Hilton Software LLC
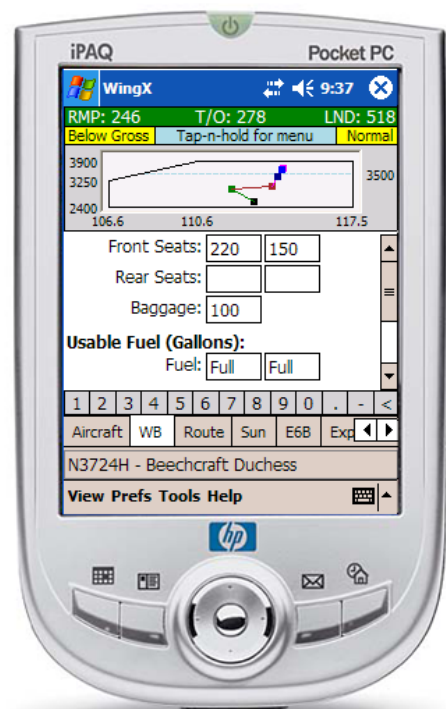
HILTON SOFTWARE LLC

WingX User Manual

WingX
for the Pocket PC

Version 1.7

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for Version 1.7

Table of Contents

WingX Introduction

WingX is a Pocket PC powerhouse – this chapter will introduce you to some of WingX's features and briefly explain how these features can solve many of your everyday flying challenges.

W ingX is a Microsoft Pocket PC application designed by pilots for pilots. By using the latest Microsoft .NET technology for your Pocket PC, Hilton Software designed WingX from the ground up to create an application that pilots can use while down at the airport and away from their home-bound desktop PC. WingX truly is a powerhouse application that brings a powerful set of features to pilots right in the palm of their hand and with them in their flightbag. No longer does it make sense to plan an entire trip at home on your desktop PC and assume that nothing will change enroute. We are living in a life full of changes and as pilots, we know that routes and passenger/baggage loads continually change and are often unpredictable. Whether your routing needs to be changed or a passenger shows up at the last minute with an extra 40-pound bag, WingX will be ready to provide the correct answers in a matter of seconds.

A Look at WingX's Feature Set

This chapter briefly describes the set of features that WingX provides. The chapters that follow delve into more detail of each feature and describes the best way for you to fully utilize everything that WingX for the Pocket PC has to offer.
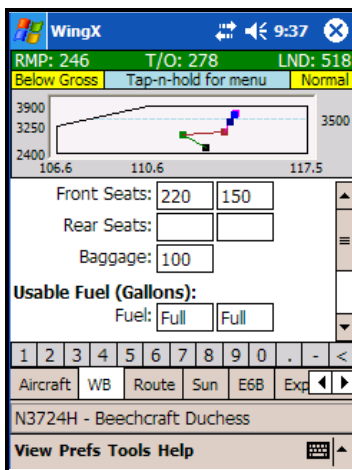
Weight and Balance

WingX currently stores over 370 aircraft models in an aircraft model database. For example, this allows you to simply tell WingX that your aircraft in a 1979 Cessna 172N and have WingX know what the various stations are, how much fuel the aircraft can carry etc. Using this data, a graphical representation of the Weight and Balance calculations is displayed within the selected envelope. The Maximum Zero Fuel Weight line is also shown (see the horizontal blue line in the screen shot). Any of the various envelopes can be shown; e.g. normal, utility, solo, etc. WingX will flag out of bounds conditions with red text. A Summary Table can also be displayed that matches the W&B table shown in most POH/AFM manuals in Section 6.
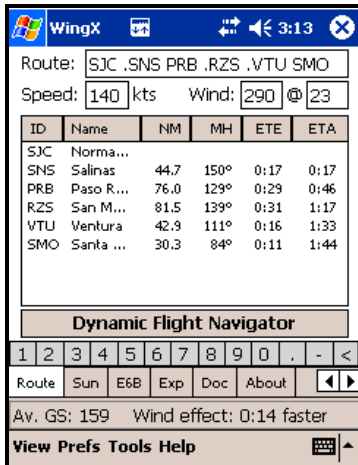
Route Planning

By using a database that contains the airports, navaids, intersections, and fixes in the United States, WingX can quickly and accurately perform route planning. Using winds aloft information, WingX will determine the ground speed, wind correction angle, magnetic heading, true heading, Estimated Time Enroute (ETE), Estimate Time of Arrival (ETA) and more. WingX's well thought-out user interface displays this information concisely and intuitively.

