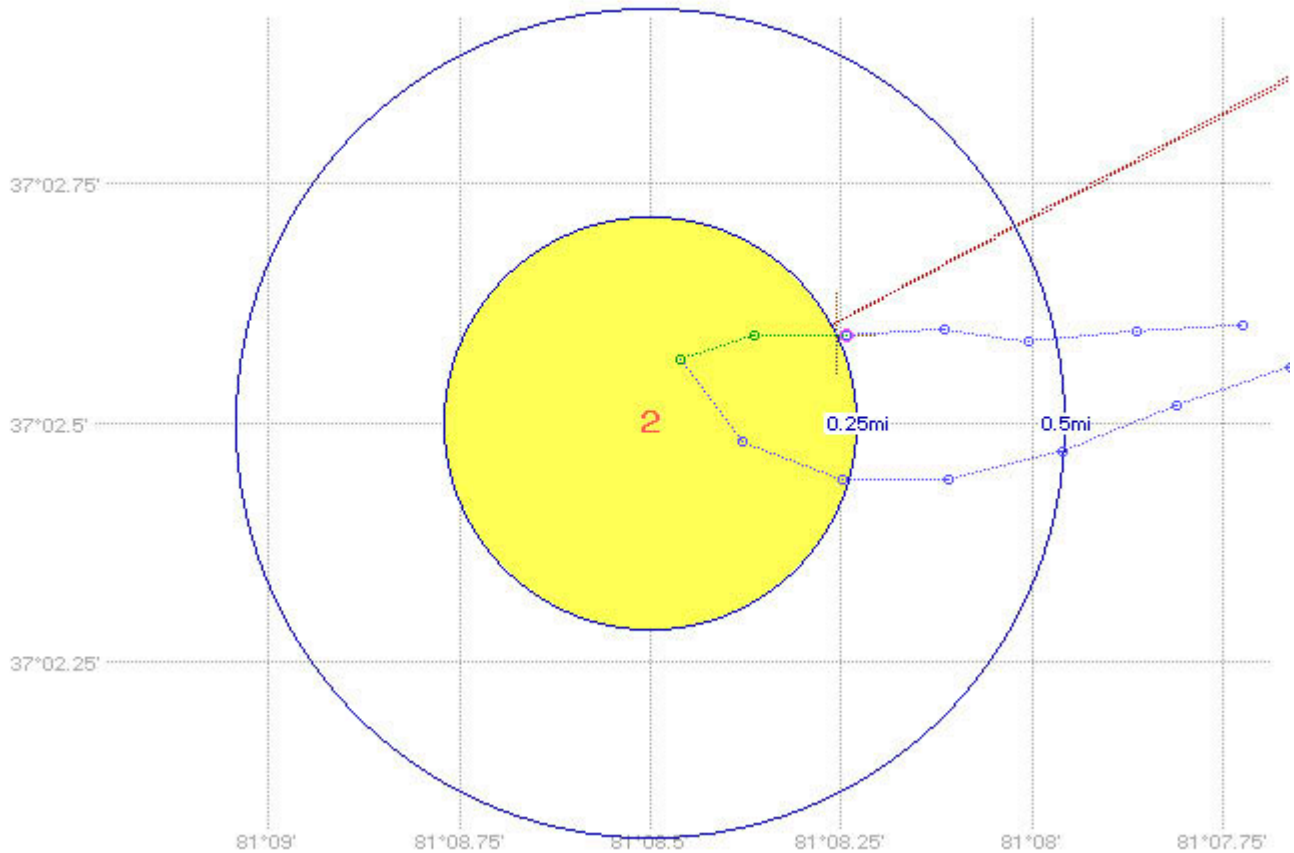


Cambridge Aero Instruments GPS-NAV PC Software Guide, Version 5

August, 1997

1 Turnpoint Cylinder - radius = 0.25mi
2 - Big Walker 37°02.500'N 081°08.501'W 3000ft MSL

Control time: 16:45:47 Status: 51 
37°02.592'N 081°08.255'W 4049ft MSL



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GPS-NAV PC Software Users Guide

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Support by Cambridge Staff and Agents around the world.

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The DATA sub-directory contains Text files with additional information:
DETAILS.TXT - EPE, 2D and DR fixes, Engine Noise Level, and Barograph Certification
IGC.TXT - Brief technical guide for interpretation of Cambridge .IGC Flight Log files.
DEMO.TXT - Commentary on Flight Logs in the DEMO directory.
EVALUATE.TXT - Guidelines for Flight Log Evaluation.
README.TXT - Installation guide plus Frequently Asked Questions

A. About this PC Software Guide

The Cambridge PC Software Guide complements on-line <F1> Help instructions. Be sure to read the Installation section carefully. Use this Guide and <F1> Help together while the software is running.

