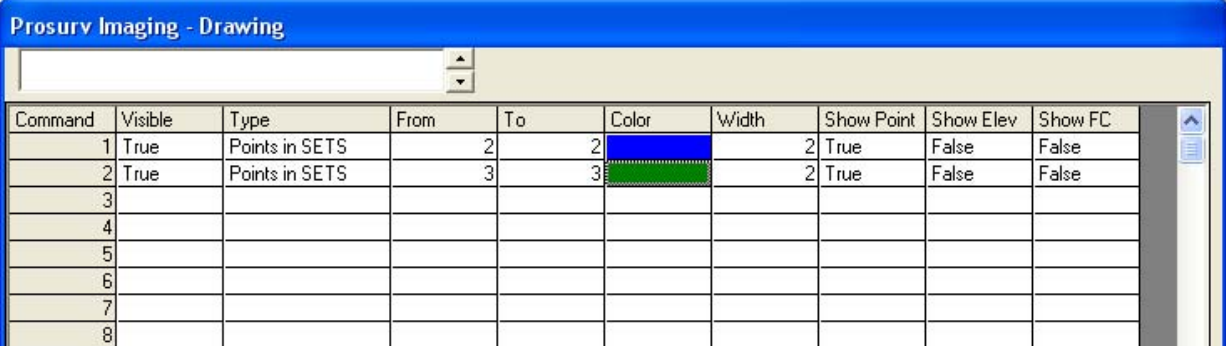
This example shows that SET #1 will be used for the Inverse Report. Since SET #1 contains points 1 *through* 15, the Inverse Report will display inverses of points 1 through 15.

Note that an asterisk (*) or a colon (:) may be used to indicate a SET.
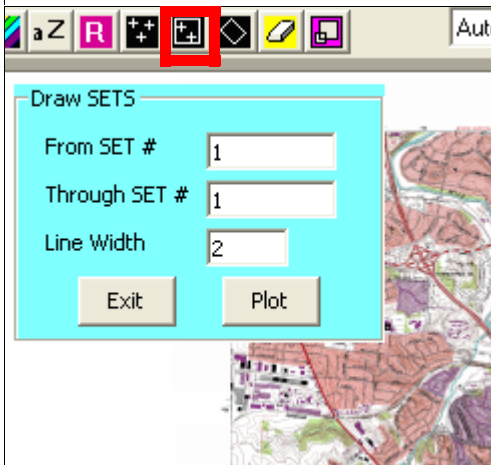
Note that SETS are also used when plotting, as shown here. The **Draw SETS** button basically "connects the dots" of each point in the SET, thus drawing a line around the SET.

Draw SETS

From SET # [1]
Through SET # [1]
Line Width [2]

Exit   Plot

Edit—Drawing

Command	Visible	Type	From	To	Color	Width	Show Point	Show Elev	Show FC
1	True	Points in SETS	2	2		2	True	False	False
2	True	Points in SETS	3	3		2	True	False	False
3									
4									
5									
6									
7									
8									

There are 3 types of drawing commands:
- Plot a Range of Points (ie 1 through 100)
- Plot Points in SETS
- Draw SETS

Each command is stored as part of your job file. Using the Edit Drawing selection, you can easily change the effects of your drawing commands. The Edit Drawing selection allows you to:
- Set the command as visible or invisible
- Re-select the type of command (as described above)
- Edit the point numbers from/to, or SET numbers from/to
- Change the color of the points or lines
- Change the width of the cross-hairs or lines
- Select whether to show the Point #, Elevation, and Feature Code on the image when the point is plotted

Edit—Settings

Points

Select the **Points** tab to set your point settings.

GPS

Image

GCDB
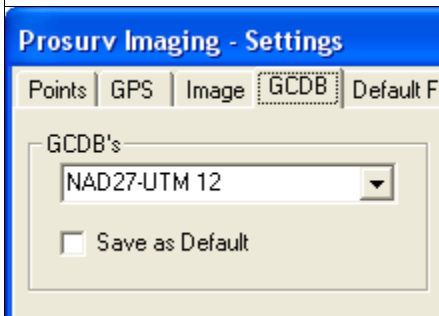
Default Folders
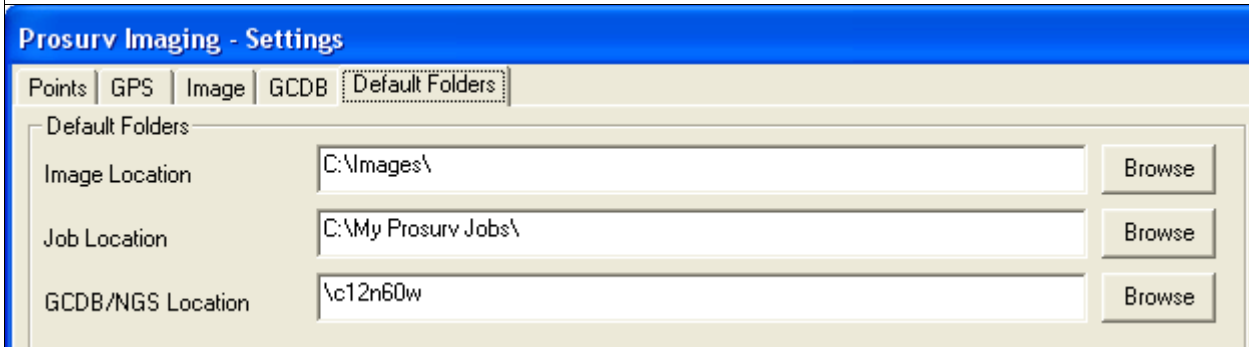
Add New Point

This selection lets you hand-enter a new point. You can enter Northing, Easting, Elevation, and Description (Feature Code), or, you may enter a Latitude and Longitude instead of a Northing and Easting.

The next available, unused point number is displayed for you. Simply enter your coordinates and tap **Save** to save the point.

Tap the **FCodes** button to view and use your own feature code list.

