



TRAINING GUIDE

Survey Pro (to Version 5.4)

Ranger 3 Data Collector &

FOCUS 30 Robotic Total Station



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Ranger 3 Data Collector &

FOCUS 30 Robotic Total Station

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Version 1.0



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This is the October, 2013, Version 1 of the Survey Pro Training Guide using the FOCUS 30 and Ranger 3. It applies up to Survey Pro version 5.4 and firmware version 1.4.0 for the FOCUS 30.

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Workflows

In this section, you will learn how to:

Use this document. Sample workflows for initial setup, data collection and stakeout will be itemized to assist in completing the necessary tasks to help ensure a successful survey.

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Step 1: Using this Document

This document is intended to help accomplish specific tasks. Some surveying routines are accomplished infrequently while others are performed many times a day. Reference the appropriate chapter to preview the steps necessary to accomplish the task being performed.

Step 2: Initial Setup Workflows

<p>Initial setups are only performed infrequently or when something changes. Ensure that these chapters have been reviewed.</p>	<ol style="list-style-type: none"> a. Manage Instruments b. GeoLock c. Job Settings d. Import Files e. Customize Home Page f. Map View g. Export
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Step 3: Data Collection Workflows

<p>For data collection, review these chapters.</p>	<ol style="list-style-type: none"> a. Create a New Job b. Import Files (Optional) c. Station Setup d. Data Collection e. Export
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Step 4: Stakeout Workflows

<p>For stakeout, review these chapters.</p>	<ol style="list-style-type: none"> a. Create a New Job b. Import Files (Optional) c. Station Setup d. Stakeout e. Export
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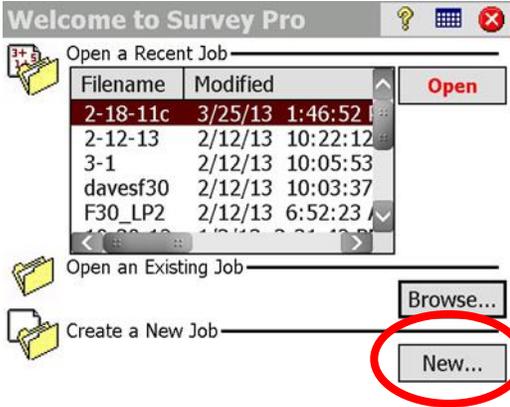
Create a New Job

In this lesson, you will learn how to:

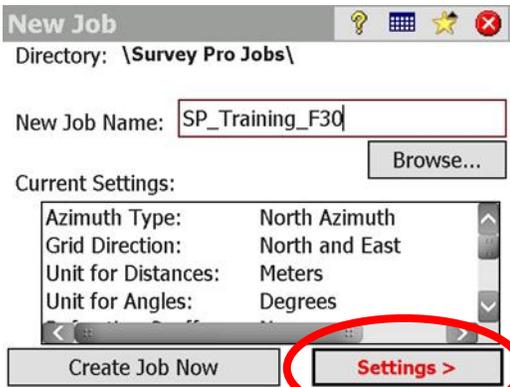
Open Survey Pro, create a new job or select an existing job, configure job settings, select a Control File (optional), select a Coordinate System (optional) and create a First Point for the job (optional).

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Step 4: Select Control File (optional)	12
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Step 6: Select First Point (optional)	14

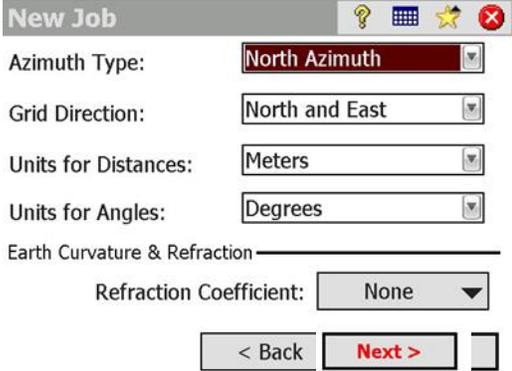
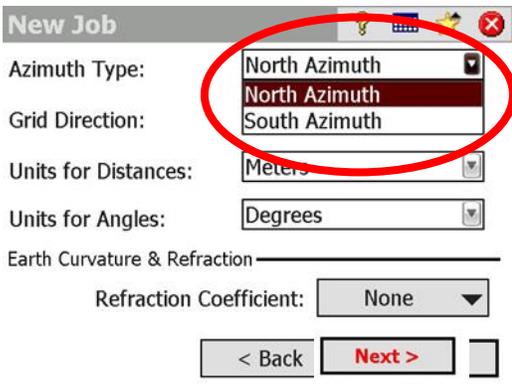
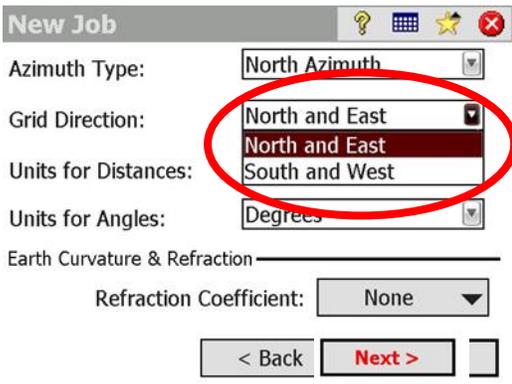
Step 1: Open Survey Pro

<p>1.</p>	<p>Tap on the Windows icon to bring up the available programs in the lower left hand portion of the data collector's screen. Navigate to the Survey Pro icon and then tap on it.</p>	
<p>2.</p>	<p>Survey Pro automatically opens a dialogue where a New job can be created or any job on the data collector can be opened. The "Open" button has RED font which indicates that hitting the "Enter" button on the data collector's keyboard will open the highlighted Recent Job. Recent Jobs are listed in the order in which they were last used. "Browse" will open a file browser. Any *.Survey or *.Job file on the data collector can be selected. Select "New" to Create a New Job</p>	

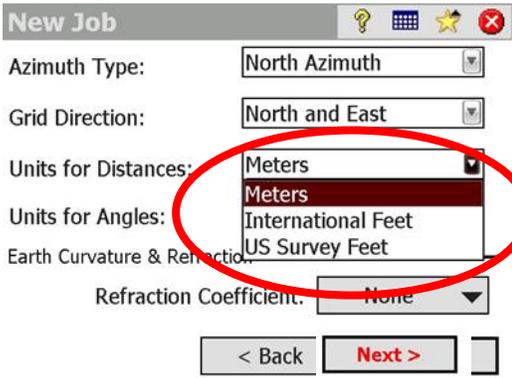
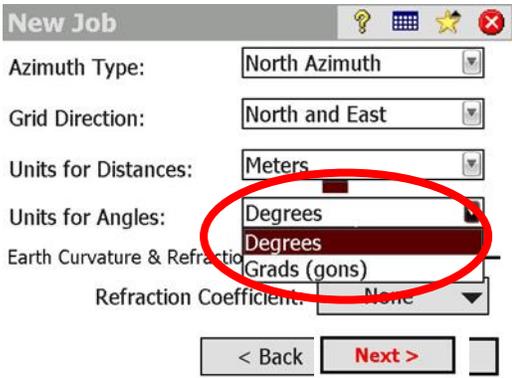
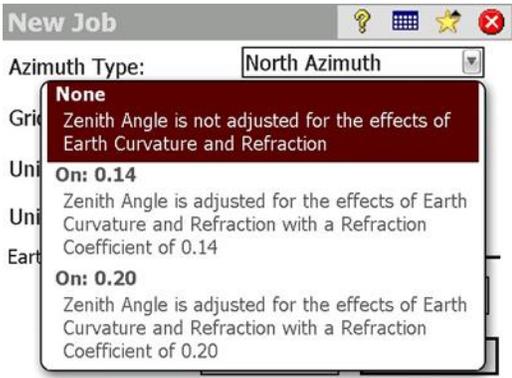
Step 2: Assign a Job Name

<p>1.</p>	<p>Assign the job a name. (16 characters, upper/lower case) "Browse" will open a file browser. The new job can be stored in any directory on the data collector. "Create Job Now" will open the newly created job with the last job's settings. Note that the current job settings can be reviewed in the provided scroll window. Select "Settings" to open the Job Settings dialogue.</p>	
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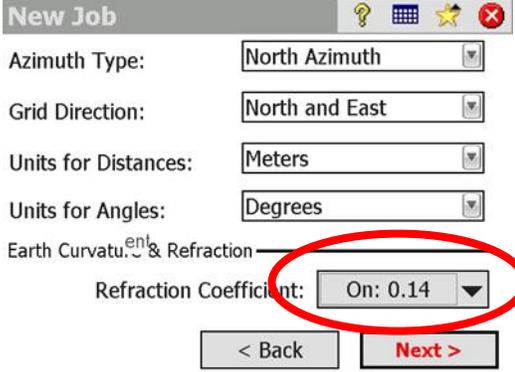
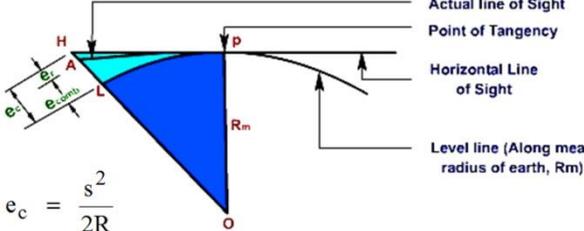
Step 3: Select Job Units

<p>1.</p>	<p>Job units include azimuth types, grid direction, distances, angles and refraction correction coefficients.</p>	
<p>2.</p>	<p>Select North Azimuth or South Azimuth</p>	
<p>3.</p>	<p>Select Grid Direction North and East or South and West</p>	

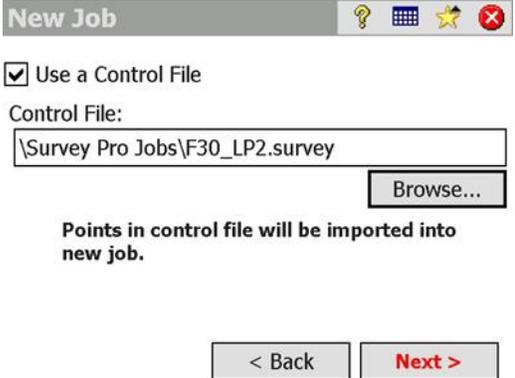
Step 3: Select Job Units

<p>4.</p>	<p>Select distance units. Note that Metric is the default selection to ensure that the correct units of “Feet” are chosen intentionally.</p>	 <p>The screenshot shows the 'New Job' dialog box with the following settings: Azimuth Type: North Azimuth, Grid Direction: North and East, Units for Distances: Meters (highlighted with a red circle), Units for Angles: International Feet, Earth Curvature & Refraction: None, and Refraction Coefficient: None. Navigation buttons for '< Back' and 'Next >' are visible at the bottom.</p>
<p>5.</p>	<p>Select the angular units.</p>	 <p>The screenshot shows the 'New Job' dialog box with the following settings: Azimuth Type: North Azimuth, Grid Direction: North and East, Units for Distances: Meters, Units for Angles: Degrees (highlighted with a red circle), Earth Curvature & Refraction: None, and Refraction Coefficient: None. Navigation buttons for '< Back' and 'Next >' are visible at the bottom.</p>
<p>6.</p>	<p>Select the Refraction Coefficient.</p>	 <p>The screenshot shows the 'New Job' dialog box with the following settings: Azimuth Type: North Azimuth, Grid Direction: North and East, Units for Distances: Meters, Units for Angles: Degrees, Earth Curvature & Refraction: None, and Refraction Coefficient: On: 0.20 (highlighted with a red circle). A tooltip is visible over the 'None' option, stating: 'Zenith Angle is not adjusted for the effects of Earth Curvature and Refraction'. The 'On: 0.14' option is described as: 'Zenith Angle is adjusted for the effects of Earth Curvature and Refraction with a Refraction Coefficient of 0.14'. The 'On: 0.20' option is described as: 'Zenith Angle is adjusted for the effects of Earth Curvature and Refraction with a Refraction Coefficient of 0.20'. Navigation buttons for '< Back' and 'Next >' are visible at the bottom.</p>

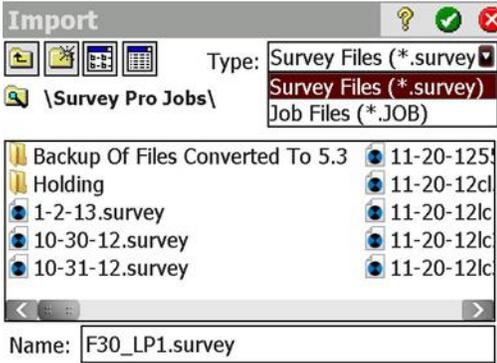
Step 3: Select Job Units

<p>7.</p>	<p>For most day-time total station operation, select 0.14.</p>	 <p>New Job</p> <p>Azimuth Type: North Azimuth</p> <p>Grid Direction: North and East</p> <p>Units for Distances: Meters</p> <p>Units for Angles: Degrees</p> <p>Earth Curvature^{ent} & Refraction</p> <p>Refraction Coefficient: On: 0.14</p> <p>< Back Next ></p>
<p>8.</p>	 <p>Actual line of Sight</p> <p>Point of Tangency</p> <p>Horizontal Line of Sight</p> <p>Level line (Along mean radius of earth, R_m)</p> $e_c = \frac{s^2}{2R}$ $e_r = \frac{1-k}{2R} s^2$	

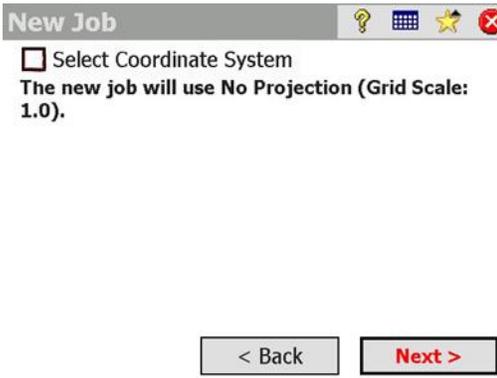
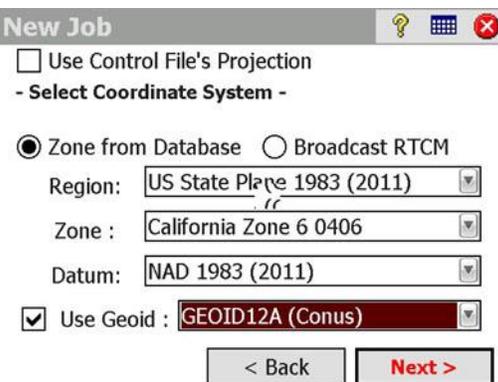
Step 4: Select Control File (optional)

<p>1.</p>	<p>A Control File with design or control points can be placed onto a separate layer in the current job. Points from the Control File can be used for Station Setup, Site Calibrations and Stakeout.</p>	 <p>New Job</p> <p><input checked="" type="checkbox"/> Use a Control File</p> <p>Control File: \\Survey Pro Jobs\F30_LP2.survey</p> <p>Browse...</p> <p>Points in control file will be imported into new job.</p> <p>< Back Next ></p>
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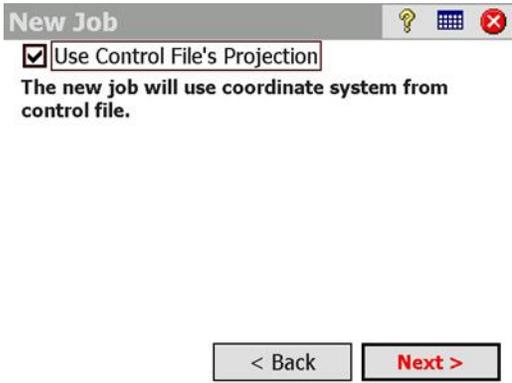
Step 4: Select Control File (optional)

<p>2.</p>	<p>A Control File can be in the form of *.survey or *.job formats.</p>	
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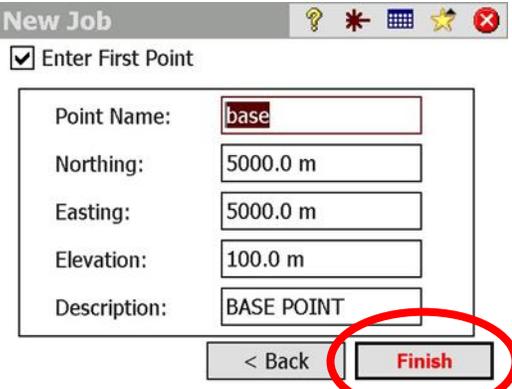
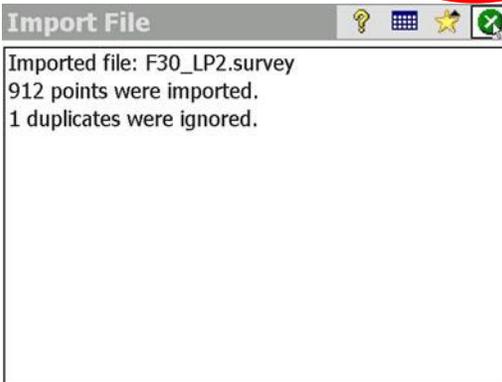
Step 5: Select Coordinate System (optional)

<p>1.</p>	<p>A coordinate system can be selected. This is typical of GNSS surveys or Optical surveys that will be combined with GNSS data.</p>	
<p>2.</p>	<p>A coordinate system from the Coordinate System database may be selected. A geoid model can also be attached. Models can be loaded using Spectra Precision Survey Office connected to the data collector or by transferring manually between computer and data collector. Typical location on the PC is: C:\Program Files\Common Files\Trimble\GeoData</p>	

Step 5: Select Coordinate System (optional)

<p>3.</p>	<p>If the job is using a Control File, the Coordinate System from that job can be selected. A control file is a convenient way to keep “Control” or “Design” points on a different job layer than the “as-built” or “as-staked” points.</p>	
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Step 6: Select First Point (optional)

<p>1.</p>	<p>The job can be optionally populated with an initial point. This can be convenient when setting up on a new job with no existing coordinates. Selecting “Finish” will import the Control Layer if assigned.</p>	
<p>2.</p>	<p>A dialogue box is displayed showing the number of imported points. Clicking on the green check/tick mark will revert to the Home screen.</p>	

Manage Instruments

In this lesson, you will learn how to:

Switch between Optical, GNSS and Leveling survey modes, connect to a FOCUS 30 robotic total station via radio connection and configure the instrument settings.

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Step 6: Configure the instrument settings	19
Step 7: Activating the instrument	24

Step 1: Select Instrument Class

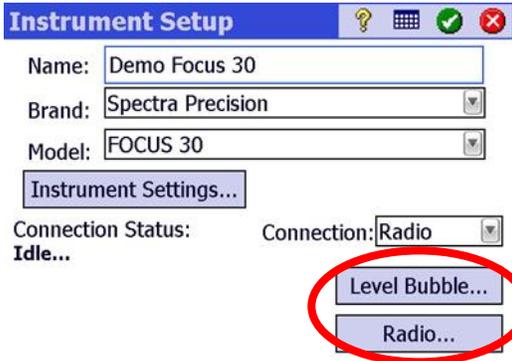
<p>1.</p>	<p>Tap on the icon of a total station on the sidebar. Note that this icon could resemble a GNSS antenna if that was the last instrument that was connected. Also note that depending upon the data collector being used, the sidebar may be in a different location on the display screen.</p>	
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Step 2: Select “Manage Instruments”

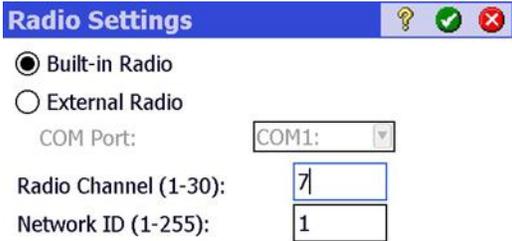
<p>1.</p>	<p>Select “Manage Instruments.” Ensure that “Optical” is selected.</p>	
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Step 3: Select “Create New Instrument” Name the instrument configuration

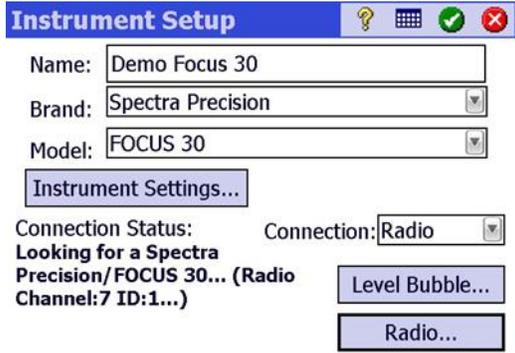
<p>1.</p>	<p>Tap on “Create New Instrument...”</p>	
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<p>2.</p>	<p>Set the instrument parameters: User Friendly Name Brand/Manufacturer Model Connection Radio for robotics Direct cable connections Bluetooth Electronic Level Bubble Radio: Robotic Settings</p>	
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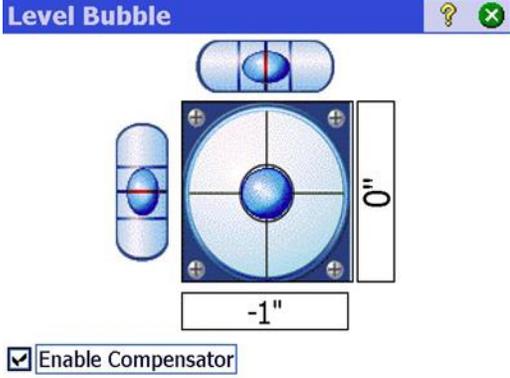
Step 4: Establish a radio connection

<p>1.</p>	<p>Screen showing the data collector’s radio settings</p> <p>“Radio Channel (1-30)” and “Network ID (1-255)” fields must match the settings on the FOCUS 30.</p>	
<p>2</p>	<p>The FOCUS 30 radio parameters can be viewed on the Face 2 display.</p> <p>Optical plummet (far left of image)</p> <p>Left button: Face 1/Face 2 rotation</p> <p>Left middle button: Arrow up and instrument level vial</p> <p>Right middle button: Arrow down and battery details</p> <p>Right button: Enter and Service Menu access</p>	

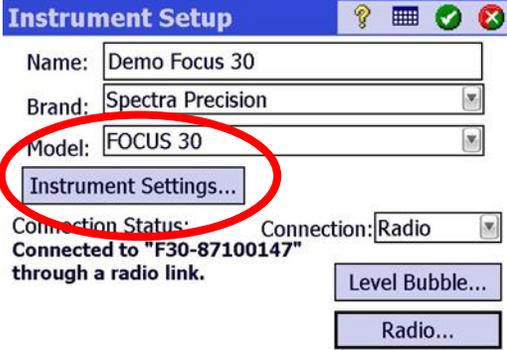
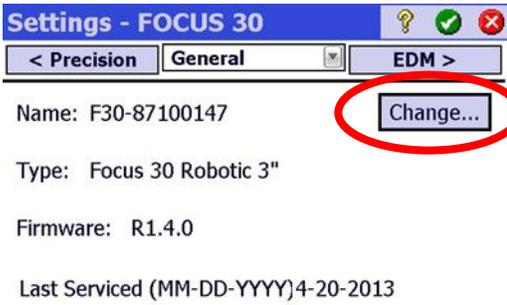
Step 4: Establish a radio connection

<p>3.</p>	<p>Once the green check/tick mark in the upper right hand corner of Survey Pro's configure radio page is clicked, the instrument will begin looking for a FOCUS 30 within radio range with the same parameters.</p>	
<p>4.</p>	<p>Once an instrument has been found, the data collector will connect and Survey Pro will report the connection status as "Connected to...through a radio link."</p>	

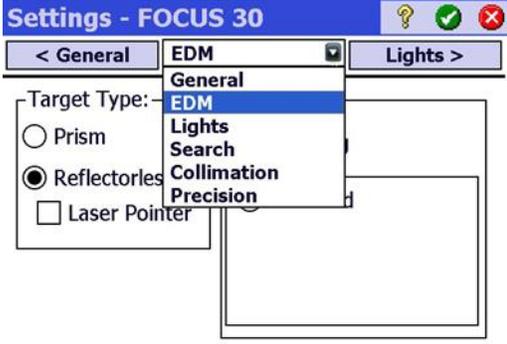
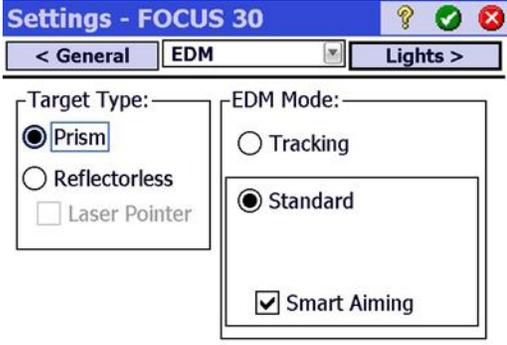
Step 5: Leveling the instrument

<p>1.</p>	<p>Within a few seconds of the radio connection being established, Survey Pro will automatically open up the electronic digital leveling screen. There is an option to disable the compensator by deselecting the "Enable Compensator" checkbox. The green X in the upper left hand corner of the page will exit this screen.</p>	
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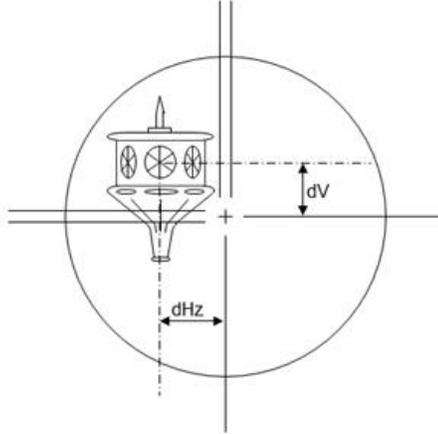
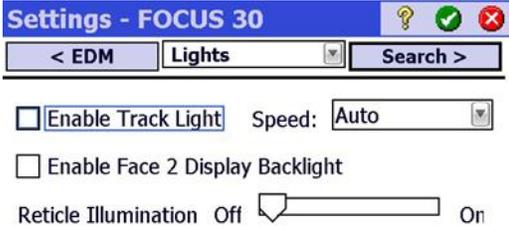
Step 6: Configure the instrument settings

<p>1.</p>	<p>Instrument settings can be accessed from the Manage Instruments dialogue.</p>	 <p>The screenshot shows a 'Settings' dialog box with a table listing instruments. The 'Instrument Settings...' button is circled in red.</p> <table border="1"> <thead> <tr> <th>Name</th> <th>Brand</th> <th>Model</th> </tr> </thead> <tbody> <tr> <td>Demo Focus 30</td> <td>Spectra Precision</td> <td>FOCUS 30</td> </tr> </tbody> </table> <p>Buttons: Instrument Settings..., Create New Instrument..., Delete, Import..., Activate, GeoLock..., Export...</p>	Name	Brand	Model	Demo Focus 30	Spectra Precision	FOCUS 30
Name	Brand	Model						
Demo Focus 30	Spectra Precision	FOCUS 30						
<p>2.</p>	<p>Instrument settings can also be accessed from the “Instrument Setup” page once an instrument is connected.</p>	 <p>The screenshot shows the 'Instrument Setup' page with fields for Name, Brand, and Model. The 'Instrument Settings...' button is circled in red.</p> <p>Fields: Name: Demo Focus 30, Brand: Spectra Precision, Model: FOCUS 30</p> <p>Buttons: Instrument Settings..., Level Bubble..., Radio...</p> <p>Connection Status: Connected to "F30-87100147" through a radio link. Connection: Radio</p>						
<p>3.</p>	<p>General information about the instrument including its firmware version, accuracy class and last servicing date can be viewed. A user friendly name can be assigned by clicking on the “Change” button.</p>	 <p>The screenshot shows the 'Settings - FOCUS 30' dialog box with a 'Change...' button circled in red.</p> <p>Buttons: < Precision, General, EDM ></p> <p>Fields: Name: F30-87100147, Type: Focus 30 Robotic 3", Firmware: R1.4.0, Last Serviced (MM-DD-YYYY) 4-20-2013</p>						

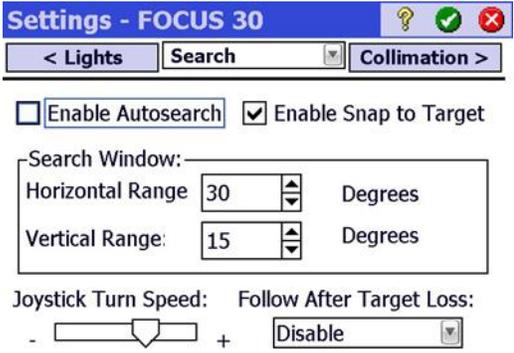
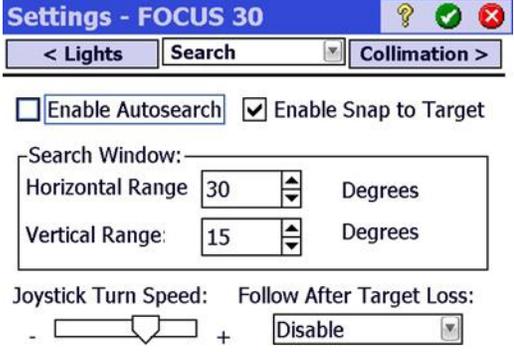
Step 6: Configure the instrument settings

<p>4.</p>	<p>Change the instrument’s name for convenience if desired. Clicking on the green check/tick mark in the upper right hand page will accept any changes made to the page. Clicking on the red X is the cancel button and if tapped, will close the dialogue without saving any changes.</p>	
<p>5.</p>	<p>Tap on the centered settings page (in this example “EDM”) to access the drop down menu, or arrow right or left. In this example, clicking on the word “< General” will scroll to the left through the menu choices while clicking on “Lights >” will scroll to the right.</p>	
<p>6.</p>	<p>The “Target Type” can be Prism or Reflectorless. If Reflectorless is chosen, the visible laser can also be activated for use as a Laser Pointer. The Tracking EDM will activate a continuous tracking mode with constant updates as long as the EDM is receiving a valid signal return. The Standard EDM is the most accurate EDM mode and should be used for most high precision work.</p>	

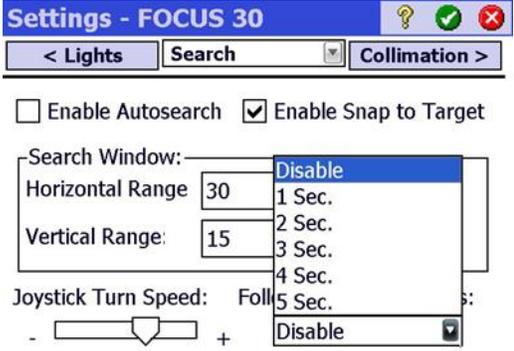
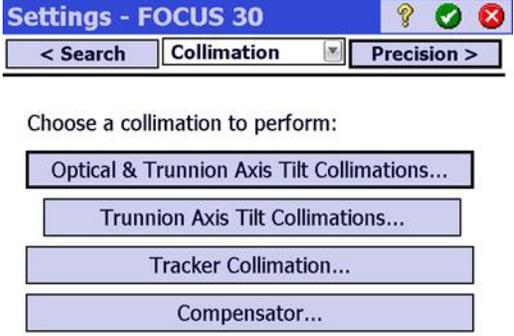
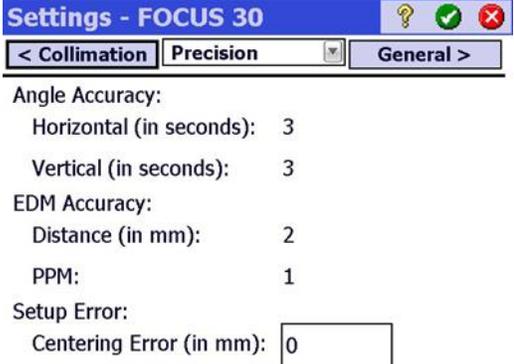
Step 6: Configure the instrument settings

<p>7.</p>	<p>Smart Aiming allows the instrument to calculate the precise center of any prism without forcing the telescope to stay precisely on the center at all times. A very accurate “camera angle offset” correction can be calculated and then applied dynamically as a dVt and dHz between the observed and calculated center of the prism providing quicker responses and more accurate tracking.</p> <p>This is a digital calculation that relies on maximum signal strength being returned from the center of any prism. This property can be used to reliably track the center of a prism without requiring the telescope to be finely tuned at all times to the center of the glass.</p>	 <p>The diagram shows a circular field of view with a central crosshair. A prism is positioned slightly below and to the left of the center. A vertical dashed line represents the optical axis. A horizontal dashed line represents the camera's horizontal axis. The vertical distance between the optical axis and the camera's horizontal axis is labeled dV. The horizontal distance between the optical axis and the prism's vertical centerline is labeled dHz.</p>
<p>8.</p>	<p>The “Enable Track Light” feature is very convenient for nearly all robotic and stakeout surveys. The remote rodman can know at a glance if the instrument is facing their direction and if it locked on to a prism.</p> <p>A two-colored beam of light is emitted from directly below the instrument’s telescope. If the remote operator stands to one side of the instrument’s direction, the light appears green. If the operator stands on the other side of “line” or the direction the instrument is facing, the light appears orange. When the rodman can see both colors, the line of sight has been found very easily. The “Speed” field is set to “Auto” which causes the light to blink at a much faster rate when it is locked onto a prism and blink at a slow rate if it is not locked onto a prism.</p>	 <p>The screenshot shows the 'Settings - FOCUS 30' window with the 'Lights' tab selected. The 'Enable Track Light' checkbox is checked, and the 'Speed' dropdown is set to 'Auto'. The 'Enable Face 2 Display Backlight' checkbox is unchecked. The 'Reticle Illumination' is set to 'Off' with a slider control.</p>