B. What's New in Version 5

GPS-NAV PC Software Version 3.1.1 was first shipped in September 1995. Version 5 has more functions and is easier to use than Version 3.1.1. If you are familiar with the original PC software, you will notice these improvements:

1. Quick, configurable access to flight display screens
2. Improved flight display screen appearance
3. Clear indication of Navpoint and Task data sources

4. Improved scaling of Barograph plots
5. Transfer to the GPS-NAV of up to 10 pre-defined tasks
6. Context sensitive <F1> Help or "Hot keys" lists for all functions
7. Detailed flight analysis through "Fix" marking
8. Task evaluation with times, speeds, and turnpoint validation
9. Menu driven flight log transfer to and from a floppy diskette
10. Full support for standard .IGC flight log files

C. Installation

Version 5.2 consists of 2 floppy disk containing these files:

Disk 1 - README.TXT INST1.GPS INSTFAST.EXE FILES.GPS INSTALL.EXE INSTALL.PRM
PIPELOOP.EXE

Disk 2 - INST2.GPS SAMPLE.GPS DATA.GPS

Disk 2 may also have Navpoint database files for gliding sites in your area. Supplemental instructions as well as the complete PC Software Guide are in .TXT files in the DATA sub-directory of the CAI program.

Minimum system requirement: a 386 processor running MS-DOS 4.0, and a hard drive with 8 megabytes of free space.

Preferred system: a 486 or Pentium processor running MS-DOS 6.0 or above, or Windows95 and at least 30 megabytes of available hard drive space.

===== For PC's running the MS-DOS Operating system =====

1. Check available User RAM space:
Type MEM at the C:\> prompt.
At least 470kBytes of conventional memory must be available.
If it is not, modify your CONFIG.SYS file as required to free up conventional memory.
2. Check available hard drive space
Type ChkDsk at the C:\> prompt.
At least 8 Mbytes of disk space must be available.
If it is not, delete unneeded application and data files.
3. Check the FILES statement in your CONFIG.SYS file
The number following "FILES=" should be at least 20.
4. Type A: at the C:\> Prompt. Type INSTALL at the A:\> prompt.
5. You can also INSTALL from a hard drive as follows:
Copy all files from both disks to a temporary directory on your hard drive.
Type INSTALL at the DOS prompt for the temporary directory.

A fast PC (Cyrix 166 or Pentium Pro 200) may cause "Divide by 0" errors during installation.
If this happens, type INSTFAST instead of INSTALL at the A:\> prompt.

6. Follow the on-screen instructions. By default the program is installed in a sub-directory labeled CAI. If you are upgrading from Version 3.1.1 you may wish to install the software to a different directory so you can compare old and new versions. Make the path for Flight Logs in Version 5.2 (use Main Menu item 6 - SYSTEM SETUP) the same as that in Version 3.1.1 (Usually C:\CAI\FLIGHTS\). Once you are familiar with Version 5.2, it can be re-installed as an upgrade to Version 3.1.1.

Existing flight log files and Navpoint databases are preserved during an upgrade.

7. To run the program, change the directory by typing CD \CAI at the C:\ prompt.
Type the command GPS. Voila! You will see the friendly Cambridge Main Menu.
8. The path for Flight Logs defaults to C:\CAI\FLIGHTS\ during a new installation.
To see Demo Flight Logs, change path to C:\CAI\FLIGHTS\DEMO\ using 6 -SYSTEM SETUP.

A fast PC (Cyrix 166 or Pentium Pro 200) may cause "Divide by 0" errors during operation.
If this happens, start the program by typing GPSFAST instead of GPS at the C:\CAI\> prompt.

===== For PCs running the WINDOWS 95 operating system =====

1. Select RUN in the START pop-up menu.
2. Type A:\INSTALL and press <Enter>.
3. Follow on-screen instructions.
Comments in 6. above apply to Windows 95 as well as DOS installations.

A fast PC (Cyrix 166 or Pentium Pro 200) may cause "Divide by 0" errors during installation.
If this happens, type INSTFAST instead of INSTALL at the A:\> prompt.

4. To run the program, select Programs in the WIN95 Start menu. Then select the DOS prompt and press <Enter>. At the C:\Windows> prompt, type CD \CAI. At the C:\CAI> prompt, type GPS. Whew!

A fast PC (Cyrix 166 or Pentium Pro 200) may cause "Divide by 0" errors during operation.
If this happens, start the program by typing GPSFAST rather than GPS at the C:\CAI\> prompt.