B*	Begin Line
E*	End Line
C*	Close Figure
POC*	Point On Curve

ABUT	BRIDGE ABUTMENT
ANC	ANCHOR (POLE/POST)
ANT	ANTENNA
AWN	AWNING (AT GROUND)
AZMK	AZIMUTH MARK
BARN	BARN
BARR	BARRICADE
BASE	BASE STATION
BERM	BERM
BIKE	BIKE (TRAIL/WAY/LANE/ROUTE)
BL	BREAKLINE
BLDG	BUILDING (ROOFLINE AT GROUND)
BM	BENCHMARK
BORE	SOIL BORING
BPOL	BRACE POLE
BRUL	BRUSHLINE
BSGN	BILLBOARD (LARGE SIGN)
BUSH	DECIDUOUS BUSH
CATL	CATTLE PASS
CB	CATCH BASIN
CBAR	CONCRETE BARRIER
CBX	TRAFFIC SIGNAL CONTROL BOX
CDU	CONDUIT
CEM	CEMETERY
CHAZ	CHECK AZIMUTH
CL	EXISTING CENTERLINE

View Point List

Select **View Point List** to view all the points in your current Job, in Numerical order.

Point #	Northing	Easting	Elevation	F Code	Attributes
1	1486726.037	1893511.910	5000.000	Search Point	
2	1486675.612	1898824.863	5000.000	Search Point	
3	1481410.133	1898799.701	5000.000	Search Point	
4	1481435.204	1893534.070	5000.000	Search Point	
5	1486700.825	1896168.387	5000.000	Comp N-1/4	
6	1484042.872	1898812.282	5000.000	Comp E-1/4	
7	1481422.669	1896166.885	5000.000	Comp S-1/4	
8	1484080.621	1893522.990	5000.000	Comp W-1/4	
9	1484061.747	1896167.636	5000.000	Comp Center	
10	1486713.431	1894840.148	5000.000	Comp N-1/4	
11	1485381.286	1896168.011	5000.000	Comp E-1/4	
12	1484071.184	1894845.313	5000.000	Comp S-1/4	
13	1485403.329	1893517.450	5000.000	Comp W-1/4	
14	1485392.307	1894842.731	5000.000	Comp Center	
15	1486688.218	1897496.625	5000.000	Comp N-1/4	
16	1485359.242	1898818.573	5000.000	Comp E-1/4	
17	1484052.310	1897489.959	5000.000	Comp S-1/4	
18	1485370.264	1897493.292	5000.000	Comp Center	
19	1482726.503	1898805.991	5000.000	Comp E-1/4	
20	1481416.401	1897483.293	5000.000	Comp S-1/4	
21	1482742.208	1896167.260	5000.000	Comp W-1/4	
22	1482734.355	1897486.626	5000.000	Comp Center	
23	1481429.936	1894850.477	5000.000	Comp S-1/4	

Delete Points

Select **Delete Points** to delete points represented by a point list or a SET.
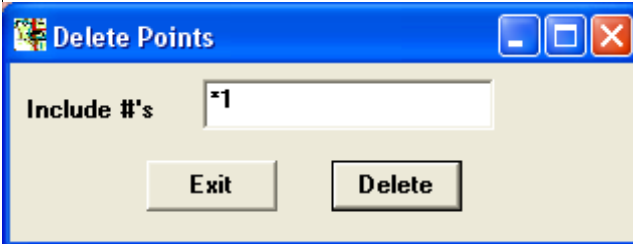
The example shown will delete points contained in SET #1. Since SET #1 has been pre-defined as points 1 through 15, then points 1 through 15 will be deleted from the job. The SET itself is NOT deleted.

Alternately, you can simply enter a point list of the points to be deleted such as 1.15 or 1.15,2125,3210

Prosurv Imaging Installation & User's Guide
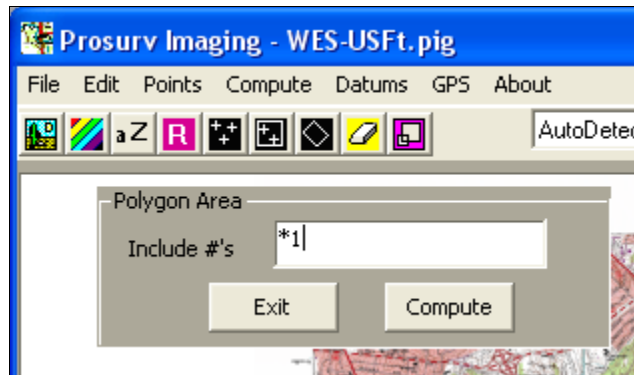
Polygon Area

Select **Polygon Area** to compute the area contained within a SET of points, or a point list. Note the example above shows that the points in SET #1 will be used.

Alternately, you can simply enter a point list of the points to be deleted such as 1.15 or 1.15,2125,3210