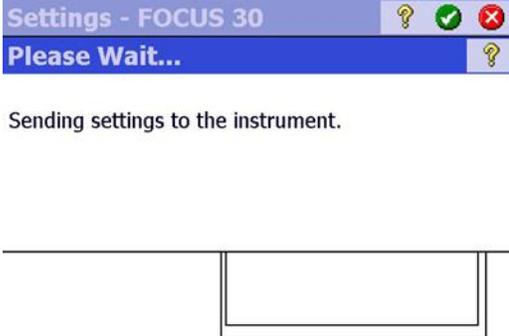
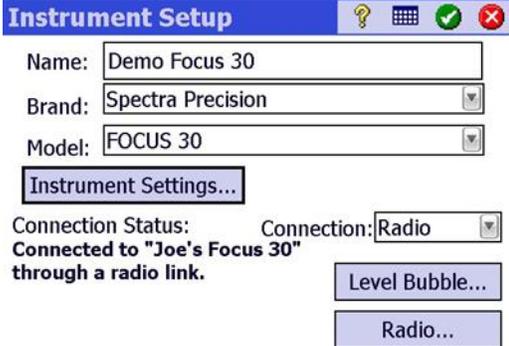
Step 6: Configure the instrument settings

<p>9.</p>	<p>The “Search” page controls the settings for how the instrument will respond when commanded to “Search” for a prism or what to do if the instrument loses lock on the prism.</p>	 <p>“Enable Autosearch” sets the instrument to begin a “Search” routine anytime loss of lock on a prism occurs. The “Search” routine will be based on the settings in the “Search Window” box.</p> <p>“Enable Snap to Target” sets the instrument to automatically jump to and lock on to a prism if it appears in the CCD camera’s field of view. Note that the CCD camera which is responsible for the automatic targeting of any prism has a wider field of view by several degrees than the telescopic field of view. This can cause the instrument to jump to the center of a prism even though an operator looking down the telescope may not be able to see glass.</p>
<p>10.</p>	<p>“Search Window” settings determine how wide the instrument will sweep from side to side and up and down when instructed by the operator to “Search” for a prism.</p>	 <p>Depending upon the type of work being done and the average distance the operator may be from the instrument, these settings should be customized to fit the job being done. If distances are short and on flat grade, a horizontal sweep of 30 degrees may be appropriate but the 15 degrees vertically may be too much. If the operator will be 100 meters or more away from the instrument, both the horizontal and vertical sweep parameters should probably be lowered. “Joystick Turn Speed” controls how fast the instrument will turn when the “spider” key is used on the remote data collector.</p>

Step 6: Configure the instrument settings

<p>11.</p>	<p>“Follow After Target Loss” controls how the instrument will react if it loses lock on a prism. 3 seconds is a nice average setting for many construction sites.</p> <p>If a piece of machinery comes between the remote operator and instrument, the instrument will continue to sweep through whatever trajectories and velocities it is currently using for another three seconds expecting that the operator will be found on the expected trajectory within the allotted time.</p>	
<p>12.</p>	<p>Survey Pro allows user access to collimation and calibration routines for the instrument.</p>	
<p>13.</p>	<p>The “Precision” page displays the accuracy specifications for the instruments angles and EDM. A field is also available for entering an instrument “Centering Error” value.</p>	

Step 6: Configure the instrument settings

14.	<p>The centering error is a value estimate of the random error in the positioning of the instrument over the setup point. This value is only used by Survey Pro during a resection least squares calculation to determine the proper weighting of each observation. This value is also passed to Spectra Precision Survey Office for use in other least squares and network adjustments. Typical values are in the 2mm-3mm range. If this value is unknown, leave it set to 0.</p>	
15.	<p>Once all of the Instrument Settings have been configured and the green check/tick mark in the upper right hand corner of the page has been clicked, Survey Pro sends all of these settings to the instrument and the changes are applied.</p>	
16.	<p>The instrument has now been configured and the data collector and FOCUS 30 are still connected via the radio link. Clicking on the green check/tick mark will close the Instrument Setup screen.</p>	

Step 7: Activating the instrument

1.	<p>The “Demo FOCUS 30” has now been configured and is the “Active” instrument as indicated by the green dot next to the instrument name. If there are other instruments available, optionally select the instrument in the list and tap Activate to make that instrument the active instrument.</p>	
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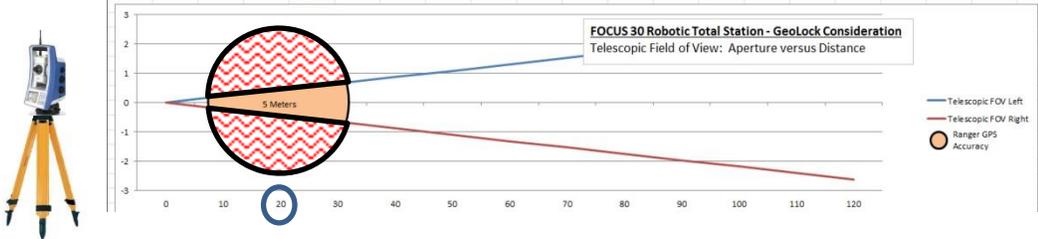
GeoLock

In this lesson, you will learn how to:

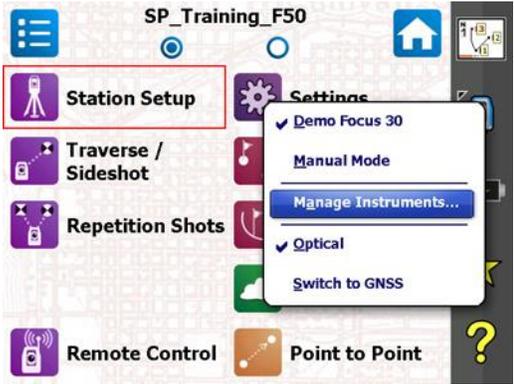
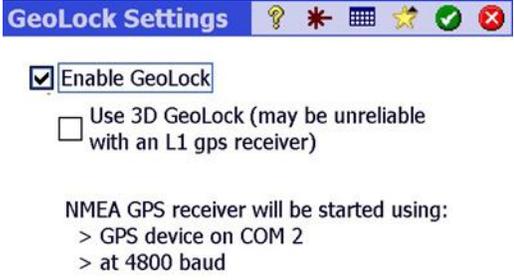
Configure GeoLock on both the FOCUS 30 and the Ranger 3 data collector, monitor and reset the GeoLock calibration and use GeoLock to find a prism.

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Step 3: Configure EDM	30
Step 4: Review GeoLock Drop-Down Menu	30
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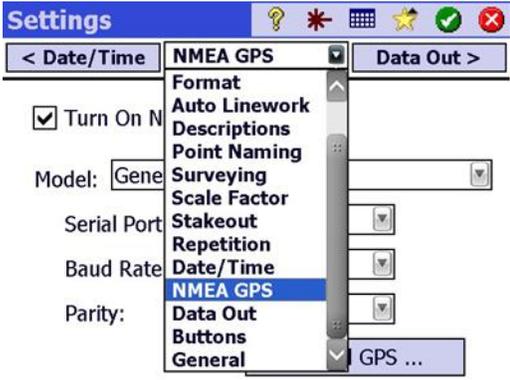
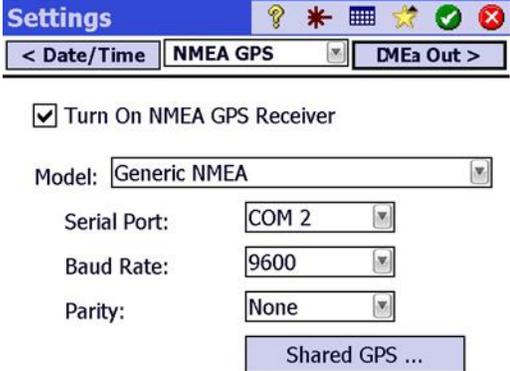
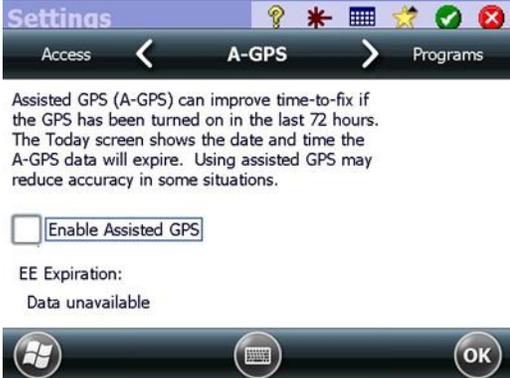
Step 1: Understanding GeoLock

<p>1.</p>	<p>GeoLock is a feature of Survey Pro that uses a GPS receiver in the data collector to calculate a position while working with the FOCUS 30 robotic total station remotely. If the total station loses lock on a prism, it can quickly turn to the prism’s location based on the GPS position of the data collector. Most handheld data collectors can provide the necessary GPS information. Since GeoLock relies on GPS technology, it must be used outside with a decent view of the sky.</p> <p>Once a backsight has been set and GeoLock is properly configured, GeoLock performs a background calibration that creates a positional relationship between the job’s local coordinates and the global coordinates being supplied by the data collector’s GPS. A point pair relationship between local and global coordinates is created with each EDM measurement. Therefore, a GeoLock calibration is computed more quickly when the tracking EDM of the instrument is used.</p>
<p>2.</p>	 <p>The accuracy of most data collector’s GPS is in the 3 – 5 meters range horizontally. Therefore, the calibration process is sensitive to the distance from the instrument. At distance less than 20 meters, it is quite possible to have a GPS position provided by the data collector that is not in the field of view of the instrument. It is recommended that GeoLock calibrations take place at distances in the 50 to 100 meters range to obtain optimal results.</p>
<p>3.</p>	<p>The geometry of the GeoLock calibration points should also be considered. While collecting the EDM measurements to be used in the calibration, move the data collector/prism pole non-linearly. It is recommended to move in an arc around the instrument to ensure strong geometry in the calibration solution. GeoLock is based on the same type of mathematics that is used in a resection. The same geometric considerations given to a resection should be considered with GeoLock.</p> <p>If the open job is using a mapping plane, GeoLock will use these parameters to calculate its solution and will work as soon as a backsight is set.</p>

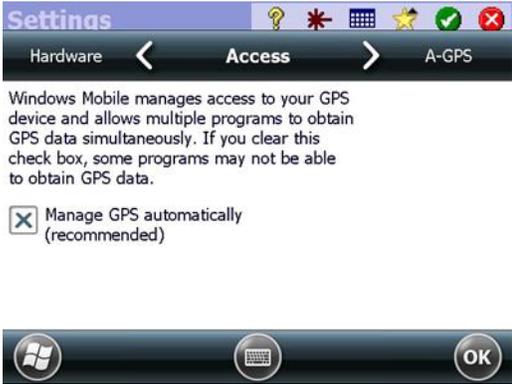
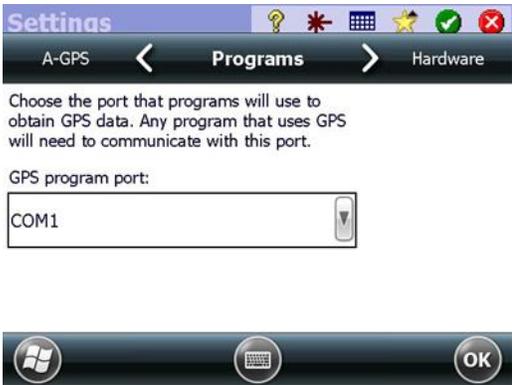
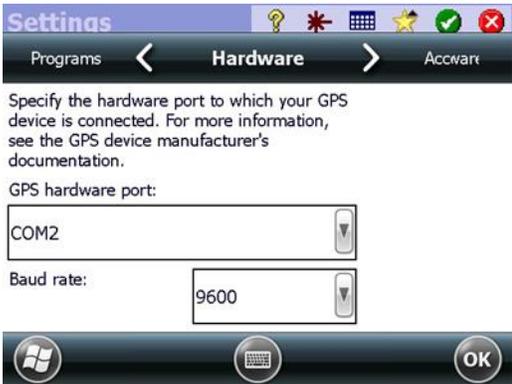
Step 2: Configure GeoLock on FOCUS 30 and Data Collector

<p>1.</p>	<p>From the Sidebar menu, tap on the Total Station icon and select “Manage Instruments”</p>	
<p>2.</p>	<p>Ensure that the correct instrument is active as indicated by the green dot. Tap on the “GeoLock” button.</p>	
<p>3.</p>	<p>Ensure that GeoLock is Enabled as shown. It is recommended that 3D positions NOT be used when using a typical data collector’s internal GPS. The vertical precision of these chips is quite poor and is therefore likely to degrade GeoLock performance.</p>	

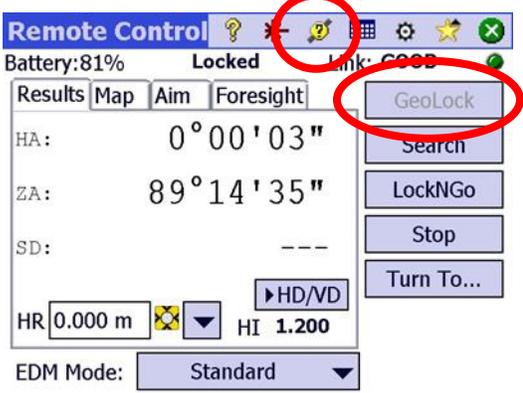
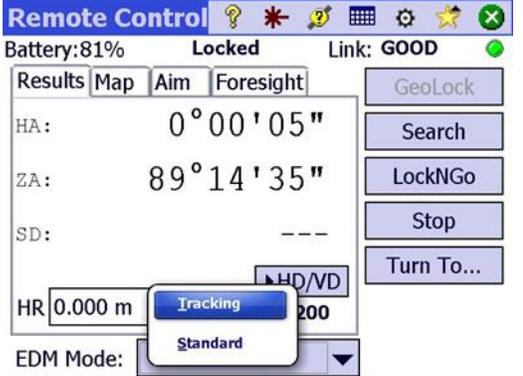
Step 2: Configure GeoLock on FOCUS 30 and Data Collector

<p>4.</p>	<p>From the main menu, select Job\Settings and then scroll to the NMEA tab.</p>	 <p>The screenshot shows the 'Settings' application window with the 'NMEA GPS' tab selected. The 'Turn On NMEA GPS Receiver' checkbox is checked. The 'Model' is set to 'Generic NMEA'. The 'Serial Port' is set to 'COM 2', 'Baud Rate' is '9600', and 'Parity' is 'None'. A 'Shared GPS ...' button is visible at the bottom.</p>
<p>5.</p>	<p>Ensure that Serial Port 2 is selected and that the Model is Generic NMEA and that the messages are turned on. Tap on the “Shared GPS” button.</p>	 <p>The screenshot shows the 'Settings' application window with the 'NMEA GPS' tab selected. The 'Turn On NMEA GPS Receiver' checkbox is checked. The 'Model' is set to 'Generic NMEA'. The 'Serial Port' is set to 'COM 2', 'Baud Rate' is '9600', and 'Parity' is 'None'. A 'Shared GPS ...' button is visible at the bottom.</p>
<p>6.</p>	<p>At this time, testing has shown that using the A-GPS corrections that are available will degrade GeoLock performance. Therefore, we recommend that this be option be de-selected. Assisted GPS smooths the GPS positions while moving and will cause lag when collecting point pairs.</p>	 <p>The screenshot shows the 'Settings' application window with the 'A-GPS' tab selected. The 'Enable Assisted GPS' checkbox is unchecked. The 'EE Expiration' is set to 'Data unavailable'. The 'OK' button is visible at the bottom right.</p>

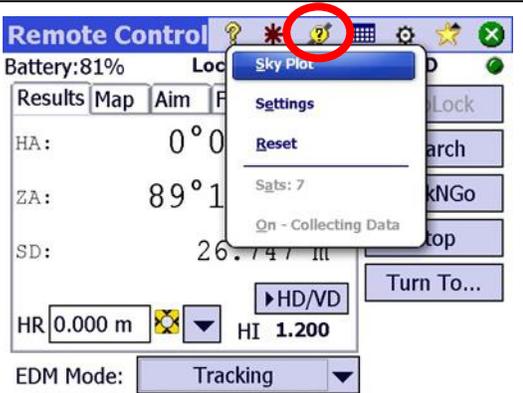
Step 2: Configure GeoLock on FOCUS 30 and Data Collector

<p>7.</p>	<p>Allow the device to Manage GPS automatically (recommended)</p>	 <p>The screenshot shows the 'Settings' application with the 'Access' screen selected. The title bar includes 'Settings', 'Hardware', 'Access', and 'A-GPS'. The main text reads: 'Windows Mobile manages access to your GPS device and allows multiple programs to obtain GPS data simultaneously. If you clear this check box, some programs may not be able to obtain GPS data.' Below this, the checkbox 'Manage GPS automatically (recommended)' is checked. At the bottom, there are navigation icons for Windows, keyboard, and an 'OK' button.</p>
<p>8.</p>	<p>GPS program port is set to COM1</p>	 <p>The screenshot shows the 'Settings' application with the 'Programs' screen selected. The title bar includes 'Settings', 'A-GPS', 'Programs', and 'Hardware'. The main text reads: 'Choose the port that programs will use to obtain GPS data. Any program that uses GPS will need to communicate with this port.' Below this, the 'GPS program port:' label is followed by a dropdown menu currently set to 'COM1'. At the bottom, there are navigation icons for Windows, keyboard, and an 'OK' button.</p>
<p>9.</p>	<p>GPS hardware port set to COM2. Tap OK and then exit the Settings pages by tapping the green check/tick mark.</p>	 <p>The screenshot shows the 'Settings' application with the 'Hardware' screen selected. The title bar includes 'Settings', 'Programs', 'Hardware', and 'Accwart'. The main text reads: 'Specify the hardware port to which your GPS device is connected. For more information, see the GPS device manufacturer's documentation.' Below this, the 'GPS hardware port:' label is followed by a dropdown menu set to 'COM2'. Below that, the 'Baud rate:' label is followed by a dropdown menu set to '9600'. At the bottom, there are navigation icons for Windows, keyboard, and an 'OK' button.</p>

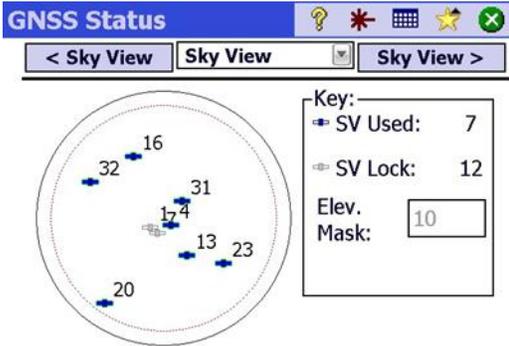
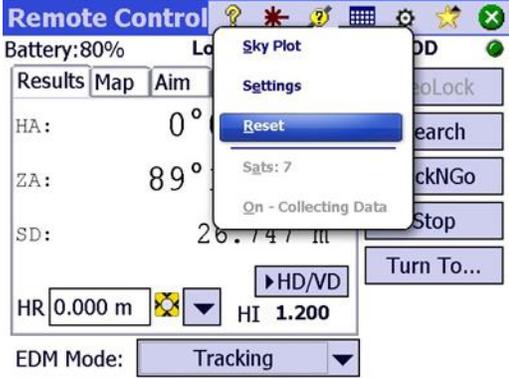
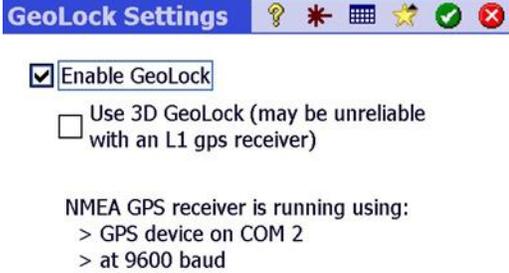
Step 3: Configure EDM

<p>1.</p>	<p>Navigate to the Remote Control page (on the Ranger 3, the STAR button is a shortcut). Otherwise, it can be accessed from the third page of the Survey menu.</p> <p>Notice that the GeoLock is not ready as can be seen by the Yellow icon at the top of the page with a question mark and the GeoLock button is grayed out.</p>	 <p>The screenshot shows the 'Remote Control' window with 'Battery: 81%' and 'Locked' status. The 'GeoLock' button is grayed out. A yellow question mark icon in the top toolbar is circled in red. The interface displays measurement data: HA: 0° 00' 03", ZA: 89° 14' 35", SD: ---, HR: 0.000 m, HI: 1.200, and EDM Mode: Standard.</p>
<p>2.</p>	<p>Switching the EDM mode to Tracking mode allows the GeoLock calibration to occur more quickly than the Standard mode since a calibration point-pair is calculated for every EDM measurement/GPS observation. But, when moving rapidly, the GPS position errors can cause ambiguity. The calibration algorithm will remove some of the error, but it is still best to measure some points with the rod not moving if possible.</p>	 <p>The screenshot shows the 'Remote Control' window with 'Battery: 81%' and 'Locked' status. The 'EDM Mode' dropdown menu is open, showing 'Tracking' selected and 'Standard' as an option. The 'GeoLock' button is now active. The measurement data is: HA: 0° 00' 05", ZA: 89° 14' 35", SD: ---, HR: 0.000 m, HI: 1.200.</p>

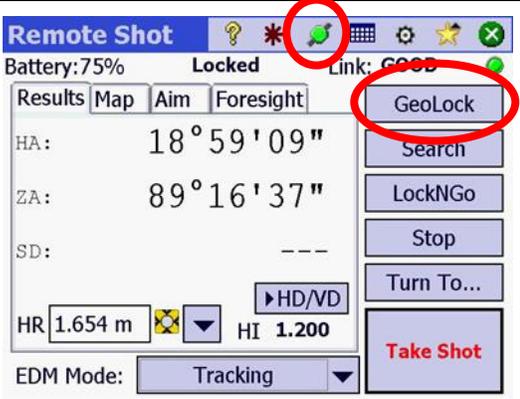
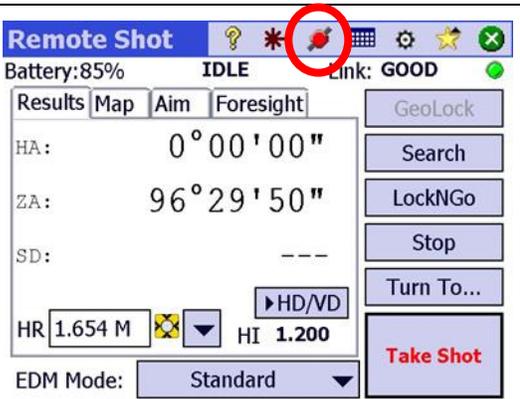
Step 4: Review GeoLock Drop-Down Menu

<p>1.</p>	<p>Clicking on the GeoLock icon from the Remote Control and other data collection/stakeout pages will display the number of satellites being tracked and whether or not the system is collecting data to add to the calibration.</p> <p>The Yellow icon with a question mark indicates that the GeoLock feature is not yet calibrated to the site.</p>	 <p>The screenshot shows the 'Remote Control' window with 'Battery: 81%' and 'Locked' status. The yellow question mark icon in the top toolbar is circled in red. The 'GeoLock' dropdown menu is open, showing options: Sky Plot, Settings, Reset, Sats: 7, and On - Collecting Data. The 'EDM Mode' is set to 'Tracking'.</p>
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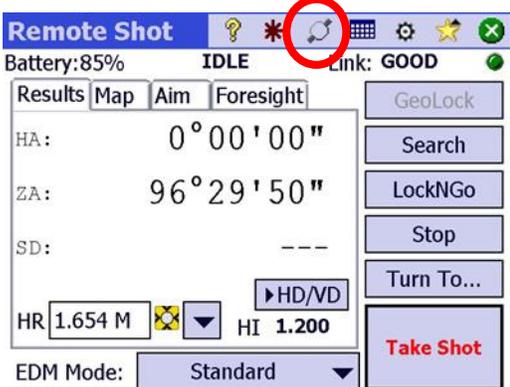
Step 4: Review GeoLock Drop-Down Menu

<p>2.</p>	<p>The Sky Plot window displays the number and position of the satellites being tracked and the total number of satellites in view based on the current elevation mask.</p>	
<p>3.</p>	<p>The Reset command can be useful to erase previous calibrations and force the software to solve a new calibration.</p> <p>For instance, an initial GeoLock calibration may have occurred quite close to the instrument in poor sky conditions. It is best to calibrate near the range from the instrument where the work will be done.</p>	
<p>4.</p>	<p>Clicking on the GeoLock icon and then on the “Settings” tab will enable or disable GeoLock. The current communication settings for the NMEA GPS messages that are being supplied to the software is shown.</p>	

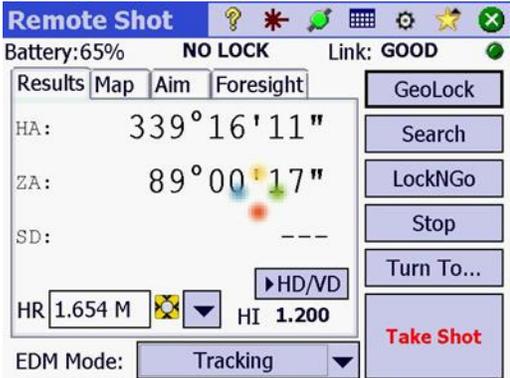
Step 5: Review GeoLock Status Icon

<p>1.</p>	<p>These two indicators go together. The top GeoLock indicator means that GeoLock has not yet solved the coordinate calibration. Since the calibration has not yet been solved, it cannot be selected for execution.</p>	 <p>The screenshot shows the 'Remote Shot' screen with 'Locked' status. The top bar has a red status icon. The 'GeoLock' button is greyed out and circled in red. Other buttons include Search, LockNGo, Stop, Turn To..., and Take Shot. The EDM Mode is set to 'Standard'.</p>
<p>2.</p>	<p>Here in the "Remote Shot" page, the green icon indicates that the GeoLock calibration has been solved and is ready for use. The GeoLock button can be tapped and the instrument will turn from its current orientation towards the prism. Once it has turned to where it thinks the prism should be, the Search routine will automatically begin to search for the prism.</p>	 <p>The screenshot shows the 'Remote Shot' screen with 'Locked' status. The top bar has a green status icon. The 'GeoLock' button is active and circled in red. Other buttons include Search, LockNGo, Stop, Turn To..., and Take Shot. The EDM Mode is set to 'Tracking'.</p>
<p>3.</p>	<p>A Red GeoLock icon indicates the GeoLock feature is not configured correctly. Check communication port assignments and settings.</p>	 <p>The screenshot shows the 'Remote Shot' screen with 'IDLE' status. The top bar has a red status icon. The 'GeoLock' button is greyed out and circled in red. Other buttons include Search, LockNGo, Stop, Turn To..., and Take Shot. The EDM Mode is set to 'Standard'.</p>

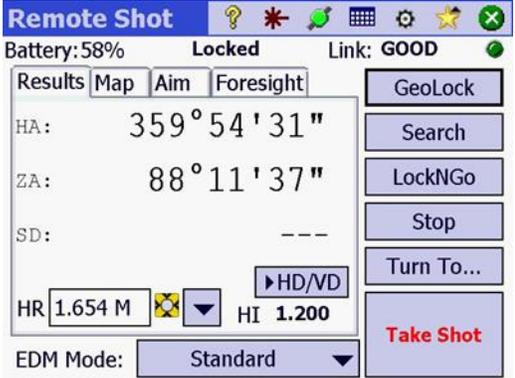
Step 5: Review GeoLock Status Icon

<p>4.</p>	<p>GeoLock can also be turned off.</p>	
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Step 6: Using GeoLock

<p>1.</p>	<p>GeoLock is ready to be used. This is indicated by the green GeoLock icon, the GeoLock button is selectable and the instrument has “NO LOCK” on a prism.</p> <p>Tap on the GeoLock button.</p>	
<p>2.</p>	<p>Survey Pro displays a confirmation that a GeoLock routine is being performed.</p>	

Step 6: Using GeoLock

<p>3.</p>	<p>Once the instrument has turned to the angle that it has calculated should be close to the prism location, the EDM will then use its LockNGo targeting capabilities to lock onto the target. If that fails, then the instrument will do a normal search.</p> <p>The Search extents are defined under the Instrument Settings – Search page.</p>	
<p>4.</p>	<p>Once a prism has been located and locked onto, the instrument is ready to make a measurement. Notice that the Tracking EDM is no longer being used since the GeoLock calibration has already been solved and this particular measurement requires the highest precision possible.</p>	

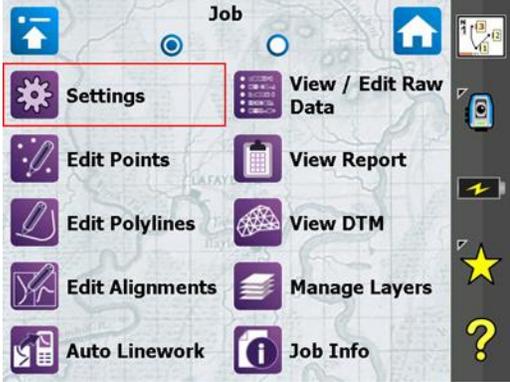
Job Settings

In this lesson, you will learn how to:

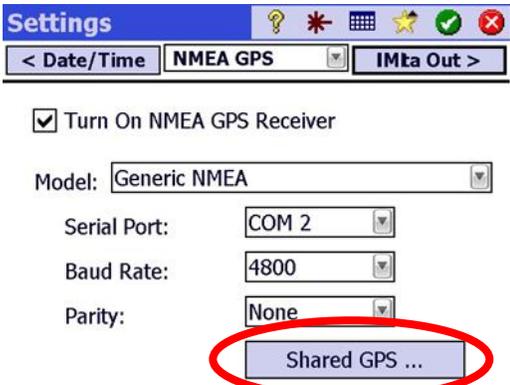
Configure settings that are specific to the current job. These include data collector settings for NMEA outputs, button assignments, date and time as well as software settings that controls how the instrument operates such as repetition shots, angle sets, stakeout tolerances, scale factors and units.