The digit bar (below the Dynamic Flight Navigator button) allows users to quickly enter the aircraft speed and wind information.
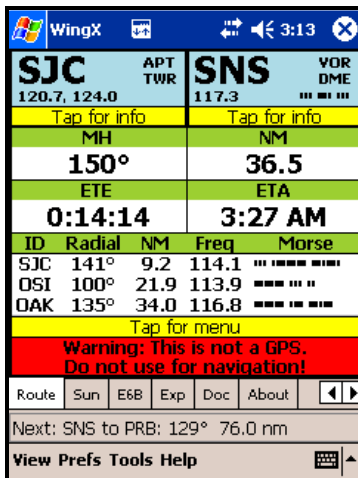
Dynamic Flight Navigator™

Once the route has been planned, a pilot can use WingX's unique Dynamic Flight Navigator to fly the route. The Dynamic Flight Navigator provides superb situational awareness by displaying the calculated position relative to the closest VORs, displays the relevant frequencies, and even the VORs' Morse codes!

Tapping on the origin or destination identifier will display A/FD information for an airport, navaid, or fix including frequencies, location, runway lengths, and more.
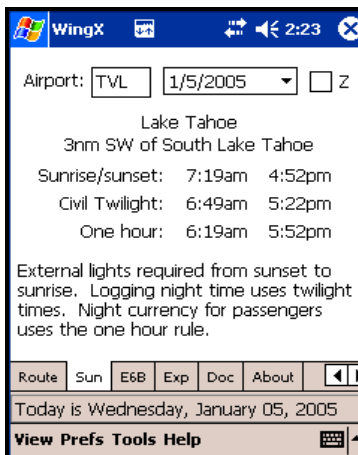
Sunrise and Sunset

Sunrise and sunset times are critical to flight planning. There are currency issues as well as aircraft capabilities such as lighting both internal and external. In addition, the Federal Aviation Regulations (FARs) define three times related to 'night' that are relevant. These three times define when a pilot requires external lights to be illuminated, when a pilot can log night time, and when a pilot can carry passengers.

WingX will calculate the sunrise and sunset times for all airports. These times can be shown in either local or Zulu times.

WingX will also show the nearest city and airport's distance and direction from the city. This is particularly useful when approaching an airport with which one is not familiar.
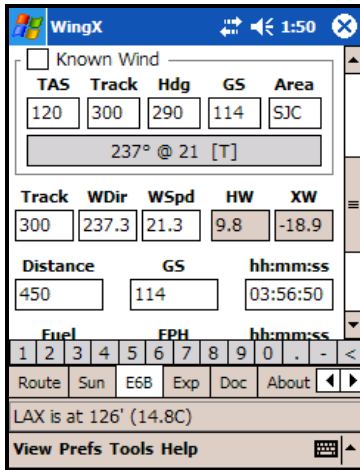
E6B Calculations

WingX's comprehensive E6B page can calculate over 130 conversions, Density Altitude, Winds Aloft, Fuel Consumption and Endurance, headwinds and crosswinds, Distance-Groundspeed-Time, and even Frostbite for pilots flying in cold areas. E6B calculations are quickly performed due to WingX's extensive use of popup menus.

The WingX E6B page has a digit bar at the bottom of the screen and also has popup menus for each text box for fast data entry– a real time saver. When flying in turbulent conditions, and for pilots who wear gloves (e.g. military pilots), WingX has Thumb Control – enter values by simply using your thumb, no need to fumble around for the stylus.
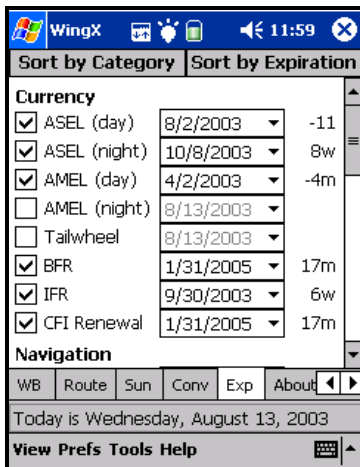
Pilot Expirations

Keeping track of a pilot's expirations can be extremely time-consuming. Some examples are medical, insurance, sectionals, approach charts, A/FD, IFR currency, ASEL day, ASEL night, tailwheel, and so on. There are a few more if you own a plane. Why risk forgetting your expiration dates and end up flying illegally when WingX can remember the dates for you?

WingX's has a unique feature that simplifies the entering of the expiration dates. For the currency items having known intervals, WingX automatically calculates the expiration date. For example, if a pilot performs three take-offs and landings on March 25, 2005, then WingX automatically converts this date to June 23, 2005; i.e. 90 days in the future.
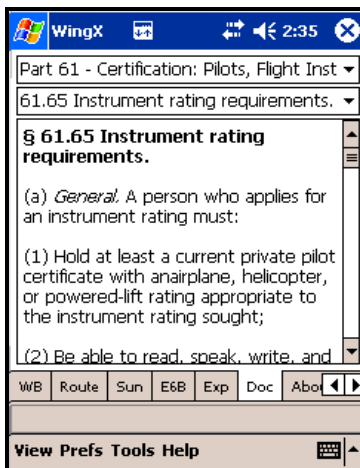
Documents and Forms

WingX is a not only a superb resource, but it is also a weight saver. Imagine carrying around the FARs, the AIM, the Pilot/Controller Glossary, AC61-65D (endorsements), the NWS contractions, and the FSS phone numbers for various areas in the US. WingX will keep all this information for you on your Pocket PC. Each of these documents is accessible extremely quickly while leaving as much memory as possible for all you other Pocket PC applications.