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Divide Section

The **Divide Section** routine will divide any standard section into Aliquot parts.
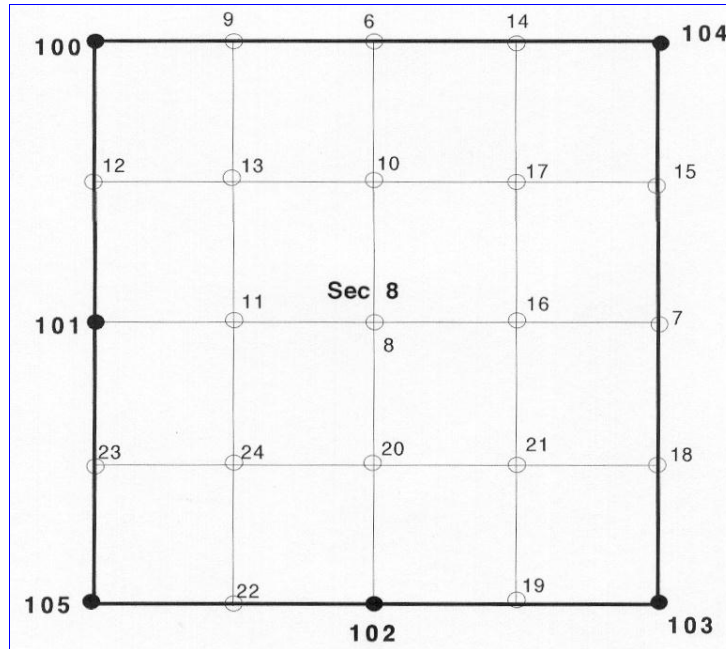
   It will automatically break the section down into "40's". You may give Prosurv Imaging up to 8 corners for the section or as little as 4 corners. For proper section breakdown, Prosurv Imaging requires that you have all four corners of the section (either found or computed). Then, Prosurv Imaging would compute the 1/4 corners automatically during it's section breakdown. The window above shows that if you don't have a corner such as the N 1/4 corner, then you should leave the point number as 0. This is how Prosurv Imaging knows that the point doesn't exist.
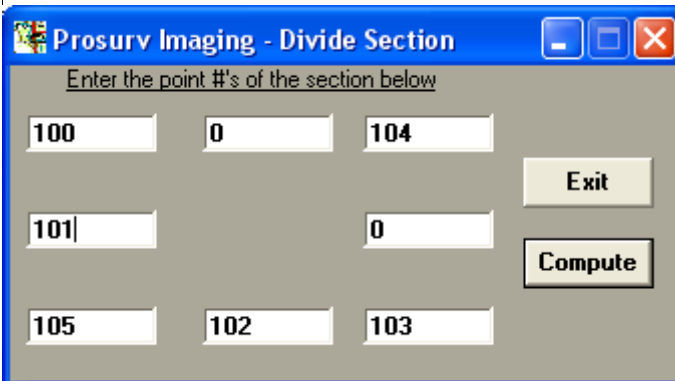
If you do have one or more 1/4 corners, then Prosurv Imaging will of course **hold** the 1/4 corner when computing the centerline of section. Also, Prosurv Imaging will compute the 1/16th corners based on the known quarter corner as well (on the boundary of the section), treating the 1/4 corner as an angle point. Once Prosurv Imaging computes the unknown 1/4 corners and the center of section, it proceeds by computing the 1/16th corners along the centerlines of the section. Then it uses the 1/16th corners to compute the center of each 1/4 of the section (i.e. #17, the center of the Northeast 1/4 of the section). As the window above shows, simply enter the point numbers that represent the different known corners. Leave unknown corners as 0. Now, just tap the **Compute** button, and Prosurv Imaging does the rest!

Pre-Determined Area: Sliding Line

Use this routine to cut up a parcel or to expand acreage. The routine will create two intersecting points and only requires you to enter four points. Each point created will be on the lines given (i.e. Line 1 and Line 2). The two points will be at the bearing that you've chosen.

The Bearing that you choose can be **any Bearing.** It is not required that this bearing be parallel to any other line. To select the bearing of the new line, you may either:

- **Enter the Bearing directly.**
- **Enter two points representing the Bearing.**

Example
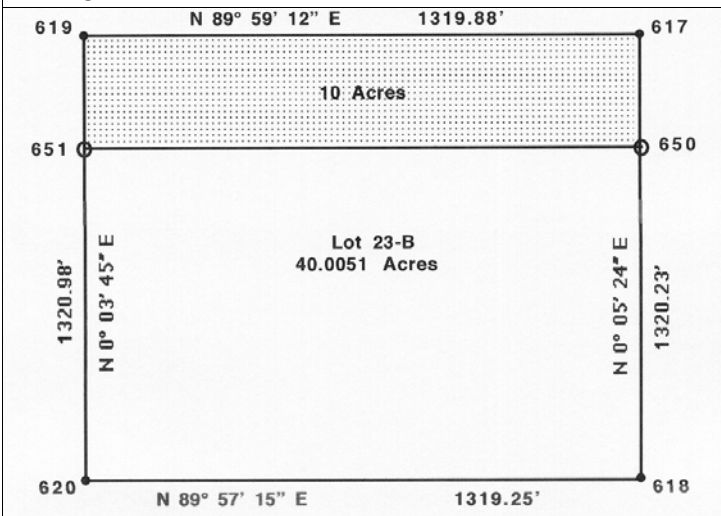
You want to create a 10 acre piece of land inside of a known 40+ acre Lot whose south line is parallel with the south line of the Lot. Line 1 is represented by points 617-618 while Line 2 is represented by points 619-620. The needed acreage therefore lies to the left of points 617 and 619 (the 'From' points of each line).

This will tell Prosurv Imaging how to compute the 10 acres. If you gave Line 1 as 619-620 and Line 2 as 617-618, then the 10 acres would be created *above* the 40 acre Lot rather than inside of it. This is how you would *expand* acreage (simply by the way that you enter the four points).
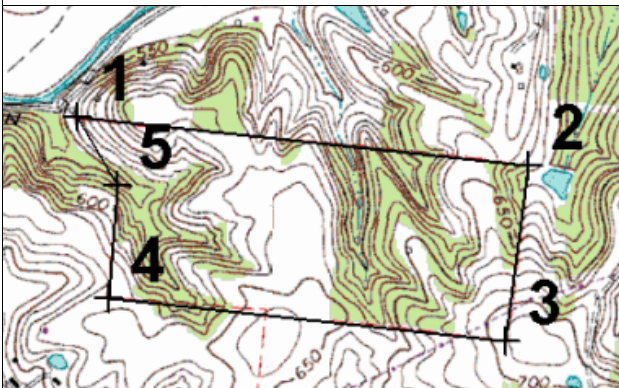
Pre-Determined Area: Hinged
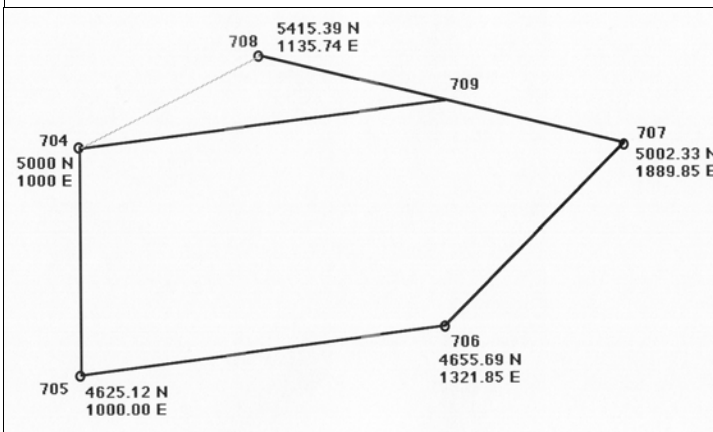
This routine can create areas using up to 100 points to define the polygon. The first point entered will be the point used as the hinge point. The points of the polygon can be entered on the first line, or you may use a set number representing the points of the polygon simply by pressing a semi-colon ; followed by the set number.