5. Make running the program easy by creating a Windows 95 shortcut.
 - a. Using Windows Explorer, find the GPS or GPSFAST Batch file in the CAI Folder.
 - b. Click on the Batch file with the Right mouse button, select MAKE SHORTCUT, and press <Enter>.
 - c. The Shortcut icon will appear at the end of the CAI file listings. Click & drag the icon to the desktop. Amaze and confuse your friends by changing the shortcut icon title to CAI5.
 - d. Double-click the icon to see the friendly Cambridge Main Menu.
6. The path for Flight Logs defaults to C:\CAI\FLIGHTS\ during a new installation.
To see Demo Flight Logs, change path to C:\CAI\FLIGHTS\DEMO\ using 6 -SYSTEM SETUP.
7. We mean two things when we say Version 5 is Windows 95 compatible. First, the program has been tested extensively with a variety of PC's running Windows 3.1.1 and Windows 95. Second, menu labels and functions are similar to typical Windows applications. Cambridge menus may look old-fashioned, but they are logical, consistent, and fast. Windows uses a mouse. Cambridge menus use <ARROW>, <ENTER> and <ESC> keys. A Graphic User Interface (GUI) is nice but has no real advantage in this application.

IMPORTANT INFORMATION ABOUT LASER PRINTERS USED WITH WINDOWS 95:

Laser Printers designed for use only with Windows will NOT work correctly with Cambridge MS-DOS based PC software. Examples of Windows-only printers are HP LaserJet 4L and 5L, Panasonic KX-P6100, NEC Superscript 860, and Brother HL-720.

With default Windows95 settings, laser printers will not print the last page of an MS-DOS print job. Follow these directions carefully to fix this problem:

On the Windows95 desktop select "My Computer". Select "Printers". Highlight the printer you are using. Press the RIGHT mouse button to open the printer control dialog box. Select "Properties". Select "Details". Select "Port Settings". Un-check the "Spool MS-DOS Print Jobs" box. Make sure you Press "OK" as you leave each screen to save the new settings.

D. Quick Tour

Even if you have used earlier versions of Cambridge PC software, you will find this tour useful and perhaps even entertaining. The DEMO flight log folder has flights from around the world. Pilot, Navpoint, and Task databases are also included to illustrate behavior of the software.

1 - Viewing a Single Flight

Start the program by typing GPS or GPSFAST at the C:\>CAI prompt. First, press the <F1> HELP key at the upper left of your keyboard. <F1> gives context sensitive help in almost every screen. Please note the universal use of <ENTER> and <ESC> keys. These keys move into and out of various parts of the program. The arrow keys move menu highlights up and down. Press <ENTER> with the top menu item "1 - SINGLE FLIGHT" highlighted. You will see a list of flight logs. Use the arrow keys to select any of the listed flights and press <ENTER> to view this flight.

Next, choose background Navpoint information to be displayed with the flight log. GPS-NAV Navpoints are part of every Cambridge flight log. If a task has been declared in the GPS-NAV by the pilot, the Navpoint sequence and declaration date and time can also be displayed.

Navpoint databases also exist in the PC. They are organized by Soaring Site. Competition tasks are sequences of Navpoints assigned by the competition director. Each Site in the PC can have Tasks associated with it. Competitions run for several days and may have different tasks for each competition class. Therefore, PC database tasks must be organized by date and class. This may seem like overkill, but Cambridge is the only Flight Recorder manufacturer providing PC software capable of goof-proof competition flight validation for all IGC approved GNSS Flight Recorders.

The Navpoint and Task Selection Screen shows data available from both the flight log and the PC Database. Version 3.1.1 attempted to recognize sitename and switch automatically to the correct PC database. This effort failed if there was no match between Flight Log and PC database sitename. Version 5 requires user selection of the appropriate Site when viewing flights using the PC Database. If the Site does not match the location of the flight itself, you will be pretty disappointed with some menu choices. For now, select the default "DECLARED TASK AND NAVPOINTS FROM FLIGHT LOG".

The next screen summarizes flight display choices. For this and the following screens, the <F1> key brings up a list of HOT keys. Each screen has its own unique list. Don't be timid. USE THE HOT KEY LISTS! They are your guide to the unique capabilities of this Cambridge PC program.

Trying features is more fun than reading about them. Therefore, I did not waste time or paper writing details about display features. However, starting with a conceptual model usually helps. Both Overhead and Vertical views have three functional levels. These are Overview, Detail, and Step level. Overview shows the

whole flight. Detail view zooms in on part of the flight. Step mode does just that - it steps through the flight one position fix at a time.

