Getting Elevations from FAST Survey

MobileMapper CE – FAST Survey – Geoid03 – NAVD88

If part of the objective is getting elevations in the coordinate file in FAST Survey a good way to get from ellipsoid heights based on the NAD83 to orthometric heights based on NAVD88 is to use the Geoid03 model that comes with GNSS Solutions.

The process may seem a little tricky. Make it less complex by looking at a process that begins with the connection to the PC using ActiveSync using the procedures described in the MobileMapper CE Getting Started Guide.

-	ne e i ni	
ut M	icrosoft ActiveSync	
	Microsoft® ActiveSync® Version 4.2.0 (Build 4876)	
1	Product ID: 77888-810-3996796-04957	
	Copyright© 1996 - 2006 Microsoft Corporation. All r	ights reserved.
	This product contains security information licensed fr Security Inc.	rom RSA Data
Warnin copyrig	g: This computer program is protected by ht law and international treaties.	

Making the connection to ActiveSync is as simple as connecting the USB cable from the MobileMapper CE I/O module to the PC. Once the hardware connection is made ActiveSync will find the MobileMapper CE and ask what you want to do.

In this example the choice is No. A partnership is not required to do this job.

New Partnership		×
	Set Up a Partnership	
	 Before you can synchronize information between your mobile device and this computer, you must set up a partnership between them. Would you like to set up a partnership? Yes Set up a partnership so that I can synchronize information between my device and this computer. No I don't want to synchronize information. Set up my device as a guest so that I can copy or move information between my device and this computer. 	
	< Back Next > Cancel Help	

With the ActiveSync connection established it is time to configure SurvCom to communicate with the MobileMapper CE. SurvCom can be started from the

Start \rightarrow Programs \rightarrow GNSS Solutions \rightarrow Tools \rightarrow

or from within GNSS Solutions. See Appendix H in the GNSS Solutions Reference Manual for SurvCom instructions and details about what the buttons represent. These instructions presume that you are familiar with the manual.

The **Options** button brings up a dialog box that allows a choice of many COM ports with ActiveSync at the bottom of the list. In the window on the right side of SurvCom navigate to the place on the SD card where the geoid separation file will be written.

😻 SurvCom v1.25			
Local PC Total Files: 16 Bytes: 15393	1	Remote Fotal Files: 0 Bytes: 0	
Bytes Free: 10802M Local Path: C:\	Options	×	
Name MeridianColor	File Mask	COM96	ize Modified File File
My Projects	Directory Sort	COM97 COM98 COM99	10/04/06 22:09 10/04/06 22:11
NED NES	Display Special Files		10/04/06 22:10
Options paccrest	Confirm Delete	YES YES	
Phil	Baud Rate	115200	
	Protect Remote Files	YES NO	
File: *.* Status: Connected to remote		Cancel	Bytes: 0
Connect Transfer Set Pat	h Make dir Delete Renar	me Options Geoid F2	F conv Send Pnts Exit

With everything ready for the gsf file to be written to the data collector just click on the **Exit** button to close SurvCom.

It is time to start the Geoids program. With the Start button the path is

Start \rightarrow Programs \rightarrow GNSS Solutions \rightarrow Tools \rightarrow

A click on the **Help** pop down menu offers a chance to take advantage of the **User's Guide** that is like a slide show that will walk through the process of using the Geoids program. Please use that User's Guide because this document will take advantage of familiarity with the User's Guide and Appendix C in the GNSS Solutions Reference Manual.



The Geoids program opens with a blank screen. It cannot know what model needs to be used. Choosing the Geoid03 model as the starting point is simply a matter of opening the file. Choose **Open...** from the **File** menu.

🔜 Geoids	
File View Transfer	Tools Help
Import	D 🖰 😭 🤶
🗃 Open Ctrl+O	
Print Setup	
<u>1</u> Geoid03.geo	
2 SFBay03.geo	
E⊻it	

Vame	Comment	Size
30SJULY	Canada (St Laurent)	678 KB
🕽 Alaska99	Geoid99 Alaska	20073 KB
DVR90	Denmark Geoid 2002	156 KB
EGM96	Global model	4058 KB
Geoid03	Geoid03 Conterminous US	33493 KB
Geoid99	Geoid99 Conterminous US	33493 KB
GGF97	France (Corse)	62 KB
🕽 GGR99	lle de la Réunion	6 KB
GSD95	Canada	646 KB 🛓

With many models to choose from a little search will locate the Geoid03 model file.

After selecting Geoid03 click the OK button.

