OPUS with ProMark500, ProFlex500, & ProMark200

OPUS is wonderful! The price is right. It must be used with proper field and office procedures or the file will be rejected. Take advantage of the resources on the OPUS web page to learn about how it works and make effective use of it. This document does not replace the tutorial information available from the OPUS web page.

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

This document will focus on the use of OPUS Static with a ProMark500, ProFlex500 or ProMark200 .

Use the instructions in chapter 7 of the ProMark500 Reference Manual to help with site selection and for general information about the operation of a GPS receiver. OPUS will reject poor quality data. If the GPS antenna is moving, or if it appears to be moving because of a poor solution OPUS will reject the data.

After the GPS receiver is set up use the Monitor / Skyplot in FAST Survey to make sure there is a good solution and a reasonably stable position.

| 😪 Monitor/Skyplot 🫛 🧲 |
|----------------------------------|
| Quality Position SATView SATInfo |
| Status: AUTONOMOUS |
| |
| Satellites: 12 |
| Local Northing: 1953933.0450 |
| Local Easting: 6142092.8623 |
| Local Elev: 52.6002 |
| HDOP: 0.90 TDOP: 1.40 |
| VDOP: 2.00 GDOP: 2.61 |
| PDOP: 2.20 |
| HRMS: 9.410 |
| VRMS: 11.76 |
| |
| 🛃 😂 FAST 📃 🎭 11:02 AM 🏴 🔁 |

After the receiver has been set up as an RTK base or whatever other job it will do use the Log Raw GPS menu selection to configure it for the OPUS session.



Click on Start File

| 😂 Magellan Setup | | |
|--------------------------|--|--|
| | | |
| File: None | | |
| Start File | | |
| Tag New Site | | |
| Close File | | |
| File Manager | | |
| Continue Logging | | |
| Pause Logging | | |
| Free Mem on Receiver: | | |
| 98090 kBytes | | |
| 🎸 📚FAST 📃 🎐 11:06 AM 🏴 🖷 | | |

Some settings specific to the OPUS session are about to be made but additional data entry will make processing in GNSS Solutions easy if OPUS rejects the file.

| 📚 Start New File 🔽 🔀 |
|--------------------------------|
| |
| Elev Mask: 5 Change Ant. |
| Antenna Height: 7.1230 ft |
| ● Internal Mem O USB Mem Stick |
| Interval: 5.0 seconds |
| |
| 🌠 😂 FAST 📃 🍛 11:08 AM 🏓 🔁 |

A five second recording interval provides more than enough data for a long static session. The elevation mask and antenna height shown here come from previous settings. OPUS requires manual entry of the vertical height to the Antenna Reference Point. The antenna height entered here is for the RTK work or data processing in GNSS Solutions. Click the check box to accept the settings.

Then tap Tag New Site.

| 😤 Ма | ngellan Setup | |
|------|-----------------------|---|
| | File: Logging | |
| | Start File | |
| | Tag New Site | |
| | Close File | |
| | File Manager | |
| | Continue Logging | |
| | Pause Logging | |
| | Free Mem on Receiver: | |
| | 98090 kBytes | |
| 🐮 😂 | FAST 📃 🎭 11:17 AM 🏴 🎙 | 4 |

| 📚 Tag New Site | |
|-----------------------------------|----------------|
| Free Mem on Receiver: | : 98079 kBytes |
| Site Name: | PHIL |
| Site Attr.: | РК |
| Antenna Height: | 7.1230 ft |
| Ch | ange Antenna |
| Interval (in Seconds) | 5.0000 |
| Stop Logging: Manually O After | 10. minutes |
| ಶ 😂 FAST 📃 🍛 | 11:20 AM 🏴 🗟 |

Use a four character alpha-numeric Site Name. Avoid punctuation. The Site Attribute is there for GNSS Solutions. Tap the dot to Stop Logging Manually at the end of the session. Tap the check box to accept the settings.

Tap Exit - Continue Logging.

| Recording site 'PHIL' |
|---------------------------|
| Site Duration: 00:00:22 |
| Antenna Height: 7.1230 ft |
| Stop Point Logging |
| Monitor/Satellite View |
| Exit - Continue Logging |
| 🌱 😂FAST 📄 🎐 11:22 AM 🏴 🗟 |

| Recording site 'PHIL' |
|--|
| |
| Site Duration: 00:56:24 |
| FAST Survey |
| Exit to main menu? Data logging will continue. |
| Yes No |
| Monitor/Satellite View |
| Exit - Continue Logging |
| 🌠 😂FAST 📃 🎐 12:18 PM ጆ 🔁 |

Tap Yes to continue data logging.

