FIA use of Trimble GeoXH 6000 GPS units for recording plot positions
(Version 1.0 March 28, 2013)

Reason for using these new units: Currently, FIA plot locations are based on recreational-grade GPS coordinates, older DOD Plugger units, or estimates from base maps. Likely position errors range from a few meters to 10's of meters. None of the existing plot coordinates have been derived from post-processed differentially corrected data. Based on tests of similar units by PNW and others, use of these units should provide plot coordinates within 1-2m of true positions.

Pilot test in 2013: PNW FIA will conduct a limited test of the units to develop protocols and refine methods. Full implementation is scheduled for 2014.

- 30 plots in FIA-South, 3 FIA-S crews
- 30 plots in FIA-Alaska, 2 FIA-AK crews
- More crews may start using the GeoXH units later in the season once initial tests are completed.

The test will evaluation the use of the units to assist with navigation to the plots.

Overview of operational field crew procedures for pilot test:

- Charge battery evening before use
- Use unit assist with navigation to plots
- Collect 15 minutes of GPS data at each subplot
- Shoot azimuth and distance from GPS unit to subplot center and enter this offset.
- Download GPS at end of week or more often to FIA_GPS_rover folder
- Send FIA_GPS_rover files to office for post-processing plot coordinates

Project timeline:
- January – February, 2013: Initial field testing, draft protocol development (Andersen/Reutebuch)
- January – February, 2013: Testing of PDR capabilities (IM rep?)
- March, 2013: Write draft supplemental manual for plot protocol (Andersen/Reutebuch/DC rep/IM rep)
- April, 2013: Field training for pilot project (DC rep)
- June-August, 2013: Field data collection on 30 FIA plots in two pilot areas (PNW-South and Alaska)
- September, 2013: Office post-processing to obtain final coordinates (Andersen/Reutebuch/IM rep)
- October-November, 2013: Evaluation of protocol and development of final draft of field & office protocol for complete implementation (2014 field season) (Andersen/Reutebuch/IM rep/DC rep).

Contact: Steve Reutebuch, sreutebuch@fs.fed.us, ph: 206-543-4710

General info about GeoXH 6000 units

Units are designed for outdoor use in rugged conditions.
They are water-resistant for use in rain.

Battery life is about 9 hours continuous power, but they have a sleep mode that extends battery life.
When not in use, shutdown the unit completely to maximize runtime on a single charge.

To turn on, press the green button.

To put into sleep mode, press the green button.

The battery can be charged in the unit or removed from the unit.
When fully charged, the left LED is green.

To completely shutdown, press and hold the green button until this menu is displayed, then tap on "Shutdown"
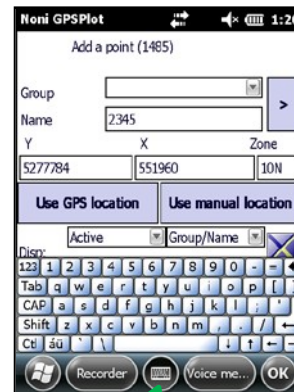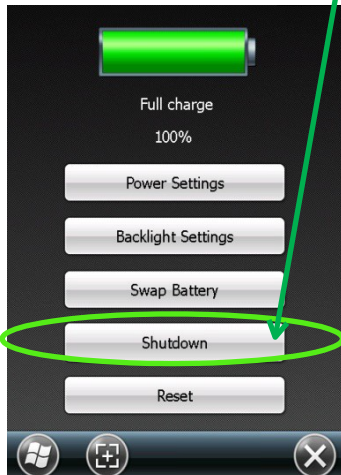
Click the keyboard icon to bring up the keyboard for typing in any application screen where it is displayed. Click it again to minimize it after use.

Starting the unit and using it to navigate to the plot

1--Press the green power button to turn the unit to turn it on.

2--Tap on the Windows start icon.

3--Tap on the NoniGPSPLOT icon to start the navigation program.

4--Tap on "No" unless you want to backtrack from earlier.

The center camera button on the GeoXH is used to bring up the main menu.
Alternatively, you can tap the battery icon in the lower left corner of the screen or simply hold the stylus in the middle of the screen for 3 seconds and release to bring up the main menu.

When first turned on, the unit will have red "?-?" at the bottom of the screen indicating that not enough satellite signals are being received. Stand in a relatively open area until the "?-?" disappears and position coordinates appear.
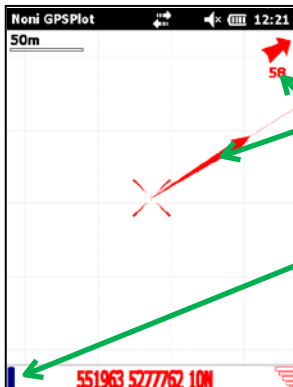
The red arrows indicate the direction (azimuth) you are moving.
The number is azimuth you are moving.