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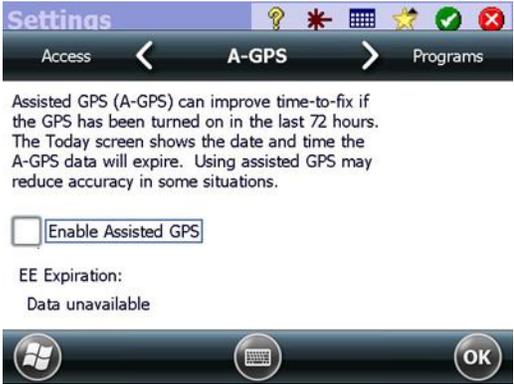
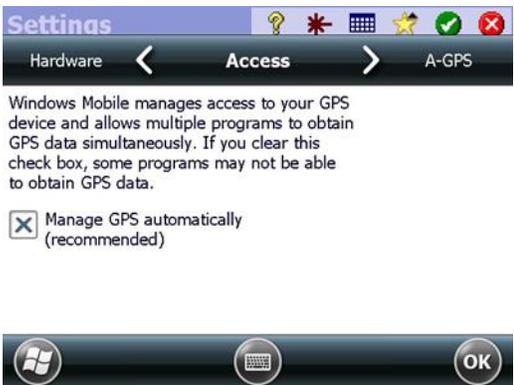
Step 1: Navigate to the Job Settings pages

<p>1.</p>	<p>From the Main menu, tap on “Job”</p>	
<p>2.</p>	<p>From the “Job” menu, tap on “Settings”</p>	

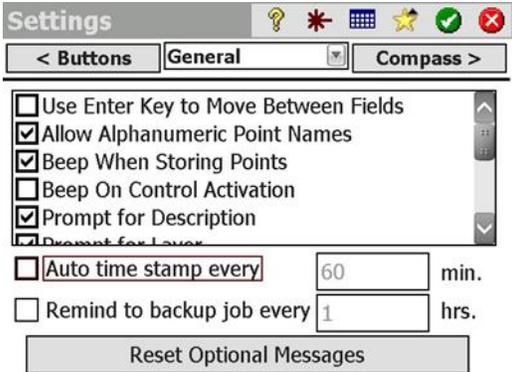
Step 2: Set NMEA and Shared GPS parameters

<p>1.</p>	<p>The internal GPS of the data collector should be turned on if the GeoLock feature will be used. The COM port and baud rates vary by data collector. The settings shown here are applicable for a Ranger 3. Tap on the Shared GPS for more GPS parameters.</p>	
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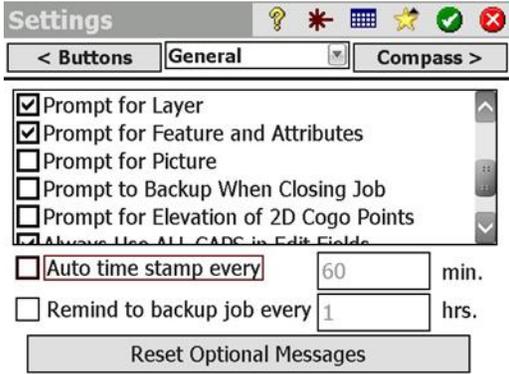
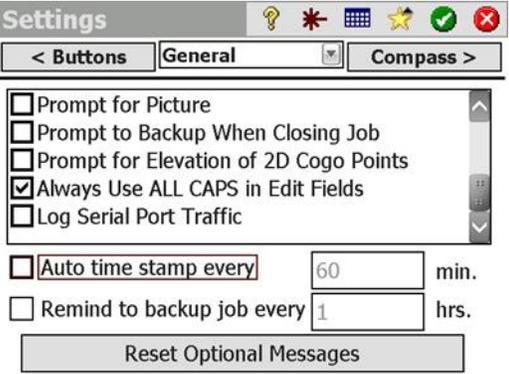
Step 2: Set NMEA and Shared GPS parameters

<p>2.</p>	<p>For the purposes of GeoLock, it is recommended that A-GPS be turned off (deselected as shown).</p>	
<p>3.</p>	<p>For the purposes of GeoLock, it is recommended that “Manage GPS automatically” is selected as shown under the “Access” tab. Tap on OK to close this dialogue.</p>	

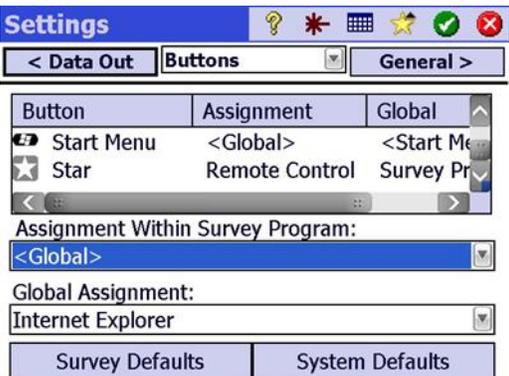
Step 3: Set General Settings

<p>1.</p>	<p>General settings related to common operations can be selected. “Prompt for Description” will prompt for a description of the measurement just taken. “Auto time stamp every” <i>N</i> minutes will insert the data collector’s time stamp into the raw data file at the <i>N</i> interval.</p>	
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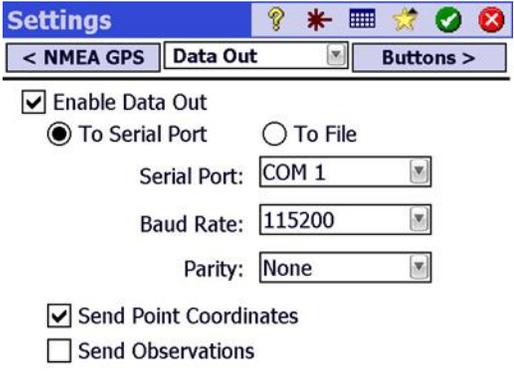
Step 3: Set General Settings

<p>2.</p>	<p>Throughout Survey Pro, there are dialogue boxes that will pop up as Helpful Hints to assist in navigating the software. Each of these boxes has a check box to turn them off. If at some point, these messages need to be turned on, the “Reset Optional Messages” will restore all of these prompts.</p>	
<p>3.</p>	<p>“Always use ALL CAPS in Edit Fields” is very attractive to many users.</p>	

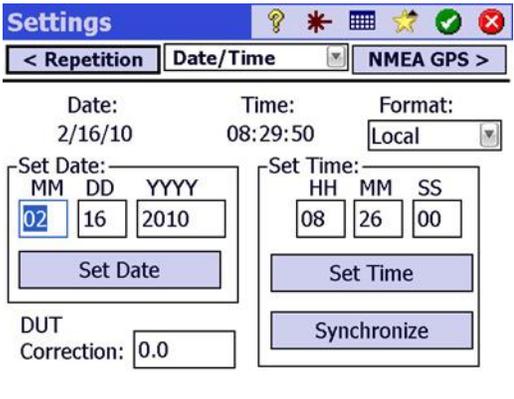
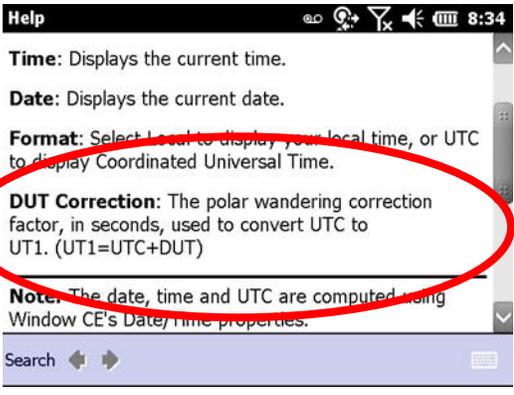
Step 4: Set keyboard assignments

<p>1.</p>	<p>Certain buttons on the data collector can be assigned for special uses. Further, each of these customizable buttons can have one assignment when inside of Survey Pro and have another assignment when used outside of Survey Pro in Windows. For instance, this image shows that the Ranger’s “Star” button will open up the “Remote Control” screen. This is important to know. Outside of Survey Pro, the “Star” button is used to open the “Today” application.</p>	
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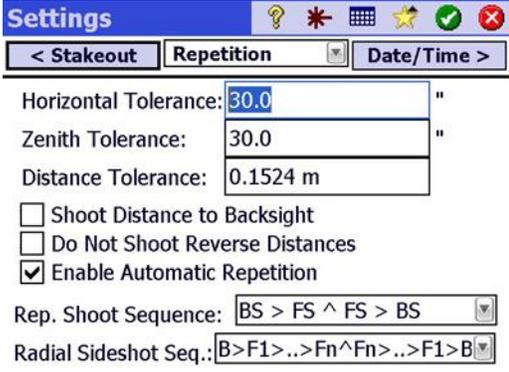
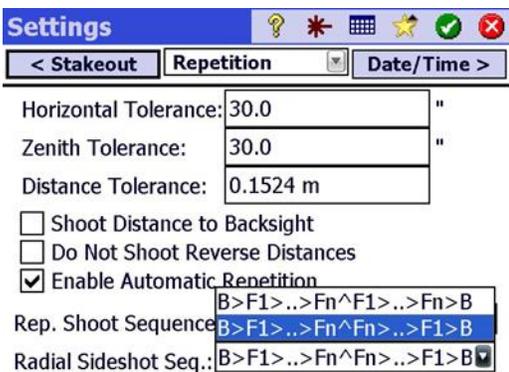
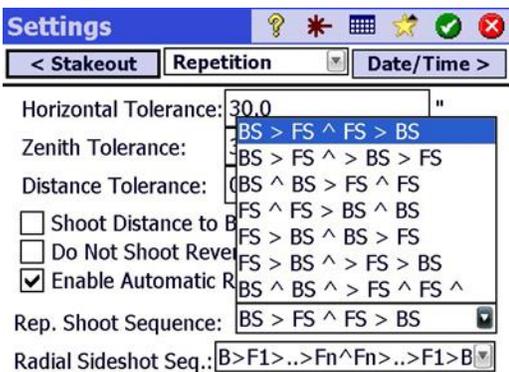
Step 5: Select communication port settings

<p>1.</p>	<p>Point Coordinate and/or Observation data can be sent through the instrument's serial or Bluetooth ports to another device or be saved to a file in memory on the data collector.</p>	
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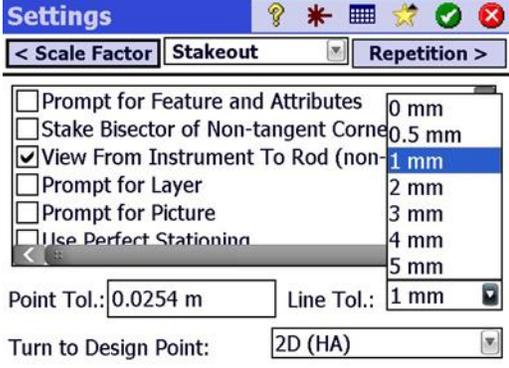
Step 6: Set Time and Date for data collector

<p>1.</p>	<p>Date and Time can be set. The "Set Date" button sets the value of the MM DD YYYY entries. The "Set Time" button sets the value of the HH MM SS entries. The "Synchronize" button zeroes the fractional portion of the current time to the nearest second so that the time can be set more accurately.</p>	
<p>2.</p>	<p>DUT corrections are described in the Help menu. Wikipedia describes DUT corrections similarly: http://en.wikipedia.org/wiki/DUT1</p>	

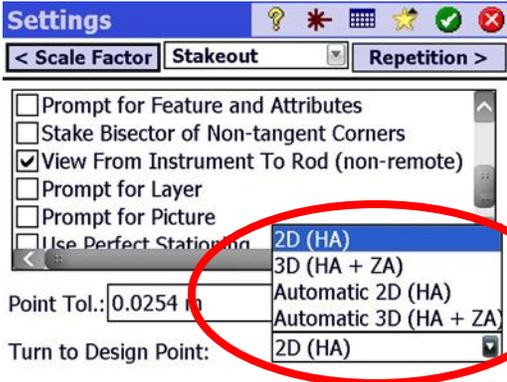
Step 7: Select Repetition settings

<p>1.</p>	<p>A variety of repetition sideshots and repetition angle set routines can be executed. Automated angle set and repetition sideshots (when using a robot) require that a “Fixed Target be set for the backsight. Horizontal and Vertical tolerances can be set. If the tolerances are exceeded, a warning is provided.</p>	
<p>2.</p>	<p>Symbol “>” indicates the instrument turning to the next position horizontally . The ^ symbol indicates that the instrument will change face.</p>	
<p>3.</p>	<p>Symbol “^” indicates the instrument turning to the opposite face to then measure the current point or the next point depending upon the sequence of observations.</p>	

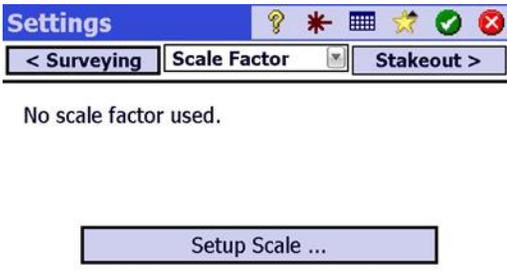
Step 8: Select Stakeout settings

<p>1.</p>	<p>A variety of Stakeout settings are provided to maximize productivity or efficiency. When using the FOCUS 30, the default stakeout mode uses a Tracking EDM. Selecting “Use Manual Updating (Remote Control)” will override this default. Individual EDM measurements can be executed by pressing the “Shot” button.</p>	
<p>2.</p>	<p>“Stake Bisector of Non-tangent Corners” will stake to the corner point where two centerline offsets intersect. “Use Perfect Stationing” when checked will compute staking locations based on perfect stationing interval. For instance, if your starting station was 0+15 and your station interval is 100, your next stakeout station will be 0+100 instead of 0+115.</p>	
<p>3.</p>	<p>Point and Line tolerances can be set. When performing a remote point stakeout, the final zoom level of the stakeout screen will appear when the rodman is within the distance to stake point specified in the “Point Tol:” field. For the “Line Tol:” field, a message will be displayed when the rodman is within this perpendicular distance to the specified line.</p>	

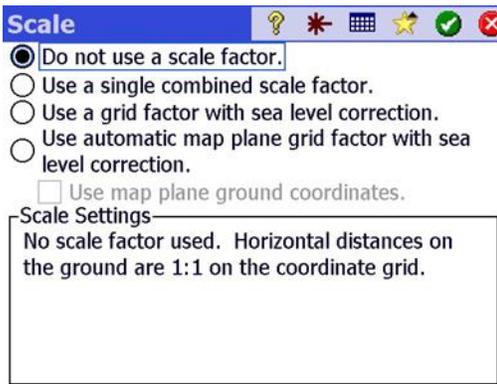
Step 8: Select Stakeout settings

<p>4.</p>	<p>Since many staked points do not have an associated elevation, Survey Pro settings can determine whether the instrument should turn in 2D or 3D and whether the instrument should automatically turn to the stake point or not. Some surveyors prefer to have the instrument automatically turn ahead to the next stake point and they will pace the distance or track the guide lights to find the line. This is the automatic setting. Other surveyors would prefer that the instrument track them to the next stake point. For example, if “3D (HA + ZA) is selected and a tracking EDM is activated, Survey Pro will provide dynamic directions to the point or station being staked.</p>	 <p>The screenshot shows the 'Settings' dialog box with the 'Stakeout' tab selected. A dropdown menu for 'Turn to Design Point' is open, listing several options: '2D (HA)', '3D (HA + ZA)', 'Automatic 2D (HA)', 'Automatic 3D (HA + ZA)', and '2D (HA)'. The 'Automatic 3D (HA + ZA)' option is highlighted and circled in red. Other settings visible include 'Point Tol.: 0.0254 m' and various checkboxes for prompts and stationing.</p>
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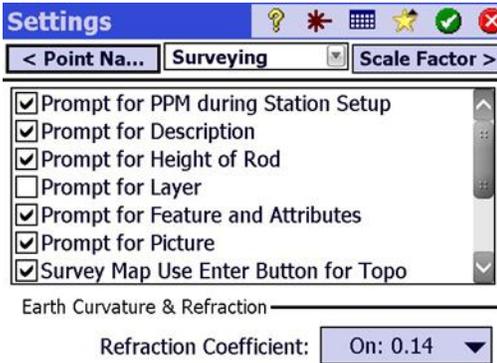
Step 9: Select Scale Factor

<p>1.</p>	<p>For most total station work, this is left with “No scale factor used.” This is the same as a scale factor of 1 to 1; grid distances equal ground distances.</p>	 <p>The screenshot shows the 'Settings' dialog box with the 'Scale Factor' tab selected. The text 'No scale factor used.' is displayed in the main area. At the bottom, there is a button labeled 'Setup Scale ...'. The 'Stakeout' tab is also visible on the right side of the dialog.</p>
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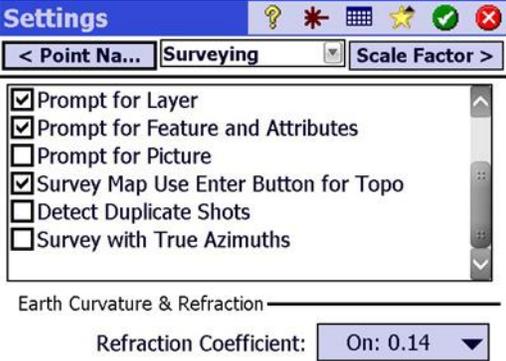
Step 9: Select Scale Factor

<p>2.</p>	<p>“Use a single combined scale factor.” to apply a single scale factor to all horizontal distance measurements.</p> <p>“Use a grid factor with sea level corrections.” to scale horizontal distances using a specified grid factor and a sea level correction applied for each measurement.</p> <p>“Use automatic map plane grid factor with sea level correction.” to scale horizontal distances using a grid factor calculated for each setup and a sea level correction for each measurement. This information is generated automatically by Survey Pro based on the mapping plane used for the survey.</p>	 <p>Scale</p> <ul style="list-style-type: none"> <input checked="" type="radio"/> Do not use a scale factor. <input type="radio"/> Use a single combined scale factor. <input type="radio"/> Use a grid factor with sea level correction. <input type="radio"/> Use automatic map plane grid factor with sea level correction. <input type="checkbox"/> Use map plane ground coordinates. <p>Scale Settings</p> <p>No scale factor used. Horizontal distances on the ground are 1:1 on the coordinate grid.</p>
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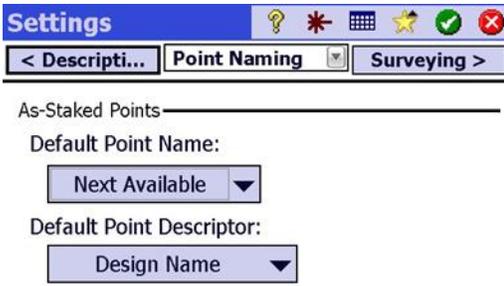
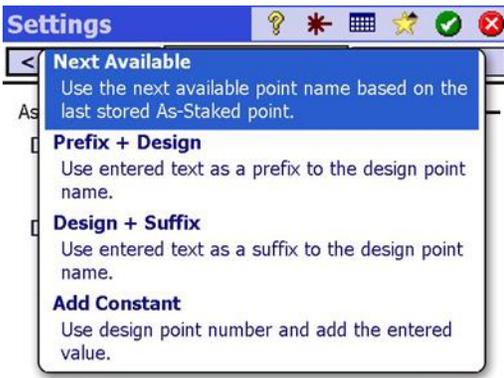
Step 10: Select Survey Settings

<p>1.</p>	<p>Various prompts can be configured for use when performing data collection or “Surveying” routines. Prompts selected here occur after the measurement is taken. The Refraction Coefficient can be changed at any time during a job.</p>	 <p>Settings</p> <p>< Point Na... Surveying Scale Factor ></p> <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Prompt for PPM during Station Setup <input checked="" type="checkbox"/> Prompt for Description <input checked="" type="checkbox"/> Prompt for Height of Rod <input type="checkbox"/> Prompt for Layer <input checked="" type="checkbox"/> Prompt for Feature and Attributes <input checked="" type="checkbox"/> Prompt for Picture <input checked="" type="checkbox"/> Survey Map Use Enter Button for Topo <p>Earth Curvature & Refraction</p> <p>Refraction Coefficient: On: 0.14</p>
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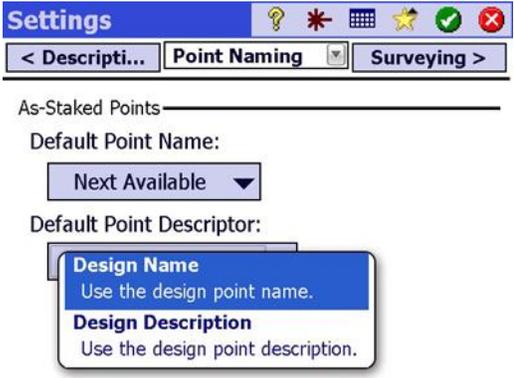
Step 10: Select Survey Settings

<p>2.</p>	<p>“Survey with True Azimuths” automates the process of adjusting the circle on the total station when traversing so that azimuths will be displayed on the total station rather than angle-right values. The backsight circle will automatically be set to match the backsight azimuth for every setup. This would be the normal mode of operation for surveyors who would typically not set the circle value to zero.</p>	 <p>The screenshot shows the 'Settings' dialog box with the 'Surveying' tab selected. The 'Survey with True Azimuths' checkbox is currently unchecked. Other checked options include 'Prompt for Layer', 'Prompt for Feature and Attributes', and 'Survey Map Use Enter Button for Topo'. The 'Refraction Coefficient' is set to 'On: 0.14'.</p>
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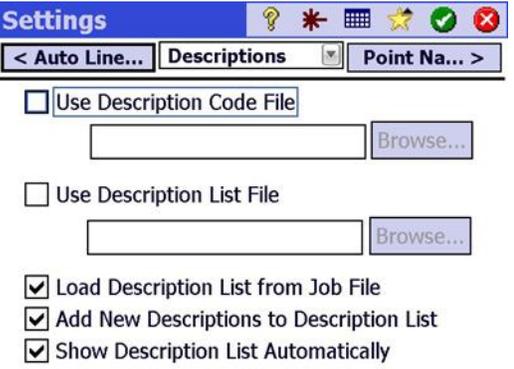
Step 11: Set Point and Description naming parameters

<p>1.</p>	<p>“As-Staked Points” can be named according to a specified convention.</p>	 <p>The screenshot shows the 'Settings' dialog box with the 'Point Naming' tab selected. The 'Default Point Name' is set to 'Next Available' and the 'Default Point Descriptor' is set to 'Design Name'.</p>
<p>2.</p>	<p>“As-Staked “ point naming choices include the next numerically available point in the job’s file, a designated prefix along with the design point name, the design point name with a designated suffix or a constant that is applied to every design point name. For example, if the constant is 1000 and point 10 is the design point staked, then the as staked point will be 1010.</p>	 <p>The screenshot shows the 'Settings' dialog box with the 'Point Naming' tab selected. A dropdown menu is open, showing the following options: 'Next Available' (Use the next available point name based on the last stored As-Staked point.), 'Prefix + Design' (Use entered text as a prefix to the design point name.), 'Design + Suffix' (Use entered text as a suffix to the design point name.), and 'Add Constant' (Use design point number and add the entered value.).</p>

Step 11: Set Point and Description naming parameters

<p>3.</p>	<p>“As-Staked” point description choices include the Design Name or the Design Description. Stationing will be used for all alignment staking.</p>	
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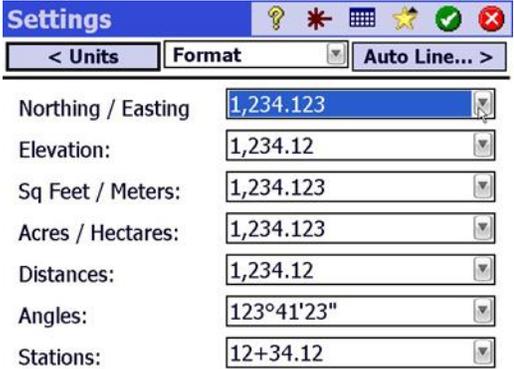
Step 12: Select Description file

<p>1.</p>	<p>These files are text based only and must have a *.TXT file extension. Description Code Files will display a list of potential descriptions to select when you start typing in a description field. The descriptors shown will match what you’ve typed in so far. When the proper description is shown, tap on that line and the full description will be added to the field.</p> <p>The “Description List File,” is a pair: a short code followed by the full description. Typing the code into the description field will tell Survey Pro to replace the short code with the full description. For example, if the DescriptionFile.TXT has a code as follows: CL Centerline “CL” is typed into the description field. When the point is stored, “Centerline” will replace the “CL” code. NOTE: The feature code FXL file is generally a better option moving forward. It allows for a much greater level of functionality than simple descriptor files.</p>	
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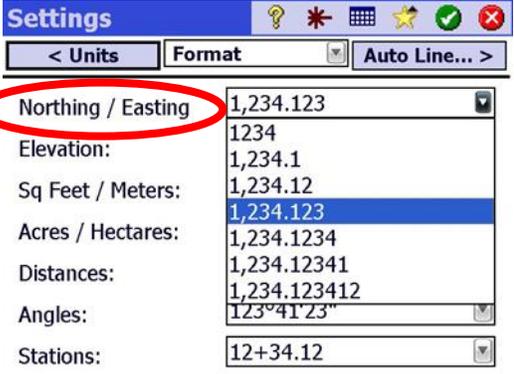
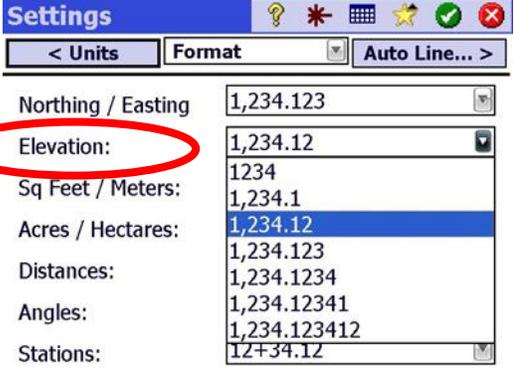
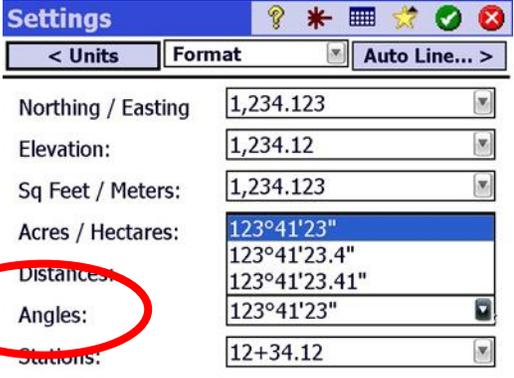
Step 13: Select Feature file

<p>1.</p>	<p>Globalfeatures.fxl is installed on to every data collector that has Survey Pro also installed. This is a comprehensive “Feature Definition File” that allows for the generation of automatic linework when collecting and coding points with these Feature Definitions. Feature and attribute data can also be collected when using the FXL file. Globalfeatures.fxl can be customized or new feature libraries created using the Spectra Precision Survey Office software utility “Feature Definition Manager.”</p>	 <p>Settings</p> <p>< Format Auto Linework Descripti... ></p> <p>Feature Definition File: Globalfeatures.fxl Browse... Clear</p> <p><input checked="" type="checkbox"/> Display linework using default commands when no Feature Definition File is selected</p>
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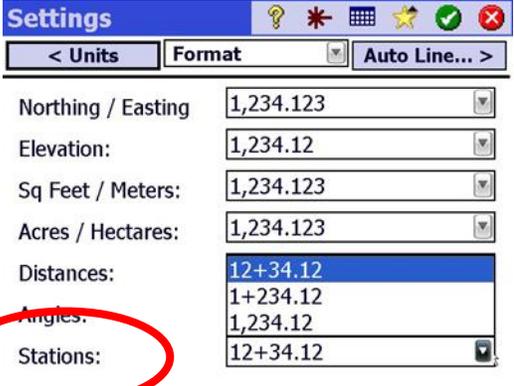
Step 14: Select numerical formats

<p>1.</p>	<p>Various numerical fields can be formatted. The values selected here will affect the raw data that is recorded. For instance, if “Distances” are rounded to the nearest meter, there will be no information about the centimeters or millimeters involved in the data display. However, full precision is always stored in the raw file. If you change these settings, it only affects what is displayed in the various routines in Survey Pro, not what is being stored in the file.</p>	 <p>Settings</p> <p>< Units Format Auto Line... ></p> <p>Northing / Easting 1,234.123</p> <p>Elevation: 1,234.12</p> <p>Sq Feet / Meters: 1,234.123</p> <p>Acres / Hectares: 1,234.123</p> <p>Distances: 1,234.12</p> <p>Angles: 123°41'23"</p> <p>Stations: 12+34.12</p>
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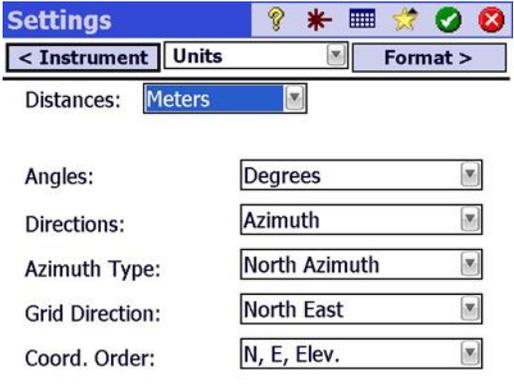
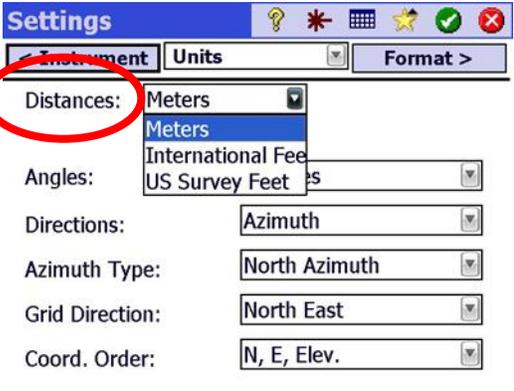
Step 14: Select numerical formats

<p>2.</p>	<p>Decimal precision of the Northing/Easting coordinates can be selected. Southing/Westing coordinates are displayed if Grid Direction is chosen as “South/West.”</p>	
<p>3.</p>	<p>The precision of the display for the various units can be selected as desired.</p>	
<p>4.</p>	<p>Decimal precision of the Angles can be selected. This image is showing the angles in degrees, minutes and seconds because “Degrees” was chosen under units. If Grads/Gons had been selected, then these units would be selectable under this “Angles” field.</p>	

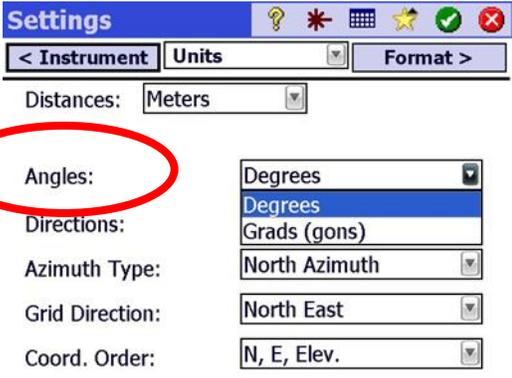
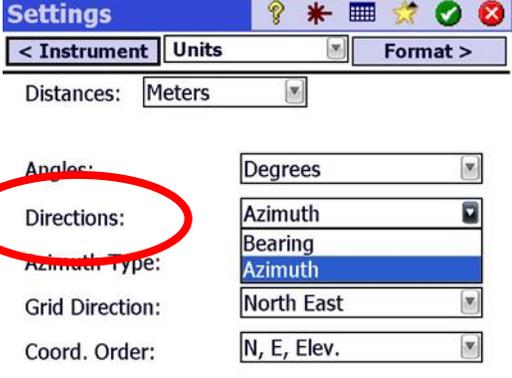
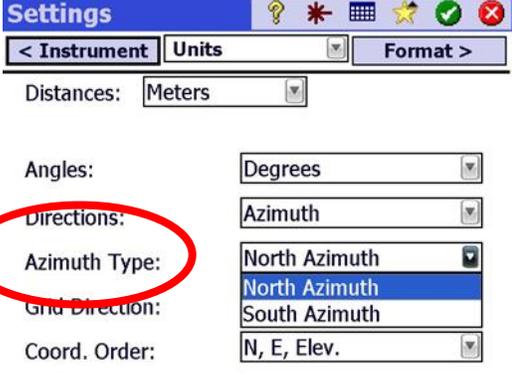
Step 14: Select numerical formats

<p>5.</p>	<p>Stationing format can be selected.</p>	 <p>The screenshot shows the 'Settings' dialog box with the 'Format' tab selected. The 'Stations' field is circled in red. The list of options for 'Stations' includes '12+34.12', '1+234.12', and '1,234.12'. The '12+34.12' option is currently selected.</p>
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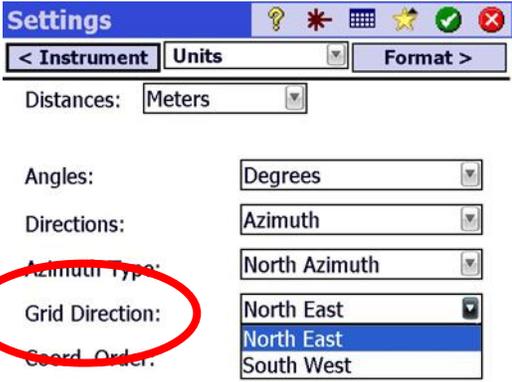
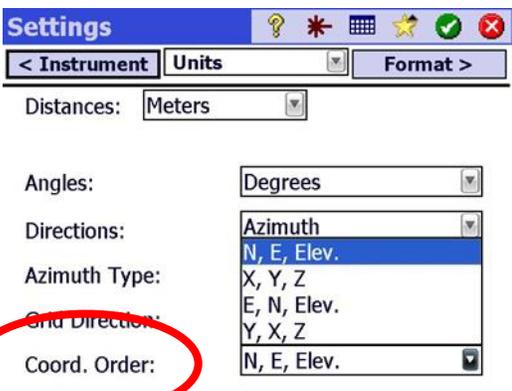
Step 15: Select units

<p>1.</p>	<p>Various units can be selected.</p>	 <p>The screenshot shows the 'Settings' dialog box with the 'Units' tab selected. The 'Distances' field is set to 'Meters'. Other fields include 'Angles: Degrees', 'Directions: Azimuth', 'Azimuth Type: North Azimuth', 'Grid Direction: North East', and 'Coord. Order: N, E, Elev.'.</p>
<p>2.</p>	<p>Meters are the default units for new jobs unless a previous unit has been selected. For those users of Feet, an intentional choice must be made between International and U.S. Survey.</p>	 <p>The screenshot shows the 'Settings' dialog box with the 'Units' tab selected. The 'Distances' dropdown menu is open, showing 'Meters', 'International Feet', and 'US Survey Feet'. The 'Meters' option is currently selected.</p>

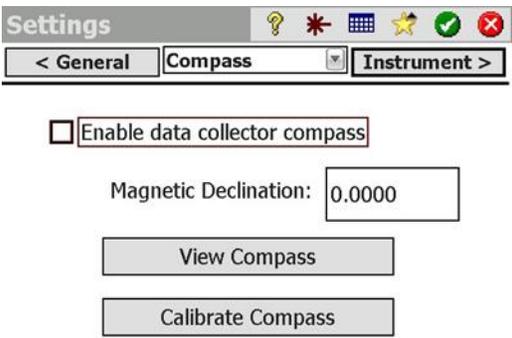
Step 15: Select units

<p>3.</p>	<p>Angles can be expressed in Degrees or Grads (Gons).</p>	
<p>4.</p>	<p>Directions can be displayed in Azimuths or Bearings. For example, an azimuth of 103 degrees has a bearing equal to South 77° East.</p>	
<p>5.</p>	<p>North or South Azimuth can be selected.</p>	

Step 15: Select units

<p>6.</p>	<p>The grid directions can be displayed as either Northings and Eastings or Southings and Westings</p>	
<p>7.</p>	<p>The coordinate order can be North/East (which equals Y,X,Z) or East/North (which equals X,Y,Z). In all cases, X = the East/West component and Y = the North/South component.</p>	

Step 16: Compass

<p>1.</p>	<p>Survey Pro can access the internal compass of the data collector to facilitate various surveying routines.</p>	
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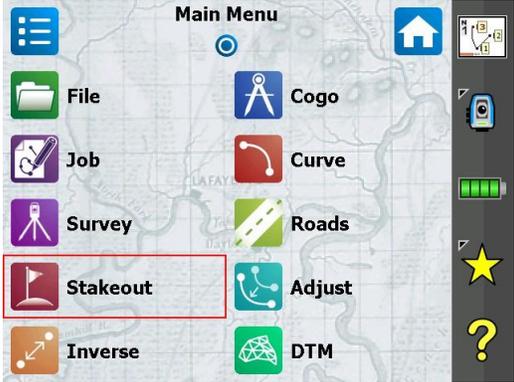
Import Files

In this lesson, you will learn how to:

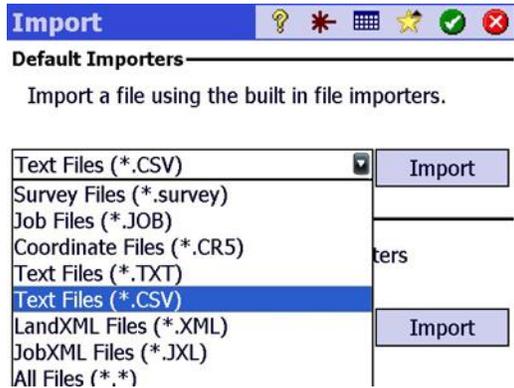
Import a text file containing point names and coordinates into the current job. This lesson will also explain how to import control point data from previous jobs.