In this example, points 704.708 have been stored as SET #2, and we'd like to create 8 acres.

Inverse Report
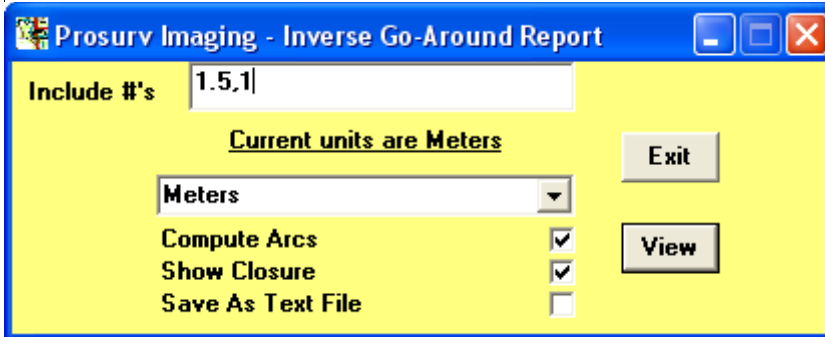
An **Inverse Report** displays the Bearings, Azimuths, and Distances between any given points. Prosurv Imaging "traverses" around the points, moving up one by one as it computes the inverses.

Note that you could use a SET #, such as *2 to indicate the point list to be Inversed.

Prosurv Imaging - Inverse Go-Around Report

Include #'s: `1,5,1`

Current units are Meters

Meters

Compute Arcs ☑
Show Closure ☑
Save As Text File ☐

Exit

View

Report: Inverse Go-Around Perfect Closure

From #	Bearing	Azimuth	Meters	To #
1	S 83°13'59.0" E	96°46'01.0"	1211.342	2
2	S 7°58'20.7" W	187°58'20.7"	473.472	3
3	N 83°05'59.6" W	276°54'00.4"	1067.302	4
4	N 5°33'22.0" E	5°33'22.0"	301.118	5
5	N 30°10'36.2" W	329°49'23.8"	212.500	1

Translate & Rotate

The powerful translate and rotate routine gives you the ability to translate points, rotate points, or do both at the same time. Options include:

- Translate/Rotate up to 200 points at one time
- Translate/Rotate the entire job
- Translate/Rotate a list of points
- Translate/Rotate a pre-defined SET of points
- Use 4 point numbers
- Use a "From point" and an Azimuth or Bearing to define each system
- Use an asterisk to define a line, such as 8*22 which uses the Azimuth between points 8 and 22

In the example above, the points contained in SET #1 are to be translated and rotated. SET #1 contains points 1.5 (1 through 5) as previously defined, and happens to represent some horizontal geometry that was defined as tangent-curve-curve.

To use this routine, you define two points (or a point and a line) **to translate/rotate ONTO**. Then you define two points (or a point and a line) that represent your existing coordinate system.

In the example, there won't be any translation, since you're using the same point number "From" for each system, in this case, **Point #1.** If you entered a different "From" number for the Reference Line, such as 55, then Prosurv Imaging would "move" or translate your points based on the translation between 55 and 1.

Back to the example, the **existing bearing** from 1 to 2 is N 22°15'10" E, which you **don't need to know**, because Prosurv Imaging will compute the bearing from 1 to 2 since you entered these numbers for the reference line.

Ultimately, in the example, we will be rotating our horizontal geometry from it's current position so that points 1 to 2 will be at N 10°00'00" E. **Tap the Comp button** to compute and store the points. In this case, only the points 1.5 will be changed.