The red "X" in the middle of the screen is your current position.

Tap on the battery icon (lower left corner of screen) or press the middle camera button to bring up the menu.
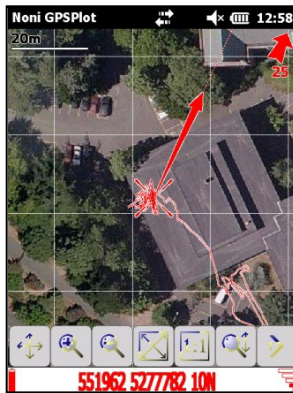
Current coordinates are displayed at the bottom of the screen.

1--Tap on "Advanced Setup"

2--Tap on "Maps"

3--Tap on "New"

4--Tap on "Import"

5--Select the map image of the plot, then tap "OK"

6--Tap "OK"
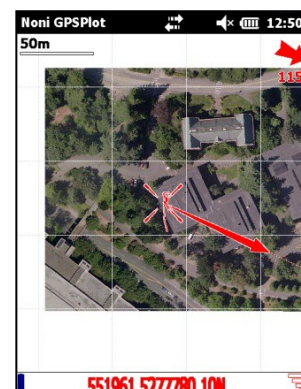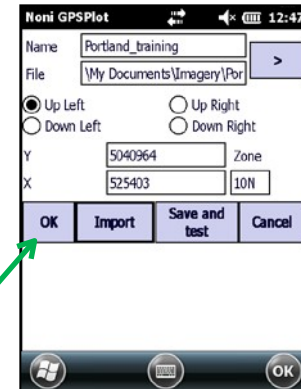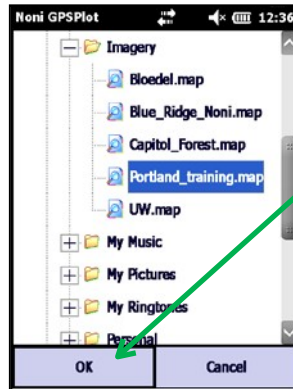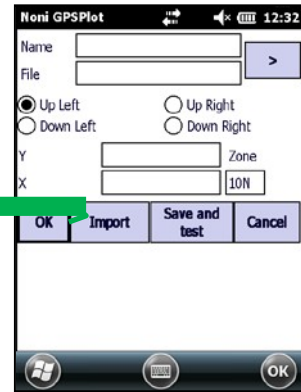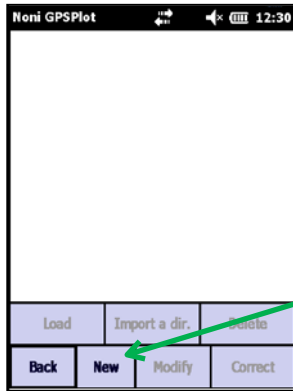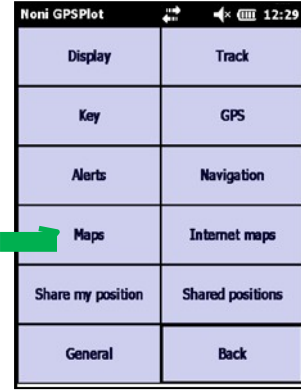
The background image of the plot area will appear

7--Tap "Back"

Methods for moving around the display

Click right above the coordinate area at the bottom of the screen to bring up zoom options:

moves your current position to center of screen

zooms in zooms out (left & right GeoXH buttons also zoom +/-)

zooms to extents of your track

zooms proportional to background image

zooms in by stroking from top to bottom of screen and zooms out by stroking from bottom to top of screen

moves to second zoom menu bar

allows you to move along a multi-point waypoint track (not used)

measures distance from center of screen to current position

adds waypoint at center of screen (where green "+" symbol is displayed)
(Note: you could use this feature to make a waypoint for your truck location)

brings up advanced menu

goes back to 1st zoom menu bar
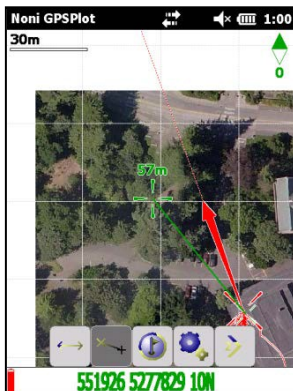
Note: you can slide the imagery around the screen by sliding the stylus around the screen.