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Step 2:	Select the correct format for the file being imported	52
Step 3:	Navigate to the file being imported and select it	53
Step 4:	Assign the points to a job layer	53
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Step 10:	Import the control data and view the results	56

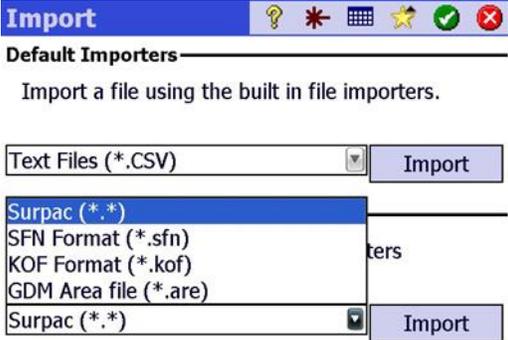
Step 1: Navigate to the File\Import page

<p>1.</p>	<p>From the main menu, tap on “File”</p>	
<p>2.</p>	<p>On the “File Page, tap on “Import”</p>	

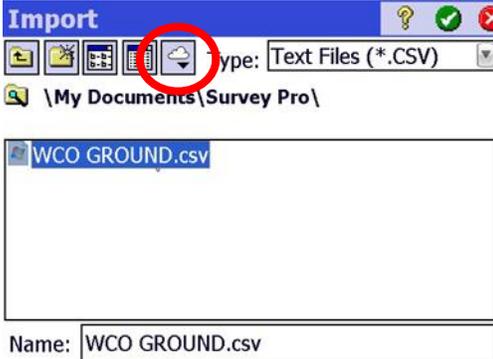
Step 2: Select the correct format for the file being imported

<p>1.</p>	<p>The file that will be imported is a *.CSV file so this is selected from the list for file “Type”</p>	
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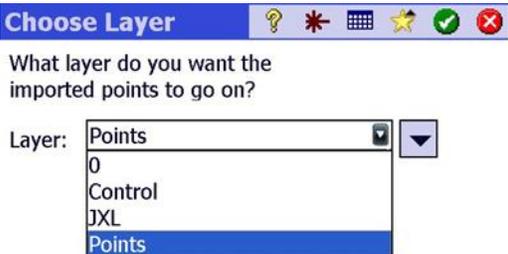
Step 2: Select the correct format for the file being imported

<p>2.</p>	<p>Custom file formats are also available to meet regional needs.</p>	
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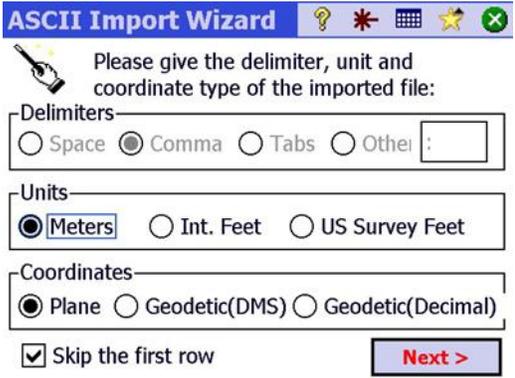
Step 3: Navigate to the file being imported and select it

<p>1.</p>	<p>Browse to the correct file, highlight it and tap on the green check/tick mark in the upper right hand corner of the page. Notice that Dropbox.com is available which can be a convenient place to store and retrieve survey files.</p>	
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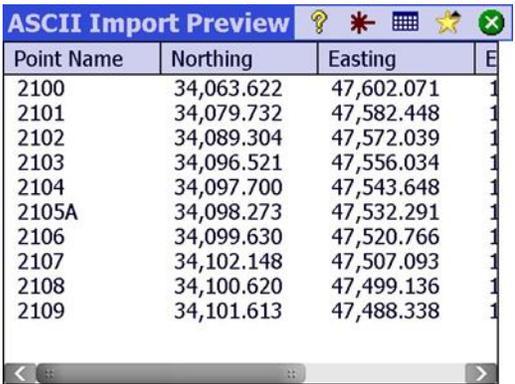
Step 4: Assign the points to a job layer

<p>1.</p>	<p>The points need to be assigned to an existing layer in the job. The “Manage Layers” utility is accessible by clicking on the down arrow on the right side of the page.</p>	
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Step 5: Define the units and columns

<p>1.</p>	<p>By definition, a CSV file is Comma delimited. If this had been an unknown file type, the delimiter between fields would need to be defined. The units and type of coordinates must also be defined. If the file being imported contains a Header row, “Skip the first row” option can be selected.</p>	
<p>2.</p>	<p>Define the order of the columns. For instance, this image is configured for a file that is in the order of Point Name, Northing, Easting, Elevation, Description. If instead, the file has the eastings before the northings, the numbering sequence would be: 1, 3, 2, 4, 5 If “Specify Missing Elevation Threshold” is selected, a numeric value can be used to flag points to be imported that do not have valid elevations.</p>	

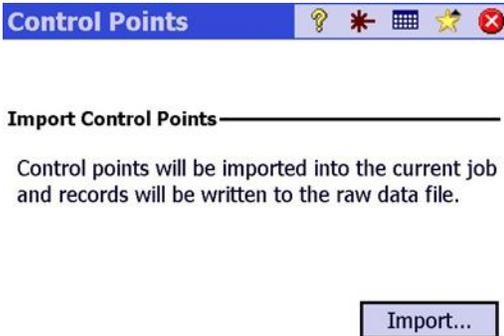
Step 6: Preview the import

<p>1.</p>	<p>A Preview of the points to be imported can be analyzed for correctness before insertion into the *.survey file.</p>	 <table border="1" data-bbox="889 1344 1404 1728"> <thead> <tr> <th>Point Name</th> <th>Northing</th> <th>Easting</th> <th>E</th> </tr> </thead> <tbody> <tr><td>2100</td><td>34,063.622</td><td>47,602.071</td><td>1</td></tr> <tr><td>2101</td><td>34,079.732</td><td>47,582.448</td><td>1</td></tr> <tr><td>2102</td><td>34,089.304</td><td>47,572.039</td><td>1</td></tr> <tr><td>2103</td><td>34,096.521</td><td>47,556.034</td><td>1</td></tr> <tr><td>2104</td><td>34,097.700</td><td>47,543.648</td><td>1</td></tr> <tr><td>2105A</td><td>34,098.273</td><td>47,532.291</td><td>1</td></tr> <tr><td>2106</td><td>34,099.630</td><td>47,520.766</td><td>1</td></tr> <tr><td>2107</td><td>34,102.148</td><td>47,507.093</td><td>1</td></tr> <tr><td>2108</td><td>34,100.620</td><td>47,499.136</td><td>1</td></tr> <tr><td>2109</td><td>34,101.613</td><td>47,488.338</td><td>1</td></tr> </tbody> </table>	Point Name	Northing	Easting	E	2100	34,063.622	47,602.071	1	2101	34,079.732	47,582.448	1	2102	34,089.304	47,572.039	1	2103	34,096.521	47,556.034	1	2104	34,097.700	47,543.648	1	2105A	34,098.273	47,532.291	1	2106	34,099.630	47,520.766	1	2107	34,102.148	47,507.093	1	2108	34,100.620	47,499.136	1	2109	34,101.613	47,488.338	1
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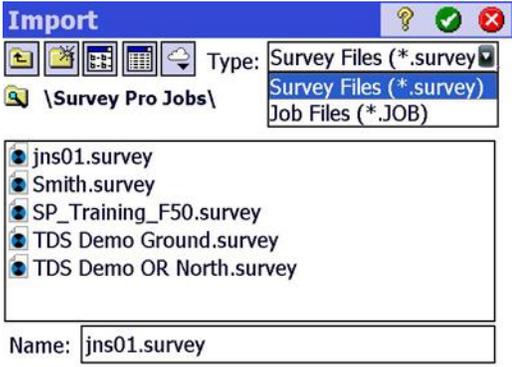
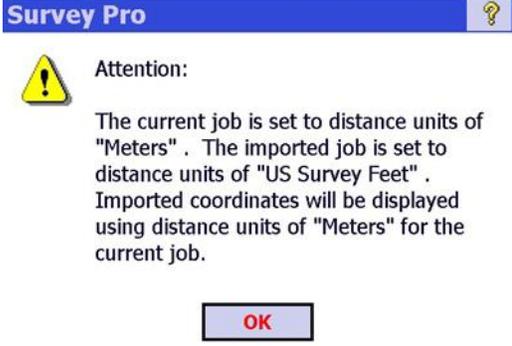
Step 7: Import the data and view the results

<p>1.</p>	<p>After the “Finish” button is pushed, a statement is provided about what was imported.</p>	
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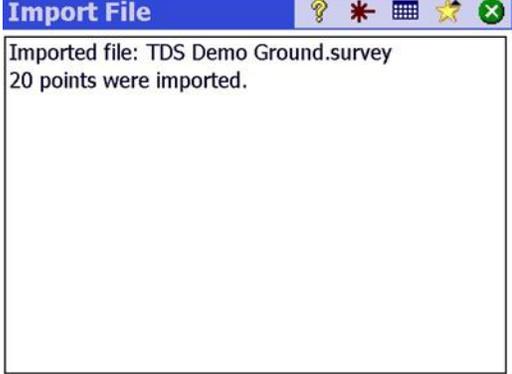
Step 8: Navigate to the File\Import Control page

<p>1.</p>	<p>Even if a Control File was not attached to the job during the job creation process, it can be added later. Navigate to “Import Control” under the File page.</p>	
<p>2.</p>	<p>A dialogue box is stating that the Control points selected will be imported into the current job.</p>	

Step 9: Navigate to the Control file being imported and select it

<p>1.</p>	<p>Browse to the location of the Control File being imported. *.Survey and *.Job files are the allowed formats.</p>	
<p>2.</p>	<p>If Survey Pro detects any compatibility problems between the current job and the Control Points being imported, a warning box will appear with advice on the action the software will take.</p>	

Step 10: Import the control data and view the results

<p>1.</p>	<p>After the file choice has been confirmed by either clicking on the green check/tick mark or hitting the OK button, a statement is provided about what was imported.</p>	
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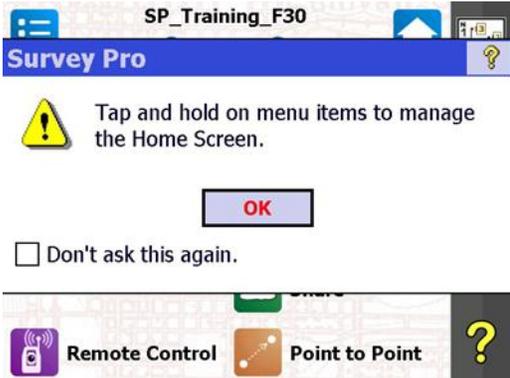
Customize the Home Page(s)

In this lesson, you will learn how to:

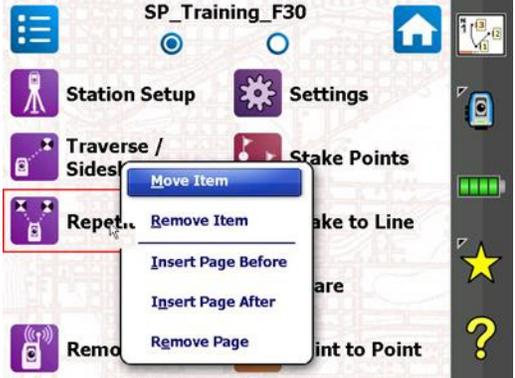
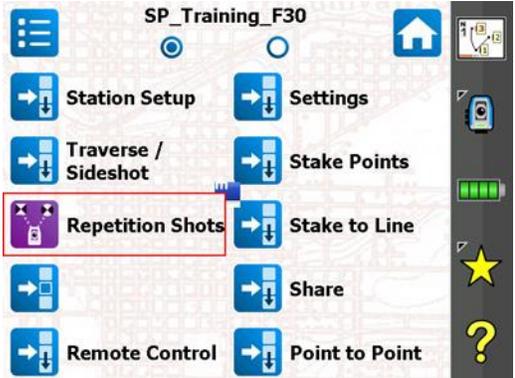
Customize the Home page, create new Home pages, delete Home pages, move icons, insert icons and delete icons.

	<i>Page</i>
Step 1: Navigate to Home page(s)	58
Step 2: Tap and hold (extended click) on icon to be moved	59
Step 3: Drop icon in new location	59
Step 4: Tap and hold, then select “Insert Page Before”	60
Step 5: Drop icon on new page	60
Step 6: Select “Repetition Shots” from Survey page and place on Home page	61
Step 7: Remove a Home Page	61
Step 8: Create a sample workflow oriented Home page	62

Step 1: Navigate to Home page(s)

<p>1.</p>	<p>When creating a new job, a dialogue box is presented with instructions for managing the Home Screen(s)</p>	
<p>2.</p>	<p>Default Home Page for a Total Station</p>	
<p>3.</p>	<p>The Home Page is accessed by clicking on the blue Home icon in the top right corner of primary menu pages.</p> <p>The Main Menu is accessed by clicking on the Blue icon in the top left corner of primary menu pages.</p>	

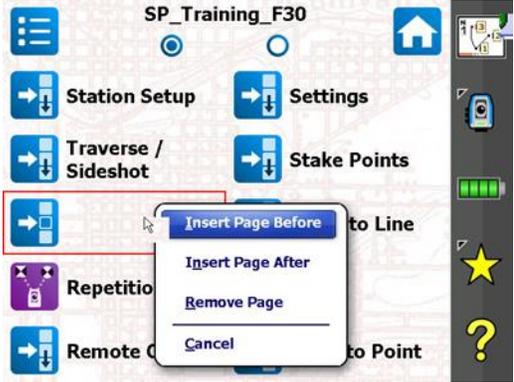
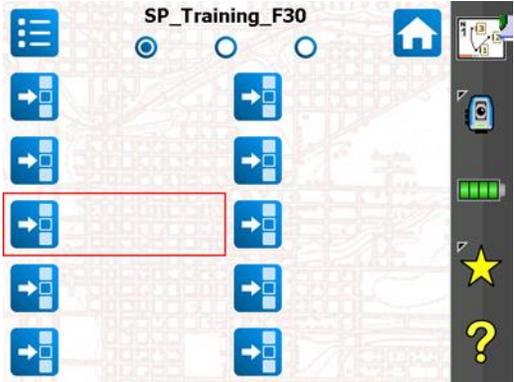
Step 2: Tap and hold (extended click) on icon to be moved

<p>1.</p>	<p>To move a menu item, perform a tap and hold (same as a right mouse click on a computer) on the menu item to be moved.</p>	
<p>2.</p>	<p>All icons on the page turn blue except for the menu item that is being selected to be placed on the home page.</p>	

Step 3: Drop icon in new location

<p>1.</p>	<p>Tap on new location for the menu item. Menu item is copied to the new location and all the other icons return to their normal color.</p>	
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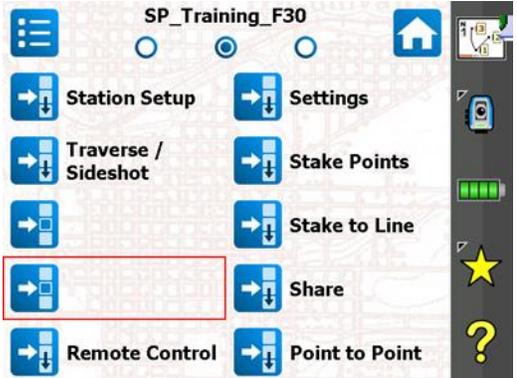
Step 4: Tap and hold, then select “Insert Page Before”

<p>1.</p> <p>Select Insert Page Before or Insert Page After to insert a page before or after the current page.</p> <p>A total of four Home Pages are currently allowed.</p>		
<p>2.</p> <p>A new page is created.</p>		

Step 5: Drop icon on new page

<p>1</p> <p>Drop the icon (that was highlighted during the new page creation) anywhere on to the newly created page.</p>		
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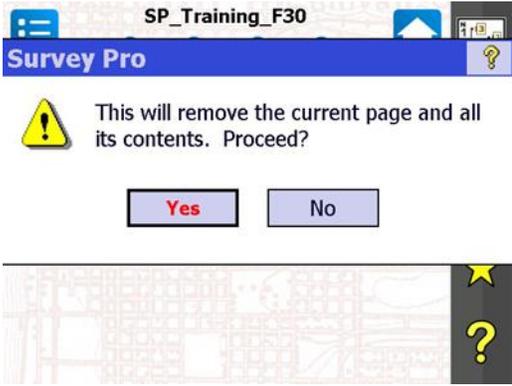
Step 6: Select “Repetition Shots” from Survey page and place on Home page

<p>1.</p>	<p>To copy “Repetition Shots” to a Home page, tap and hold on the button inside the first Survey Page. Select “Add to Home”</p>	
<p>2.</p>	<p>Navigate to the desired Home page. Tap on the desired location</p>	

Step 7: Remove a Home Page

<p>1.</p>	<p>Home Pages can be removed.</p>	
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Step 7: Remove a Home Page

<p>2.</p>	<p>A warning dialogue will be presented confirming the page deletion.</p>	 <p>The screenshot shows a warning dialog box in the Survey Pro application. The title bar reads 'SP_Training_F30' and 'Survey Pro'. The dialog contains a yellow warning triangle icon and the text: 'This will remove the current page and all its contents. Proceed?'. Below the text are two buttons: 'Yes' and 'No'. The background of the application is dimmed, showing a grid and a sidebar with a yellow question mark icon.</p>
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Step 8: Create a sample workflow oriented Home page

<p>1.</p>	<p>One example of a workflow oriented approach to Home Page creation. Begin by opening a job, then importing data. Settings come next and any point editing that might be necessary. The station must be set and then data collection and/or stakeout come next. Many times, a couple of COGO calculations will be required. At the end, the data will be shared. Dropbox or email is an option.</p>	 <p>The screenshot shows the Survey Pro home page with a workflow-oriented menu. The title bar reads 'SP_Training_F30'. The menu items are: 'Open / New' (highlighted with a red box), 'Import', 'Settings', 'Edit Points', 'Station Setup', 'Traverse / Sideshot', 'Stake Points', 'Stake List of Points', 'Point to Point', and 'Share'. The sidebar on the right contains a yellow star icon and a yellow question mark icon.</p>
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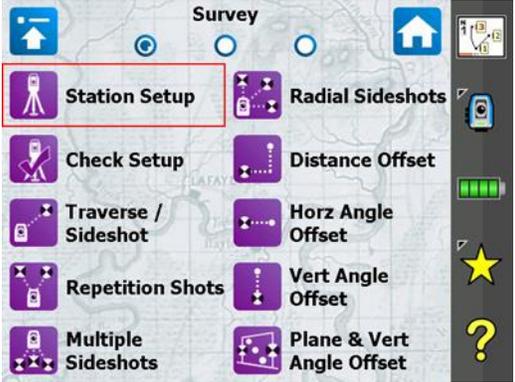
Station Setup

In this lesson, you will learn how to:

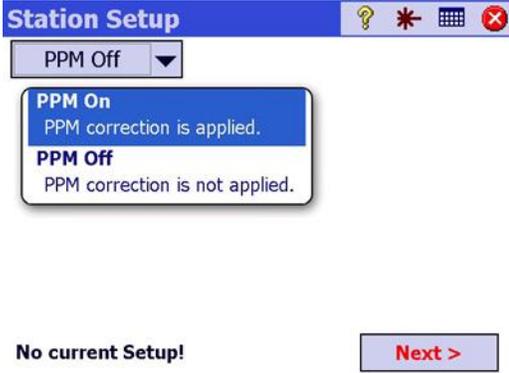
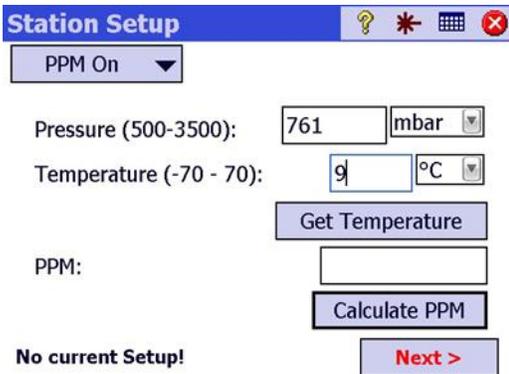
Setup and orient a FOCUS 30 total station on a known point. This lesson will also provide instructions on how to perform a resection or free station to setup on an unknown point.

		<i>Page</i>
Step 1:	Navigate to Station Setup	64
Step 2:	Input Temperature and Barometric Pressure (Optional)	64
Step 3:	Set Station on Known Point	65
Step 4:	Set Station on Unknown Point (Resection or Freestation)	71
Step 5:	Use Last Setup	78

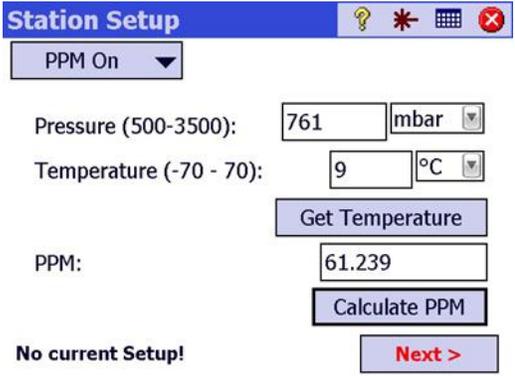
Step 1: Navigate to Station Setup

<p>1.</p>	<p>Navigate to the Station Setup routine located on the first Survey page. If a user attempts to go directly to measurement routine such as Traverse/Sidehots, they will be directed to the Station Setup routine as well.</p>	 <p>The screenshot shows a 'Survey' menu with various options. The 'Station Setup' option, represented by a purple icon of a surveying station, is highlighted with a red rectangular box. Other options include Radial Sidehots, Check Setup, Distance Offset, Traverse / Sidehot, Horz Angle Offset, Repetition Shots, Vert Angle Offset, Multiple Sidehots, and Plane & Vert Angle Offset. The background is a map.</p>
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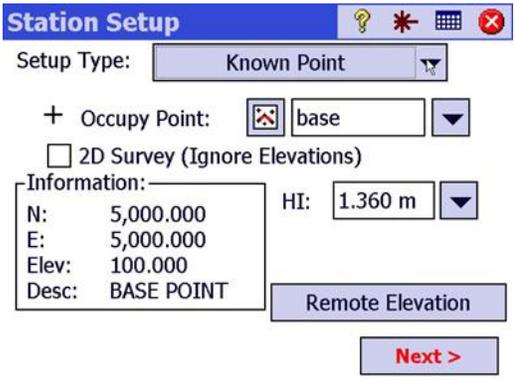
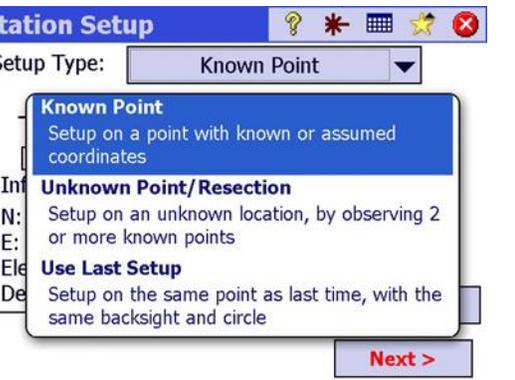
Step 2: Input Temperature and Barometric Pressure (Optional)

<p>1.</p>	<p>For most surveys with optical equipment, it is a good idea to adjust the EDM calculations for the current atmospheric conditions.</p> <p>This option will be shown if Prompt for PPM option is selected in the Surveying section of Settings.</p>	 <p>The screenshot shows the 'Station Setup' screen. At the top, there is a blue header with the title 'Station Setup' and several icons. Below the header, a dropdown menu is set to 'PPM Off'. A tooltip is displayed over the dropdown, showing 'PPM On' with the text 'PPM correction is applied.' and 'PPM Off' with the text 'PPM correction is not applied.' Below the dropdown, the text 'No current Setup!' is visible, and a red 'Next >' button is on the right.</p>
<p>2.</p>	<p>Insert the correct temperature and barometric pressure.</p>	 <p>The screenshot shows the 'Station Setup' screen with the dropdown menu set to 'PPM On'. Below the dropdown, there are two input fields: 'Pressure (500-3500):' with the value '761' and a unit dropdown set to 'mbar', and 'Temperature (-70 - 70):' with the value '9' and a unit dropdown set to '°C'. Below these fields are two buttons: 'Get Temperature' and 'Calculate PPM'. At the bottom, the text 'No current Setup!' is visible, and a red 'Next >' button is on the right.</p>

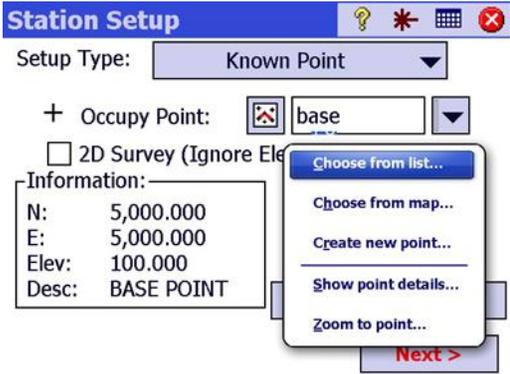
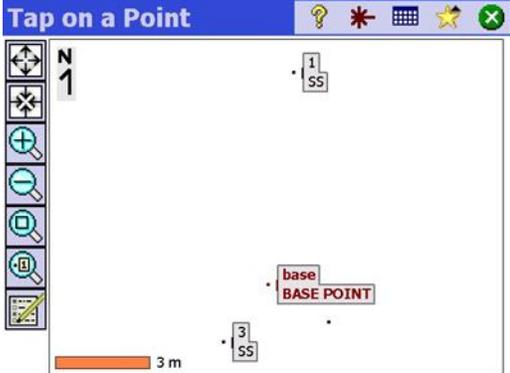
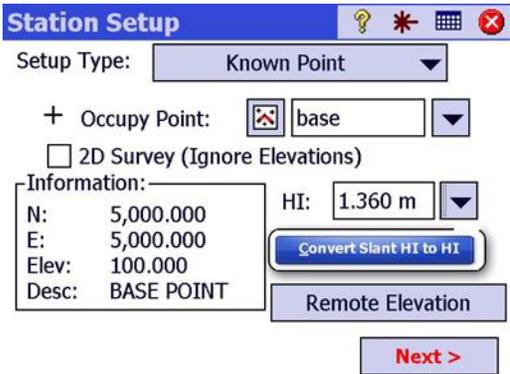
Step 2: Input Temperature and Barometric Pressure (Optional)

<p>3.</p>	<p>Tap on the “Calculate PPM” to populate the correction value.</p> <p>Alternatively, the PPM value can be calculated externally and manually entered into the PPM field.</p>	
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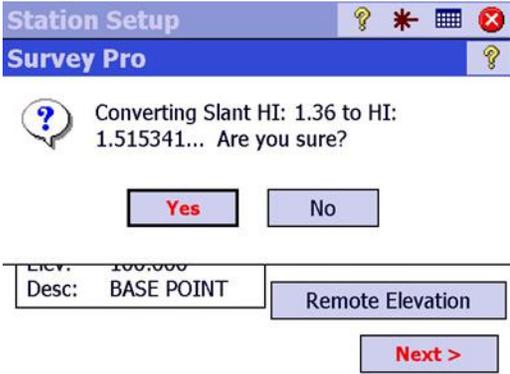
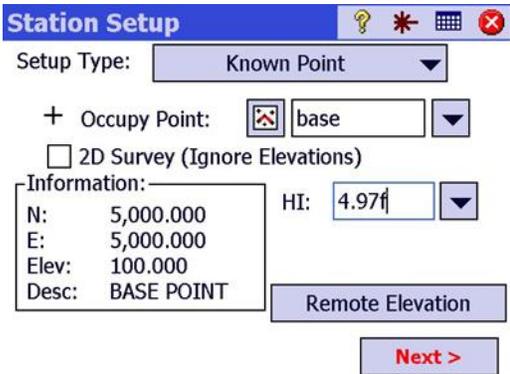
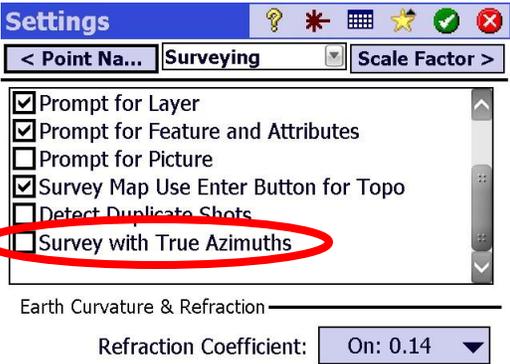
Step 3: Set Station on Known Point

<p>1.</p>	<p>The Station Setup page will initially display the last setup information.</p> <p>Notice that Survey Pro can support 2D surveys where elevations are ignored and that a Remote Elevation from a benchmark can be observed to calculate the occupied elevation.</p>	
<p>2.</p>	<p>The Total Station can be set on a Known Point or an Unknown point. If returning to the same location, the “Use Last Setup” option can be used.</p> <p>Select Known Point.</p>	

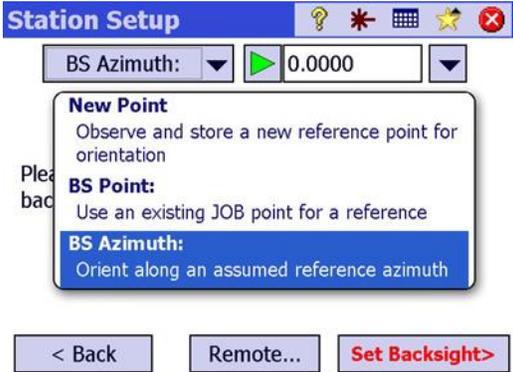
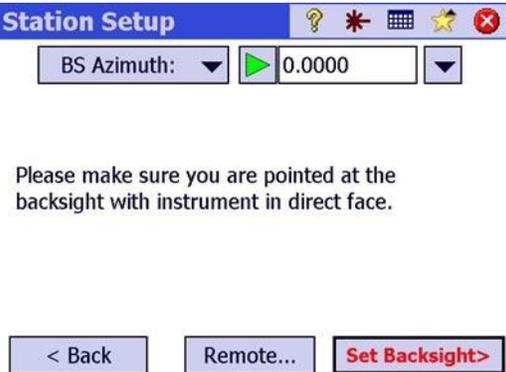
Step 3: Set Station on Known Point

<p>3.</p>	<p>The Known Point can be chosen from the current job's point list, from the Map display or a new point can be created.</p>	
<p>4.</p>	<p>Tap on a point to select it.</p>	
<p>5.</p>	<p>Generally, the instrument height is measured by tape measure to the trunnion mark. However, on some instruments, like the FOCUS 30, there is a slant measure mark as well. To use slant height, measure to the slant measure mark, and enter that value into the HI field. Tap the power menu (down arrow), and tap on Convert Slant HI to HI.</p>	

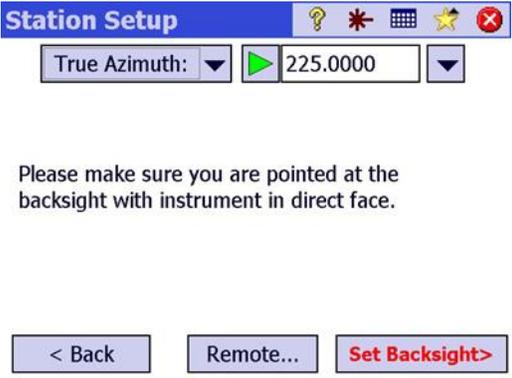
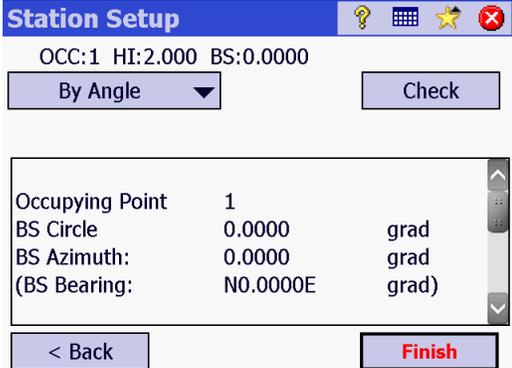
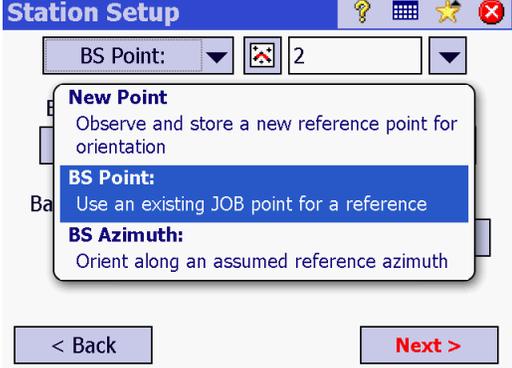
Step 3: Set Station on Known Point

<p>6.</p>	<p>The 1.36 meter slant height is converted to a vertical value and then the offset to the trunnion axis is applied to derive the correct Height of Instrument (HI).</p>	 <p>The screenshot shows a 'Station Setup' dialog box with a 'Survey Pro' sub-header. A message box asks: 'Converting Slant HI: 1.36 to HI: 1.515341... Are you sure?'. Below the message are 'Yes' and 'No' buttons. At the bottom, there is a 'Remote Elevation' button and a 'Next >' button. The 'Desc:' field is set to 'BASE POINT'.</p>
<p>7.</p>	<p>Notice that if the job is metric but the HI measurement is performed in feet, an “f” can be inserted after the number and Survey Pro will manage the conversion. The opposite is true for a job in feet where an “m” after the number will be converted by Survey Pro to feet. (This method works in all distance fields inside Survey Pro)</p>	 <p>The screenshot shows the 'Station Setup' dialog box with 'Setup Type' set to 'Known Point'. The 'Occupy Point' is 'base'. There is an unchecked checkbox for '2D Survey (Ignore Elevations)'. The 'Information' section shows: N: 5,000.000, E: 5,000.000, Elev: 100.000, Desc: BASE POINT. The 'HI:' field is set to '4.97f'. There are 'Remote Elevation' and 'Next >' buttons.</p>
<p>8.</p>	<p>Survey Pro has two modes of operation with regards to the treatment of the setting of the instrument circle (the instrument circle setting is the orientation of the instrument’s horizontal angle encoders). The first method that is typical in many regions is to set the instrument’s circle to be 0° when pointed at the backsight. This is the default mode for Survey Pro.</p>	 <p>The screenshot shows the 'Settings' dialog box. The 'Surveying' mode is selected. A list of checkboxes includes: 'Prompt for Layer' (checked), 'Prompt for Feature and Attributes' (checked), 'Prompt for Picture' (unchecked), 'Survey Map Use Enter Button for Topo' (checked), 'Detect Duplicate Shots' (unchecked), and 'Survey with True Azimuths' (unchecked and circled in red). Below the list, 'Earth Curvature & Refraction' is set to 'On: 0.14'.</p>