With Version 5 you can mark a fix in Step mode. Then you can step along the flight path to any other fix. The top right side of the screen shows calculations made from the marked fix and the current selected fix. Horizontal as well as vertical separations and velocities are calculated. This means you can determine the meteorological wind strength and direction from drift during circling flight in a thermal. Of course you can also measure the average climb rate over the entire thermal.

In all viewing modes the X (eXchange) key jumps between horizontal and vertical views. Finally, you can capture any display screen by pressing the <I> (Image) key. Captured screen images are printed as a group using the PRINT menu choice. You must choose an appropriate print driver in 6 - SYSTEM SETUP.

The OPTIONS menu lets you temporarily change display appearance. Take a few minutes to examine each flight using different OPTIONS and sources for Navpoints and Tasks. Demo flights and Navpoints are selected to illustrate the powerful features of this PC program.

2 - Viewing MULTIPLE FLIGHTS

Now for the fun stuff! Watching world class pilots fly together can be amusing and instructive. From the Main Menu, choose 2 - MULTIPLE FLIGHTS. Using the <SPACE BAR>, choose any group of flights from the same day. You MUST see an asterisk next to the flight logs indicating that a PC Database Task is available. If you have not selected the appropriate PC Database, you will have to do so before you can see the pilots in action. Why? Because there must be a common Task for all flight logs. Only the task defined in the PC database for a Site is used for display of flights in 2 - MULTIPLE FLIGHTS.

If another Site has been selected, go to Main menu 4 - PC DATABASES. Then select 2 - SOARING SITES and select the PC Navpoint Database where the flights were flown. Look at 4 - TASKS FOR THE SITE. You will see Tasks for the Demo flights at this site listed. This is the source of Task data used in display of Multiple Flights.

Now go back to Main Menu 2 - MULTIPLE FLIGHTS, and enjoy the show. OPTIONS let you start all pilots together or view the flights in actual time of day. The UP arrow accelerates the action. In Overview mode the space bar pauses the action. Note that the pre-start flight track is suppressed so you do not see the tow or the struggle to gain altitude early in the day.

3 - Working with FLIGHT LOGS

Main Menu choices 1 and 2 are for viewing flights. All other flight log functions are grouped under menu choice 3 - FLIGHT LOGS. They include transfer of flight logs from the GPS-NAV, translation to the standard .IGC file format, and copying flight log files to and from a floppy diskette.

Access to flight logs is by choice from a list of flights. The program looks inside the flight log file to find pilot name, flight date, and other useful information. Of course you can copy and delete flight logs using DOS commands or the Windows Explorer. But you will have to type in or at least remember the cryptic IGC Standard filename to do so. We designed intelligent Copy, and Delete utilities to make your life easier. We hope you like them!

4 - Overview of PC DATABASES

Cambridge PC software can validate flights made with all IGC approved Flight Recorders at a gliding competition. The PC software recognizes the Serial Number of the GPS-NAV Flight Recorder. The Pilot database assigns a GPS-NAV Serial Number to each pilot. Competition directors can load the official

Competition Turnpoint database into a GPS-NAV while preserving pilot preferences for Approach and Arrival radii, and units of measure (for example Statute or Nautical Miles).

Flight Log filenames are created automatically. The filename contains the GPS-NAV Serial Number. Flight log files are thus positively keyed to the correct pilot name, glider class, and competition number. During post-flight analysis, the official task for each class is correlated with the class of the pilot's glider. This makes it possible to completely automate turnpoint validation, flight timing, and even scoring for an entire competition.

Entering all the information needed for a competition may seem excessive to non-competition pilots. However, it needs to be done only once, so please be patient. For now, just browse through the various databases. Remember to use the <F1> help key. Detailed, context sensitive information will guide you through the screens.

5 - PREFERENCES for Flight Log Selection and Display

There are many ways to display flights. Certain ways have been chosen as defaults. The OPTIONS menu in both Single and Multiple flight display screens also let you choose how the current flight will be displayed. OPTIONS choices are temporary; they revert to defaults whenever you select another flight.

Main Menu choice 5 - PREFERENCES is where flight log selection and display defaults are chosen. Here is an example: In the PREFERENCES menu for "Flight log selection scheme", add "Select by pilot". Now go back to Main Menu choice 1 - SINGLE FLIGHT. You will notice a new screen that allows you to select flights by pilot. This menu also lets you change the PC database Site and the Pathname for flight files. Cambridge thought ahead for the time when you and your friends will have hundreds of flight logs in your PCs.

6 - SYSTEM SETUP for the PC and Software

The PC must be told where to store all the database and flight log information it uses, and how it communicates to the outside world of Printers and Serial Data Communication ports. The 6 - SYSTEM SETUP menu lets you change data pathways.