If the measurement icon is clicked on, a green "+" is displayed in the center of the screen, along with the distance from your current position to the "+". Also, the coordinates at the bottom of the screen turn green and a green
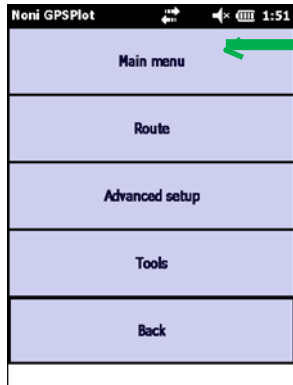
compass needle **0** appears to indicate what direction is true north.

If you tap the waypoint icon, a new waypoint is created at center of the screen where the green "+" is displayed.
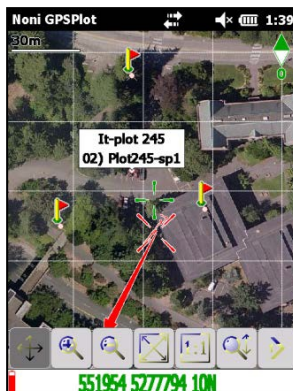
You can display the waypoint number by tapping it.
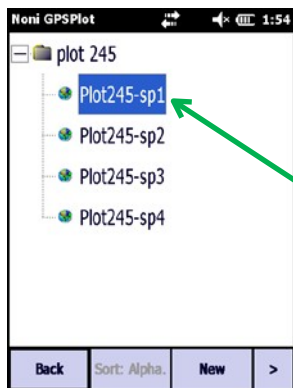You can edit the waypoint by double tapping it.

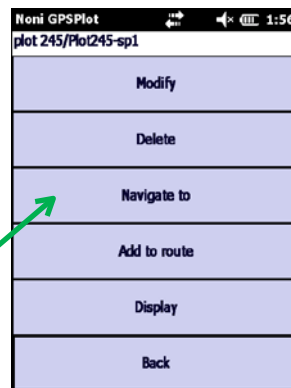## Selecting the target subplot location from the waypoints list

1--Tap on battery icon to go to Menu then tap "Main menu"

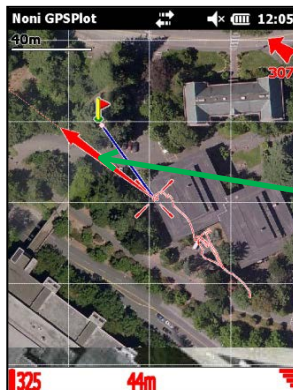2--List Points

3--Tap on target point, ">",

4--Tap "Navigate to"

5—The blue line is between your current position and the target subplot

The red arrow is the direction you are moving.

Azimuth and distance from your current position to the subplot is displayed.

6--After navigating to the subplot center, go to the main menu and tap "Quit" to exit NoniGPS Plot

7--Tap on the ⊞ Windows start icon

Measuring the offset from the GPS unit to the subplot center

Before collecting GPS data, set the GeoXH with its antenna area relatively flat on a pack in a relatively open area (as little overstory as possible and limited understory over the pack).