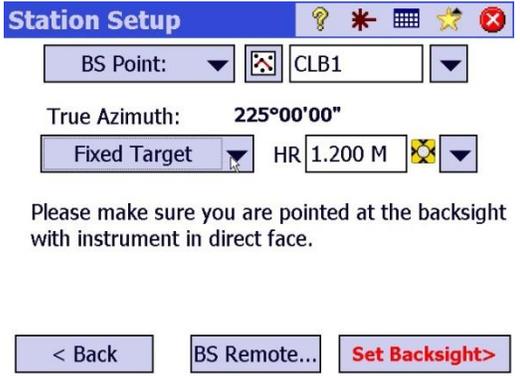
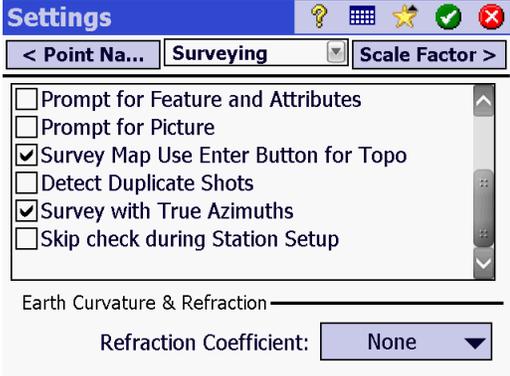
Step 3: Set Station on Known Point

	<p>Survey Pro can also operate in True Azimuth mode. This mode is selected using the “Survey with True Azimuth” setting in the Job/Settings/Surveying page . In this case, Survey Pro will always automatically set the instrument circle to match the backsight azimuth.</p> <p>If managing the backsight circle is not important to your survey methods, or if you always want to see azimuths related to a cardinal direction, select the True Azimuth mode and Survey Pro will automatically manage the circle for you.</p> <p>It is important to note that the circle orientation that manages the generation of coordinates need not match the backsight azimuth. Survey Pro always manages the differences automatically. Setting the circle is simply a method to make recognition of errors easier. It also enables the instrument display to show the same angle values that are being used in Survey Pro.</p>
<p>9.</p>	<p>The instrument’s backsight aiming can be an Azimuth or a Point. The Point can be an existing point or a new point can be created by measuring the target position while setting the backsight values. The New Point option is nearly the same as the BS Azimuth option except that once the backsight is set, a new point can be measured and stored.</p> 
<p>10.</p>	<p>To use a backsight azimuth, select BS Azimuth by tapping on the scroll menu. Set the backsight azimuth.</p> <p>Ensure the instrument is accurately aimed at the backsight and tap the Set Backsight button to set the circle on the instrument.</p> 

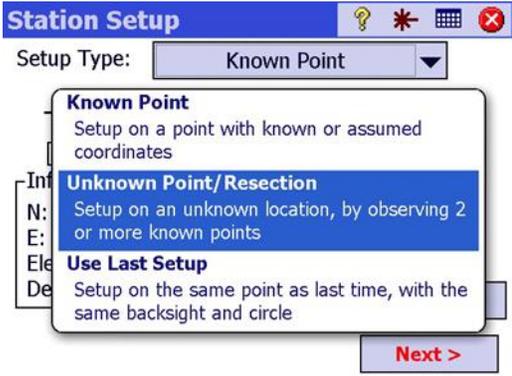
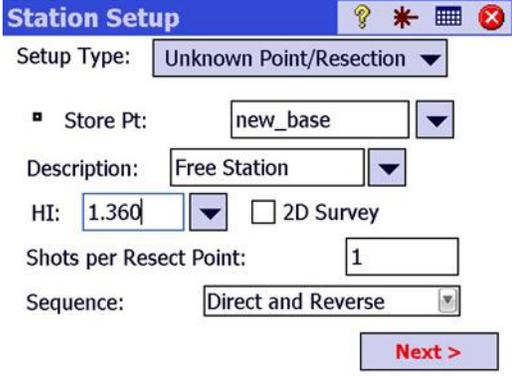
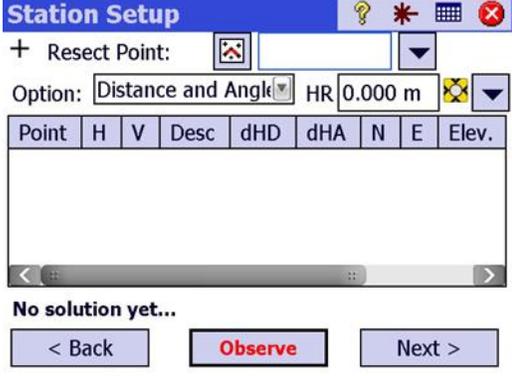
Step 3: Set Station on Known Point

<p>11.</p>	<p>If the Surveying settings have been set to use “True Azimuth”, this value can be keyed in or two points from the job can be selected to compute the True Azimuth. Clicking on the Green Arrow will read the current circle orientation of the instrument.</p>	 <p>The screenshot shows the 'Station Setup' window with a title bar containing icons for help, zoom, grid, and close. Below the title bar, there is a 'True Azimuth:' label, a dropdown arrow, a green play button, a text input field containing '225.0000', and another dropdown arrow. Below this, a message reads: 'Please make sure you are pointed at the backsight with instrument in direct face.' At the bottom, there are three buttons: '< Back', 'Remote...', and 'Set Backsight>'.</p>
<p>12.</p>	<p>Once the backsight has been set, a final confirmation screen is presented. The station setup can be Checked By Angle, By Distance or By Point. Clicking on Finish launches the Survey menu.</p>	 <p>The screenshot shows the 'Station Setup' window with a title bar. Below the title bar, it displays 'OCC:1 HI:2.000 BS:0.0000'. There is a 'By Angle' dropdown menu and a 'Check' button. Below this is a scrollable list with the following items: 'Occupying Point 1', 'BS Circle 0.0000 grad', 'BS Azimuth: 0.0000 grad', and '(BS Bearing: NO.0000E grad)'. At the bottom, there are two buttons: '< Back' and 'Finish'.</p>
<p>13.</p>	<p>To set the backsight using a known point, select BS Point from the scroll menu. Select the point for the backsight. If it is required to use the backsight azimuth for the circle setting, use the True Azimuth setting described in this guide.</p>	 <p>The screenshot shows the 'Station Setup' window with a title bar. Below the title bar, there is a 'BS Point:' label, a dropdown arrow, a button with a point icon, a text input field containing '2', and another dropdown arrow. A modal dialog box is open, showing three options: 'New Point' (Observe and store a new reference point for orientation), 'BS Point:' (Use an existing JOB point for a reference), and 'BS Azimuth:' (Orient along an assumed reference azimuth). At the bottom, there are two buttons: '< Back' and 'Next >'.</p>

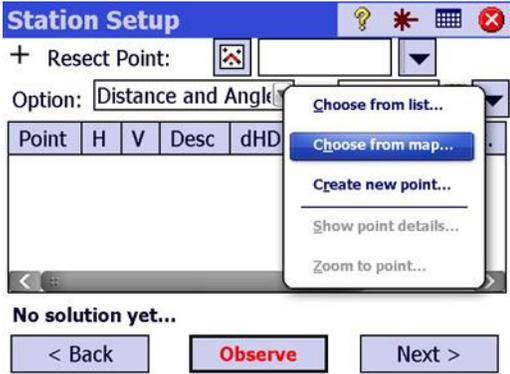
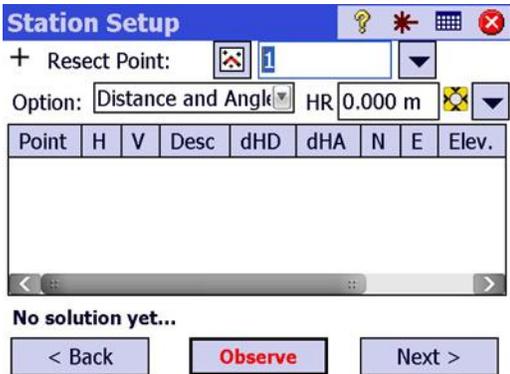
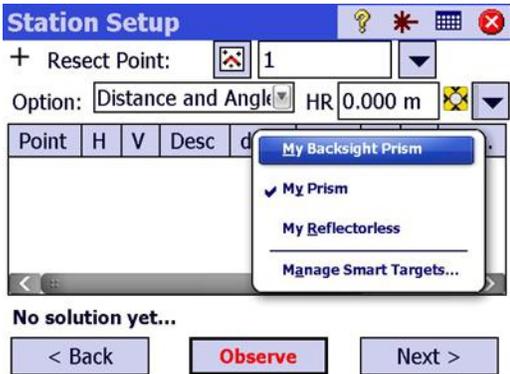
Step 3: Set Station on Known Point

<p>14.</p>	<p>When backsighting a point, a distance will be measured and the instrument circle will be rotated accordingly. The backsight can be measured with a dedicated prism called a “Fixed Target” that will remain in place throughout the survey. This allows Survey Pro to assume that there will NOT be a change of HR or prism constant. A “Roving Target” can be used if the prism is not left on the backsight point throughout the survey.</p>	 <p>Station Setup</p> <p>BS Point: CLB1</p> <p>True Azimuth: 225°00'00"</p> <p>Fixed Target HR 1.200 M</p> <p>Please make sure you are pointed at the backsight with instrument in direct face.</p> <p>< Back BS Remote... Set Backsight></p>												
<p>15.</p>	<p>In the case where the instrument circle must match the backsight azimuth or when the instrument circle reading is not important or not used, then set True Azimuth mode for the backsight setup. This setting is controlled under the Job/Settings/Surveying page.</p>	 <p>Settings</p> <p>< Point Na... Surveying Scale Factor ></p> <p><input type="checkbox"/> Prompt for Feature and Attributes</p> <p><input type="checkbox"/> Prompt for Picture</p> <p><input checked="" type="checkbox"/> Survey Map Use Enter Button for Topo</p> <p><input type="checkbox"/> Detect Duplicate Shots</p> <p><input checked="" type="checkbox"/> Survey with True Azimuths</p> <p><input type="checkbox"/> Skip check during Station Setup</p> <p>Earth Curvature & Refraction</p> <p>Refraction Coefficient: None</p>												
<p>16.</p>	<p>The final screen of the Station Setup is a confirmation page showing the various values involved in the setup. The display of this screen is controlled by the “Skip check during Station Setup” option in the Surveying settings page. If this setting is checked, the final station check page will not be shown. This page can always be accessed by using the Check Setup routine..</p>	 <p>Station Setup</p> <p>OCC:base HI:1.360 BS:6°52'37"</p> <p>By Angle Check</p> <table border="1"> <tr> <td>Occupying Point</td> <td>base</td> <td></td> </tr> <tr> <td>BS Circle</td> <td>0°00'00"</td> <td>deg</td> </tr> <tr> <td>BS Azimuth:</td> <td>6°52'37"</td> <td>deg</td> </tr> <tr> <td>(BS Bearing:</td> <td>N6°52'37"E</td> <td>deg)</td> </tr> </table> <p>Refraction Coeff.: 0.14</p> <p>< Back Remote... Finish</p>	Occupying Point	base		BS Circle	0°00'00"	deg	BS Azimuth:	6°52'37"	deg	(BS Bearing:	N6°52'37"E	deg)
Occupying Point	base													
BS Circle	0°00'00"	deg												
BS Azimuth:	6°52'37"	deg												
(BS Bearing:	N6°52'37"E	deg)												

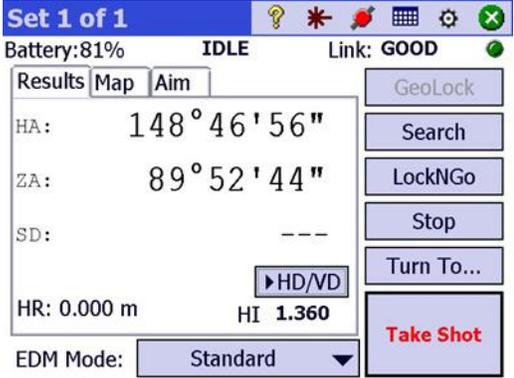
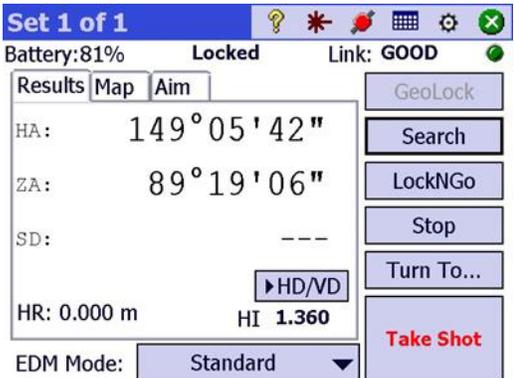
Step 4: Set Station on Unknown Point (Resection or Freestation)

<p>1.</p>	<p>In the drop-down menu for Setup Type, select “Unknown Point/Resection”. This routine is sometimes called a “Freestation”.</p>	 <p>The screenshot shows the 'Station Setup' dialog box. The 'Setup Type' dropdown menu is open, showing three options: 'Known Point', 'Unknown Point/Resection' (which is highlighted in blue), and 'Use Last Setup'. The 'Next >' button is visible at the bottom right.</p>																		
<p>2.</p>	<p>The “Store Pt:” field is used to assign a name to the point that is occupied and that is going to be calculated. A Description is optional. Enter the HI and the number of measurements to take to each of the points to be used in the resection. Select either Direct and Reverse (Face 1 and Face 2) or Direct Only for the sequence. Then tap Next.</p>	 <p>The screenshot shows the 'Station Setup' dialog box with 'Unknown Point/Resection' selected. The 'Store Pt:' field contains 'new_base', 'Description:' is 'Free Station', 'HI:' is '1.360', 'Shots per Resect Point:' is '1', and 'Sequence:' is 'Direct and Reverse'. The 'Next >' button is at the bottom right.</p>																		
<p>3.</p>	<p>In the “Resect Point:” field, enter the first point that is going to be measured. Distance and Angle or Angle only resections are supported.</p>	 <p>The screenshot shows the 'Station Setup' dialog box with the 'Resect Point:' field and 'Option:' set to 'Distance and Angle'. Below this is a table for recording observations:</p> <table border="1" data-bbox="898 1283 1393 1459"> <thead> <tr> <th>Point</th> <th>H</th> <th>V</th> <th>Desc</th> <th>dHD</th> <th>dHA</th> <th>N</th> <th>E</th> <th>Elev.</th> </tr> </thead> <tbody> <tr> <td> </td> </tr> </tbody> </table> <p>Below the table, it says 'No solution yet...' and there are '< Back', 'Observe', and 'Next >' buttons.</p>	Point	H	V	Desc	dHD	dHA	N	E	Elev.									
Point	H	V	Desc	dHD	dHA	N	E	Elev.												

Step 4: Set Station on Unknown Point (Resection or Freestation)

<p>4.</p>	<p>The point to be observed can be manually entered, selected from the point list or off the map. A new point can also be created.</p>	 <p>The screenshot shows the 'Station Setup' window. At the top, there is a '+ Resect Point:' field with a dropdown arrow. Below it, the 'Option:' is set to 'Distance and Angle'. A table with columns 'Point', 'H', 'V', 'Desc', and 'dHD' is visible. A dropdown menu is open, showing options: 'Choose from list...', 'Choose from map...', 'Create new point...', 'Show point details...', and 'Zoom to point...'. At the bottom, there are buttons for '< Back', 'Observe', and 'Next >'. The text 'No solution yet...' is displayed above the buttons.</p>
<p>5.</p>	<p>Point number "1" has been selected for the first point observation in the resection.</p>	 <p>The screenshot shows the 'Station Setup' window. The '+ Resect Point:' field now contains the number '1'. The 'Option:' is still 'Distance and Angle', but now includes 'HR' and a value of '0.000 m'. The table below has additional columns: 'dHA', 'N', 'E', and 'Elev.'. The 'Observe' button is highlighted in red. The text 'No solution yet...' is still present.</p>
<p>6.</p>	<p>Ensure that the correct Height of Rod (HR) and prism type are defined. Point the instrument at the target. For robotic instruments, either use the Remote Control screen to aim the instrument or use the tracking EDM to track the target to the point. Clicking on Observe will initiate a measurement.</p>	 <p>The screenshot shows the 'Station Setup' window. The '+ Resect Point:' field contains '1'. The 'Option:' is 'Distance and Angle' with 'HR 0.000 m'. A dropdown menu is open, showing prism type options: 'My Backsight Prism', 'My Prism' (which is checked), and 'My Reflectorless'. There is also a 'Manage Smart Targets...' option. The 'Observe' button is highlighted in red. The text 'No solution yet...' is still present.</p>

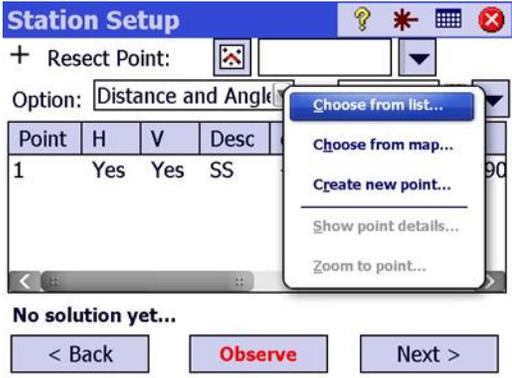
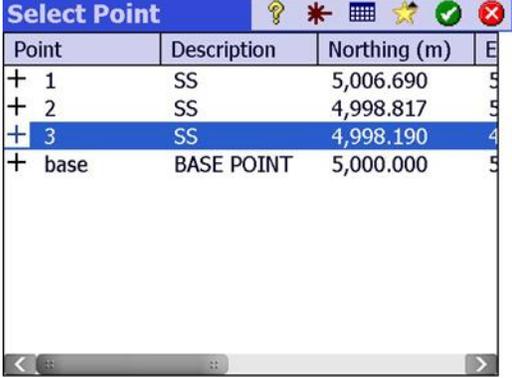
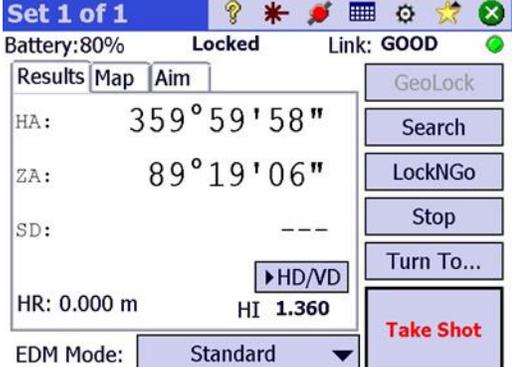
Step 4: Set Station on Unknown Point (Resection or Freestation)

<p>7.</p>	<p>Use the Ranger's "spider button" to joy-stick the instrument close to the prism (or any other method such as search and then track).</p>	
<p>8.</p>	<p>Tap on the Search button and allow the LockNGo technology to find the center of the prism.</p>	
<p>9.</p>	<p>When the instrument has found the prism, the Take Shot page will indicate that it is Locked on the prism. Tap on Take Shot to begin the observation.</p>	

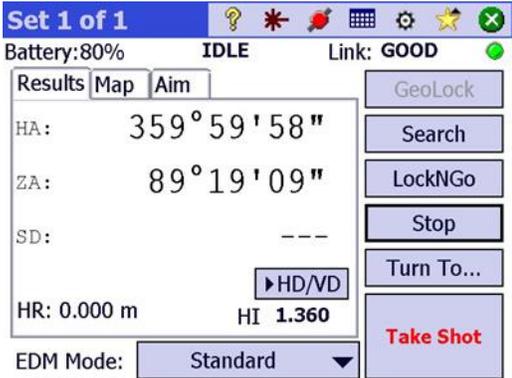
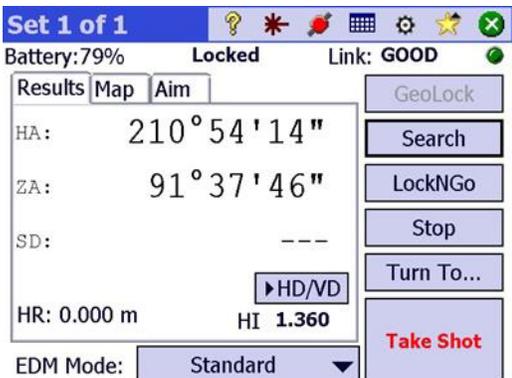
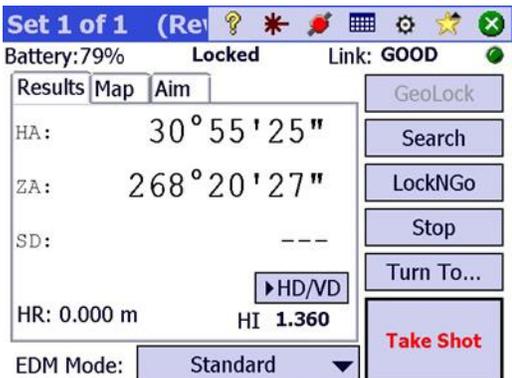
Step 4: Set Station on Unknown Point (Resection or Freestation)

<p>10.</p>	<p>Survey Pro will report that it is taking a measurement and display the Prism, HR and Prism constant being applied.</p>															
<p>11.</p>	<p>After the measurement, Survey Pro will prompt the surveyor to turn the instrument if Direct and Reverse was selected for the sequence. If the instrument is robotic, Survey Pro will automatically turn it to the reverse face. The reverse measurement will then be executed. If only Direct was selected for the sequence, Survey Pro will return to the resection screen for selection of the next point.</p>															
<p>12.</p>	<p>When the measurements are completed on the first resect point, it is displayed in the analysis box. Select the next point to be used in the resection.</p>	 <table border="1" data-bbox="899 1360 1393 1528"> <thead> <tr> <th>Point</th> <th>H</th> <th>V</th> <th>Desc</th> <th>dHD</th> <th>dHA</th> <th>N</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Yes</td> <td>Yes</td> <td>SS</td> <td>---</td> <td>---</td> <td>5,006.690</td> </tr> </tbody> </table>	Point	H	V	Desc	dHD	dHA	N	1	Yes	Yes	SS	---	---	5,006.690
Point	H	V	Desc	dHD	dHA	N										
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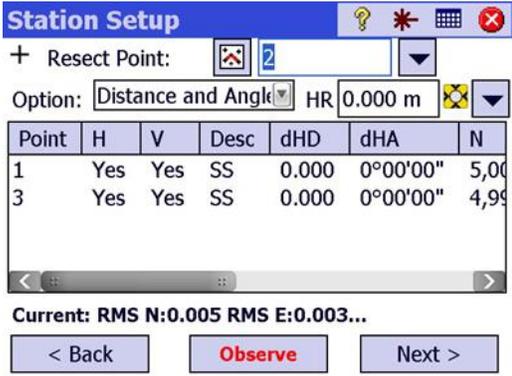
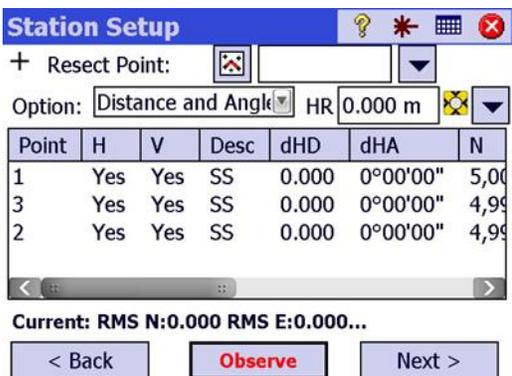
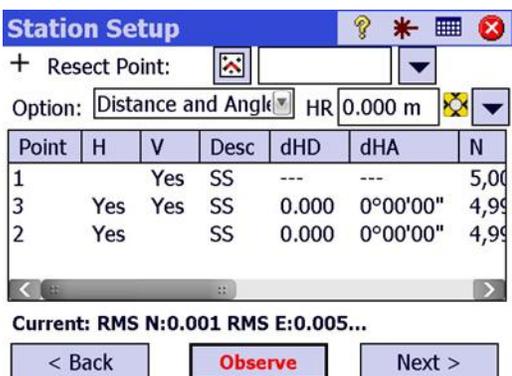
Step 4: Set Station on Unknown Point (Resection or Freestation)

<p>13.</p>	<p>Select “Choose from list...”</p>	
<p>14.</p>	<p>Point number 3 will be used next.</p>	
<p>15.</p>	<p>The instrument is still locked onto the first resect point and must now be aimed towards the second point.</p>	

Step 4: Set Station on Unknown Point (Resection or Freestation)

<p>16.</p>	<p>Clicking on the “Stop” button will stop the instrument from being Locked onto the first resect prism.</p> <p>This example assumes that static targets are being used. If a prism/data collector are being used on a rod that is moving between the resection points, Lock on the prism may be retained throughout the entire process.</p>	
<p>17.</p>	<p>Use the joy-stick feature to get the instrument somewhat aligned to the prism, hit the Search button and the instrument should be able to find and precisely target the second prism as indicated by “Locked” at the top of this page. Tapping on Take Shot will initiate the measurements.</p>	
<p>18.</p>	<p>The instrument will turn to face two and shoot the point again in the reverse face. (Notice the zenith angle is 180 degrees out of phase.)</p>	

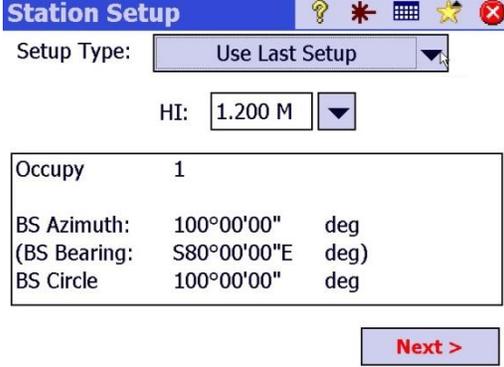
Step 4: Set Station on Unknown Point (Resection or Freestation)

<p>19.</p>	<p>When the second point has been observed, a choice is provided to add more points to the resection or solving the resection with this minimum of two points. A third point will be added to the resection in the same ways that the first two were added.</p>	 <p>The screenshot shows the 'Station Setup' window with 'Resect Point' set to 2. The 'Option' is 'Distance and Angle' with 'HR' set to 0.000 m. The table below shows two points:</p> <table border="1"> <thead> <tr> <th>Point</th> <th>H</th> <th>V</th> <th>Desc</th> <th>dHD</th> <th>dHA</th> <th>N</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Yes</td> <td>Yes</td> <td>SS</td> <td>0.000</td> <td>0°00'00"</td> <td>5,00</td> </tr> <tr> <td>3</td> <td>Yes</td> <td>Yes</td> <td>SS</td> <td>0.000</td> <td>0°00'00"</td> <td>4,99</td> </tr> </tbody> </table> <p>Current: RMS N:0.005 RMS E:0.003...</p>	Point	H	V	Desc	dHD	dHA	N	1	Yes	Yes	SS	0.000	0°00'00"	5,00	3	Yes	Yes	SS	0.000	0°00'00"	4,99							
Point	H	V	Desc	dHD	dHA	N																								
1	Yes	Yes	SS	0.000	0°00'00"	5,00																								
3	Yes	Yes	SS	0.000	0°00'00"	4,99																								
<p>20.</p>	<p>The resection results are dynamic. As more points are added or deleted, the Root Mean Square (RMS) adjustment values will be displayed.</p>	 <p>The screenshot shows the 'Station Setup' window with 'Resect Point' set to 3. The 'Option' is 'Distance and Angle' with 'HR' set to 0.000 m. The table below shows three points:</p> <table border="1"> <thead> <tr> <th>Point</th> <th>H</th> <th>V</th> <th>Desc</th> <th>dHD</th> <th>dHA</th> <th>N</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Yes</td> <td>Yes</td> <td>SS</td> <td>0.000</td> <td>0°00'00"</td> <td>5,00</td> </tr> <tr> <td>3</td> <td>Yes</td> <td>Yes</td> <td>SS</td> <td>0.000</td> <td>0°00'00"</td> <td>4,99</td> </tr> <tr> <td>2</td> <td>Yes</td> <td>Yes</td> <td>SS</td> <td>0.000</td> <td>0°00'00"</td> <td>4,99</td> </tr> </tbody> </table> <p>Current: RMS N:0.000 RMS E:0.000...</p>	Point	H	V	Desc	dHD	dHA	N	1	Yes	Yes	SS	0.000	0°00'00"	5,00	3	Yes	Yes	SS	0.000	0°00'00"	4,99	2	Yes	Yes	SS	0.000	0°00'00"	4,99
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2	Yes	Yes	SS	0.000	0°00'00"	4,99																								
<p>21.</p>	<p>Clicking on the Horizontal Angle and Vertical Angle elements of the points involved in the resection will either enable or disable that element. Tap on Next > to accept the resection.</p>	 <p>The screenshot shows the 'Station Setup' window with 'Resect Point' set to 3. The 'Option' is 'Distance and Angle' with 'HR' set to 0.000 m. The table below shows three points with some H and V elements disabled (indicated by dashes):</p> <table border="1"> <thead> <tr> <th>Point</th> <th>H</th> <th>V</th> <th>Desc</th> <th>dHD</th> <th>dHA</th> <th>N</th> </tr> </thead> <tbody> <tr> <td>1</td> <td></td> <td>Yes</td> <td>SS</td> <td>---</td> <td>---</td> <td>5,00</td> </tr> <tr> <td>3</td> <td>Yes</td> <td>Yes</td> <td>SS</td> <td>0.000</td> <td>0°00'00"</td> <td>4,99</td> </tr> <tr> <td>2</td> <td>Yes</td> <td></td> <td>SS</td> <td>0.000</td> <td>0°00'00"</td> <td>4,99</td> </tr> </tbody> </table> <p>Current: RMS N:0.001 RMS E:0.005...</p>	Point	H	V	Desc	dHD	dHA	N	1		Yes	SS	---	---	5,00	3	Yes	Yes	SS	0.000	0°00'00"	4,99	2	Yes		SS	0.000	0°00'00"	4,99
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2	Yes		SS	0.000	0°00'00"	4,99																								

Step 4: Set Station on Unknown Point (Resection or Freestation)

<p>22.</p>	<p>A final confirmation screen is presented for final analysis before completing the Station Setup. Notice that Survey Pro has automatically selected a point to be used as a backsight. Another backsight point or azimuth can be chosen at this point by clicking on the “Backsight >” button.</p>	
<p>23.</p>	<p>Clicking Finish on the Resection confirmation page will launch the Home page and the instrument is setup and ready for use.</p>	

Step 5: Use Last Setup

<p>1.</p>	<p>Use Last Setup is convenient if the instrument has been setup on a point, but work has been interrupted. If nothing has changed since the last Station Setup, this option can be used to facilitate getting back to work. Aim at the backsight, set the backsight, Finish the Station Setup.</p>	
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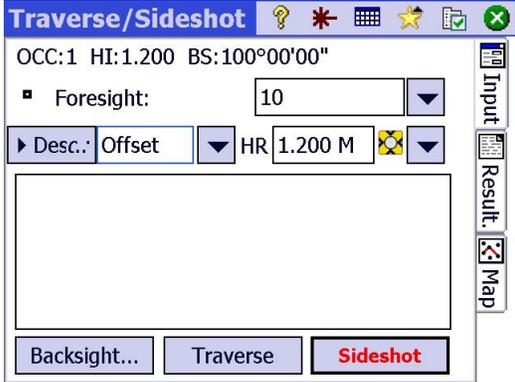
Data Collection

In this lesson, you will learn how to:

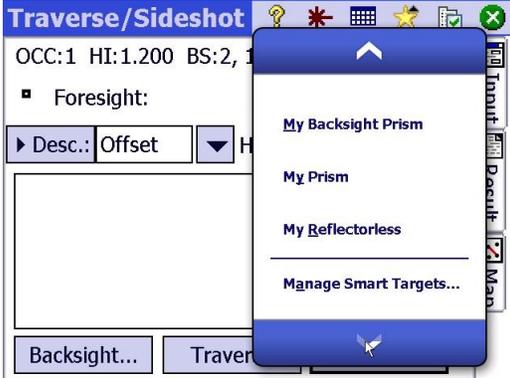
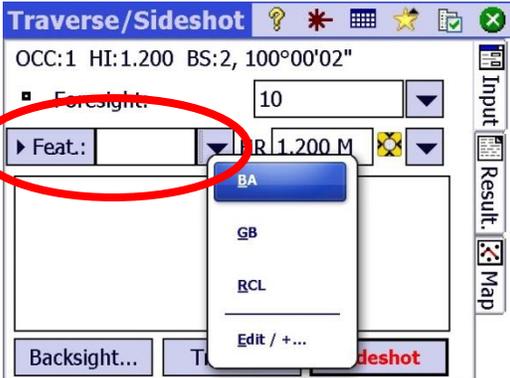
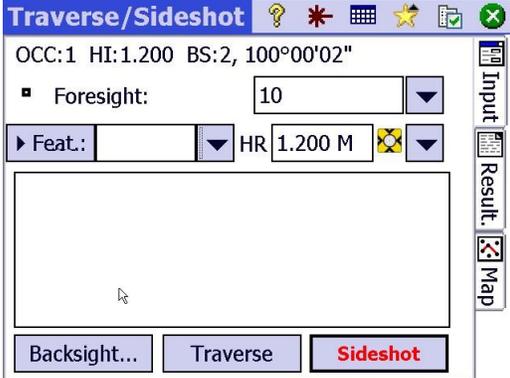
Collect points with features and .descriptions. The lesson will also review the fundamentals of remote controlling the total station, managing the EDM and prism settings and generating linework.