E. Using the PC Databases

The Quick Tour introduced general concepts and features of the GPS-NAV Flight Recorder and PC software. The following sections give specific instructions for use of the PC software with your GPS-NAV.

1 - PILOT

The first step is entry of Pilot and GPS-NAV data. In the Main Menu, select 4 - PC DATABASES. Then, select 1 - PILOT. Select ADD command from the Menu at the top of the screen. You will see a data entry screen with lots of blank spaces. Use the <F1> key for help. You must enter a Glider ID. The Pilot database is organized by Glider ID rather than by the actual pilot name. However, more than one pilot can be tied to one Glider ID.

Next, enter the pilot's name. When entering last name first, separate names with a comma so the pilot's first name appears on the top line of the GPS-NAV LCD screen. You must also enter the glider class. With the cursor in this field, use the <F1> Help to see allowed glider classes.

You cannot load turnpoints into a GPS-NAV without first entering the correct 4 letter identification code for that GPS-NAV in the Pilot Database. The first character is always C for Cambridge. The next three

characters can be found on the GPS-NAV product label, or on the second line of the GPS-NAV LCD screen startup message. When in doubt, use the number 0 rather than the letter O. Also, use the number 1 rather than the letter l in the product identification code. Paranoid pilots can carry two or more GPS-NAV Recorders. Separate the identification codes for each GPS-NAV by commas.

The GPS-NAV can use 4 different sets of navigation units -- Use <F1> Help to see the possible choices. The GPS-NAV alerts the pilot when approaching the active Navigation point. The first message (Close To) accompanied by two short audio beeps happens at the "close to" radius. The second message (Arrival!) with a long audio beep happens at the Arrival radius. We recommend 2 km (1 mile) and 0.5 km (0.3 Statute Miles or 0.25 Nautical Miles) for "Close to" and "Arrival!" radii. GPS-NAV Versions 4.8 and above ensure that a "fix" is logged as the arrival message is displayed.

Finally, you can choose the time intervals used in recording your flights. The factory default is 4 seconds, and this is fine for most flights. If you expect to fly over 11 hours in one day, or if you want to keep lots of flights in the GPS-NAV before transferring them to the PC, you may wish to try the new variable interval recording feature available with GPS-NAV Revision 4.8 or higher firmware and Version 5 PC software. Fixes far from the Navpoint are recorded at the enroute interval. As the glider approaches the Arrival radius, the interval decreases to the short value.

With long and short intervals of 30 and 4 seconds, it is possible to keep more than 60 hours of glider flight in the GPS-NAV. However, the instrument is limited to 16 flight logs. We recommend starting with constant interval recording, and experimenting with variable interval recording before using this feature during a badge or record flight attempt.

2 - SOARING SITES

The Cambridge GPS-NAV depends on this PC program for the databases used in GPS-based navigation. Cambridge does not supply Navpoint databases for all the gliding sites in the world. Why? First, such databases are evolving rapidly with the advent of GPS as a navigation aid. Mistakes are being corrected and supplemental information is being added by pilots who fly at these sites. It is not possible for Cambridge to be current with all these evolving databases. Second, the Internet has become a remarkable source for this information. A volunteer effort headed by John Leibacher has an amazing number of Gliding Navpoint databases available at:

<http://niit1.harvard.edu/SSA/JL/TP/HomePage.html>

Version 5 PC software makes it easy to import databases from the Internet and from GPS-NAV flight logs made by other pilots.

For this example, a complete Navpoint database will be created using only tools supplied with this PC program. From the Main Menu, select 4 - PC DATABASES. Then select 2 - SOARING SITES. Then select ADD from the menu choices at the top of the screen. You will see a data entry screen with lots of blank spaces. This screen is used to create a unique Site and define its general properties.

Time Zone, Magnetic Variation, and Units control screen appearance on the PC. This data is not sent to the GPS-NAV. The GPS receiver also computes Magnetic Variation based on Latitude and Longitude. This value is used for Bearing and other navigation data shown on GPS-NAV screens.

Control Zones for Competition, badge, and record flights can vary from site to site around the world. The Site screen records default Control Zone dimensions for Tasks flown at the site. Control Zones can be modified in the Task entry screen.

Make sure you POST the new Site as you leave this screen.

3 - NAVPOINTS FOR THE SITE

Now you are ready to enter Navpoints for the site. Select 3 - NAVPOINTS FOR THIS SITE. Again, you will see a data entry screen with blank fields. The first field is the Point ID. This number is generated automatically, but you can change it. This number serves to organize the Navpoint list. The program can get into trouble with duplicate numbers, so be careful.