The settings have been made but a new file must be started with all of the settings just as they are. Tap Log Raw GPS to return to the menu to close the file and begin a new one. Alternatively close the file and start it again with the log button on the front panel of the receiver. This question takes several forms in different places in FAST Survey. If a screen like this one appears. Tap Yes to continue Logging.

| 😤 JOB: 31AU | JG09 | | 1 | 0 |
|----------------------|-------------|---------------|-------------|---|
| <u> </u> | | Ē | quip | |
| <u>S</u> urvey | <u>C</u> O0 | GO | <u>R</u> oa | d |
| | 1 | | | 1 |
| 1 FAST Su | rvey | | | M |
| 2 | Continue | e Loggir | ng File? | 2 |
| <u>3</u> <u>Y</u> e | 5 | 1 | <u>4</u> o | 8 |
| 4 Stake Offset | - | | | |
| 5 Elev Difference | e 🕨 | | | |
| 🐮 😂 FAST . | | 3 12:2 | 0 PM 🗭 | |

Next is another example of the question about stopping the log. Tap Yes to continue recording the Site that was entered.

| SOC 🏀 | 3:31AU | G09 | Ĺ | 2 |) 🔞 |
|---|--------------|--------------|---------------|------------|--------------|
| | <u>F</u> ile | Ĩ | ļ | Equi | p |
| Surv | /еү | <u>C</u> O0 | GO | <u>R</u> e | bad |
| EAG | T Gurs |) (/ O V | | | -1 |
| Continue recording site PHIL'? <u>Yes No</u> | | | | | |
| 4 Sta Off: | ke set | • | | | |
| 5 Elev Diff | erence | , 🖿 | | | |
| 27 | FAST . | . 📃 |) 12:: | 21 PM | 7 🔁 |
| 😤 Ма | gellan | Setuj | p | | (|
| | File: | Logg | ging | | |
| | 0 | Start F | ile | | |
| | Та | g New | Site | | |
| | (| Close F | ile | | |
| | Fil | e Mana | ager | | |
| | Cont | inue Lo | ogging | | |
| | Pau | use Log | ging | | |
| | Free M | 1em or | n Rece | iver: | |
| | 9 | 17724 k | :Bytes | | |
| 🐮 😂 | FAST | . 📃 🤅 |) 12:2 | 23 PM | > |

Tap Close File to close the file that was used to set the parameters in the receiver.

| <mark>ಿ</mark> Ma | gellan Setup |
|-------------------|-----------------------|
| | File: None |
| | Start File |
| | Tag New Site |
| | Close File |
| | File Manager |
| | Continue Logging |
| | Pause Logging |
| | Free Mem on Receiver: |
| | 97724 kBytes |
| 🛃 😂 | FAST 📃 🎐 12:25 PM 🏓 🖷 |

Tap Start File to begin a new file.

| 📚 Start New File 🔽 🔀 |
|--------------------------------|
| |
| Elev Mask: 🗧 🛛 Change Ant. |
| Antenna Height: 7.1230 ft |
| 🔘 Internal Mem 🔿 USB Mem Stick |
| Interval: 5.0 seconds |
| 🌠 😂FAST 🔳 🍫 12:26 PM ጆ 🛱 |

Do not make changes in the settings. Click the check box.

| <mark>ề</mark> Magellan Setup | |
|-------------------------------|-------|
| | |
| File: Logging | |
| Start File | |
| Tag New Site | |
| Close File | |
| File Manager | |
| Continue Logging | |
| Pause Logging | |
| Free Mem on Receiver | |
| 98079 kBytes | |
| ಶ 😂 FAST 📃 🎐 12:49 PI | w 🏴 🗟 |

Use File Manager, if desired, to confirm that the first file was closed and a new file is being recorded.

| 📚 Files on Receiver : |
|---|
| PHIL 6 kBytes 8/31 19:34 PHIL 84 kBytes 8/31 19:50 |
| Internal Mem O USB Mem Stick |
| Free Memory: 97997 kBytes |
| 2 files |
| Delete Delete All Files |
| 🌠 计FAST 📄 🈏 12:52 РМ 🏴 🖷 |

The first file that was used to configure the settings will not be used for the processing.

This is the beginning of at least two hours of raw data recording to create a file that will be used by OPUS. When the session is finished return to the Log Raw GPS menu. Remember to respond with Yes to the questions illustrated on pages 5 and 6.

| 📚 Magellan Setup 🧲 |
|---------------------------------------|
| File: Logging Start File |
| Tag New Site |
| Close File |
| File Manager |
| Continue Logging |
| Pause Logging |
| Free Mem on Receiver: 97984 kBytes |
| 🛃 😂 FAST 📃 🎐 12:54 PM 🏓 菪 |

Close file and turn off the receiver if this is the last session of the day.