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Step 4: Generating Linework	84
Step 5: Viewing Results	85

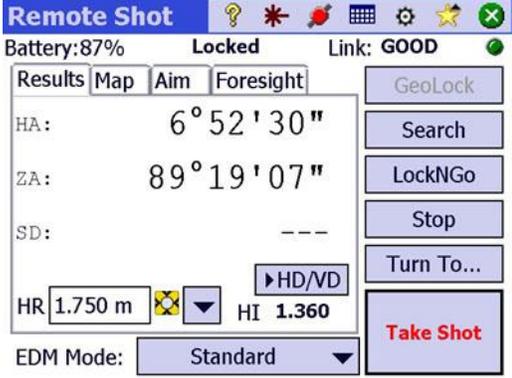
Step 1: Traverse / Sideshot Page Overview

<p>1.</p>	<p>From the main menu, tap on the Survey Icon and then tap on Traverse/Sideshot</p>	
<p>2.</p>	<p>OCC = Occupied point. HI = Height of Instrument BS = Backsight (point if being used) and Azimuth. Foresight = Next point to be measured. Traverse = Survey Pro will assume the instrument will be moved ahead to the point just observed and the next backsight will be the currently occupied location. (The instrument does not need to be moved right away). Backsight = Check the backsight orientation. Sideshot = Access the data collection page.</p>	
<p>3.</p>	<p>The Description of the point can be entered prior to the observation or depending upon the Survey configuration, after the observation. Descriptions can be manually entered or selected from a Description List. The Desc.: power button can be toggled to input Feature Codes.</p>	

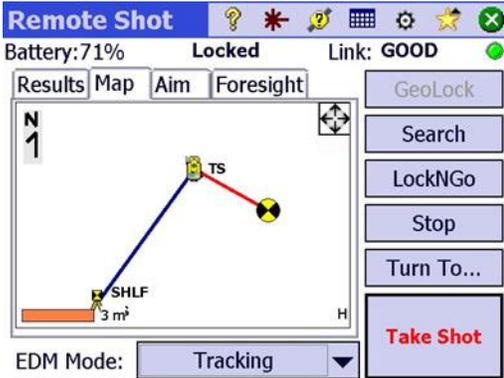
Step 1: Traverse / Sideshot Page Overview

<p>4.</p>	<p>The foresight's prism HR, (Height of Rod) can be changed at any time. Under the prism drop-down menu, any predefined prism is available for selection. Tapping on "Manage Smart Targets" will open the prism dialogue where additional prism definitions can be created or existing definitions modified. This dialogue is also used to switch the EDM modes between prism and reflectorless.</p>	
<p>5.</p>	<p>Clicking on the left power button toggles between descriptions and feature codes. Descriptions are text based extensions of the popular PNEHD format. Features are smart codes capable of generating icons and linework.</p>	
<p>6.</p>	<p>The next point will be named "10" as indicated in the Foresight field. To begin measurements, tap on the "Sideshot" button. Once the remote control screen is entered, as many points as required can be measured. The point names will increment sequentially. If a new point name sequence is required, close the remote control screen which will exit back to the Traverse/Sideshot screen.</p>	

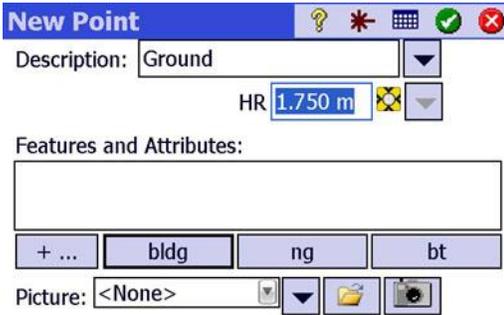
Step 2: Remote Control

1.	<p>The Remote Control screen can be accessed at any time by pressing the Star key on the Ranger 3 keyboard, using the Quick Pick menu or by navigating to the third page of the Surveying menu. The Remote Control screen is used to control the instrument and collect data.</p>	
2.	<p>Tapping search in the Remote Control screen will initiate a search to find the prism.</p>	
3.	<p>Once a prism is found and the instrument has locked onto it and the rod is positioned over the position that needs to be measured, tap on Take Shot and the instrument will initiate the measurements.</p>	

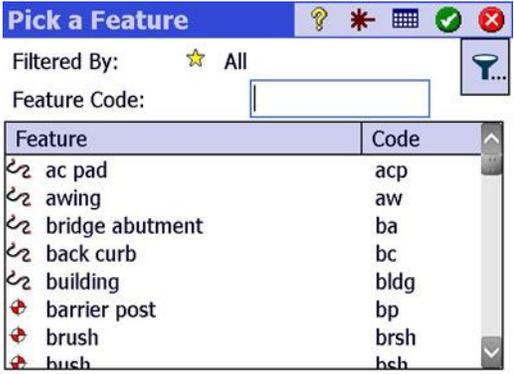
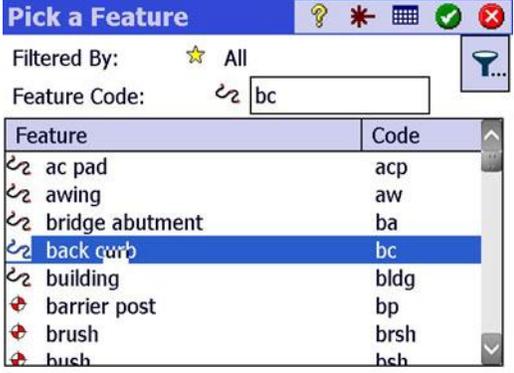
Step 2: Remote Control

<p>4.</p>	<p>On the Remote Control Map page, the orientation of the instrument against the backsight orientation (blue line) and the current angle to the prism (yellow/black target) can be seen.</p> <p>Notice that the “Tracking EDM” is initiated which indicates the distance meter is continuously triggering measurements to the prism.</p>	 <p>The screenshot shows the 'Remote Shot' interface. At the top, it displays 'Battery: 71%', 'Locked', and 'Link: GOOD'. Below this are tabs for 'Results', 'Map', 'Aim', and 'Foresight'. The 'Map' tab is active, showing a map with a blue line representing the backsight and a red line representing the foresight to a target labeled 'TS'. The distance between the instrument and the target is shown as '3 m'. The 'EDM Mode' is set to 'Tracking'. On the right side, there are buttons for 'GeoLock', 'Search', 'LockNGo', 'Stop', 'Turn To...', and a prominent red 'Take Shot' button.</p>
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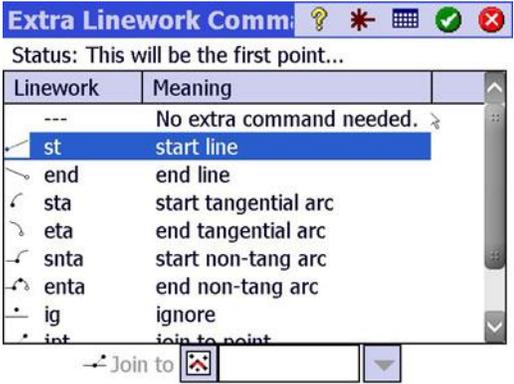
Step 3: Assigning Feature Codes and Descriptions

<p>1.</p>	<p>Survey Pro Job Settings can be configured to prompt for Description and/or Features and Attributes after each measurement. The Description can be manually entered, selected from the Description list, the field can be cleared or it can be ignored. Descriptions are simply a textual extension of the traditional PNEHD format (Point, Northing, Easting, Height, Description).</p>	 <p>The screenshot shows the 'New Point' dialog box. The 'Description' field contains 'SS'. The 'HR' (Height) field is set to '1.750 m'. Below the fields is a section for 'Features and Attributes' with a text input area and buttons for '+ ...', 'bldg', 'ng', and 'bt'. There is also a 'Picture' field set to '<None>' with a dropdown arrow and icons for file selection and camera capture.</p>
<p>2.</p>	<p>“GlobalFeatures.fxl” has been attached to the job. This file is a default file of features and attributes that is included with every Survey Pro installation. Linework can be generated using the “Features and Attributes” function of Survey Pro. Clicking on the “+...” will open up the Feature list.</p>	 <p>The screenshot shows the 'New Point' dialog box. The 'Description' field contains 'Ground'. The 'HR' (Height) field is set to '1.750 m'. Below the fields is a section for 'Features and Attributes' with a text input area and buttons for '+ ...', 'bldg', 'ng', and 'bt'. There is also a 'Picture' field set to '<None>' with a dropdown arrow and icons for file selection and camera capture.</p>

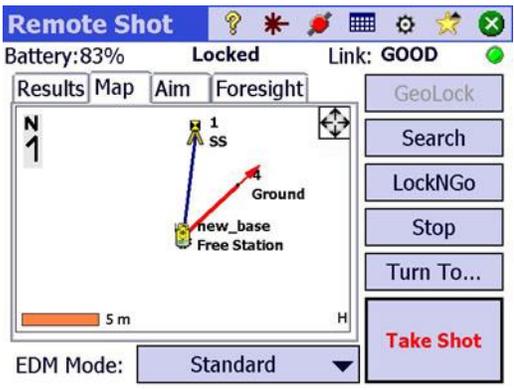
Step 4: Generating Linework

<p>1.</p>	<p>Features are divided between point and line. Features can be assigned to various layers so that large lists can be filtered. Survey Pro allows layer filters to be applied and signifies the type of feature by either a wavy line or a survey target for point features. These features are part of the GlobalFeatures.fxl file which can be customized in the office using the Feature Definition Manager which is automatically installed with Spectra Precision Survey Office software.</p>	
<p>2.</p>	<p>Selecting “bc” for “back of curb” will assign this feature to the last point observation.</p>	
<p>3.</p>	<p>Clicking on the wavy lined icon inside of the Features and Attributes box will allow the user to apply special conditions to the line code that has been assigned.</p>	

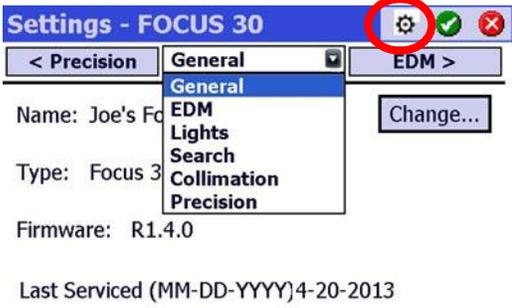
Step 4: Generating Linework

<p>4.</p>	<p>The “st” or “start line” command is used to instruct Survey Pro to begin the line coded “bc” with this observation. As it can be seen, several other special line commands are also supported.</p>	 <p>Extra Linework Comm ? * [Grid] [Check] [Close]</p> <p>Status: This will be the first point...</p> <table border="1"> <thead> <tr> <th>Linework</th> <th>Meaning</th> </tr> </thead> <tbody> <tr> <td>---</td> <td>No extra command needed.</td> </tr> <tr> <td>st</td> <td>start line</td> </tr> <tr> <td>end</td> <td>end line</td> </tr> <tr> <td>sta</td> <td>start tangential arc</td> </tr> <tr> <td>eta</td> <td>end tangential arc</td> </tr> <tr> <td>snta</td> <td>start non-tang arc</td> </tr> <tr> <td>enta</td> <td>end non-tang arc</td> </tr> <tr> <td>ig</td> <td>ignore</td> </tr> <tr> <td>int</td> <td>join to point</td> </tr> </tbody> </table> <p>Join to []</p>	Linework	Meaning	---	No extra command needed.	st	start line	end	end line	sta	start tangential arc	eta	end tangential arc	snta	start non-tang arc	enta	end non-tang arc	ig	ignore	int	join to point
Linework	Meaning																					
---	No extra command needed.																					
st	start line																					
end	end line																					
sta	start tangential arc																					
eta	end tangential arc																					
snta	start non-tang arc																					
enta	end non-tang arc																					
ig	ignore																					
int	join to point																					

Step 5: Viewing Results

<p>1.</p>	<p>After a measurement has been executed, a visual reference of the instrument’s orientation to the point that was just measured can be seen on the Remote Shot Map page.</p>	 <p>Remote Shot ? * [Grid] [Settings] [Star] [Close]</p> <p>Battery:83% Locked Link: GOOD</p> <p>Results Map Aim Foresight</p> <p>GeoLock</p> <p>Search</p> <p>LockNGo</p> <p>Stop</p> <p>Turn To...</p> <p>Take Shot</p> <p>EDM Mode: Standard</p>
<p>2.</p>	<p>The Foresight page in the Remote Shot routine will display the last measured coordinates for about 15 seconds after the measurement’s conclusion.</p>	 <p>Remote Shot ? * [Grid] [Settings] [Star] [Close]</p> <p>Battery:80% Locked Link: GOOD</p> <p>Results Map Aim Foresight</p> <p>GeoLock</p> <p>Search</p> <p>LockNGo</p> <p>Stop</p> <p>Turn To...</p> <p>Take Shot</p> <p>EDM Mode: Standard</p> <p>Foresight: 6</p> <p>Desc.: Ground</p> <p>N: 5,000.319</p> <p>E: 4,997.855</p> <p>El 99.422</p> <p>Prism Const.: 0.0mm</p>

Step 5: Viewing Results

<p>3.</p>	<p>Clicking on the gear/cog icon in the upper task bar will open up the instrument settings directly. This can be quite convenient to quickly turn on the guide lights or to change the Search parameters.</p>	
<p>4.</p>	<p>The main Traverse/Sideshot page provides information about the last measurement that was stored.</p>	
<p>5.</p>	<p>The Results tab provides a nice snapshot of the recent measurements.</p>	

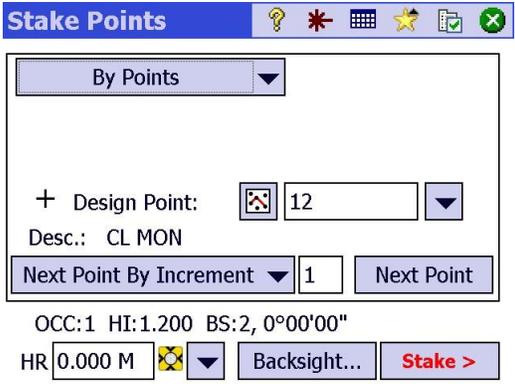
Stakeout

In this lesson, you will learn how to:

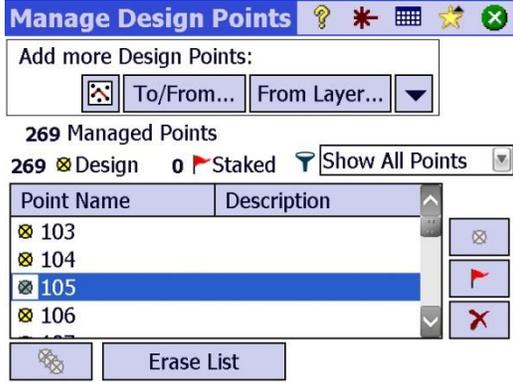
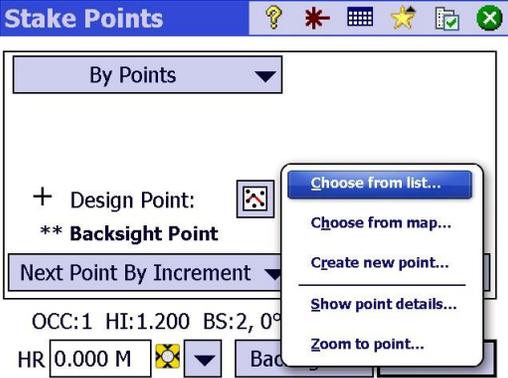
Stakeout points and lines. This lesson will also review various stakeout configuration options including stations and offsets and automatic advancements for cross-section staking.

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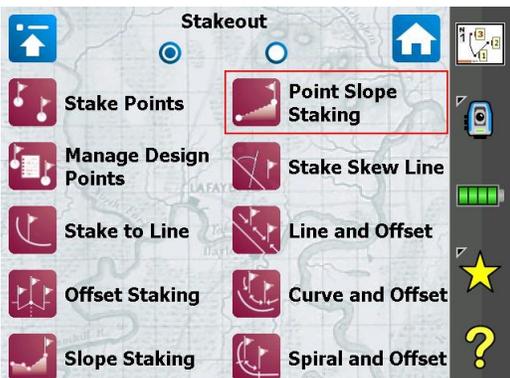
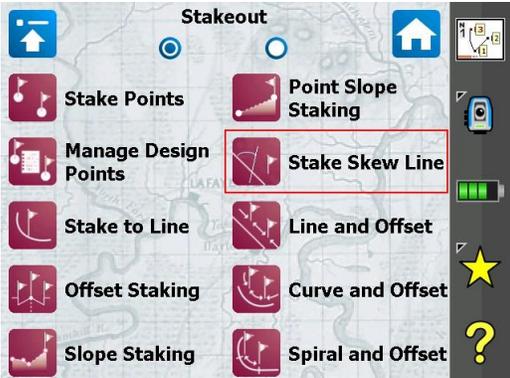
Step 1: Stakeout Page Overview

<p>1.</p>	<p>The Stakeout Menus are accessed from the Main Menu.</p>	
<p>2.</p>	<p>Survey Pro supports the most popular stakeout routines. The Manage Design Points screen is used to select a set of job points to be staked out, and then to manage the collection as design points are staked and as staked points are stored.</p>	
<p>3.</p>	<p>The Stake Points page provides a dialogue for selecting the point to be staked, HR, prism type and point numbering increments as well as a check backsight routine.</p>	

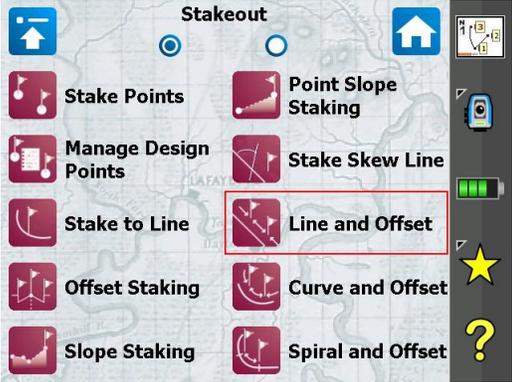
Step 1: Stakeout Page Overview

<p>4.</p>	<p>A set of “Managed Points” can be defined and selected which allows Survey Pro to flag those points in the list that are from the design, those points that have been staked, and the points that have not been staked. Show Design Points Only or show Staked Points Only filters can be applied. Points can be manually flagged as Staked or deleted from the list.</p>	
<p>5.</p>	<p>Any point in the job to be staked can be manually keyed in, chosen from the Map View or selected from the point list.</p>	
<p>6.</p>	<p>Staking By Managed Points provides a visual and textual method for determining the amount of work that has been completed or remains to be accomplished. Survey Pro can also increment the staking by selecting the Next Closest point in the list of points being staked.</p>	

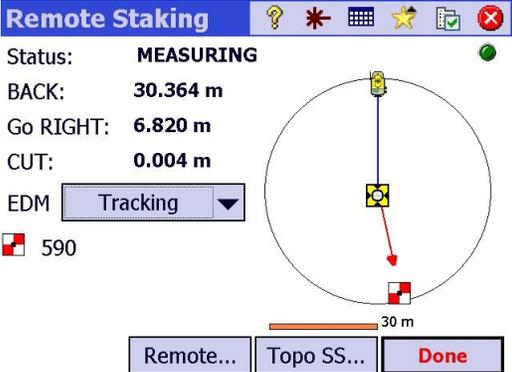
Step 2: Staking Options

<p>1.</p>	<p>In addition to point staking, Survey Pro supports several line staking routines. Stake to Line allows a line to be defined in several different ways and then station information is provided dynamically. Centerline offsets and Slope Staking from centerlines is also supported.</p>	 <p>The screenshot shows the 'Stakeout' menu with various options. The 'Stake to Line' option is highlighted with a red rectangular box. Other options include Stake Points, Manage Design Points, Offset Staking, Slope Staking, Point Slope Staking, Stake Skew Line, Line and Offset, Curve and Offset, and Spiral and Offset.</p>
<p>2.</p>	<p>Point Slope Staking is a simplified Slope Staking routine allowing the determination of the location of a catch point from a known hinge point and a specified horizontal direction from that hinge point (whereas the Slope Staking routine requires a centerline alignment with vertical and horizontal offsets at specified stations).</p>	 <p>The screenshot shows the 'Stakeout' menu with various options. The 'Point Slope Staking' option is highlighted with a red rectangular box. Other options include Stake Points, Manage Design Points, Stake to Line, Offset Staking, Slope Staking, Stake Skew Line, Line and Offset, Curve and Offset, and Spiral and Offset.</p>
<p>3.</p>	<p>Stake Skew Line is used to select or define any alignment and then define a skew angle from this line for staking purposes. A graphical interface is provided to visualize the skewed angle as it relates to the reference line.</p>	 <p>The screenshot shows the 'Stakeout' menu with various options. The 'Stake Skew Line' option is highlighted with a red rectangular box. Other options include Stake Points, Manage Design Points, Stake to Line, Offset Staking, Slope Staking, Point Slope Staking, Line and Offset, Curve and Offset, and Spiral and Offset.</p>

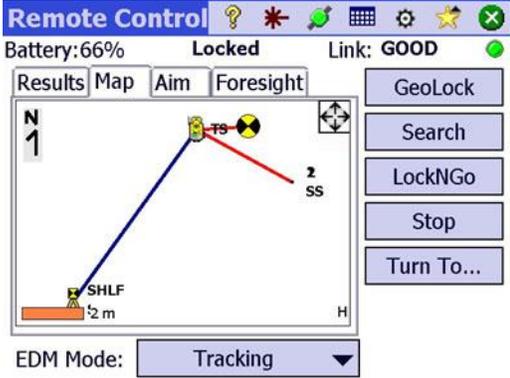
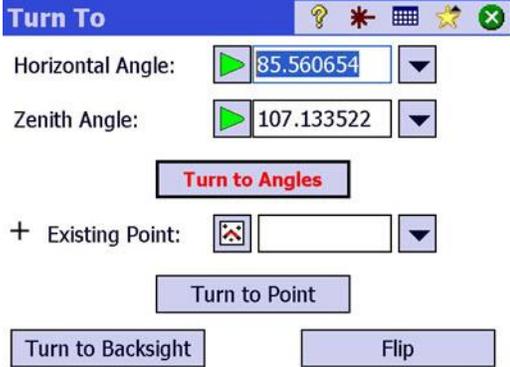
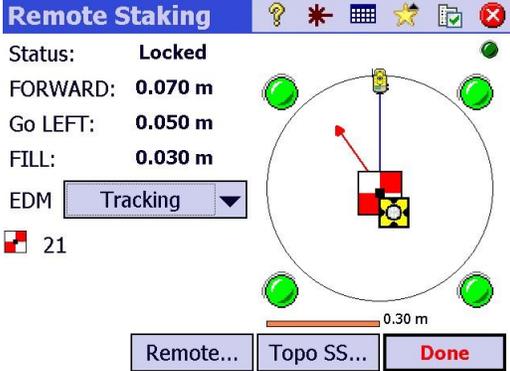
Step 2: Staking Options

<p>4.</p>	<p>Offsets can be staked from lines, curves, spirals and polylines.</p>	 <p>The screenshot shows the 'Stakeout' menu with various options. The 'Line and Offset' option is highlighted with a red rectangular box. Other options include Stake Points, Point Slope Staking, Manage Design Points, Stake Skew Line, Stake to Line, Curve and Offset, Offset Staking, and Spiral and Offset.</p>
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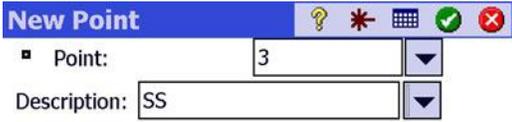
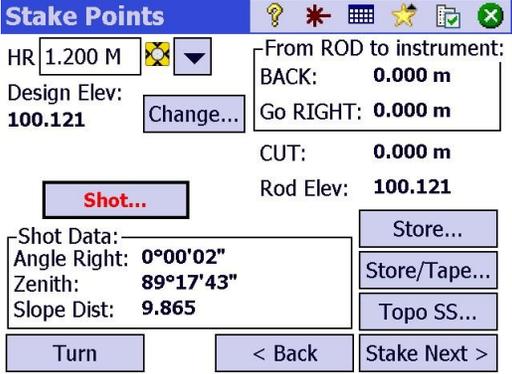
Step 3: Stake Points

<p>1.</p>	<p>Select the design point in the Stake Points screen. The point to be staked can be manually defined, selected from the Map view or chosen from the point list. The HR and prism type can be defined and the Backsight can be checked for any drift. When ready, select “Stake” to move to the Staking screen.</p>	 <p>The screenshot shows the 'Stake Points' screen. It includes a 'Design Point' dropdown menu set to 'DOOR', an 'Increment' field set to '1', and an 'HR' field set to '1.200 M'. There is a 'Next Point' button and a 'Stake >' button. The status 'OCC:TS HI:1.200 BS:SHLF, 215°51'52"' is also visible.</p>
<p>2.</p>	<p>Once the instrument has locked onto the prism, the Tracking EDM will provide dynamic Forward/Backward, Right/Left, Cut/Fill values to the design point location. By default, robotic staking directions are given from the perspective of the rod. This can be optionally changed in the survey settings. The prism/rodman is the yellow/black target. The stake point is the red/white target.</p>	 <p>The screenshot shows the 'Remote Staking' screen. It displays the status 'MEASURING' and several distance values: 'BACK: 30.364 m', 'Go RIGHT: 6.820 m', and 'CUT: 0.004 m'. There is a diagram showing the instrument (yellow/black target) and the stake point (red/white target) with a 30m scale bar. Buttons for 'Remote...', 'Topo SS...', and 'Done' are visible at the bottom.</p>

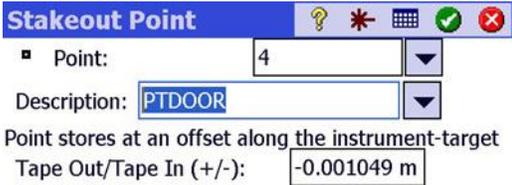
Step 3: Stake Points

<p>3.</p>	<p>If the “Remote” button is clicked, it launches the Remote Control page. Clicking on the Map tab will also provide a visual reference of the rodman’s location in relation to the stake point.</p>	
<p>4.</p>	<p>The Remote Control page also offers the capability to turn the instrument to any angle or point in the job. It can reverse the instrument (Flip) or to turn to the backsight. Turn to Point is very helpful especially if the orientation of the instrument is unknown. Stand near a known point in the job. Instruct Survey Pro to “Turn to Point” and the instrument’s targeting camera should be able to find the prism and lock onto it.</p>	
<p>5.</p>	<p>As the prism approaches the stake point, the display will refine as seen. As long as the EDM is in a Tracking mode, dynamic positioning information will be displayed. The objective is to place the yellow/black target directly on top of the red/white target.</p>	

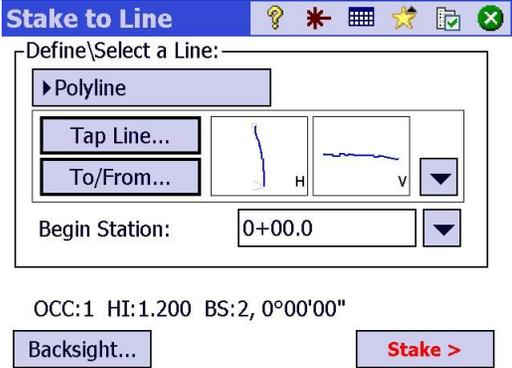
Step 3: Stake Points

<p>6.</p>	<p>At any time during the Stakeout, the “Topo SS...” button can be tapped to store a point observation using the parameters defined under the Surveying settings. This can be convenient when performing a stakeout mission and then encountering unexpected or uncollected features that need to be recorded.</p>	
<p>7.</p>	<p>For the most precise measurements, place the EDM into the Standard mode to make the final observations.</p>	
<p>8.</p>	<p>After the “Done” button is clicked, a results page will be displayed showing the final observation calculations. If there is a vertical offset that needs to be applied, this can be accomplished by clicking on the “Change...” icon.</p> <p>Shot = Revert to previous page Turn = Turns the instrument to current design point. Store = Stores point and cut sheet data with currently displayed values.</p>	 <p>Topo SS = Collect a sideshot. Stake Next = Stake the next point (by increment or closest). Back = Revert to Stake Point selection page.</p>

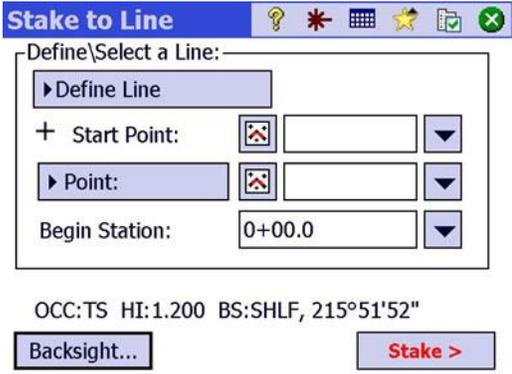
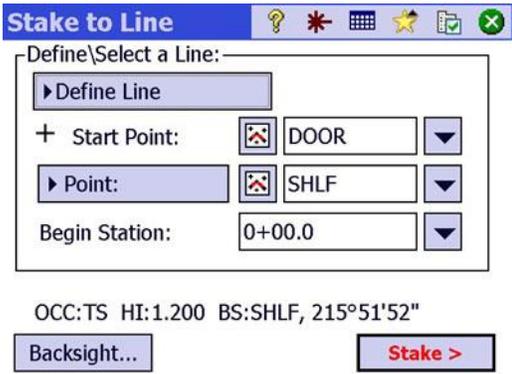
Step 3: Stake Points

<p>9.</p>	<p>The “Store/Tape” option allows a line to be extended past the prism. This distance can be added/subtracted by a distance measured using another method such as a tape measure.</p>	
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Step 4: Stake Lines

<p>1.</p>	<p>Stake to Line provides positioning information along any line. The position is expressed in terms of stationing along the line and offsets left or right of the line. Cut/Fill values are also provided.</p>	
<p>2.</p>	<p>A line must be defined. This can be an existing polyline that is in the currently open job or as part of the basemap attached to the job. Stationing can be in the form 0+00 or 0+000 as defined in the Job Settings/Format page.</p>	

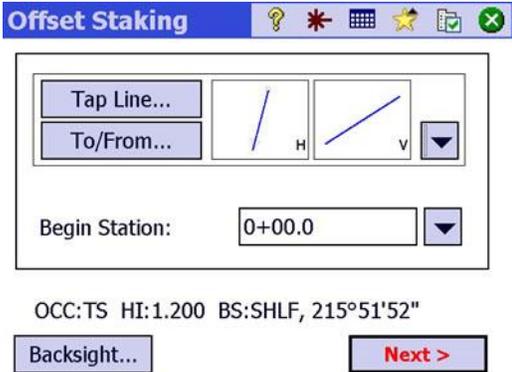
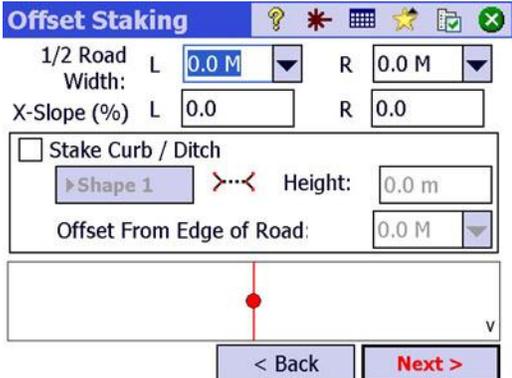
Step 4: Stake Lines

<p>3.</p>	<p>In this example, the line is being defined by a point of beginning oriented against a second point.</p>	
<p>4.</p>	<p>In this example, the line is being defined by a point of beginning and a direction. Survey Pro can calculate the direction: If the orientation of the line needs to be the same as the inverse direction between points 10 and 12, “10-12” can be entered into the “Direction” field and this azimuth will be calculated and then inserted. If there was a previous calculation in the job that contains the desired azimuth, this value can be accessed under the “Past Results” in the drop-down menu for the Direction field.</p>	
<p>5.</p>	<p>In this example, the line has been defined as the azimuth between points “DOOR” and “SHLF”</p>	

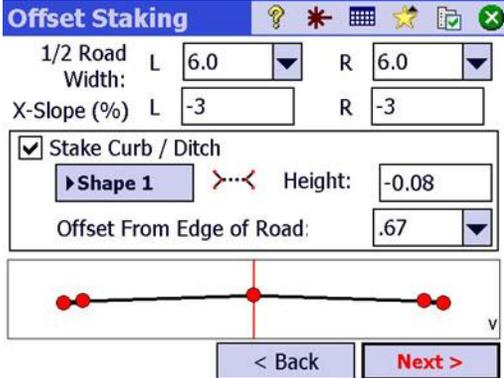
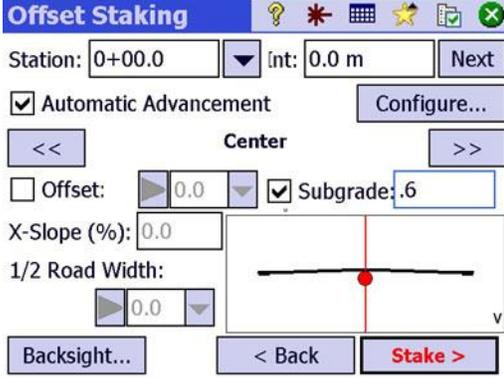
Step 4: Stake Lines