The pack should <u>not be within 10 feet</u> of a large diameter tree (over 20" DBH) if possible. You can place it outside the 24 foot radius of the subplot where it won't interfere with plot measurements.
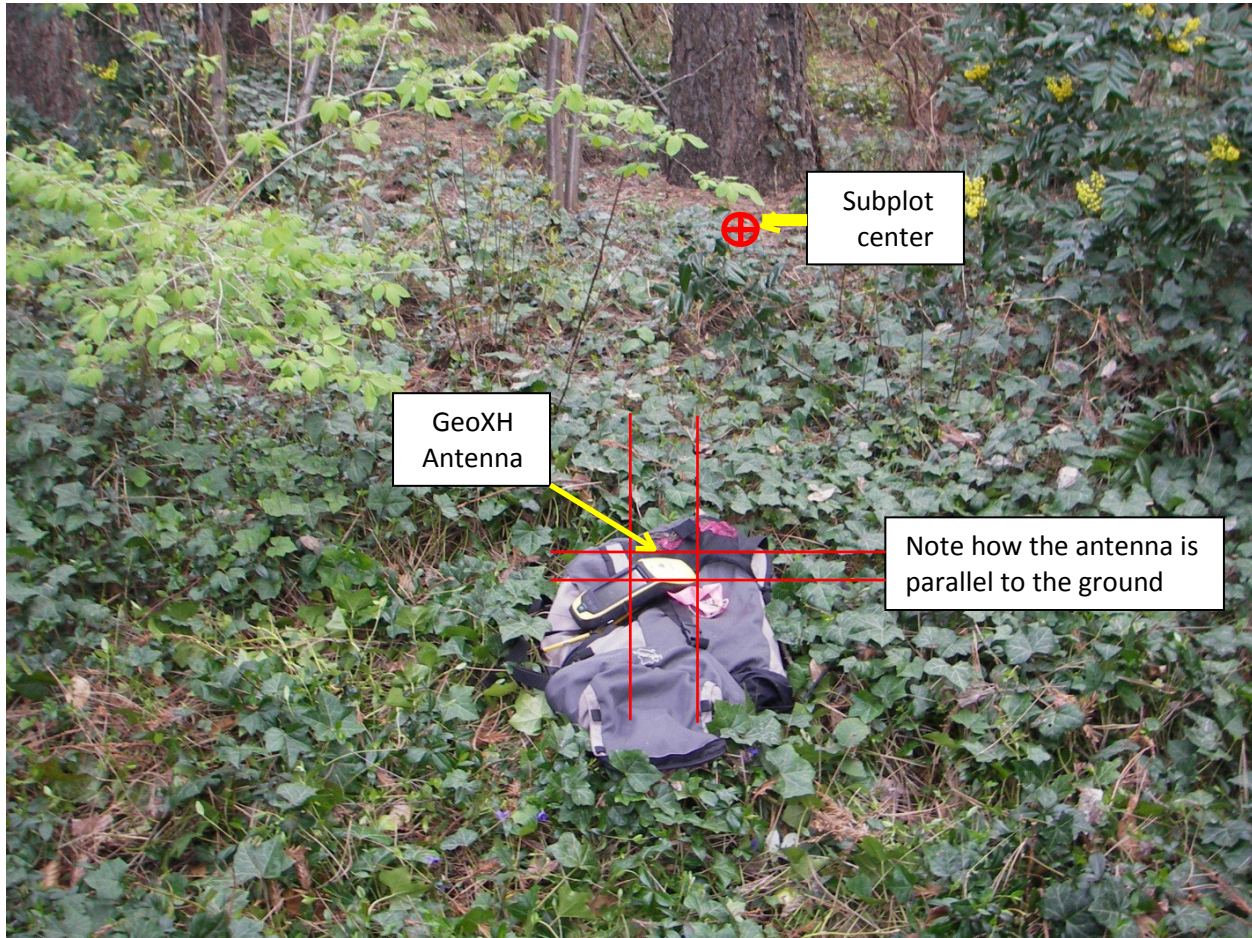
Starting Trimble TerraSync GPS data collection software
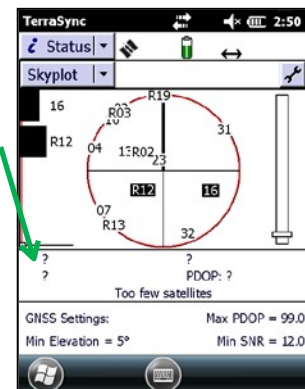**(With the GeoXH laying on pack. It must not be moved until GPS data logging has been completed)**
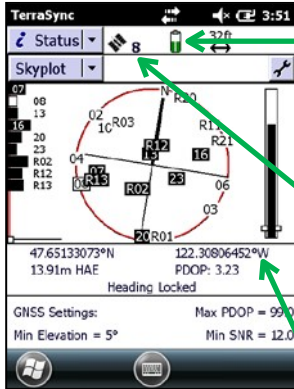
1--Tap the TerraSync icon

2--Notice that there is not a position

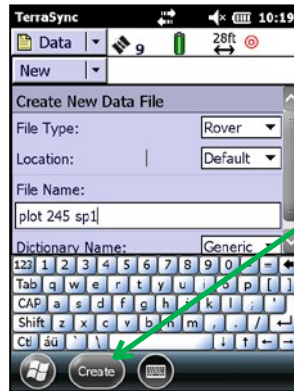3--Wait until a position is displayed instead of "?"

Battery charge level

Number of satellites must be 5+
To get a position

Position is displayed

1—Tap the drop down arrow
2—Tap "Data"
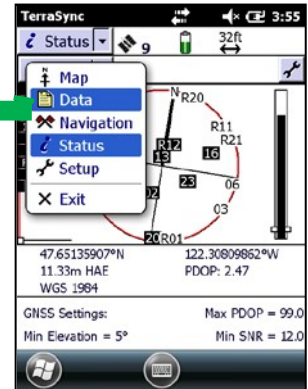
3--Enter the plot and subplot as file name

4—Tap "Create"

5—Tap "Point_generic"

6--Measure the azimuth (0-360)
and distance **FROM the GeoXH antenna to the subplot center**

7—Enter the subplot number and the azimuth and distance **FROM the GeoXH to the subplot center** in the "Comment" box

8—Tap "Options", then "Offset"

9—Tap "Distance-Bearing"