If you need to translate without any rotation, you could enter **NE0.0000** for each **To #**.   An example would be moving from a 1000, 1000 system to 50000,50000.
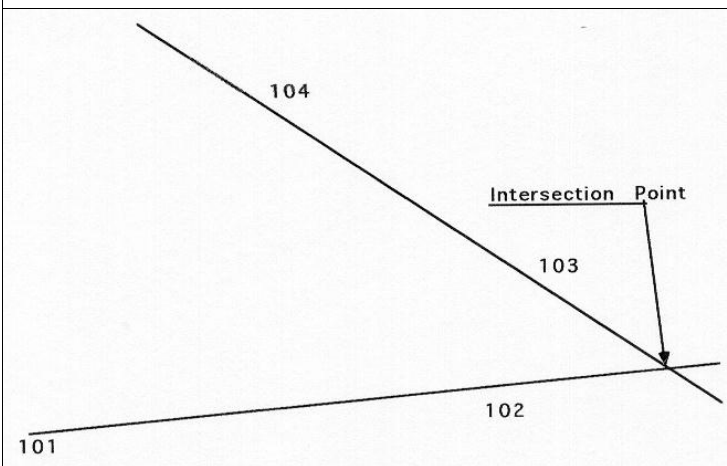
Intersections
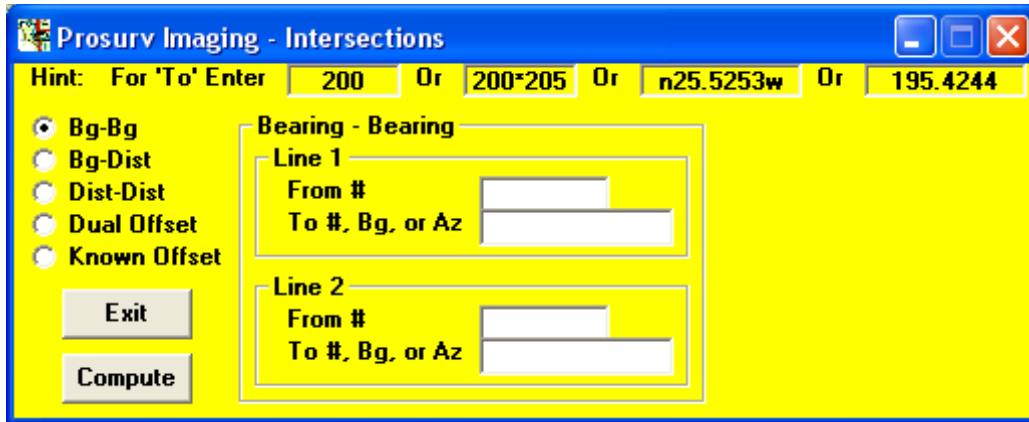
Prosurv Imaging contains 5 different intersection routines:
- Bearing-Bearing
- Bearing-Distance
- Distance-Distance
- Dual-Offset
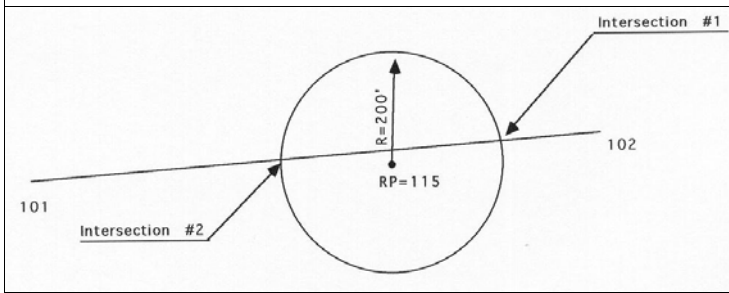- Known Offset

Bearing-Bearing Intersect

To compute the intersection of two lines, just enter two points from each line.

Tap the **Compute** button to compute the intersection point.

Bearing-Distance Intersection

Whenever you compute a Bearing-Distance Intersection, there will always be two possible solutions. Prosurv Imaging computes and displays both solutions. You can Save #1, Save #2, or Save Both. If you're unsure as to which solution you need, simply Save Both, then check your plotting display to see which one is the one you want.

Distance-Distance Intersection
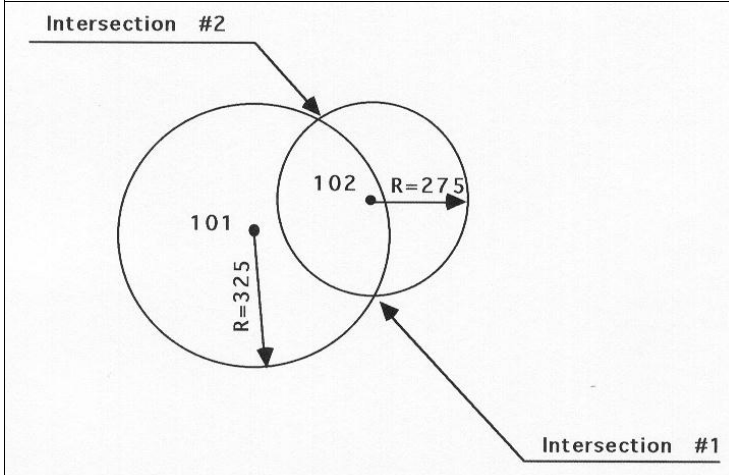
This routine also gives two solutions. You can Save #1, Save #2, or Save Both. If you save both, you can then view the points on the image to see which one you need.