With the receiver connected to the PC with the long USB cable it is a simple matter to copy the large G file to a folder on the PC. The small file with the configuration settings in it can be left behind.

| ols Help | | | |
|-------------------------|--------|----------|-------------------|
| 🗋 Search 🔀 Folders 🛄 🕶 | | | |
| | | | 💌 芛 Go |
| 🔨 Name 🔺 | Size | Туре | Date Modified |
| GPHILD09.243 | 7 KB | 243 File | 8/31/2009 7:34 PM |
| GPHILE09.243 | 724 KB | 243 File | 8/31/2009 9:54 PM |
| ~ < | | | > |
| 09 9:54 PM Size: 723 KB | | 723 KB | 😼 My Computer |

RINEX Converter 1.0.0.7 that comes with GNSS Solutions 3.60.1 will convert the ATOM file (G file) to the RINEX format for OPUS.

Click the Add button and select the raw data G file that was copied from the receiver.

Choose the input directory and the output directory where the G file will be input and the RINEX file will be output.

In the Use box remove the check marks from GLONASS and SBAS.

| 🗘 RINEX Converter 1.0.0.7 | | | _O× |
|--|-----------------|---------|---------------|
| Convert Raw Data File(s) | Add | Remove | Info |
| C:\Projects\ProMark500\PM500atDE C:\Projects\phil2451.10o C:\Projects\phil2451.10n C:\Projects\phil2451.10g C:\Projects\phil2451.10h C:\Projects\phil2451.10b C:\Projects\phil2451.10b C:\Projects\phil2451.10m | CK\Gfile\GPHILB | 10.245 | |
| Into: RINEX Raw Data Files version In folder: C:\Projects | n 2.11 | | . |
| Include: 🔽 GPS 🗖 GLONASS 🗖 Ask before overwriting any file | SBAS | Convert | |
| | | | |
| Copyright © 2010 Ashtech. All rights reserved. | | <u></u> | v.ashtech.com |

Click the Info button near the top right of the screen and check the box near the bottom left of the screen where it says: Include all optional header records

| Observation Navigation Meteo | |
|---|----------------------|
| Name of Program / Agency creating current file / Date of creation | PGM / RUN BY / DATE |
| Comment line | COMMENT |
| Name of antenna marker (ie station name) | MARKER NAME |
| Name of observer / Name of observer agency | MARKER NUMBER |
| Beceiver Number / Turne / Version | OBSERVER / AGENCY |
| Antenna Number / Tune | REC # / TYPE / VERS |
| Antenna Height / East offset / North offset - all units in motors | ANT # / TYPE |
| | ANTENNA: DELTA H/E/N |
| Include all optional header records | |
| OK Cancel | |

With all the settings done press the Convert button to create the file.

Upload the o file to OPUS.

While waiting for OPUS to return the results there may be time to watch a video about OPUS.

http://www.youtube.com/watch?v=nJYyed0GErk&feature=channel_page

A variety of Ashtech videos are available at

http://www.youtube.com/user/MagellanProfessional

http://www.youtube.com/ashtechvideos

| nor | | AP | - | OPUS | : Online Posi | tionin | g User Ser | vice |
|--------------------------|---|--------------------------------------|--|----------------------------------|---|------------|--------------|--------------|
| | | | | | | | National Geo | detic Survey |
| NGS Home | About NGS | Data & Imagery | Tools | Surveys | Science & Education | | | |
| -/- | | Upload Tie your G What is O | yourda PSobser PUS? F | ta file. vation to the AQs | National Spatial Referenc | ce System. | | |
| OPUS Mer | | * Email ad * Data file | ldress - y | our solution | will be sent here. Brow S observations. <mark>sample</mark> | wse | | |
| Upload | | NONE | | | no antenna selecto | ed | | * |
| About OPUS | | Antenna t | Antenna type - choosing wrong may degrade your accuracy. | | | | | |
| Published So | OPUS? | 0.0 Antenna h | 0.0 meters above your mark. Antenna height of your antenna's reference point. | | | | | |
| O OPUS: C | talas Publicaling Ever Xernico 1922 – 1928 geneticantinacio | Deptions to customize your solution. | | | | | | |
| adjusticity of the state | n liline | Upl | oad to Ra | apid-Static | Upload to Stat | ic | | |
| | - ner miler - j ner penins peninjeling gin | for data > 1 | 15 min. < 2 | hrs. | for data > 2 hrs. < 48 h | rs. | | |
| revert | to OPUS v1.2 tell us why. | * required We may u | * required fields We may use your data for internal evaluations of OPUS use, accuracy, or related research. | | | | | |

Please dig deeper than the OPUS home page to learn more about how it works.

Questions? Errors? Need some additional details? Send an email to <u>pstevenson@ashtech.com</u>

Phil Stevenson March 1, 2011