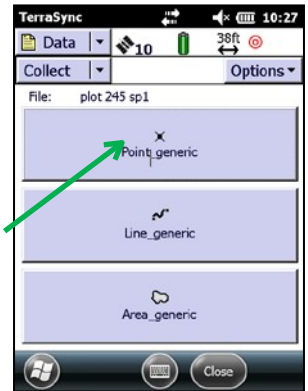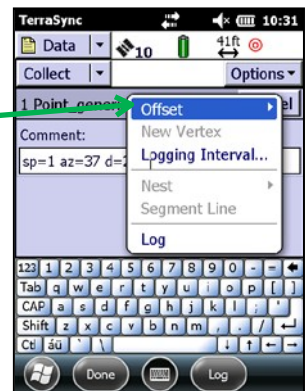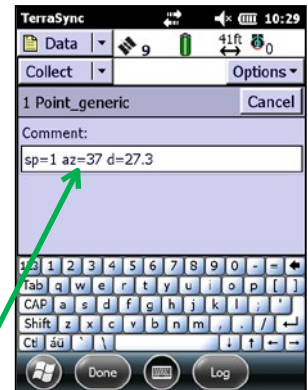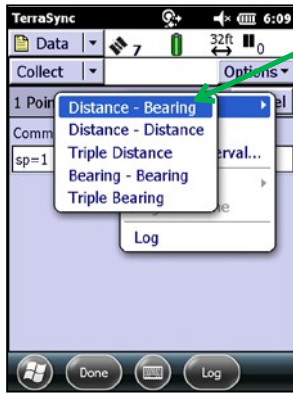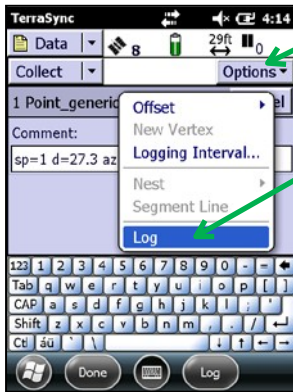10—Type in the Bearing and Horizontal distance, Leave Vertical distance 0, tap "Done"

Note: Tap the keyboard icon to bring up numbers if not displayed
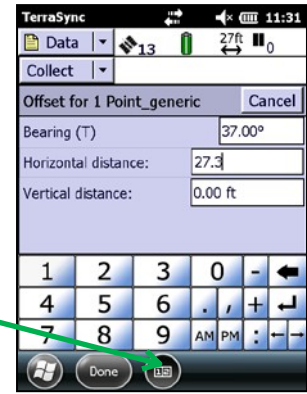
11—Tap the "Options" drop down menu then tap "Log" to start collecting GPS points

12—leave the GeoXH collecting data for AT LEAST 15 minutes (at least 900 positions)

13—Tap "Done"

Note: Don't stand over the unit as your body will block GPS signals!
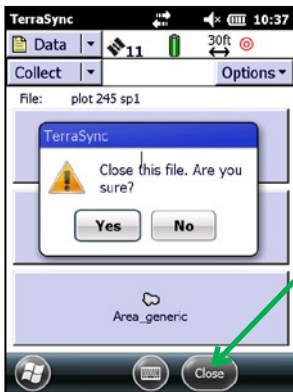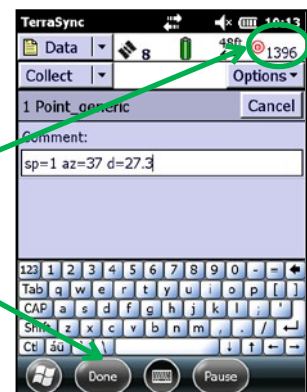
14—Tap "Close", then "Yes"

15—Tap "Data", then "Exit" to close TerraSync
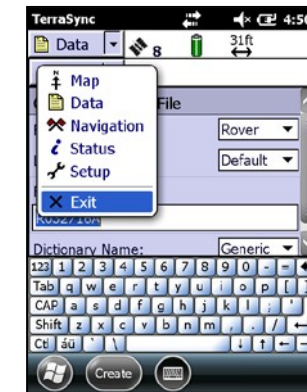
You have completed the GPS data collection for the subplot.
Repeat this procedure for remaining subplots.

You can restart NoniGPSPLOT if you want to use it to navigate to the next subplot.

NOTE: Completely shutdown the GeoXH power <u>to conserve battery life</u> between subplots.

To do this, press and hold the green power button for 3 seconds, then tap "Shutdown"

Downloading the GPS rover file to your laptop:

You must have Microsoft ActiveSync (XP) or Windows Mobile Devices Center (Windows7) loading on your laptop (same software for downloading your dataloggers).

 1—Pull the USB cable into the laptop
 and the GeoXH,
then power on the GeoXH.

Make sure the GeoXH is
connected in ActiveSync.
If not, see section on first time connection to GeoXH below.