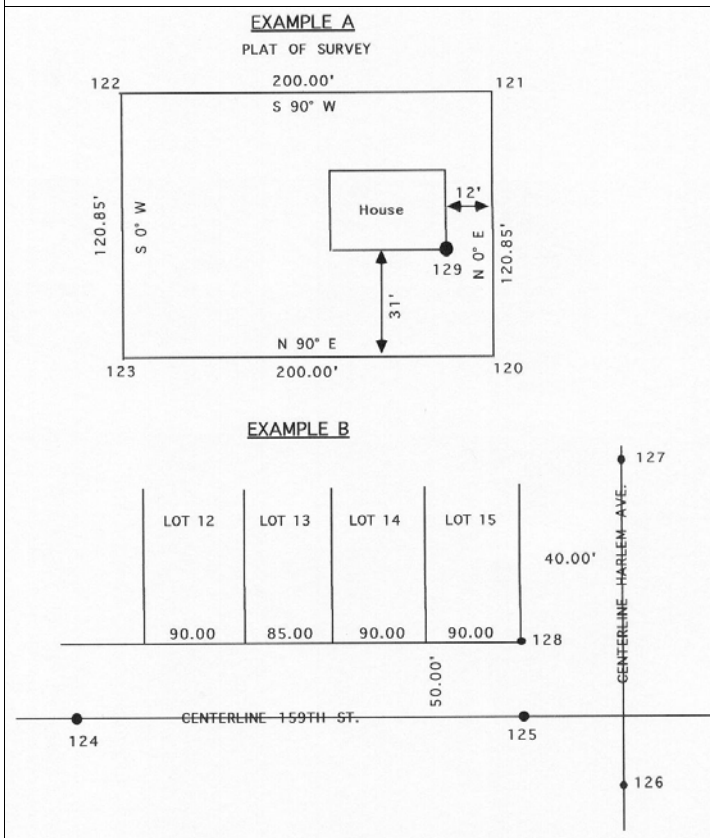Enter the point number and distance from each point. Tap the **Compute** button to compute the intersection.
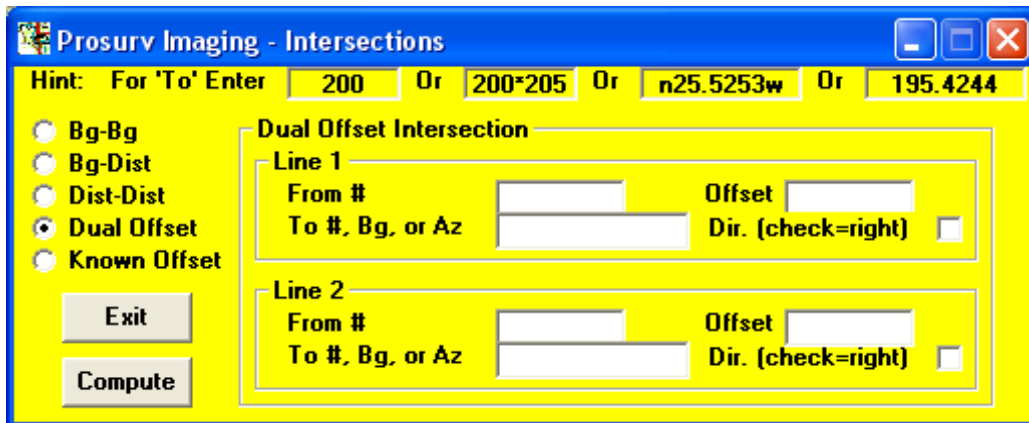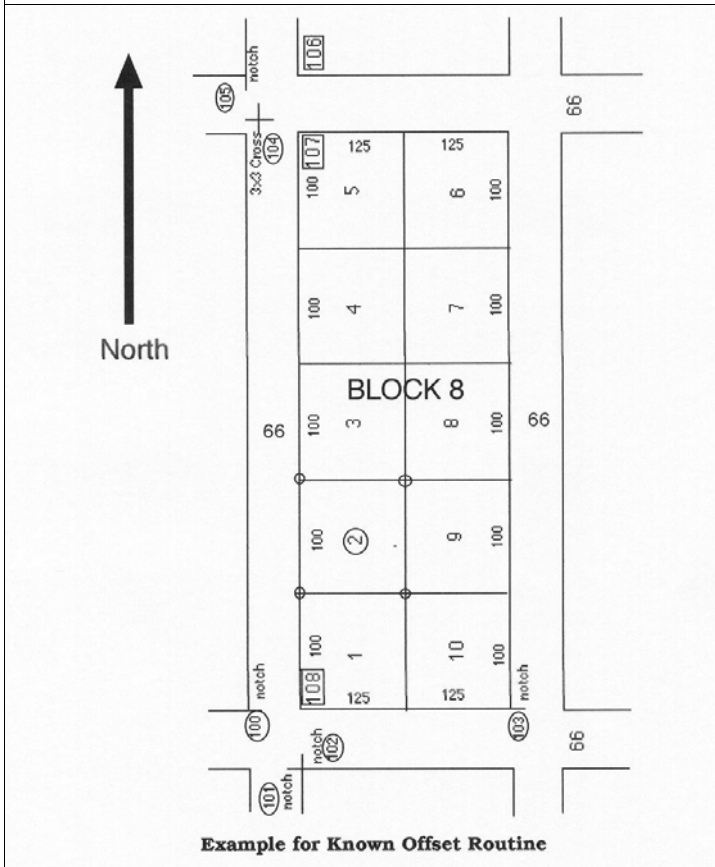
Dual-Offset Intersection

This function makes it very easy to create a point which represents the intersection of two different offset lines. This can be useful for computing a Block Corner when two centerlines are known. You can also use this function to create the corner of a house given two property lines and two setback lines (offsets from property lines). All that is needed are the two offset amounts and two points representing each line. Follow the examples below for a step-by-step guide to using the function.

EXAMPLE A

PLAT OF SURVEY

122   200.00'   121
S 90° W

120.85'   S 0° W

House   12'
N 0° E   120.85'

31'   129

N 90° E
123   200.00'   120

EXAMPLE B

127

LOT 12   LOT 13   LOT 14   LOT 15

40.00'

90.00   85.00   90.00   90.00   128

50.00'

CENTERLINE 159TH ST.
124   125

126

CENTERLINE HARLEM AVE.

Prosurv Imaging - Intersections

Hint: For 'To' Enter   200   Or   200*205   Or   n25.5253w   Or   195.4244

- Bg-Bg
- Bg-Dist
- Dist-Dist
- (•) Dual Offset
- Known Offset

Exit

Compute

Dual Offset Intersection

Line 1
From #   Offset
To #, Bg, or Az   Dir. (check=right)

Line 2
From #   Offset
To #, Bg, or Az   Dir. (check=right)

## Known Offset

Example for Known Offset Routine

The **Known Offset** function is very useful when computing Block corners or any time when the shifting of an offset cross, iron pipe, rebar, brass cap, or notch is needed. Refer to the figure on the next page for the following example.

In computing the lot corners for Lot 2 in Block 8, it is desired that the Block Corners #107 and #108 be computed. This will be done by using the various found notches and crosses. The Block corner at 108 can be easily created by using the **Line-Line Intersect** routine. The first Line is 100-103. The second line would be at #102 sighting #105 pulled 66' East. This is where the Known Offset routine comes into play.