😪 Geoids - Geoid03.geo
File View Transfer Tools Window Help
🖻 Geoid03.geo
Name : Geoid03 Date : 01/28/04 17:11:51 33493 KB Comment : Geoid03 Conterminous US
North coordinates : 58° 0' 0.0000"N West coordinates : 130° 0' 0.0000"W South coordinates : 24° 0' 0.0000"N East coordinates : 60° 0' 0.0000"W
Latitude step : 1.00' Longitude step : 1.00'
Number of points : 8574241

The entire Geoid03 model file is much too large for the data collector. It is not appropriate to transfer the entire file to the data collector. Extract a segment of the model based on the area where the GPS work will be done.

A model that is too small will limit where it can be used. A model that is too large will bog down the data collector.

😪 Geoids - Geoid03.geo				
File View Transfer To	ools Window Help			
Import Import Gpen Ctrl+O Close				
Extract As	17:11:51 33493 KB 03 Conterminous US			
Print Preview	es : 58° 0' 0.0000"N s : 130° 0' 0.0000"W es : 24° 0' 0.0000"N s : 60° 0' 0.0000"W			
<u>1</u> Geoid03.geo <u>2</u> SFBay03.geo	: 1.00' : 1.00'			
E <u>x</u> it	s : 8574241			

Begin the process of defining the work area with the **Extract As...** on the **File** menu.

A first look at the map reveals the coverage area of the Geoid03 model. It will not extract a model file that is located outside of the box shown on the map.

My own preference is for as much map information as it will provide. Every box gets a check mark so the geography on the screen will help mark the box.



This is too much map for accurate selection. The right mouse button offers a menu for zoom and pan. Choose Zoom In and drag a box over the desired area using the left mouse button





With the general work area shown on the map it is time to draw a box that will enclose the area that will be included in the geoid separation file.

A right mouse click on the map brings up the menu. Draw a box with a click and drag of the left mouse button.



The work area is now defined and limited to what is enclosed by that box. There is one more chance to make adjustments after a click on the **OK** button.

mment				
		My turf		
35°54' 0.000	10'' N	South	32*44' 0.0)000''N
01°15' 0.000	10''W	East	96*37' 0.0	000''W
	35°54' 0.000 01°15' 0.000 Ap	35°54' 0.0000''N 01°15' 0.0000''W Approximate f	35°54' 0.0000''N <u>South</u> 01°15' 0.0000''W <u>East</u> Approximate file size : 206	35°54' 0.0000''N <u>South</u> 32°44' 0.0 01°15' 0.0000''W <u>East</u> 96°37' 0.0 Approximate file size : 206 KB

A meaningful name and comment will help make effective use of the geoid separation file as time goes by.

The latitude and longitude shown in the dialog box can be adjusted based on what is known about the boundaries of the work area.

Avoid choosing limits that will cause a failure when a measurement is made outside the limits of the box. A little bit too much is better than an area too small. The data collector will provide ellipsoid heights for the points when a measurement is made outside the limits of the geoid separation file.

The larger the area the longer it will take the data collector to search the file. Some experimentation might be needed to figure out what works best. Avoid choosing city sized geoid separation files. Get some miles across that box. Trying to put the whole state of Texas in one file might result in long waits while the data collector searches for the geoid height.

With the choice made it is time to click on the **Extract** button to see the results of the effort.

~	Geoids - OKTX1.geo	
File	View Transfer Tools Window Help	
) 🖆 🖬 🖪 🐵 🗠 🎦 😭 🤋	
	Geoid03.geo	-OX
N	🖸 OKTX1.geo	
D C N	Name : OKTX1 Date : 11/08/06 15:52:54 210 KB Comment : My turf	
SE L	North coordinates : 35°55' 0.0000"N West coordinates : 101°15' 0.0000"W South coordinates : 32°44' 0.0000"N East coordinates : 96°36' 0.0000"W	
L N	Latitude step : 1.00' Longitude step : 1.00' Geoids X	
	Number of points : 53760 Operation successfuly completed.	
	ОК	

The area is now added to our list of available geoid models with a click of the OK button. The time has come to **Transfer** the model to the data collector and **Write...** the GSF to the SD card in the MobileMapper CE.

🔜 G	eoids - OKTX1.geo
File	View Transfer Tools Window Help
	🗃 🖥 Write Ctrl+W 🧗 🤗
	Geoidt Read Ctrl+R
Na	S OKTX1.geo
Di Ci	Name : OKTX1 Date : 11/08/06 15:52:54 210 KB
Ne We	Comment : My turf
Sc Ea	North coordinates : 35°55' 0.0000"N West coordinates : 101°15' 0.0000"W
La	East coordinates : 32 44 0.0000 N
	Latitude step : 1.00' Longitude step : 1.00'
	Number of points : 53760

The effort made to prepare SurvCom for the file transfer pays off. The choice is a **Zmax data collector** as the destination for the file.