 2—Start the "Trimble Data Transfer" program by either clicking on the desktop icon or by clicking on the Windows "Start" icon , then "All Programs", "Trimble", "Trimble Data Transfer"
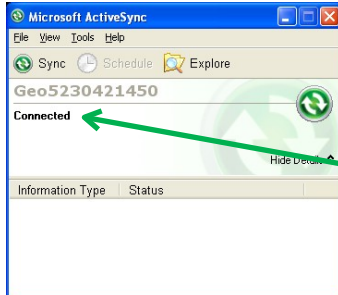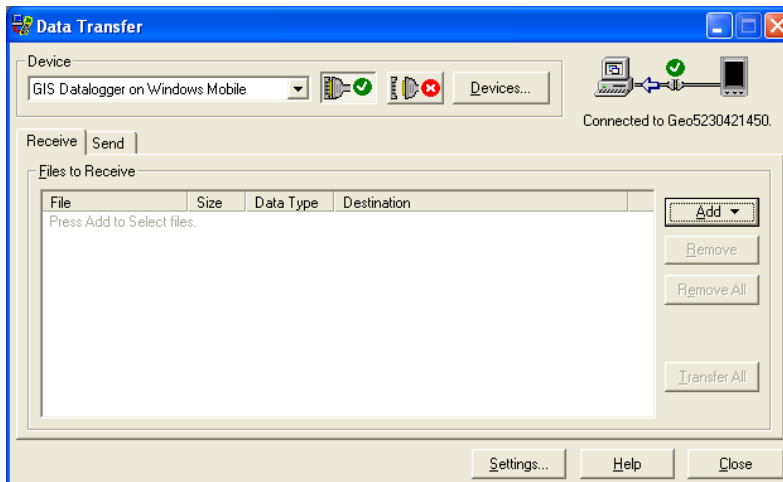
 3—click "Add",
then "Data file"
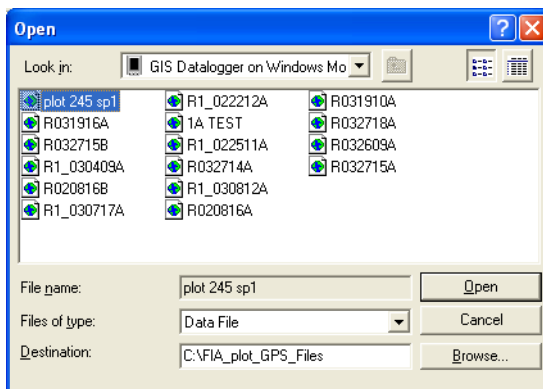
 4—highlight the files you want to transfer (hold laptop "Ctrl" key to select more than 1 file), then click "Open"

5—click "Browse" and select the "FIA_plot_GPS_Files" folder (must be already created).
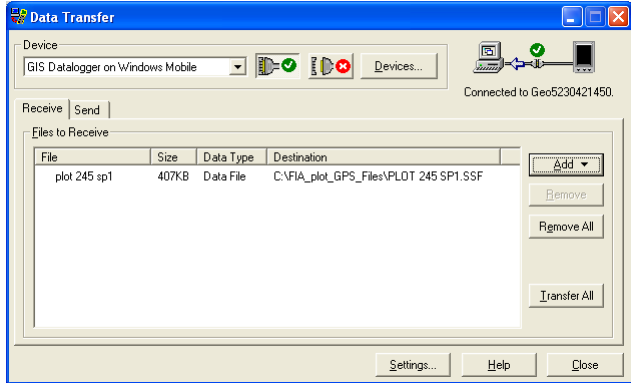
6—click "Transfer All"

If the file is transferred successfully, this screen appears

7—click "Close"
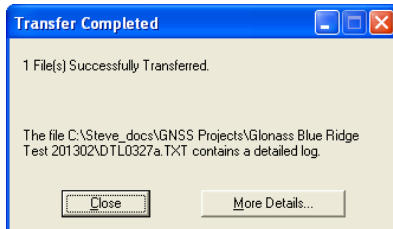
8—click "Close" to exit the program

The file has now been moved to your laptop.

Deleting subplot GPS files from the GeoXH <u>AFTER they have been transferred</u> to a laptop <u>AND backed up</u>

Once a week, after all data files have been transferred from the GeoXH to the laptop and the *.SSF files in the "FIA_plot_GPS_Files" folder have been backed up or sent to the office, you need to delete the transferred files from the GeoXH.
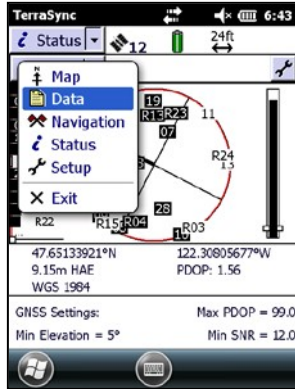
1--Start TerraSync on the GeoXH
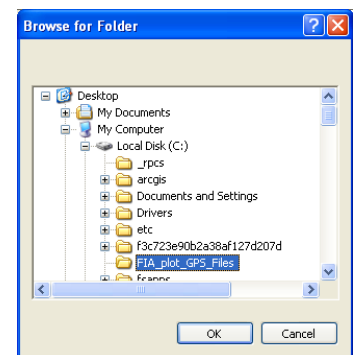
2—Tap "Status", then "Data"