Known Offset will then create the coordinate (saved as #107) by calculating the angle and distance based on the triangle shown below:
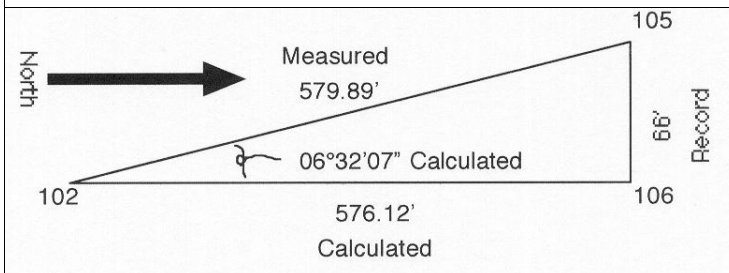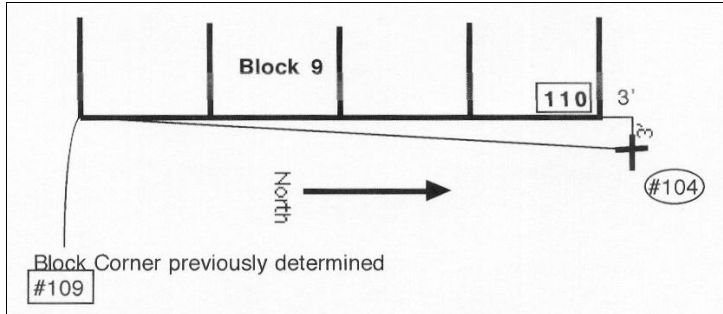
In the same manner, point #104 (a found cross), can be 'moved' to the Block corner that it represents. It was determined in the field that it is a 3' by 3' offset cross.

A new coordinate is created based on the triangle shown left. The new block corner (saved as #110) is now created.

   Note: Keep in mind that when using this function, the triangle which will be used will determine the outcome of the computed coordinate. For instance, to create #110 you would *not* use 'Hold #102' and specify '3 feet left' and '3 feet towards', since this would give a bogus answer. In other words, the point to be 'moved' should end up on a baseline with the point held. Also note that the point 'moved' is unaffected and its coordinate value is *not* changed.
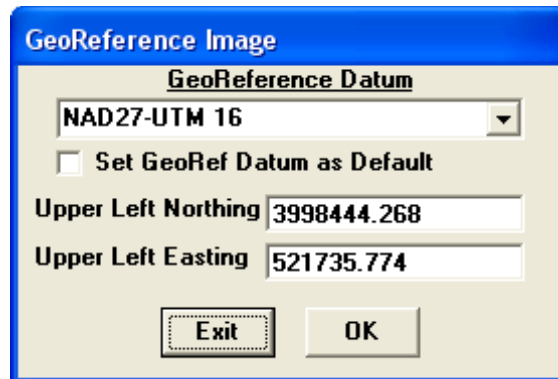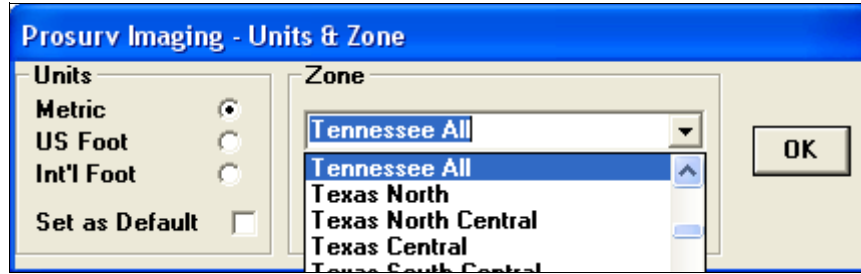
Image Datum

You can manually set your Image's Datum (Projection and Zone) by selecting **Image Datum**.

The **Set GeoRef Datum as Default** check box allows you to set a default datum, which is used by Prosurv Imaging whenever a valid datum is not found when loading a new Quad Sheet image.

The Upper Left Corner coordinates, which are read from the .tfw (**world**) file when an image is loaded are displayed. These coordinates are always in meters.

When using **All Topo Maps** to export a Quad Sheet image, a text file is created by **All Topo Maps** which contains the Projection, Datum, and Zone information for the Quad Sheet. Prosurv Imaging reads this text, if available, and sets the Image Datum automatically upon loading. See page 2 of this guide for more information on exporting maps from the **All Topo Maps** program.

Job Datum

You can select any Datum as your Job's Datum. This means that you can work in NAD83 Tennessee All State Plane Coordinates, even though your Image Datum is NAD27 UTM 16!

Prosurv Imaging contains an on-the-fly, built in NADCON conversion, that automatically transforms coordinates to and from your Image Datum. For example, when you click on the image to create a point, the clicked location is converted from NAD27 UTM 16 to NAD83 Tennessee SPC's automatically!

Plus, when you're using a GPS receiver with Prosurv Imaging, your GPS position is transformed from WGS84 Lat/Long to your image datum, for precise plotting on your image.

This screen also lets you set and select your Units and Zone as a default for all of your new jobs.

NADCON Conversions

You can convert between NAD27 and NAD83 based Lat/Long directly in Prosurv Imaging. Simply select the direction of the conversion, then enter the appropriate values.

Note that entry for the Latitude and Longitude are in DD.MMSSsssss format. For example:
- Latitude = 44°12'52.79115"
- Longitude = 109°44'23.51678"

    would be entered as:
    - 44.125279115
    - 109.442351678

Since NADCON conversions are US-based, longitudes are assumed to be West (do not use a negative to represent west longitude).

At this time, Prosurv Imaging's NADCON conversions are for the continental US **ONLY**.

GPS

   Prosurv Imaging allows you to connect a GPS receiver to your computer's USB or serial port, and automatically reads the incoming GPS data. The data is converted to the Image Datum and a flashing green circle displays your position on the Quad in real time (as long as the GPS Lat/Long is within the Lat/Long borders of your Quad sheet).

   Connection is fairly straight-forward, and starting the GPS data stream is a matter of simply selecting **GPS—>Start** from the Menu.