<p>6.</p>	<p>Tapping on “Stake” will bring up a dynamic page (with Tracking EDM selected) providing directions to the design location. The Results tab shows the prism’s position in relation to the stake location.</p>	
<p>7.</p>	<p>The “Meas” tab provides horizontal and vertical angles at the instrument as well as SD, or Slope Distance the has also been reduced to HD (Horizontal Distance) and VD (Vertical Difference). “Back” will go back one page so that another line can be selected. “Store..” will store the current observation.</p>	
<p>8.</p>	<p>A description will be assigned to the point record based on its stationing. This can be changed before the point is stored on this page.</p>	

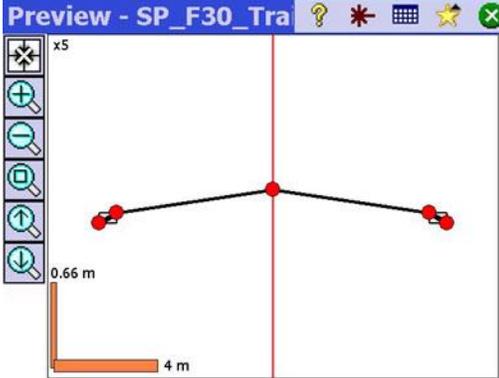
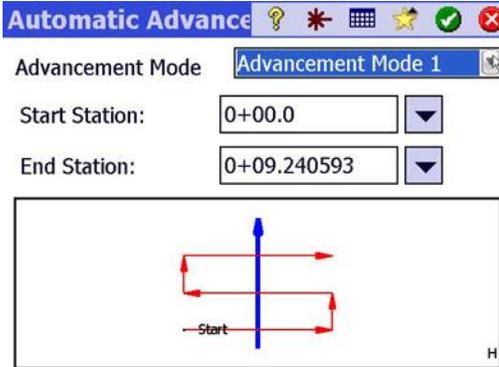
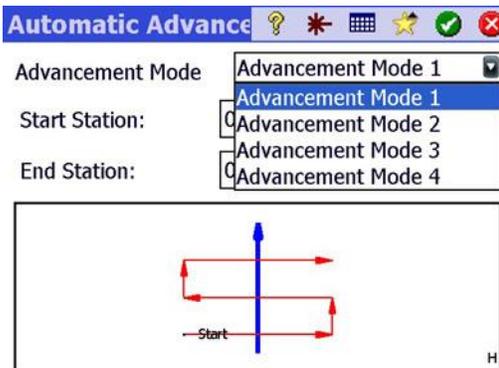
Step 5: Stake Offset Lines

<p>1.</p>	<p>The Offset Staking routine is a convenient tool for staking cross sections such as simple roads and other corridors.</p>	
<p>2.</p>	<p>A line must be selected for the offset line staking. Horizontal and Vertical alignments of the selected line are displayed. A “Begin Station” location can be defined.</p>	
<p>3.</p>	<p>The Line Offset routine provides an interface to define simple cross-sections. A centerline with offsets left and right along with cross-slope percentages are supported. Additionally, curb or ditch features can also be defined.</p>	

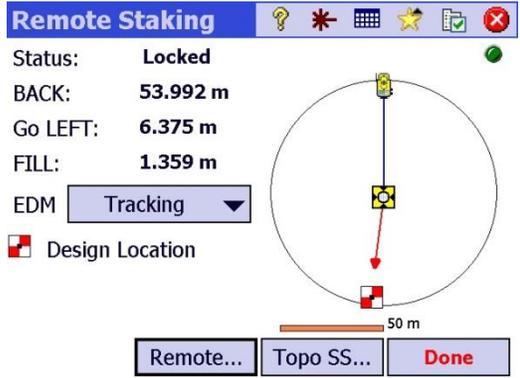
Step 5: Stake Offset Lines

<p>4.</p>	<p>In this example, the road is defined as being 6 meters wide on each side with a negative 3% cross-slope. On the side of the road, a curb (element in the up direction) or a ditch (element in the down direction) can be defined by an offset from the edge of the road and a distance up or down. This example has a ditch that is 8 centimeters down and has a total offset from the edge of the road of 67 centimeters. There are four different standard shapes that can be used for the curb/ditch feature. A visual representation of the cross-section is provided.</p>	
<p>5.</p>	<p>Tapping Next advances to a page where the station information and any sub-grade details can be entered. The red dot in the graphic indicates the next position to be staked along the alignment. This can be changed right or left by clicking on the double arrows in either direction. In this case, the check box for Automatic Advancement has been checked. This feature will automatically advance the station and the segment based on the configuration applied.</p>	

Step 5: Stake Offset Lines

<p>6.</p>	<p>Tapping on the graphic of the alignment will bring up a larger image allowing for a closer inspection of the elements of the cross-section.</p>	
<p>7.</p>	<p>In this example, Advancement Mode 1 is being used allowing the stakeout to be conducted in a serpentine fashion. Survey Pro will drive the positions in the order shown by the arrows and red line.</p>	
<p>8.</p>	<p>Survey Pro supports four different automatic advancement routines which can greatly improve efficiencies for cross-sectional stakeouts.</p>	

Step 5: Stake Offset Lines

9.	<p>The Stake button advances to the same stakeout screen as for point staking except that now the directions are based on the stationing and offsets.</p> <p>The goal is to place the yellow/black target on top of the red/white target.</p> <p>When the location has been staked, clicking on the Done button will return to the Store/Stake page where the data can be stored and the next station and offset can be selected.</p>	 <p>Remote Staking</p> <p>Status: Locked</p> <p>BACK: 53.992 m</p> <p>Go LEFT: 6.375 m</p> <p>FILL: 1.359 m</p> <p>EDM Tracking</p> <p><input checked="" type="checkbox"/> Design Location</p> <p>50 m</p> <p>Remote... Topo SS... Done</p>
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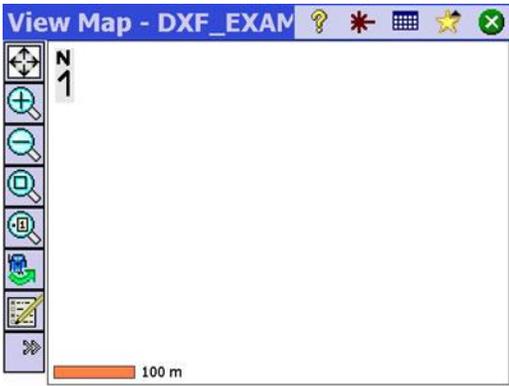
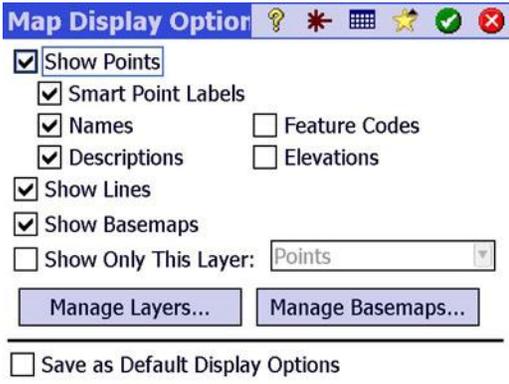
Map View

In this lesson, you will learn how to:

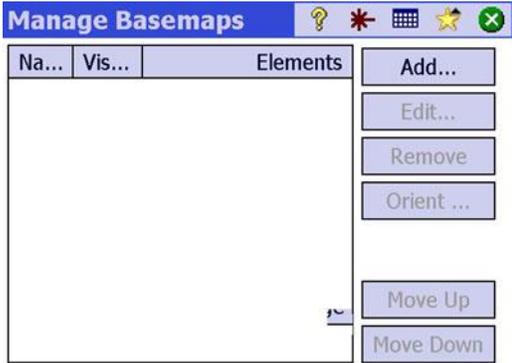
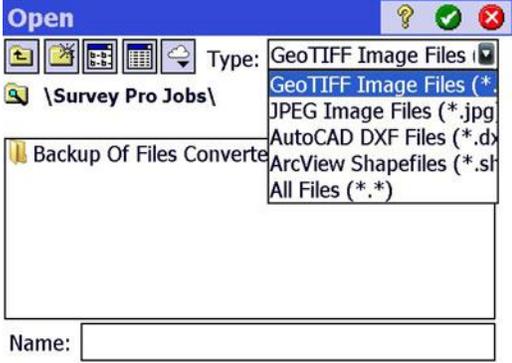
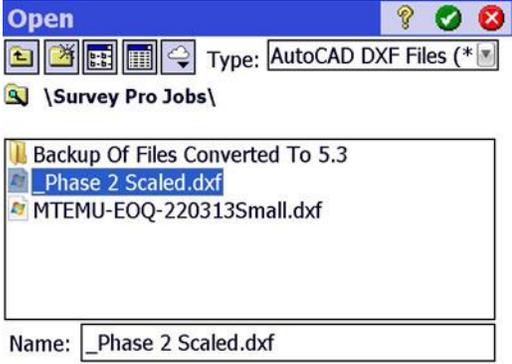
Work directly from the Map page. This lesson will provide instructions for attaching basemaps, performing COGO calculations, managing layers and surveying directly from the Map View page. Data collection with line features attached to the point observations are used to illustrate the possibility of generating linework in the field.

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Step 7:	Create Points	114
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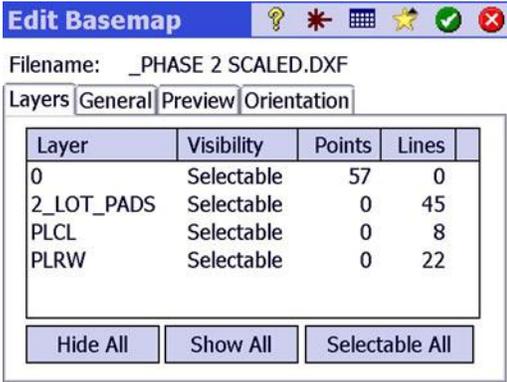
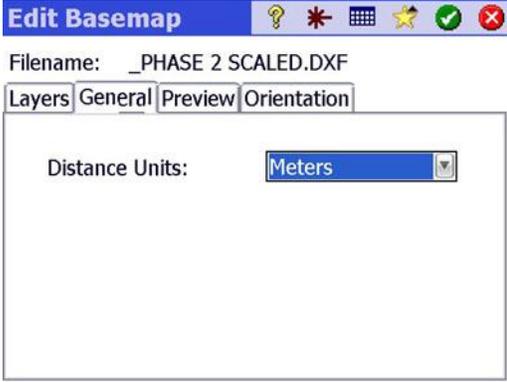
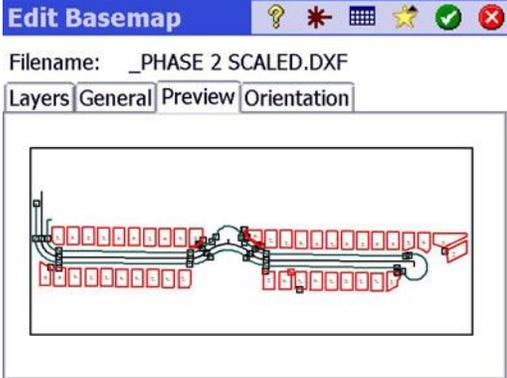
Step 1: Manage the Map View

<p>1.</p>	<p>The Map View is opened by clicking on the Map icon in the far upper right hand side of the main menu pages.</p>	
<p>2.</p>	<p>Depending upon the contents of the currently opened job, the Map View will display all visible layers. By default, all layers are visible. The map buttons shown here in order from top to bottom:</p> <ul style="list-style-type: none"> Zoom All Zoom Out Zoom In Zoom Window Zoom to Point Tap to Turn (robotic only) Map Display Options Flight-Out menu for Snap To actions 	
<p>3.</p>	<p>Clicking on the bottom icon in the Map View will bring up the Map Display options. Various elements of the job can be displayed or hidden. Smart Point Labels is an intelligent approach to displaying more recent elements of the job instead of older elements to reduce screen clutter.</p>	

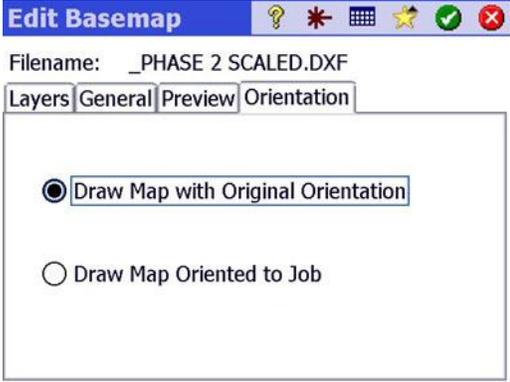
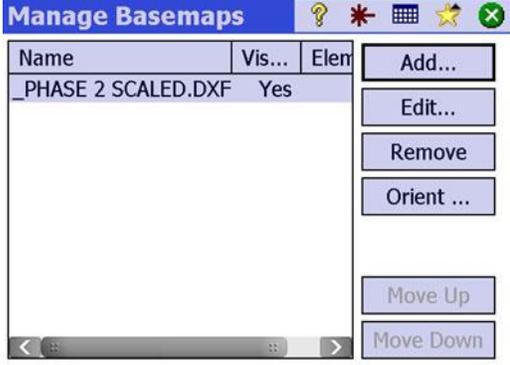
Step 2: Insert a Basemap

<p>1.</p>	<p>Clicking on the Manage Basemaps icon opens up the Basemap management dialogue. Tap on the Add button.</p>	
<p>2.</p>	<p>Four different file formats are currently supported. By definition, GeoTIFF files are already rectified to a coordinate system. The same is true for SHP files that have an associated PRJ file. DXF files have an assumed northing/easting datum. In order to use JPF files, an associated JPG World file must be in the same directory.</p>	
<p>3.</p>	<p>For this example, a DXF file will be attached to the job.</p>	

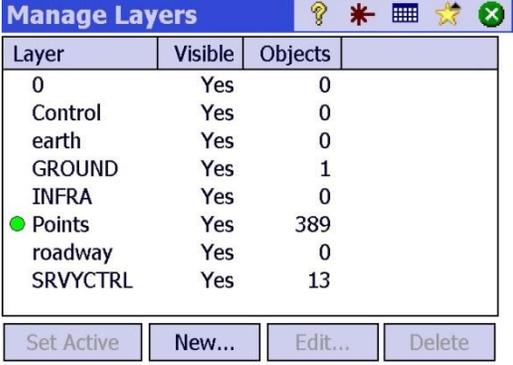
Step 2: Insert a Basemap

<p>4.</p>	<p>Survey Pro identifies the contents of the different layers and provides a summary. In the “Visibility” column, tap on any row to toggle each item as “Selectable” “Visible” or “Hidden”</p> <p>Selectable: Element can be used within the context of the job for COGO, data collection and stakeout.</p> <p>Visible: Element will be visible on the map screen but not selectable.</p> <p>Hidden: Element will not be visible on the map screen.</p>	 <p>Edit Basemap ? * [Grid] ★ ✓ ✕</p> <p>Filename: _PHASE 2 SCALED.DXF</p> <p>Layers General Preview Orientation</p> <table border="1"> <thead> <tr> <th>Layer</th> <th>Visibility</th> <th>Points</th> <th>Lines</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>Selectable</td> <td>57</td> <td>0</td> </tr> <tr> <td>2_LOT_PADS</td> <td>Selectable</td> <td>0</td> <td>45</td> </tr> <tr> <td>PLCL</td> <td>Selectable</td> <td>0</td> <td>8</td> </tr> <tr> <td>PLRW</td> <td>Selectable</td> <td>0</td> <td>22</td> </tr> </tbody> </table> <p>Hide All Show All Selectable All</p>	Layer	Visibility	Points	Lines	0	Selectable	57	0	2_LOT_PADS	Selectable	0	45	PLCL	Selectable	0	8	PLRW	Selectable	0	22
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PLRW	Selectable	0	22																			
<p>5.</p>	<p>The units of the basemap must be defined.</p>	 <p>Edit Basemap ? * [Grid] ★ ✓ ✕</p> <p>Filename: _PHASE 2 SCALED.DXF</p> <p>Layers General Preview Orientation</p> <p>Distance Units: <input type="text" value="Meters"/></p>																				
<p>6.</p>	<p>A preview of the file that is to be attached to the job is provided.</p>	 <p>Edit Basemap ? * [Grid] ★ ✓ ✕</p> <p>Filename: _PHASE 2 SCALED.DXF</p> <p>Layers General Preview Orientation</p> <p>[Preview of basemap data showing lot pads and lines]</p>																				

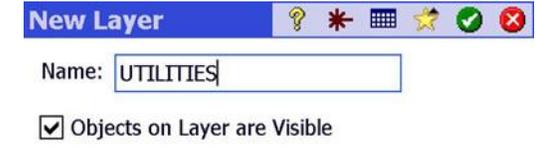
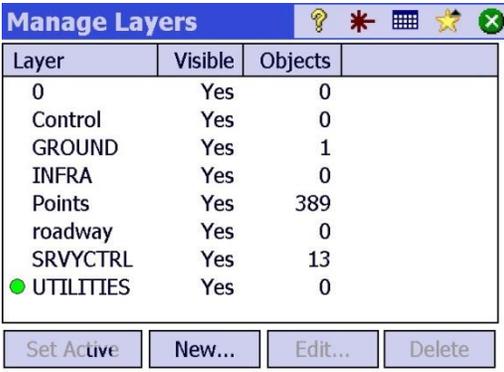
Step 2: Insert a Basemap

<p>7.</p>	<p>The DXF file will generally be imported with its original orientation. Once attached to the job, the basemap can then be reoriented if necessary. There is the option to toggle the view between the basemap with its original orientation or the job's calibrated orientation.</p>	
<p>8.</p>	<p>Additional basemaps can be added. Basemaps that have been attached to the job can be oriented by selecting two points from the job and calibrating them against two points in the basemap file.</p>	

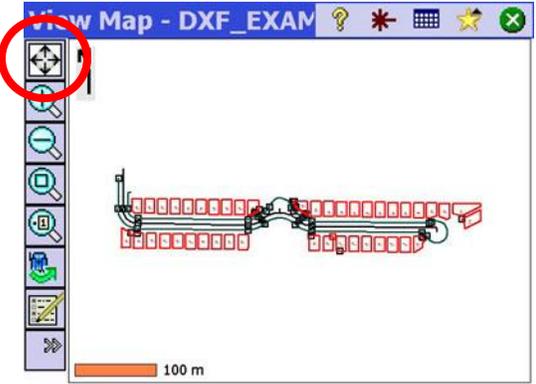
Step 3: Manage Layers

<p>1.</p>	<p>Each Layer in the current job is listed in the Manage Layers dialogue. One layer is active at any time as indicated by the green dot next to Points. All points that are collected will be placed on the active layer by default. The Prompt for Layer option or Feature Code Definition can be used to define a layer for each stored point.</p>	 <table border="1" data-bbox="880 1255 1377 1537"> <thead> <tr> <th>Layer</th> <th>Visible</th> <th>Objects</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>Yes</td> <td>0</td> </tr> <tr> <td>Control</td> <td>Yes</td> <td>0</td> </tr> <tr> <td>earth</td> <td>Yes</td> <td>0</td> </tr> <tr> <td>GROUND</td> <td>Yes</td> <td>1</td> </tr> <tr> <td>INFRA</td> <td>Yes</td> <td>0</td> </tr> <tr> <td>● Points</td> <td>Yes</td> <td>389</td> </tr> <tr> <td>roadway</td> <td>Yes</td> <td>0</td> </tr> <tr> <td>SRVYCTRL</td> <td>Yes</td> <td>13</td> </tr> </tbody> </table>	Layer	Visible	Objects	0	Yes	0	Control	Yes	0	earth	Yes	0	GROUND	Yes	1	INFRA	Yes	0	● Points	Yes	389	roadway	Yes	0	SRVYCTRL	Yes	13
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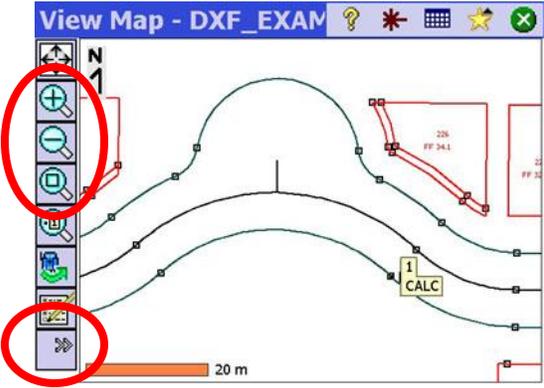
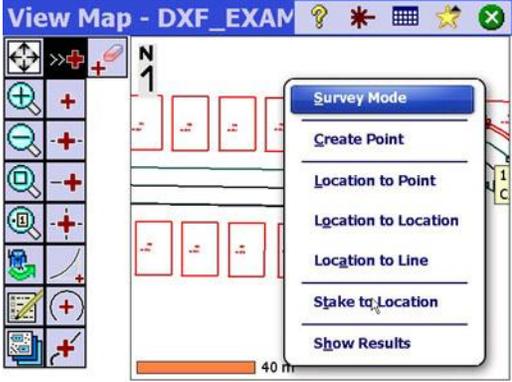
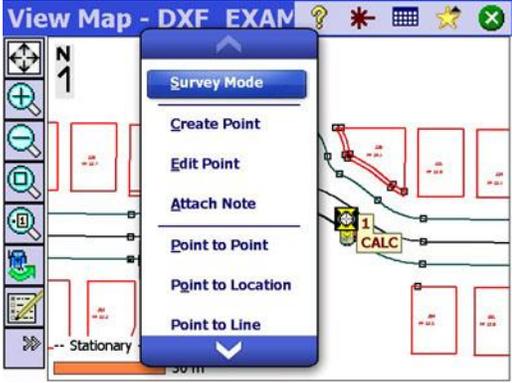
Step 3: Manage Layers

<p>2.</p>	<p>New Layers can be created on the fly.</p>																												
<p>3.</p>	<p>The number of elements on each layer is displayed. A Layer that is highlighted can be selected to be the Active Layer.</p>	 <table border="1" data-bbox="868 751 1372 1033"> <thead> <tr> <th>Layer</th> <th>Visible</th> <th>Objects</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>Yes</td> <td>0</td> </tr> <tr> <td>Control</td> <td>Yes</td> <td>0</td> </tr> <tr> <td>GROUND</td> <td>Yes</td> <td>1</td> </tr> <tr> <td>INFRA</td> <td>Yes</td> <td>0</td> </tr> <tr> <td>Points</td> <td>Yes</td> <td>389</td> </tr> <tr> <td>roadway</td> <td>Yes</td> <td>0</td> </tr> <tr> <td>SRVYCTRL</td> <td>Yes</td> <td>13</td> </tr> <tr> <td>● UTILITIES</td> <td>Yes</td> <td>0</td> </tr> </tbody> </table>	Layer	Visible	Objects	0	Yes	0	Control	Yes	0	GROUND	Yes	1	INFRA	Yes	0	Points	Yes	389	roadway	Yes	0	SRVYCTRL	Yes	13	● UTILITIES	Yes	0
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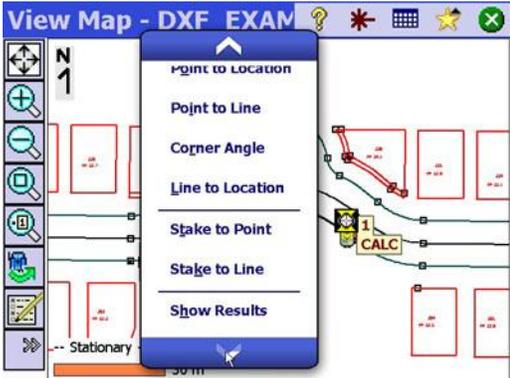
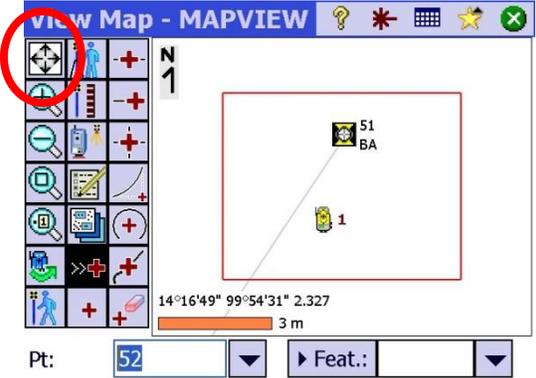
Step 4: Map Page Options

<p>1.</p>	<p>The Zoom Extents button will zoom to include all elements of the currently opened job.</p>	
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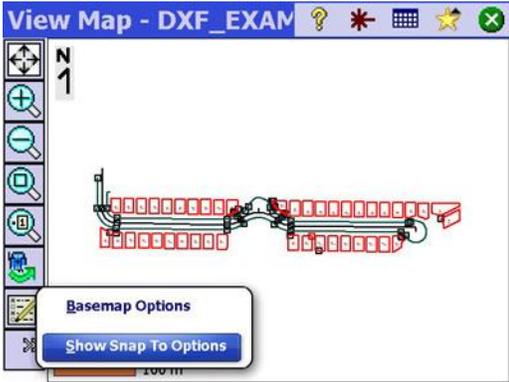
Step 4: Map Page Options

<p>2.</p>	<p>The Zoom In, Zoom Out or Zoom Window buttons can be used to focus on any area. Tap on the double arrows to Show Snap To Options</p>	
<p>3.</p>	<p>Tap and hold anywhere in the white (blank) areas of the Map View to bring up a menu of additional choices.</p>	
<p>4.</p>	<p>Tap and hold on top of any specific element in the Map View will bring up a slightly different menu of options.</p>	

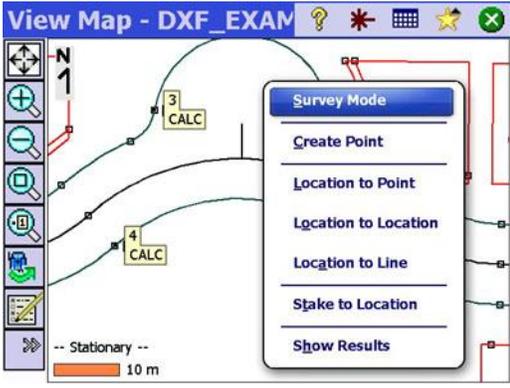
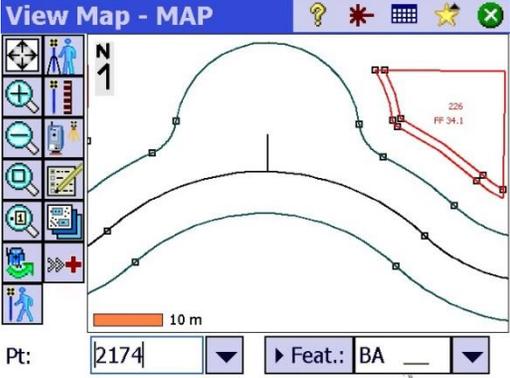
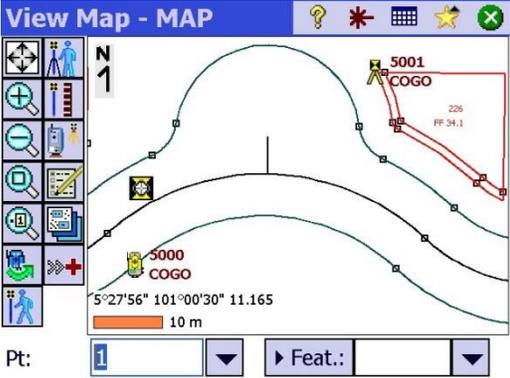
Step 4: Map Page Options

<p>5.</p>	<p>Tap and hold on an element in the Map View provides several useful COGO routines.</p>	
<p>6.</p>	<p>When in the Surveying mode, the Map screen can be configured to keep the prism (or GNSS antenna) centered on the screen using the Set "Follow Me" mode available by an extended click on the Map Page.</p>	
<p>7.</p>	<p>Set User Zoom Extent will allow the Map Screen to be zoomed to a certain level with a single click on the zoom extents icon.</p>	

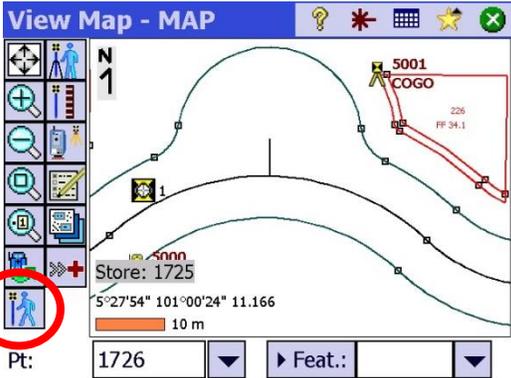
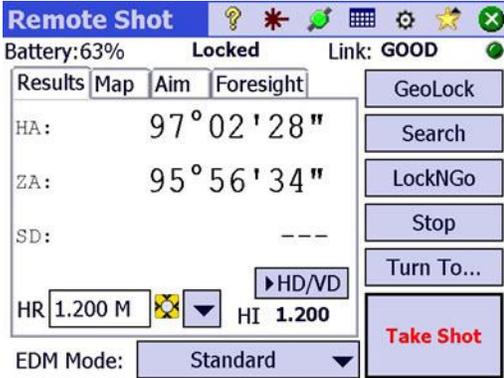
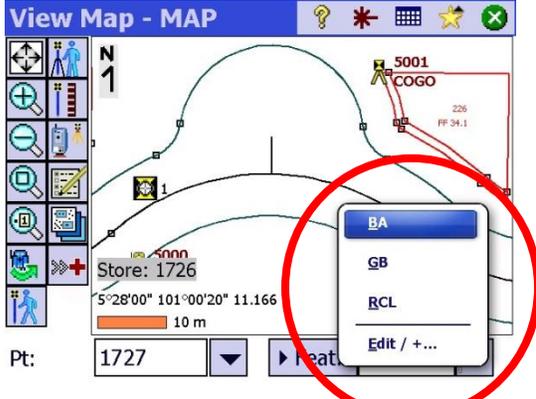
Step 5: Snap-To Options

<p>1.</p>	<p>Tapping on the double-arrows at the bottom of the toolbar will display the “Snap-To” functions of Survey Pro.</p>	 <p>The screenshot shows a window titled 'View Map - DXF_EXAM'. On the left is a vertical toolbar with various navigation and editing icons. At the bottom of the toolbar, a button labeled 'Show Snap To Options' is highlighted. The main map area displays a technical drawing of a road layout with red lines and points. A small 'N' with a downward arrow is visible in the top left corner of the map area.</p>																	
<p>2.</p>	<table border="1"> <thead> <tr> <th data-bbox="391 695 483 730">Button</th> <th data-bbox="483 695 1271 730">Function</th> </tr> </thead> <tbody> <tr> <td data-bbox="391 741 483 814"></td> <td data-bbox="483 741 1271 814">Snap to nearby point.</td> </tr> <tr> <td data-bbox="391 825 483 898"></td> <td data-bbox="483 825 1271 898">Snap to the midpoint of the selected line segment.</td> </tr> <tr> <td data-bbox="391 909 483 982"></td> <td data-bbox="483 909 1271 982">Snap to the nearest of the begin point or the end point of the selected line segment.</td> </tr> <tr> <td data-bbox="391 993 483 1066"></td> <td data-bbox="483 993 1271 1066">Snap to the intersection of two straight line segments. You cannot snap to the intersection of line segments that are curves or spirals.</td> </tr> <tr> <td data-bbox="391 1077 483 1150"></td> <td data-bbox="483 1077 1271 1150">Snap to the point of intersection (PI) of the selected curve segment.</td> </tr> <tr> <td data-bbox="391 1161 483 1234"></td> <td data-bbox="483 1161 1271 1234">Snap to the radius point (RP) of the selected curve segment.</td> </tr> <tr> <td data-bbox="391 1245 483 1318"></td> <td data-bbox="483 1245 1271 1318">Snap to the nearest point on the selected straight line or curve segment.</td> </tr> <tr> <td data-bbox="391 1329 483 1402"></td> <td data-bbox="483 1329 1271 1402">Remove all of the Snap To temporary points created on this map.</td> </tr> </tbody> </table>	Button	Function		Snap to nearby point.		Snap to the midpoint of the selected line segment.		Snap to the nearest of the begin point or the end point of the selected line segment.		Snap to the intersection of two straight line segments. You cannot snap to the intersection of line segments that are curves or spirals.		Snap to the point of intersection (PI) of the selected curve segment.		Snap to the radius point (RP) of the selected curve segment.		Snap to the nearest point on the selected straight line or curve segment.		Remove all of the Snap To temporary points created on this map.
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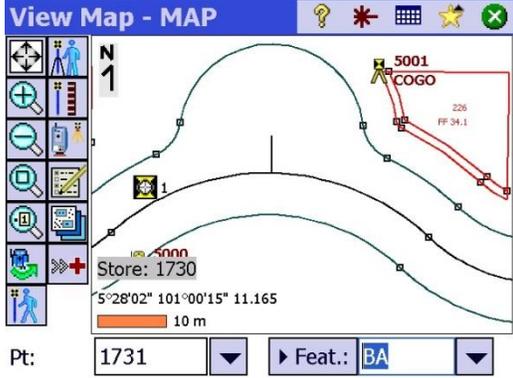
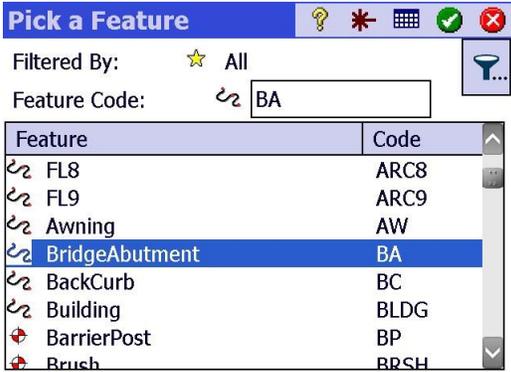
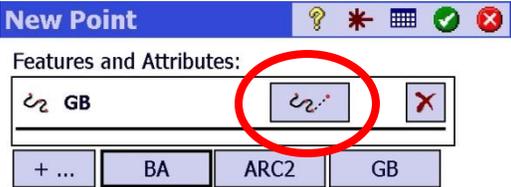
Step 6: Data Collection in the active Map