3—Tap "New", then "File Manager"
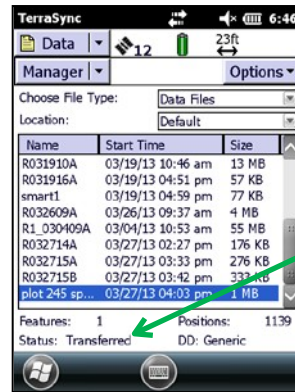
4—Tap the file to be deleted
Note: Status MUST be "Transferred"

5—Tap "Options", then "Delete"
If the file hasn't been transferred,
a warning will appear-don't delete!
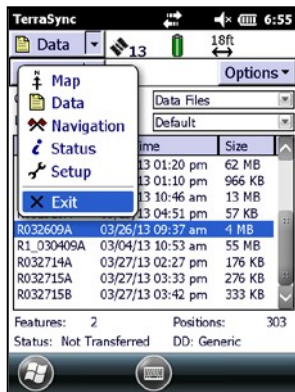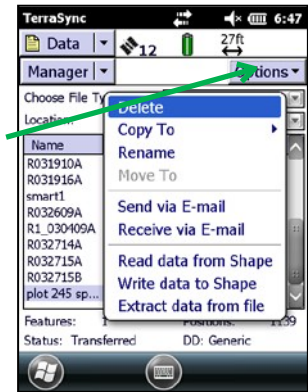
6—Tap "Data", then "Exit" to close TerraSync
after you have deleted transferred files

First time connecting the GeoXH to your laptop

Note: the first time you plug the GeoXH into your laptop, you will need to do the following steps to sync it with your laptop:
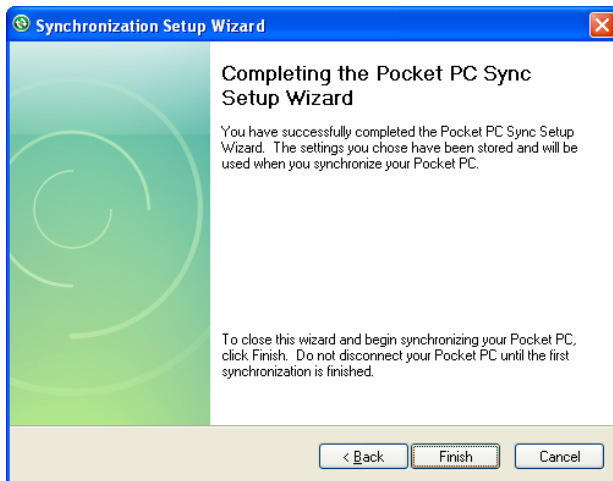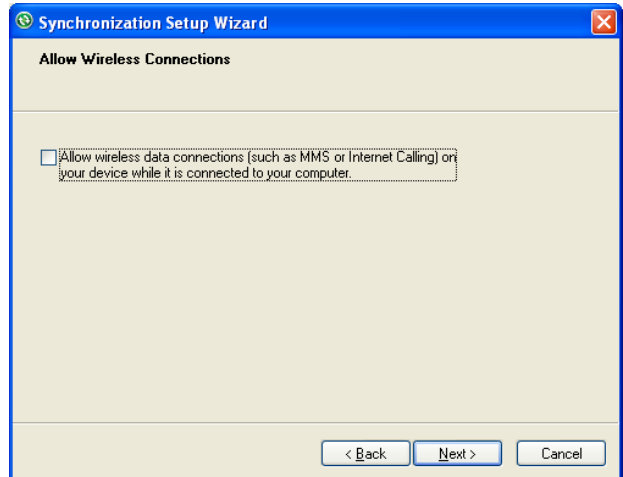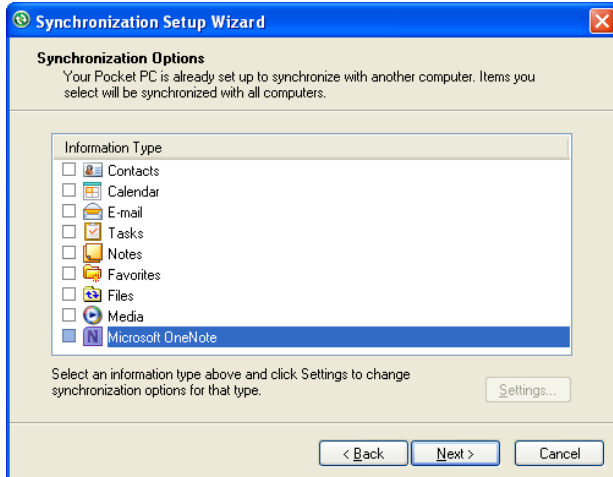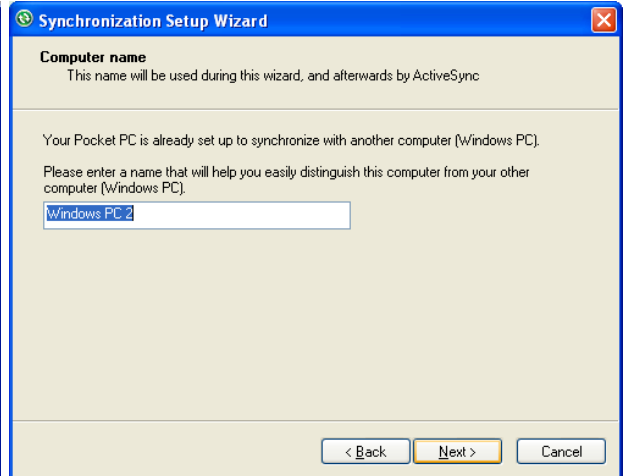
Charging the GeoXH battery