The GPS-NAV also shows Latitude and Longitude in the Degrees and Decimal minutes format rather than Degrees, Minutes, and Seconds format. Here is an example of each format:

DD MM.MMM => 44 07.620
DD MM SS => 44 07 37

To change from seconds to decimal minutes, divide seconds by 60 and multiply by 100. If your reference source for coordinates uses the archaic marine DD MM SS notation, press the FORMAT command at the top of the screen. Voila! Now enter coordinates in the alternate format. Pressing the FORMAT key again changes the entry to DD MM.MMM as used by the Cambridge GPS-NAV.

Both the Cambridge GPS-NAV and PC program utilize Navigation Point Attributes to control behavior. See the GPS-NAV User's guide for details about Attributes. Press the <F1> key to see the list of allowed Attributes. A Navigation point can have more than one Attribute. H, T, and W Attributes control PC display properties as follows:

- a. Distances to remote Points are computed from the Navpoint with the H (Home) attribute.
- b. Flight log display screens use the T attribute to select only Turnpoints rather than all Navpoints for display. This can reduce screen clutter.
- c. The W (Waypoint) attribute makes a Navpoint show up when a flight log display screen has been configured to show only Task points. This is a handy way to mark and visualize mountain passes and cols which are not part of the task sequence. You can easily visualize your flight over a low spot on a ridge or a mountain pass using this feature.

Navpoint Elevation controls Cambridge Glide Computers (S-NAV and L-NAV) in an important way. Elevation is passed through the GPS-NAV to the glide computer. It is used in computing the total altitude required to safely land at that point. Please enter the correct elevation for every landable Navigation Point in the database.

The S (Start Point) attribute has a special meaning for Cambridge Glide Computers. A Start point with the S attribute uses a separate Start height (typically 1000 meters) rather the safety Goal Height for other, landable points.

4 - TASKS FOR THE SITE

Competition task evaluation and Multiple Flight Display REQUIRE creation of a Task Database within the PC. The PC Task Database can also be used to create up to 10 favorite tasks that are transmitted automatically to the GPS-NAV flight recorder. On-line <F1> Help explains most of this. Only weird and obscure details are covered here.

1. A separate Task database is kept for each Site.
2. Default Flight Evaluation Control zone types and sizes are taken from the SITE database.
3. Control zone type and orientation can be overridden for a Task, but size cannot.
4. For competition evaluation, Task Code means competition class. See <F1> Help for a list.

5. For recreational flying, Tasks with codes A - J are sent to the GPS-NAV Flight Recorder. Task A is automatically declared in the GPS-NAV with time and date of Transfer. This allows a GPS-NAV Recorder to be used for badge flights without a navigation display.
6. Tasks with codes A - J cannot be used for flight evaluation.
7. Flight evaluation with a PC Task requires a flight log with matching date.

5 - DATA TRANSFER TO FLIGHT RECORDER

Connect the 9 pin serial data communication cable between the GPS-NAV Flight Recorder and the PC serial port. Make sure the GPS-NAV green light is on (No Power = No data transfer!). Select CONNECT on the menu line at the top of the screen. You should see the Message "Connected to Cxxx Back-up battery = 2.x volts". If not, CONNECT looks for a GPS-NAV on any of the available PC COM ports. Use this information to change the COM port in 6 - SYSTEM SETUP to match the available PC COM port.

Boldly assuming CONNECT was successful, Navpoints and other PC Database can now be transferred to the GPS-NAV. First, check for the correct Navpoint Site, Pilot name, and GPS-NAV Serial number. Then select TRANSFER command from the menu at the top of the screen. Note that flight logs are cleared as new PC database information is transferred to the GPS-NAV.

F. Transferring GPS-NAV Flight Logs to the PC

Connect the GPS-NAV Flight Recorder to the PC as described above. Make sure the PC COM port selection in 6 - SYSTEM SETUP matches the COM port to which the GPS-NAV is actually connected.

Go to Main Menu 3 - FLIGHT LOGS. Press <Enter>. Go to menu item 1 - TRANSFER FLIGHT LOGS FROM GPS-NAV. Press <Enter>. If things are going well, the PC lists flight logs available for TRANSFER. Choose the one you want and press <Enter>. Flight logs end up in the directory (Windows Folder) designated in 6 - SYSTEM SETUP.

Only use the TRANSFER ALL option if the GPS-NAV fails to report any available flight logs, or if you have severe trouble transferring individual flights.

G. Using the GPS-NAV at a gliding competition

In the dim dark past when photography ruled, turnpoint photo books showed pilots the proper in-flight appearance of the photo target. Competition organizers, not the individual pilot, took responsibility for this material.

