# Downloading and managing GPS data with the Trimble GeoXT (Windows Mobile 5/GeoExplorer 2005 Series)

david.kimball@state.ma.us
617-626-1447
June 2006

This document discusses the method for transferring GPS data collected with ArcPad onto your office computer and managing that data.  This process is significantly different than with previous Trimble GPS units like the GeoExplorer I/II/3 or ProXR.  It is also slightly different than the process used with previous generations of GeoXT/GeoXMs that use ArcPad 6 and GPScorrect 1.  This document specifically discusses the GeoExplorer 2005 series, which has 11 buttons on the front, and uses ArcPad 7 with GPScorrect 2.  If your GeoXT has two buttons on the front, or you are using ArcPad 6 with GPScorrect 1, you have an older version and you should see the earlier version of this document.

Note: the method discussed in this document is for managing data as shapefiles.  It does not discuss managing your data as a geodatabase by using the checkout/checkin tools in ArcMap.

## Connecting the GPS unit to your computer

Plug the cradle into an electrical socket using the power cable.  The cradles that work with these GPS units are gray and have 12 pins; the older units have black cradles with 10 pins.  Use the USB cable to connect the cradle to a USB port on your computer.  Turn the GPS unit on and place it in the cradle by setting the top end (the end with the Trimble logo) into the top of the cradle, and then firmly pressing the bottom end (the end with the power button) into the cradle until it clicks.

This should automatically launch Microsoft ActiveSync on your office computer (you may need to wait several seconds).  [You need to have this software installed – see the "Updating GeoXT Software (Windows Mobile 5)" document for instructions].  When ActiveSync launches, you should see the Synchronization Setup Wizard. Click Cancel – this will allow you to install programs and move files back and forth without having to set up a sync relationship.  Now you are connected.  If you have a problem connecting, try removing the unit from the cradle, waiting a bit (say, 20 seconds or more), and then reconnect.  In some cases you may need to restart your computer or soft-reset the GPS unit to get it to work.

## Transferring the data

ArcPad saves your GPS data into an existing shapefile or shapefiles, and, if you have GPScorrect, it will save additional GPS information into an .SSF file.  The .SSF file will allow you to differentially correct the shapefile data.  You will need to transfer all the files associated with the shapefiles plus the .SSF file.

On the ActiveSync window click the Explore button.  This will launch a Windows Explorer-type window showing the contents of the GPS unit.  [You can also see the contents in a regular Windows Explorer or My Computer window if you prefer—the GPS unit will show up as a "drive" called Mobile Device].  Double-click "My Windows Mobile-based Device", then "My Documents".  This is where we store our GPS shapefiles.  Your data may be stored in another folder within \My Documents\, for instance \ArcPad_Fells\ or \catchbasins\.

Once you have found your shapefile(s), you'll need to copy the files to your hard drive.  Select all the files associated with the shapefile(s)—ALL  files that start with the same name, for instance:

catchbasin.apl
catchbasin.dbf
catchbasin.prj
catchbasin.shp
catchbasin.shx
catchbasin.vbs

In addition, look for a file called "GPScorrect.ssf".  This will be in the same folder as your edited shapefiles unless you were using an ArcPad project file (*.apm) that is saved in another folder, in which case it may be in the same folder as the .apm file.  You will need to copy this file also and place it in the same folder on your desktop computer as your shapefiles.

Right click on the selected set of files and click Copy.  Then open Windows Explorer or My Computer and navigate to the place where you want to store your GPS data.  Create a new folder, name it something relevant (for instance \20060529_XT3\ (for the date downloaded and the name of the GPS unit)), and paste the files into that folder by right-clicking on the folder and clicking Paste.  The reason you need the files to be in their own folder is that all the files (for instance all catchbasin GPS files) will have the same names, so if you have multiple days of data from multiple GPS units, you will end up overwriting the files unless you have each set in its own folder.  If you have more than one shapefile to download, for instance *trails.shp* and *trailpoints.shp*, then you can put them both in the same folder.  An alternative to storing each day's work in a separate folder is to rename each shapefile after you transfer it and keep them all in the same folder.


**Emailing the files to GIS staff**

At this point, you can either send the files to GIS staff or you can differentially correct the files yourself.  When you email the files to GIS staff ( nathanael.lloyd@state.ma.us or david.kimball@state.ma.us or chandreyee.lahiri@state.ma.us ) make sure you include ALL the files that start with the same name, plus the GPScorrect.ssf file as mentioned

above.  If any of the files are missing, the data may be unusable.  Once you have emailed the files and received the corrected versions back from GIS staff, skip to the step titled *Looking at the files in ArcView/ArcMap*.


**Differentially correcting the shapefile(s).**

If you have an .SSF file along with your shapefile(s), you can use it to differentially correct your shapefile(s), which will improve the locational accuracy of the shapes.