The GeoXH battery life is about 10 hours continuous run time. The battery should be charged each night if possible. If not, conserve power by completely shutting down the unit when not in use by holding the green power button down for 3 seconds and then tapping "Shutdown".

If camping for extended periods (1 week), a fully charged battery should allow GPS'ing of 5 full plots (20 subplots at 20 minutes run time per subplot is 6.7 hours, leaving 2 hours of battery life for navigation to plots).

The battery can be charged in the unit or removed from the unit.

Installing and removing the battery pack

To install the battery pack:
Insert the battery pack into the battery opening and then push the battery firmly into the handheld, ensuring that both battery latches click into place fully.

To remove the battery pack:
Pinch the latches together until the latches disengage from the handheld, and then slide the battery out.

Power menu:

To access the Power Menu, press and hold the **Power** key ⏻ when the handheld is operating.

The Power Menu is a convenient way to:

- View the remaining battery run time
- Access Power and Backlight settings
- Swap batteries without turning off the device
- Reset or turn off the handheld
- Calibrate the touch panel
- Access the Start Menu from applications running in full screen mode.

Troubleshooting:

If the screen on the handheld is blank, try one of the following:

- The backlight is off: tap the screen with the stylus or press a key to turn on the backlight.
- The handheld is off, or has suspended: press the **Power** ⏻ key to turn on the handheld.

If the handheld stops responding to the stylus, or if it does not respond when you press any keypad button, you may need to reset it. To reset your handheld, press and hold the **Power** ⏻ key until the Trimble boot screen appears.

> ⚠ *CAUTION:* Resetting your handheld may cause unsaved data to be lost. Always try to save your data before resetting your handheld.

Parts of the handheld:

Integrated GNSS Receiver

External GNSS Antenna Connector

Ambient Light Sensor

Touch Screen

SIM Card Slot

SDHC Card Slot

Keypad

Microphone

Status LEDs

USB Connector

Speaker

Included accessories:

AC Power Supply & International Adapter Kit	USB Data Cable	Spare Stylus & Lanyard
Carry Pouch	Hand Strap	Screen Protectors (x2)
Software CD	Device ID labels	Battery Pack

Title bar status indicators:

Status indicators are displayed in the title bar at the top of the display.

Start   12:50

Wi-Fi Network Detected
Indicates one or more Wi-Fi networks are available

Connectivity Status
Indicates USB and wireless data connectivity status

Cellular Status
Indicates cellular modem status and current network connection type

Battery Status
Display the current level or charging status of the battery

Audio Status
Display the current status of the system speaker

LED status indicators:

Three LEDs on the keypad of the handheld indicate battery charge status, GNSS status, and wireless radio status:

Battery Status

	Battery charging is complete
	Battery is charging
	Battery level is low (< 10% remaining)
	Battery fault

GNSS Receiver Status

	Receiver is on, and GNSS positions are available.
	Receiver is on, but GNSS positions are not available.

Wireless Status

	A wireless radio is turned on

TIP - Leaving wireless radios activated when they are not in use reduces battery run time. If they are not being used, turn off Bluetooth, Wi-Fi, and the cellular modem using the Wireless Manager. To access the Wireless Manager, Tap **Start > Settings > Connections > Wireless Manager.**