With GPS Navigation and competition, the list of turnpoint coordinates has largely replaced the turnpoint photo book. A competition that allows GPS flight evaluation MUST provide a list of turnpoint coordinates. Any respectable gliding competition that allows GPS flight validation will also provide pilots with the turnpoint coordinate list in Cambridge format on a diskette or transferred directly to the pilot's GPS-NAV.

We strongly suggest using the official competition turnpoint coordinate database as a starting point for your PC Navpoint database. If you do not want to bring your own laptop PC to the competition, simply have the scoring Officials load your name and the turnpoint list into your GPS-NAV flight recorder. Do not forget to specify the units of measure and the "Approaching" and "Arrival" radii.

If you want to create the official competition turnpoint list in your own laptop PC, you have two choices:

1. Have the competition officials transfer the turnpoint list to your GPS-NAV, transfer a flight log to your PC, and IMPORT the turnpoints from the flight log. Cambridge strongly recommends this method because it guarantees appropriate Site information as well as turnpoint coordinates.
2. Obtain a floppy disk with the NPEXPORT.DAT turnpoint database file from the scoring officials. Copy this file into the TEXT database associated with this program. Then IMPORT the turnpoint database to your PC Database file.

In either case, see section L below for instructions on use of the IMPORT function.

Version 5 GPS-NAV sorts Navigation points by alphanumeric spelling or distance rather than by point number. Competition turnpoints are often listed by number. Alphanumeric sorting includes numbers. If turnpoint number is included as the first characters of the turnpoint name, turnpoints will be sorted by number rather than by name. The first number must be 001 rather than 1.

H. Documenting a badge or record flight

The Cambridge GPS-NAV Secure Flight Recorder was designed with 3 goals in mind:

1. Make competition flying easier and safer.
2. Make competition flight validation faster and more objective.
3. Simplify procedures associated with FAI Badge and Record flights.

With Version 5 and new IGC rules, the operational simplicity of a Secure Flight Recorder has been extended to the PC software. Official documentation requirements are described in the FAI Sporting Code SC3 that applies to Gliders and Motorgliders. This information can be found by starting at:

<http://www.fai.org/~fai/>

and pursuing IGC (International Gliding Commission) documents. National Aero Clubs may publish further information on rules and regulations for a particular country. The information presented is intended to help you understand the basic concepts of flight Declarations and OO procedures.

Note: THIS MATERIAL IS NOT OFFICIAL - IT IS THE OPINION OF CAMBRIDGE AERO INSTRUMENTS.

For FAI flights with declared turnpoints, a Declaration must be made in the GPS-NAV before takeoff. The "Electronic Declaration" made in the GPS-NAV contains date and time of the declaration as well as coordinates of the declared turnpoints. No Official Observer (OO) is required to witness an "Electronic Declaration".

An OO is still required for FAI badge and record flights. But the role of the OO is diminished from the bad old days of photo declarations. The GPS-NAV Secure Flight Recorder cannot verify that the named pilot actually flew the declared task. Further, it cannot know the type of glider being flown. Associating a flight Log with the pilot and glider can be done at either the beginning or the end of a badge flight.

The OO must write down the time and GPS coordinates of either takeoff or landing together with the pilot's name and glider type. GPS coordinates can be obtained from the GPS-NAV display. The rest of the flight is completely documented in the GPS-NAV secure flight log. The flight log is correlated with the OO's observations by matching GPS coordinates and time at either beginning or end of the flight.

FAI rules presently require the flight log in both .CAI and .IGC format. This is because the .CAI format is required for checking the authenticity of the flight log. The .IGC format is required so an NAC or the FAI can validate the flight log with a non-proprietary PC program. This is silly, since Cambridge software is required anyway for flight log authenticity checking. If an NAC authority wishes to use third party software, freely available Version 5 PC software can easily generate the required .IGC file.

The pilot can be responsible for generating the required flight log files on a floppy diskette. This is because the .CAI file is inherently secure since tampering can be detected.

Here are the procedures for generating the required flight logs on the floppy diskette:

1. In the Main Menu, highlight 3 - FLIGHT LOGS and press <Enter>.
2. Highlight 2 - TRANSLATE FLIGHT LOG FILE TO .IGC FORMAT and press <Enter>.
3. Highlight the flight log for translation and press <Enter>. This creates a .IGC file in the directory specified in 6 - SYSTEM SETUP for translated files.
4. Copy both .CAI and .IGC files to a floppy diskette using commands found in 4 - COPY LOG FILE TO FLOPPY DISKETTE.
5. Send paper documentation and diskette to your NAC office.