To complete this step, you must have GPS Pathfinder Office version 3.10 or higher installed on your computer.  Open GPS Pathfinder Office.  You can use the Default project or you can use or create a special project.  Drag the .SSF file you just downloaded from Windows Explorer onto the GPS Pathfinder Office window.  You may get a message saying "Changes cannot be made to this file as it was created with GPScorrect.  The file has been opened in read only mode."  This is OK.  You will see a bunch of little black dots on the screen, which are your GPS positions.  Choose Differential Correction from the Utilities menu.

The Differential Correction Wizard has changed a lot from previous versions of GPS Pathfinder Office.  On the first page make sure your .SSF file is selected.  On the second page, choose "Automatic Standard Carrier and Code Processing".  On the third page hit "Change…" to alter the default settings (you only need to do this once).  This will bring up the Correction Settings dialog – click the Output tab and choose "Corrected and Uncorrected".  Click OK.  On the fourth page you will choose the base station to use for your corrections – choose "Base Provider Search".  We have been using "COOP_CORS, Environmental Data Center, Univ. of Rhode Island, RI".  [You can choose a base station by clicking "Select…".  This will bring up a window showing the base station list – you may need to click "Update List" to get a complete list.]  Choose "Use reference position from base provider" and check "Confirm base data and position before processing".  On the fifth page, choose "Use the same folder as the input file".  Click Start.  The utility will attempt to download the files from the base station.  If it does not succeed, you may need to wait until the base station makes the files available (some make them availably hourly, some daily) or try another base station.  If it succeeds and, under "Coverage Details", your coverage is 100% or close to it, click Confirm.  The utility will now correct your SSF file and give you some information about what percentage of your positions were corrected (this should be a high percentage – if it's not above 90% you might want to try another base station unless the errors are in your SSF file) and what the estimated accuracy ranges are.  Click Close when it is done.  It should have written a .COR file into the same folder where your .SSF file and shapefile(s) are.

Now you are ready to run the ShapeCorrect utility.  Click Start—Programs—GPS Pathfinder Office 3.x—ShapeCorrect.  Click Browse and browse to your shapefile(s) if they don't already appear in the window (you can alternately drag the .shp file(s) into the ShapeCorrect window from Windows Explorer).  Make sure that "Corrected and Uncorrected" is the selected option under Output GPS Positions.  Click OK.  This utility

will save your existing <filename>.shp file as <filename>.bkp, and it will substitute a new <filename>.shp file with the corrected positions for each shapefile. If you ever need to revert to the uncorrected shapefile, you could rename the .shp file to something else and then rename the .bkp file to .shp.

**Looking at the files in ArcView/ArcMap**

Now you can add the shapefiles to ArcView or ArcMap to see how they look. If you are personally managing the data you are collecting (as opposed to having the GIS staff manage it for you), and you have many days worth of fieldwork, you should at some point merge your shapefiles together (only merge the ones that have the same name; for instance, merge all your "trailpoints" shapefiles together into one, but don't merge "trailpoints" with "trails" or "catchbasins". Contact GIS staff for instructions on how to merge shapefiles.

**Email files to GIS staff**

Even if you are managing your data yourself, we'd like a copy. See above for how to email the data to us. The data may be useful for the FAMIS project or it may be of interest to others within the agency.

**Replacing the files on the GPS unit**

Before you go back out into the field, you'll want to replace the files on the GPS unit (or at least delete the .SSF file). Once you're SURE that you have downloaded the data correctly onto your office computer, you can delete all the files on the GPS unit that make up the shapefile (they all start with the same name, i.e. catchbasin.* ). Then you can replace them with the files in the \My Documents\projectname\empties folder (if it exists). Alternately, you can keep adding GPS data to the original shapefile(s) if you want. If you don't delete the .SSF file and you edit data for longer than a week, GPScorrect will rename your old .SSF file and create a new one, because an SSF file can't contain more than one week's worth of data. You can do this deletion and copying using My Computer or Windows Explorer. Browse to the folder where your data is ( \My Documents\projectname\ ) and select the files you want to delete, right-click, and choose Delete. Then go into the \empties\ folder and select all the files and right-click and choose Copy. Go back to the folder where you deleted the files, right click in a blank area, and click Paste. The next time you go out in the field with the GPS unit, you'll edit this new, empty shapefile. If you don't have an \empties\ folder, it is a good idea to create one, in which you can keep an empty copy of your shapefile.

In addition, if you have created a merged file of previously collected data, you can load it onto the unit for use as a background layer (this merged shapefile needs to have a different name than the shapefile you are editing). This can be useful for visualizing

where you have already been.  Simply select all the files that make up the merged layer, Copy, and Paste it into the \My Documents\projectname\ folder on the GPS unit.  When you launch ArcPad and load your project, tap the Load Data button (black + on yellow background) and add that layer.  Tap the Layers button (looks like 3 yellow sheets of paper) and move the layer down in the drawing order so it is below your edit layer.  You might also want to make it a different color.

Now you should be ready to go back out in the field and collect more data.  Make sure you leave the GPS unit on the cradle for long enough to charge its internal battery.  You can check the battery level by tapping Start—Settings, choose the System tab, and tap Power.  If you modified any of your settings during your last day of fieldwork (for instance the GPS quality slider in GPScorrect) make sure you set them back to the default setting.