   Requirements for utilizing your GPS receiver with Prosurv Imaging are:
* NMEA data string output from your GPS receiver
* Connection to your laptop or PC via USB or Serial port. Serial drivers for your particular GPS receiver's manufacturer may be required. If so, then they must be installed to your PC prior to running Prosurv Imaging.
* Virtually any baud rate settings may be used, since Prosurv Imaging has auto-sensing port and baud rate capabilities.
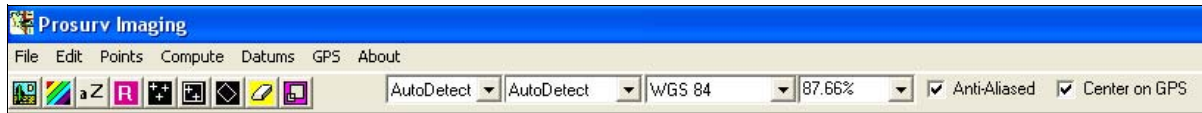

   The two AutoDetect drop-downs allow you to set the port and baud rate manually. The WGS84 selection should not be changed. Once GPS has been started, you can stop the GPS data stream by selecting GPS—>Stop from the same menu.

   To scroll, pan, and zoom, while GPS data is being read, uncheck the "Center on GPS" box. When the box *is* checked, Prosurv Imaging will automatically center the Image on the Lat/Long GPS location as you drive!

   NOTE: Prosurv Imaging utilizes an ActiveX GPS Control by franson.biz, for acquiring GPS data from NMEA data strings.

Staking a Point (Navigation)
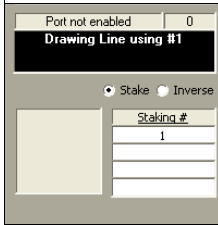
Prosurv Imaging lets you stake, or navigate to a point. Enter the point # to be staked in the first box below "Staking #". Then press Enter.
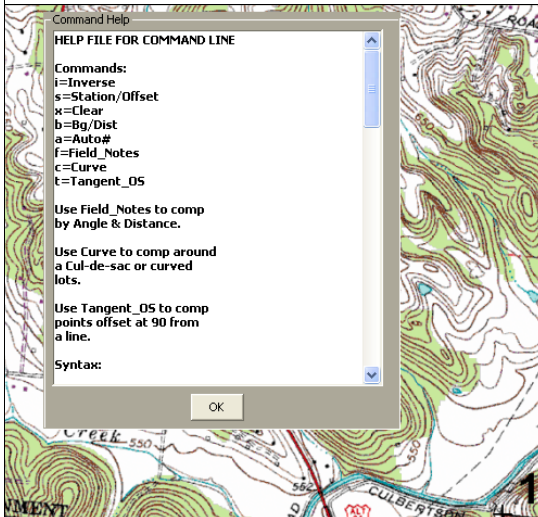
If you're connected to a GPS receiver, Prosurv Imaging will determine the direction and distance to the point that you're staking, and will display the results in the boxes shown.

An arrow will indicate the direction to the point. All data is shown in real-time, that is, it is updated continuously, based on the current GPS data.

Command-Line Computations

	1	186061.880	537489.181	5000	Search Point	Save

Prosurv Imaging contains some powerful command-line based computation routines. At the bottom of the screen, tap in the left-hand box, then enter a ?.

Command Help

HELP FILE FOR COMMAND LINE

Commands:
i=Inverse
s=Station/Offset
x=Clear
b=Bg/Dist
a=Auto#
f=Field_Notes
c=Curve
t=Tangent_OS

Use Field_Notes to comp
by Angle & Distance.

Use Curve to comp around
a Cul-de-sac or curved
lots.

Use Tangent_OS to comp
points offset at 90 from
a line.

Syntax:

OK

A help box is presented that displays detailed information about the 8 command line functions, and their syntax.

With these functions, you can quickly create points around a subdivision or other plat, to aid in searching for land corners.

Functions include:
- Traverse
- Station/Offset determination
- Clear
- Compute by Bearing & Distance
- Set Auto #
- Reduce Field Notes (computes points)
- Create points in a curve
- Compute points by Tangent/Offset (enter distance from a point and offset from line)

<u>Right-Click Commands</u>

You can use the Right-Click button on your mouse to perform the following functions:

- Create Points by Clicking
- Inverse Points by Clicking
- Zoom 100%
- Zoom In Once
- Zoom Out Once
- Cancel Tools (cancels all tools below this selection)
- Pan
- Select Area & Export
- Zoom
- Zoom Area
- Zoom In (continuously)
- Zoom Out (continuously)
- Draw Lines
- Draw Polygons
- Draw Rectangles
- Draw Ellipses
- Freehand Draw
- Magnify

See the Edit—>Settings section for settings related to creating points.

Plotting & Buttons

With Prosurv Imaging, you can easily plot points and draw lines between points.
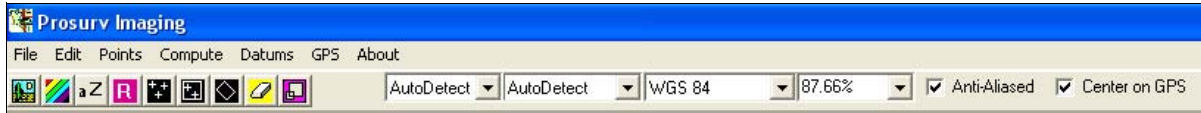
Buttons shown above, from left to right are:
- **Open Image**
- **Select Color**
- **Set Font**
- **Regen drawing (clear & reload the image, then re-plot all points and lines)**
- **Plot Range of Points**
- **Plot Points in SETS (plots all the points in the given SETS, but does not "connect the dots")**
- **Draw SETS (plots all the points in the given SETS AND connects the dots by drawing a line between each point)**
- **Erase all drawing commands in the job**
- **Toggle to expand the Image view to the entire width of Prosurv Imaging**

Note: Anti-aliasing, when selected, provides a sharper image, especially when the image is zoomed-out (ie 25%). However, zooming while anti-alias is on, is slower. Prosurv Imaging will automatically de-select anti-aliasing when using the scroller on your mouse for zooming in and out.