<p>1.</p>	<p>The “Survey Mode” can be entered (or exited) by a tap and hold any place inside the Map View and selecting it from the menu choices.</p>	
<p>2.</p>	<p>The toolbar on the left hand side of the display has changed and there are now surveying appropriate icons. Note that the Features and Attributes toolbar at the bottom is enabled which allows point coding for line generation and other classifications. This field can be toggled for text descriptors.</p>	
<p>3.</p>	<p>An icon indicating the location of the total station, the prism and the backsight is shown. The blinking red dot in the center of the prism icon indicates that the instrument has tracking lock on the prism.</p>	

Step 6: Data Collection in the active Map

<p>4.</p>	<p>Tapping on the icon of a rodman with prism pole will execute a sideshot observation. Hitting Enter on the data collector will accomplish the same thing. The point will be stored and the point number will increment.</p>	
<p>5.</p>	<p>Tapping on the icon showing a rodman with a bipod on the prism pole will launch the Remote Control page. Full control of the instrument is provided. When the measurement is complete and the point stored, the program will return to the main map screen.</p>	
<p>6.</p>	<p>Clicking on power arrow next to the Feat.. field will allow quick entry of the last three feature codes and access to the complete feature code definition list including line commands (start, end, arcs, etc.).</p>	

Step 6: Data Collection in the active Map

<p>7.</p>	<p>Features and Attributes can be processed directly with Spectra Precision Survey Office or be included in a variety of exportable formats. Prior to a measurement being performed, tap on one of the last used feature codes buttons (FH, bc, or fl in the example) or tap the “+...” icon to bring up the list of available features.</p>	
<p>8.</p>	<p>In this example, the code BA is chosen which represents a line feature described as a BridgeAbutment. This list can be filtered to display a single group or all groups by clicking on the configuration icon near the upper right-hand side of the display.</p>	
<p>9.</p>	<p>Additional line code commands can be applied to the line feature being recorded. Once a point has been assigned the feature, clicking on the wavy line in the Features and Attributes page will access these additional commands.</p>	

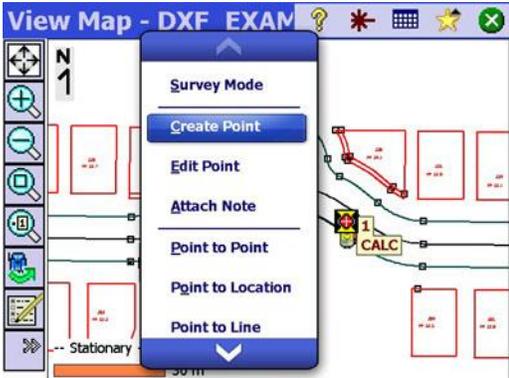
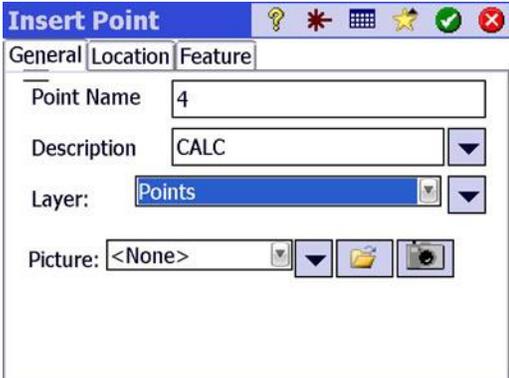
Step 6: Data Collection in the active Map

<p>10.</p>	<p>Line Commands (applied to Feature codes): sta = start tangential arc will use the incoming tangential line to create a best fit arc through this point and the next observed point. eta = end a two point arc best on the best fit of the exiting tangent leg. Non-tangential arcs use the best fit of an arc without regard to a tangent leg.</p>	
<p>11.</p>	<p>Point number 1731 is ready to be collected with a BA line feature associated with the point.</p>	
<p>12.</p>	<p>Point number 1732 has now been collected and is also feature coded BA. Since this is a line feature, Survey Pro has drawn a line between the two points. Points coded with the feature BA will continue to be connected together until an “End” or “Close” command is applied to the feature.</p>	

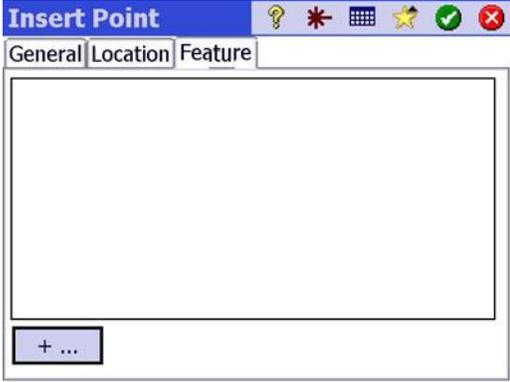
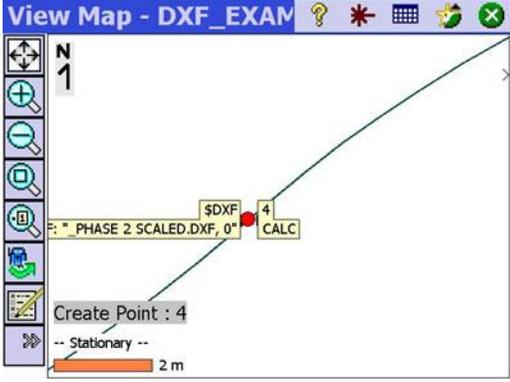
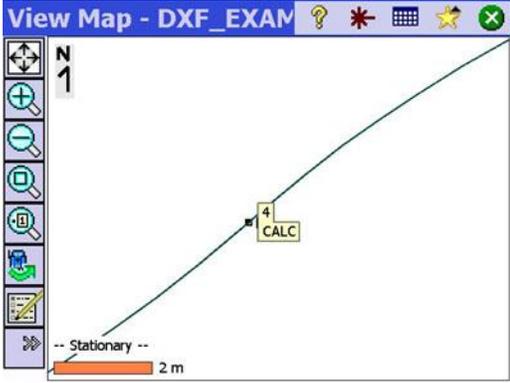
Step 6: Data Collection in the active Map

<p>13.</p>	<p>After a measurement has been recorded, the Map View will display the point number of the last stored point as well as the current angles and EDM readings from the instrument.</p>	
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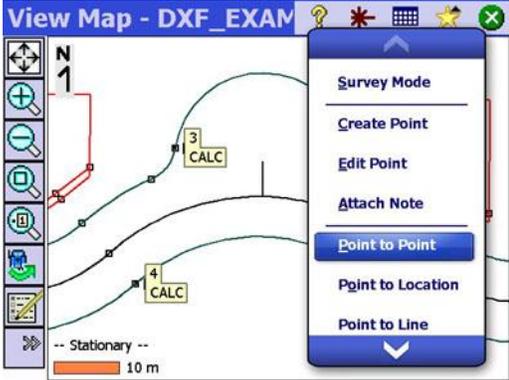
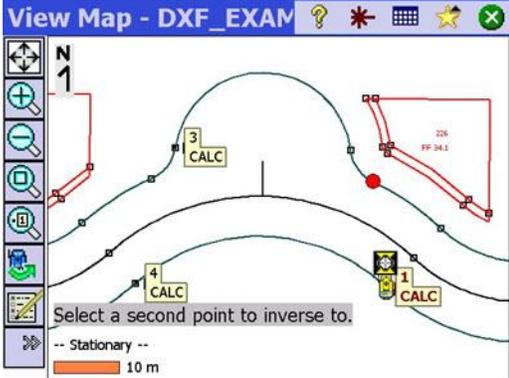
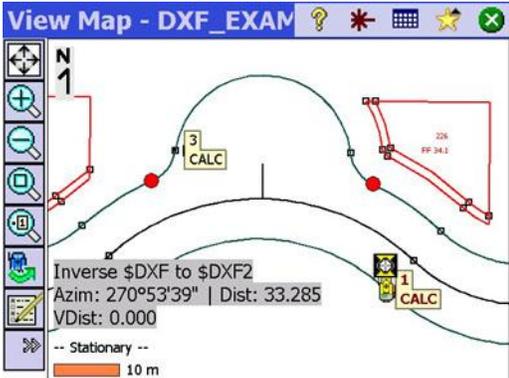
Step 7: Create Points

<p>1.</p>	<p>Tap and hold anywhere in the Map View and select Create Point.</p>	
<p>2.</p>	<p>The new point can be assigned to any existing layer or a new layer can be created. Any description can be given. An image file can also be associated with the point.</p>	

Step 7: Create Points

<p>3.</p>	<p>Tap on the Feature tab. Tapping on the “+...” button will open up the Feature library where features and attributes can be assigned to the newly created point. The special line commands can also be applied.</p>	
<p>4.</p>	<p>Points displayed in the Map View that are prefixed with a “\$” sign, are temporary points. They can be converted to permanent points by clicking tap and hold on one and selecting “Create Point.” Temporary points are created any time a node is clicked on, as a result of certain COGO calculations and clicks and when using the Snap-To functions.</p>	
<p>5.</p>	<p>Exiting the Map View page and re-entering will erase all of the temporary points. Most Survey Pro COGO routines can also use the Snap features so the temporary snap points are easy to create and easy to access from routines that can use them.</p>	

Step 8: COGO

<p>1.</p>	<p>A tap and hold directly on top of any active element in the basemap or main map will present a more comprehensive set of COGO menu choices.</p> <p>Point to Point allows the inverse between any two points or nodes to be calculated in the currently opened job.</p>	
<p>2.</p>	<p>The first point of the inverse has been selected as indicated by the red dot.</p> <p>The display is providing by stating "Select a second point to inverse to."</p>	
<p>3.</p>	<p>The two points included in the inverse are denoted by red dots and results are presented in the Map View.</p>	

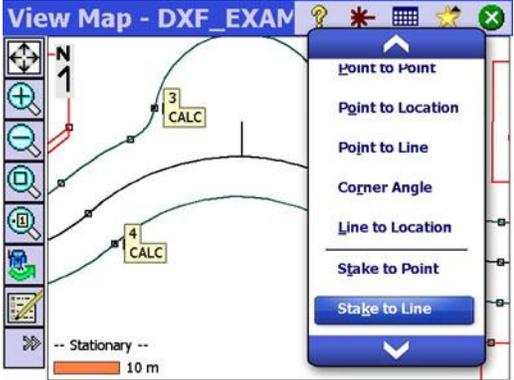
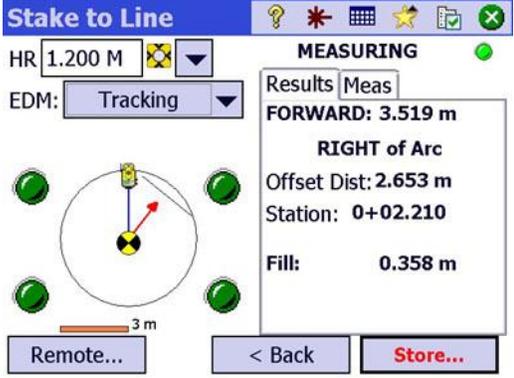
Step 8: COGO

<p>4.</p>	<p>Depending upon the element that is tapped in the Map View, various COGO calculations can be executed including:</p> <p>Point to Point Point to Line Location to Line Location to Point Corner Angles </p>	
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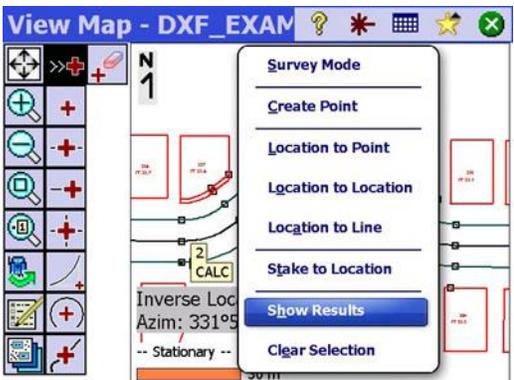
Step 9: Stakeout

<p>1.</p>	<p>Tapping and holding on a desired location in the Map View will select that location to be staked.</p>	
<p>2.</p>	<p>After tapping Stake to Location, the Remote Staking screen is shown providing directions to the location.</p>	

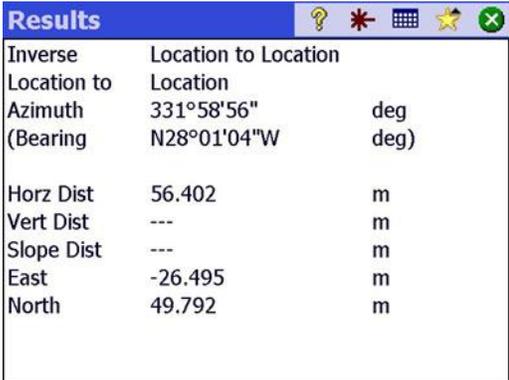
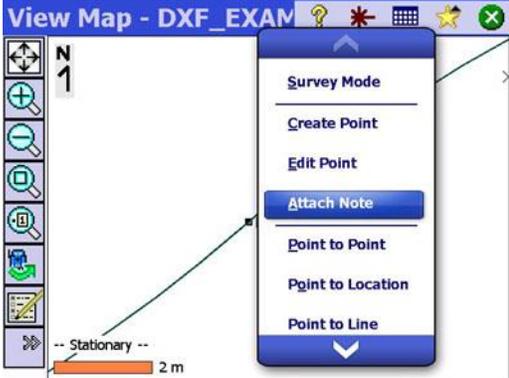
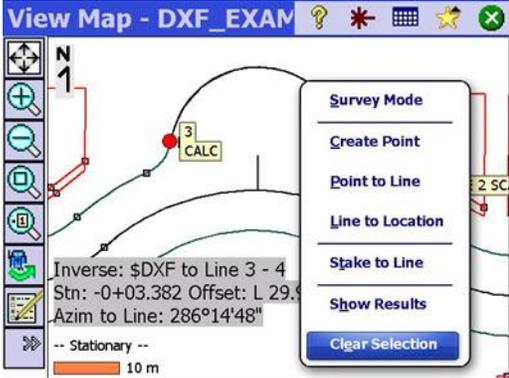
Step 9: Stakeout

<p>3.</p>	<p>Stake to line is also an option from the Active Map. Tap and hold on any line and tap Stake to Line.</p>	 <p>The screenshot shows a map view with a menu open. The menu options are: Point to Point, Point to Location, Point to Line, Corner Angle, Line to Location, Stake to Point, and Stake to Line. The 'Stake to Line' option is highlighted with a blue bar.</p>
<p>4.</p>	<p>The Stake to Line routine provides dynamic position information in relation to the reference line and its station. The graphic indicator shows the rodman's location (yellow/black) in relation to the total station and the reference line. When the desired location has been reached, there is an option to store the location.</p>	 <p>The screenshot shows the 'Stake to Line' routine interface. It includes a horizontal distance (HR) of 1.200 M, EDM mode set to Tracking, and a graphic indicator showing a rodman's location (yellow/black) relative to a reference line. The 'MEASURING' section displays: FORWARD: 3.519 m, RIGHT of Arc, Offset Dist: 2.653 m, Station: 0+02.210, and Fill: 0.358 m. Buttons for 'Remote...', '< Back', and 'Store...' are visible.</p>

Step 10: Miscellaneous Map View Features

<p>1.</p>	<p>More detailed information on measurements, COGO and staking results can be viewed by tapping and holding and then selecting "Show Results"</p>	 <p>The screenshot shows a map view with a menu open. The menu options are: Survey Mode, Create Point, Location to Point, Location to Location, Location to Line, Stake to Location, Show Results, and Clear Selection. The 'Show Results' option is highlighted with a blue bar.</p>
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Step 10: Miscellaneous Map View Features

<p>2.</p>	<p>Additional details about the inverse are provided. Since the line that was inverted to did not contain any elevation information, these values are null in this example. If both element of the inverse contain vertical information, these details will also be provided.</p>	 <table border="1"> <thead> <tr> <th colspan="3">Results</th> </tr> </thead> <tbody> <tr> <td>Inverse</td> <td colspan="2">Location to Location</td> </tr> <tr> <td>Location to</td> <td colspan="2">Location</td> </tr> <tr> <td>Azimuth</td> <td>331°58'56"</td> <td>deg</td> </tr> <tr> <td>(Bearing</td> <td>N28°01'04"W</td> <td>deg)</td> </tr> <tr> <td>Horz Dist</td> <td>56.402</td> <td>m</td> </tr> <tr> <td>Vert Dist</td> <td>---</td> <td>m</td> </tr> <tr> <td>Slope Dist</td> <td>---</td> <td>m</td> </tr> <tr> <td>East</td> <td>-26.495</td> <td>m</td> </tr> <tr> <td>North</td> <td>49.792</td> <td>m</td> </tr> </tbody> </table>	Results			Inverse	Location to Location		Location to	Location		Azimuth	331°58'56"	deg	(Bearing	N28°01'04"W	deg)	Horz Dist	56.402	m	Vert Dist	---	m	Slope Dist	---	m	East	-26.495	m	North	49.792	m
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East	-26.495	m																														
North	49.792	m																														
<p>3.</p>	<p>There is also an Attach Note feature that allows entry of raw data note information for a point.</p>	 <p>The screenshot shows a map interface with a toolbar on the left and a context menu on the right. The context menu includes options: Survey Mode, Create Point, Edit Point, Attach Note (highlighted), Point to Point, Point to Location, and Point to Line. A scale bar at the bottom indicates 2 m.</p>																														
<p>4.</p>	<p>There is an option to Clear Selection. In this example, if Clear Selection is clicked, the Inverse results will disappear and point number 3 will be deselected.</p>	 <p>The screenshot shows a map interface with a toolbar on the left and a context menu on the right. The context menu includes options: Survey Mode, Create Point, Point to Line, Line to Location, Stake to Line, Show Results, and Clear Selection (highlighted). A tooltip for point 3 shows: Inverse: \$DXF to Line 3 - 4, Stn: -0+03.382 Offset: L 29.9, Azim to Line: 286°14'48". A scale bar at the bottom indicates 10 m.</p>																														

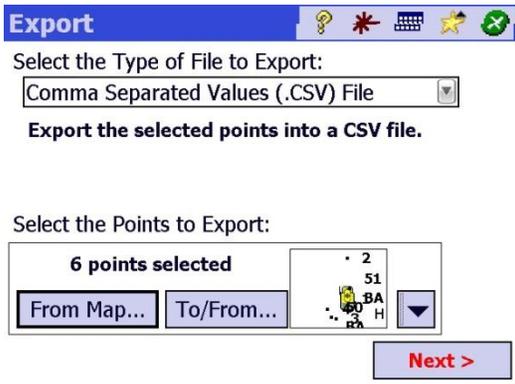
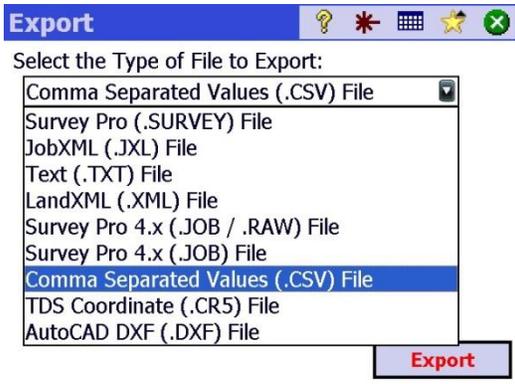
Export

In this lesson, you will learn how to:

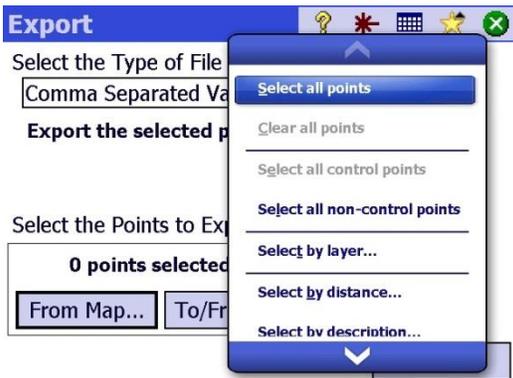
Export data from Survey Pro to a variety of user formats. File Sharing will also be illustrated using dropbox.com which is a non-affiliated, commercial cloud service offered by a third party. This lesson will also show how to backup or restore archived records.

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Step 1: View the Available Export Formats	121
Step 2: Primary Export Options	122
Step 3: Format Dependent Export Options	122
Step 4: Archiving and Restoring Data	123
Step 5: Sharing	124
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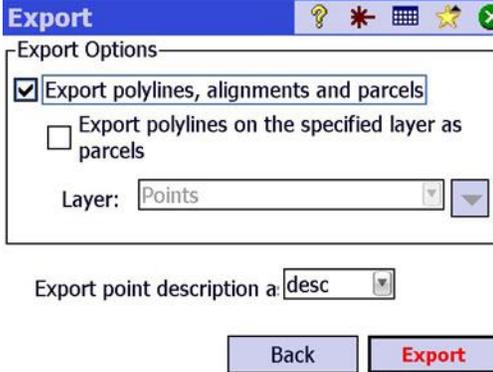
Step 1: View the Available Export Formats

<p>1.</p>	<p>Data Export routines can be found under the File Menu.</p>	
<p>2.</p>	<p>Select the points and/or lines to be exported. Selections include date ranges, layers, distance, feature code, etc.</p> <p>Select the type of file to be exported. Different file formats support different levels of export choices.</p>	
<p>3.</p>	<p>Supported export formats are shown to the right. Select the appropriate format and tap on the Export button.</p>	

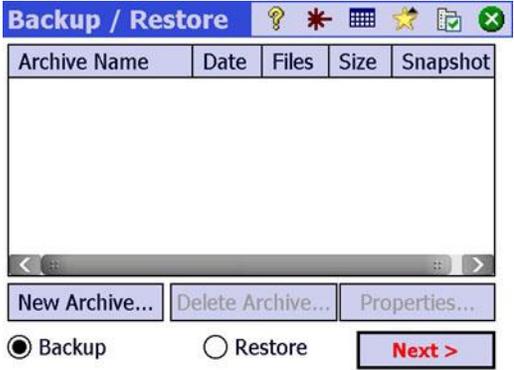
Step 2: Primary Export Options

<p>1.</p>	<p>For the majority of the supported export formats, points can be selected by layer, range or from the map.</p>	
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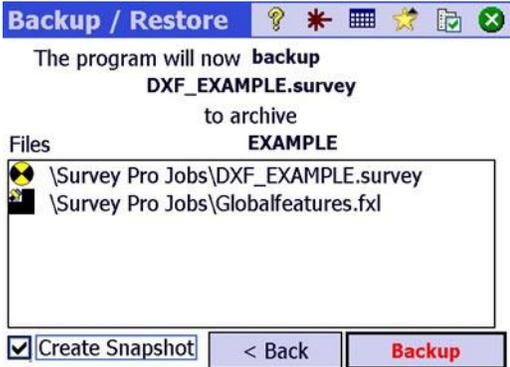
Step 3: Format Dependent Export Options

<p>1.</p>	<p>Some export formats have different options. When selecting both JOB and RAW data format (from Survey Pro version 4), the entire job and associated measurement data is exported.</p>	
<p>2.</p>	<p>LandXML export options.</p>	

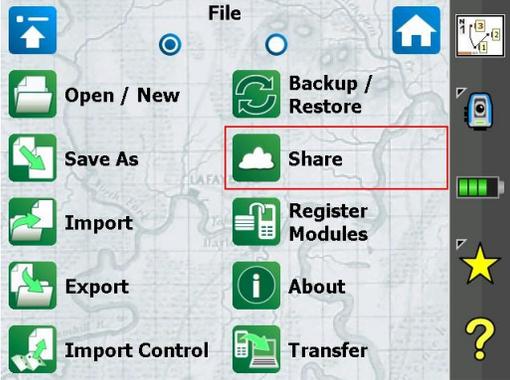
Step 4: Archiving and Restoring Data

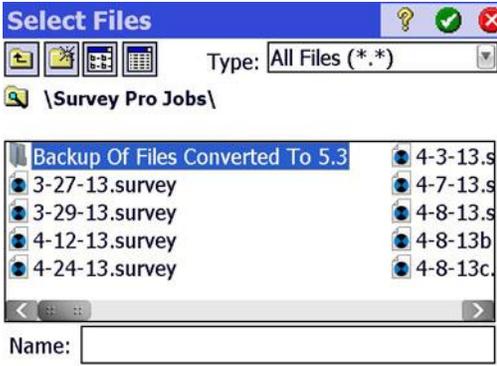
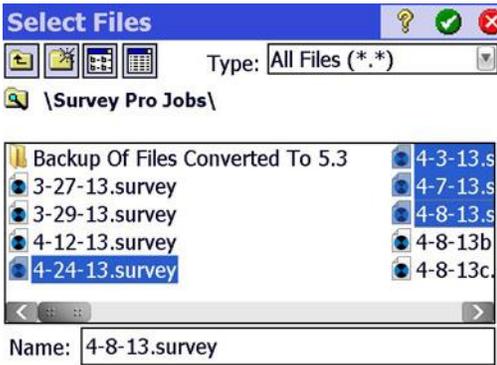
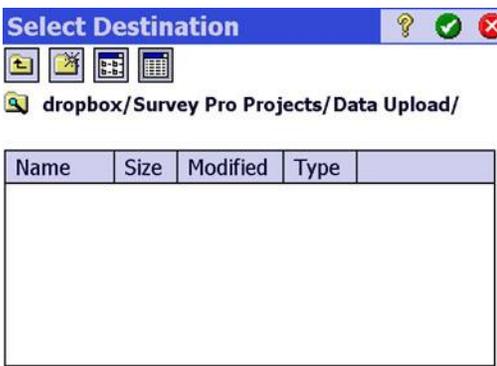
<p>1.</p>	<p>Jobs and data can be backed up for security or archival purposes and can also be restored. The Backup/Restore routine is located under the File menu.</p>	
<p>2.</p>	<p>Backup is used to create a backup (archive) of the currently open job. Restore is used to restore a previously archived (backed up) job. Select New Archive to create a Backup.</p>	
<p>3.</p>	<p>An optional description of the backup being made can be inserted. Most often, this would be the job name itself.</p>	

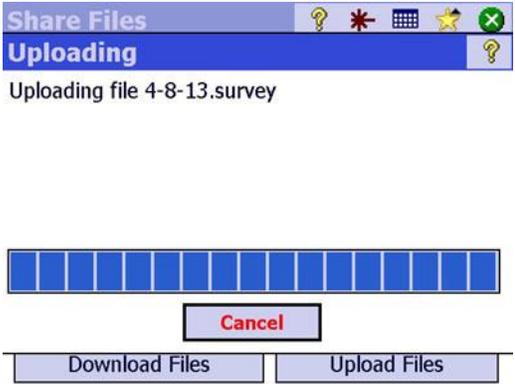
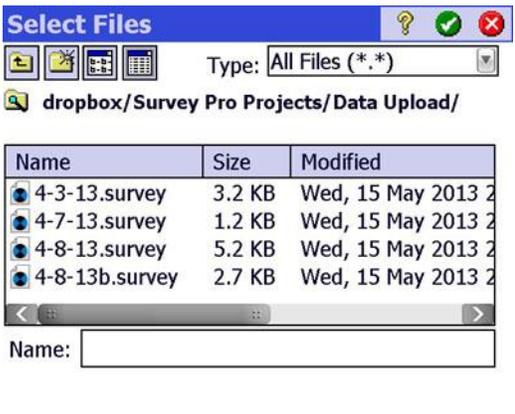
Step 4: Archiving and Restoring Data

<p>4.</p>	<p>Survey Pro will provide a notification about what is being backed up and the location of the file(s). A Snapshot of the job can be created which provides a screen capture of the project with all the visible layers.</p>	
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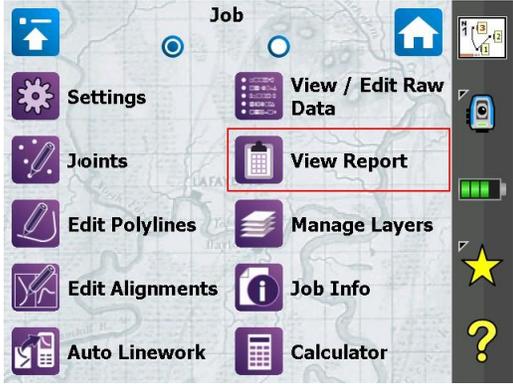
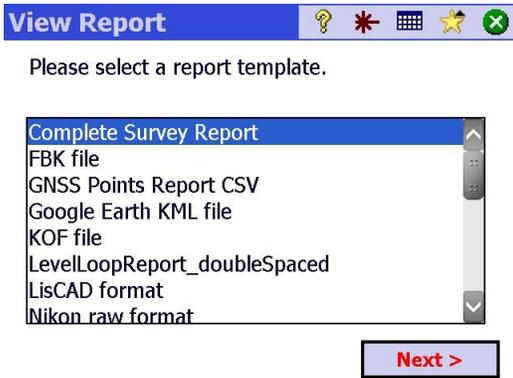
Step 5: Sharing

<p>1.</p>	<p>Sharing, or backing up data to the cloud (internet based data storage) has become increasingly popular as field users are more electronically connected with their offices. Survey Pro Share services can be accessed from the File menu.</p>	
<p>2.</p>	<p>Survey Pro supports E-Mail and Dropbox services. Dropbox is a U.S. based commercial company that is not affiliated with Spectra Precision, Trimble or its affiliates. Dropbox offers 2 GB of cloud storage for free. Additional storage space can be earned or purchased. Visit dropbox.com for details.</p>	

<p>3.</p>	<p>The data collector must be connected to the internet which can be accomplished simply through WiFi or the embedded cell phone (SIM card and service required). In this example, several Survey Pro files will be copied from the data collector and uploaded to Dropbox.</p>	 <p>The screenshot shows a 'Select Files' dialog box with the title bar in blue. The file type is set to 'All Files (*.*)'. The current directory is '\Survey Pro Jobs\'. A list of files is displayed, including a folder 'Backup Of Files Converted To 5.3' and several survey files with dates like '3-27-13.survey', '3-29-13.survey', '4-12-13.survey', '4-24-13.survey', '4-3-13.s', '4-7-13.s', '4-8-13.s', '4-8-13b', and '4-8-13c'. The 'Name:' field at the bottom is empty.</p>
<p>4.</p>	<p>Four jobs are selected for uploading.</p>	 <p>This screenshot is similar to the previous one, but the four files '4-12-13.survey', '4-24-13.survey', '4-8-13b', and '4-8-13c' are highlighted in blue. The 'Name:' field at the bottom now contains the text '4-8-13.survey'.</p>
<p>5.</p>	<p>Survey Pro remembers the last login information used and will automatically reconnect to that account. The Logout button disconnects from the current account and deletes the login information.</p>	 <p>The screenshot shows the 'Share Files' interface for Dropbox. The account name 'Joe Sass' is displayed. There are 'Logout' and 'Details' buttons. A message states: 'You may be prompted to login to your Dropbox account to allow Survey Pro access to your files.' At the bottom, there are 'Download Files' and 'Upload Files' buttons.</p>
<p>6.</p>	<p>The desired folder is selected or created to which the data will be uploaded. When satisfied, tap on the check/tick mark in the upper right hand corner of the display.</p>	 <p>The screenshot shows a 'Select Destination' dialog box. The path 'dropbox/Survey Pro Projects/Data Upload/' is entered. Below the path is a table with columns 'Name', 'Size', 'Modified', and 'Type'. The table is currently empty.</p>

<p>7.</p>	<p>Data is being copied to the cloud.</p>																
<p>8.</p>	<p>When completed, Survey Pro will display the files that have been uploaded. Now, all other computers and devices that are associated with the Dropbox folder will get a notification that new files have been added. This gives remote parties the opportunity to see the data as soon as it becomes available in the cloud.</p>	 <table border="1" data-bbox="889 758 1385 909"> <thead> <tr> <th>Name</th> <th>Size</th> <th>Modified</th> </tr> </thead> <tbody> <tr> <td>4-3-13.survey</td> <td>3.2 KB</td> <td>Wed, 15 May 2013 2</td> </tr> <tr> <td>4-7-13.survey</td> <td>1.2 KB</td> <td>Wed, 15 May 2013 2</td> </tr> <tr> <td>4-8-13.survey</td> <td>5.2 KB</td> <td>Wed, 15 May 2013 2</td> </tr> <tr> <td>4-8-13b.survey</td> <td>2.7 KB</td> <td>Wed, 15 May 2013 2</td> </tr> </tbody> </table>	Name	Size	Modified	4-3-13.survey	3.2 KB	Wed, 15 May 2013 2	4-7-13.survey	1.2 KB	Wed, 15 May 2013 2	4-8-13.survey	5.2 KB	Wed, 15 May 2013 2	4-8-13b.survey	2.7 KB	Wed, 15 May 2013 2
Name	Size	Modified															
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4-8-13.survey	5.2 KB	Wed, 15 May 2013 2															
4-8-13b.survey	2.7 KB	Wed, 15 May 2013 2															
<p>9.</p>	<p>From the Sharing main page, the “Details” button can be clicked to see details about the Dropbox.com account being used. This Dropbox customer has either purchased or earned an additional 13 GB of storage space beyond the 2 GB provided for free.</p>	 <p> Dropbox Details Display Name: Joe Sass Account ID: 116289425 Country: US Regular Files: 2.39GB Shared Files: 3.24GB Total Space: 15.00GB Free Space: 9.36GB Date: 5/15/13, Time: 14:30:36.000 </p>															

Step 6: Reports

<p>1.</p>	<p>The Report menu can be accessed from the Job menu. Several popular and regionally specific reporting formats can be generated.</p>	
<p>2.</p>	<p>A partial list of the supported formats are shown to the right. A GoogleEarth KML file is a convenient tool to visualize data on the ground. At least nine different Stakeout Cut Sheet reports are available to meet most needs. Many of the reports can be filtered by date range which can facilitate daily reporting requirements.</p>	

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