Notes:

1. There is no need to produce printouts of the flight. The information is all on the floppy diskette.
2. There is no inherent reason why the OO rather than the pilot needs to send the data to the NAC. The information on the floppy diskette is secure and cannot be altered without discovery.
3.
The electronic Security Seal on the GPS-NAV must not be broken. Broken security seals are noted in the 1 - SINGLE FLIGHT, NAVPOINT AND TASK SELECTION screen. Claims made using Flight logs from a GPS-NAV with a broken seal will be rejected.
4. The Flight Log file must pass the PC Software Security check. Security check failure will cause the claim to be rejected. If a transferred flight log fails security, try transferring the flight log from the GPS-NAV to another computer. Also, if you are using Windows 95, try re-starting the PC in pure DOS mode for flight log transfer.

I. Printing copies of your flight display screens

All the graphic screen images in this program can be captured for printing. Use the <I> "Image" hot key to capture the screen image. Captured images are sent to the printer with the PRINT command on the Flight Log display Menu screen.

This program supports only two generic printer types. They are listed in 6 - SYSTEM SETUP. Most modern bubble-jet printer printers can emulate a generic 24 pin dot matrix protocol (EPSON LQ-510). Most Laser printers can emulate the HP LaserJet II protocol.

J. Making scaled map overlays from flight logs

The program can print the flight log on a transparency with latitude and longitude lines shown. The transparency (foil) can be placed over a paper map and aligned with the lat/lon lines. This capability is available only with HP LaserJet II - compatible printers.

Scaled flight chart printing is available in the PRINT menu associated with the flight display. Map scale can be changed over the range 1/50,000 to 1/1,000,000 in the 5 - PREFERENCES menu.

K. Viewing flight logs made by other pilots

With Cambridge Version 5 PC software it is easy to get flight logs into the appropriate directory for viewing. Put a diskette containing flight logs of interest into the A:\> drive. Go to: 3 - FLIGHT LOGS and choose 4 - LOG FILES FROM A FLOPPY DISKETTE. Press <Enter> to copy these flight logs to the directory chosen in 6 - SYSTEM SETUP.

L. Importing PC databases from other sources

Navigation point databases for gliding are evolving rapidly. GPS coordinates are being corrected, supplementary information is being added, and competition rules are evolving as the benefits of GPS flight validation are being recognized. The Cambridge GPS-NAV is designed so it's Navpoint database can be changed easily. Version 5 PC software has powerful new Menu driven IMPORT capabilities. This means that pilots will rarely have to construct their own Navpoint databases.

There are four ways to construct a Navpoint database:

1. Manual construction using the Database entry screens found in 4 - PC DATABASES, 3 - NAVPOINTS FOR THE SITE. This method has been described earlier in this SW Guide.
2. Import the Navpoints contained in every GPS-NAV Flight log
3. Import a NPEXPORT.DAT file containing a Navpoint database
4. Import points from a large, specialized National database

Here are some general rules about importing Navpoint databases:

It is best to start by IMPORTING Navpoints to an empty SITE. Go to 4 - PC DATABASES, 2 - SOARING SITES, and ADD a new, empty Site. You can experiment and make mistakes without messing up an existing Navpoint database. After the techniques have been mastered, Navpoints can be added to existing Sites. Import functions are at 4 - PC DATABASES, 6 - SPECIAL FUNCTIONS, IMPORT. This menu lets you choose the source of Navpoints. The easiest source is the most recently displayed flight log.

Another technique is to use Navpoints in the format generated by the PC software EXPORT function. These are referred to as NPEXPORT.DAT files. There are two ways to direct the PC software to the location of a NPEXPORT.DAT file. The first is to type in the complete file Pathname. The second is to put the NPEXPORT.DAT file into the DATA sub-directory of this program. When this is done, the name of any file containing Navpoints will be listed in the IMPORT menu structure.

Finally, Cambridge may make certain specialized databases available by name. These databases will also be located in the DATA sub-directory. For pilots in the USA, we have included a VERY complete listing of ALL known airstrips. This may serve as a useful source of coordinates for outlanding fields in your gliding area.

The Internet has become a source of gliding Navpoint lists from around the world. Here are specific instructions for Netscape Navigator users. Other browsers work in a similar way.

Go to: <http://niit1.harvard.edu/SSA/JL/TP/HomePage.html>

Select a site and ask for the Navpoint database in Cambridge format. You will see the formatted listing. Note that Navpoint Database files have comment lines before the actual Navpoint coordinate listings. Write down the SITE's local time offset and Magnetic Variation. Do a Save As. Pay very close attention to the filename and the Save As location in the Save As box.