Extract i	region from OKTX1 geoid	×
	Zmax data collector	
North	35*54' 0.0000''N <u>South</u> 32*44' 0.0000''N	
<u>West</u>	101*15' 0.0000''W East 96*37' 0.0000''W	
	Approximate file size : 464 KB	
	World Map OK Cancel	

A click on the **OK** button reminds us to make the connection that has already been done in preparation for this procedure. The file is ready to be transferred if the ActiveSync connection is working.

Data Transfer	×
Connect your field terminal to your PC	
On your field terminal, launch the Data Transfer utility	
Then press OK when ready !	
Automatic transfer	
OK Cancel	

A click on the **OK** button transfers the file.

The Geoids program reports successful transfer of the GSF to the data collector.

😪 Geoids - OKTX1.geo	
File View Transfer Tools Window Help	
🖻 Geoid03.geo	
Ne 🖾 OKTX1.geo	
Date : OKTX1 Date : 11/08/06 15:52:54 210 KB N(Comment : My turf	
We Set North coordinates : 35°55' 0.0000"N Set West coordinates : 101°15' 0.0000"W South coordinates : 32°44' 0.0000"N Le East coordinates : 96°36' 0.0000"W Le Le Transfer Completed	
N1 Longitude step : 1.00' Transfered 1 of 1 files successfully.	
Number of points : 53760	

How can we tell for sure?



Start SurvCom and notice that the file is right where it is supposed to be with one little problem. It was supposed to be in the GSF folder but only if we had opened the GSF folder to receive the file when SurvCom was setting this up for the transfer.

No problem. The **Exit** button will close SurvCom.

The Explore tool in ActiveSync provides the means to move the file to the GSF folder on the SD card.

🔁 Microso	oft Acti	veSync			
File View	Tools	Help			
Sync	\bigcirc	ichedule	🞾 Explore		
Guest			Ex	olore Device	0
Connecte	d		25	169	U
					Hide Details 🗙
Information	Туре	State	JS		

🔋 Mobile Device				
File Edit View Favorites To	ols Help		100 A	
🖛 Back 🔻 🔿 👻 🔂 🖓 Search	🔁 Folders 🕥 🗳	$\mathbb{G} \times \mathbb{O} \blacksquare$		
Address [Mobile Device		~	∂Go Links » 🛱 SnagIt 🖺	
	Name 🛆	Size Type	Modified	
	🚞 Application Data	File Folder		
Research Balance	🛅 My Documents	File Folder		
Mobile Device	C MyDevice	C MyDevice File Folder		
	Network	File Folder		
SD Card	Program Files	File Folder		
		File Folder		
	SD Card	File Folder		
		File Folder		
		File Folder	CH 1000 4:00:05 AM	
1 object(s) selected		0 Mobile Device		

Open the SD card on the MobileMapper CE with the Explore tool.

🔄 \SD Card			
File Edit View Favorites Tools	; Help		10 A
🗢 Back 🔹 🔿 👻 🔂 🧟 Search	🔁 Folders 3 🗳	$\mathbb{G} \times \mathbb{N} \mid \mathbb{H}^{\bullet}$	
Address 🛅 \SD Card		. ∂G	o Links 🎽 🗰 SnagIt 😭
SD Card	Name A FAST GSF Projection OKTX1.gsf Cut Cop Crea Dele Ren. Proj	Size Type File Folder File Folder File Folder File Folder SPERE OSF File Ate Shortcut te ame perties	Modified
📴 Cut selected item(s)			11

Select the file and use the right mouse button to bring up the menu to Cut the GSF from the root folder of the SD card.

📩 \SD Card\GSF							
File Edit View Favorites Tools	Help						-
😓 Back 🔹 🔿 👻 🔂 🥘 Search	🔁 Folders 🛛 🕥 🛛 🖓	ල X හ)				
Address 🛅 \SD Card\GSF			•	€°G0	Links »	🛱 SnagIt	P
	Name	Size	Туре	Modified		ed	
	SFBay03.gsf 96.4KB GSF File CKTX1.gsf 525KB GSF File			4/10/2006 10:41:3			
Research Research					11/8/2006 3:59:54		
GSF	2						
Select an item to view its description.	-						

Open the GSF folder and paste the GSF where it needs to be.

This GSF is now ready for use with FAST Survey as described on pages 45 through 47 of the FAST Survey Reference Manual. See the topic heading Geoid Separation File.

Copy the GSF from the SD card to the hard drive on your PC in order to share it with other FAST Survey users or to replace a file that is lost when a GSF is inadvertently deleted from the SD card.

The Geoids program does not write the GSF to the hard drive on the PC. Copy the file from the data collector using the Explore tool in ActiveSync.

For more information get the Z-Max.Net Reference Manual and read pages 272 through 274 in the Appendices.

Be an informed user:

For more information about geoid models and how they are used see the NGS web page at

http://www.ngs.noaa.gov/GEOID/

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