Just like the Model Database, and the Airport Database, the Document Database can be easily and quickly updated with a few simple taps.
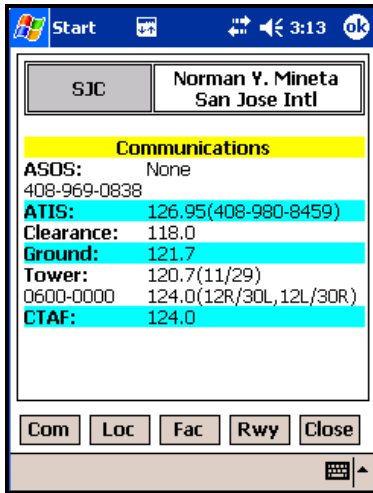
A/FD Information

No more thumbing through the A/FD book while bouncing around in the clouds, no more fumbling through a sectional chart at night while trying to locate a VOR frequency. WingX provides this information in a very easy-to-read format while providing a tremendous amount of information including airport and navaid frequencies, Morse codes, location, relative position to the closest VORs, runway information, and much more.

In the example on the left, the communications information shows the ASOS phone number, the ATIS frequency and phone number, as well as the relevant frequencies for the three runways at San Jose International Airport.

WingX Installation

This chapter describes the WingX installation process. The installation process is mostly automated and very little user intervention is required.

W ingX is installed on a Pocket PC by running an installation program on a laptop or desktop (we'll simply refer to it as the desktop) to which the Pocket PC is connected either via a cradle, Bluetooth, or other connection. The most common way will be for the Pocket PC to be cradled and have ActiveSync running on the desktop. Two ways to obtain WingX are:

1. Download via the Internet
2. On a WingX CD

Downloading WingX via the Internet

WingX is freely available for download on the Internet via the Hilton Software LLC website. Enter http://www.hiltonsoftware.com into your favorite web browser and click on the Download button. The latest version of WingX will always be downloadable in this manner. Since some email servers are configured to prevent email viruses, making the WingX-install.exe available would not work reliably on some networks. Therefore, WingX is will be downloaded as a zip file called WingX-install.zip. This zip file contains the WingX-install.exe installation program. To start the download, click on the WingX-install.zip link. The File Download dialog box will appear: Click on "Open". This will cause the zip file to download and open automatically. You will see the file WingX-install.exe as the only file in the zip file – double click on the WingX-install.exe. The installation process will begin.
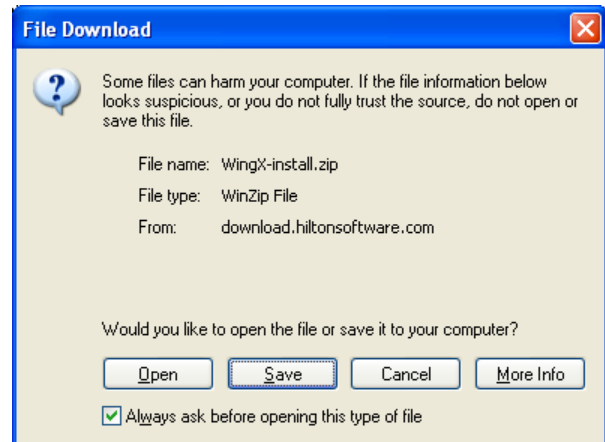
The WingX CD

The WingX CD contains the WingX installation program as well as the WingX Agent utility. The CD also contains the following two Microsoft packages:

- **NETCFSetup.msi:** Microsoft .NET Compact Framework

- **dotnetfx.exe:** Microsoft .NET Framework

NETCFSetup.msi: Microsoft .NET Compact Framework

WingX is written using Microsoft's new C# language. The advantages of writing WingX in C# are numerous:

- C# applications, such as WingX, run inside a **Virtual Machine** or VM. The VM contains each C# application within its own environment thereby protecting the other applications running on the same Pocket PC. For the user, this means that WingX cannot crash freeze your Pocket PC.

- The Virtual Machine has something called a Garbage Collector that automatically cleans up any memory that is no longer used. For the user, this means that WingX will **no have memory leaks** that cause the Pocket PC to slow down and perhaps complete stop working.

- C# is a high-level language that allows programmers to concentrate more on the cool new features you want in WingX instead of worrying about the small details and the strange bugs that plague other programming languages. This **streamlined development** allows us to get new features to you faster.

- many more…

Mobile 2003 Users: Every Mobile 2003 Pocket PC has the Compact Framework built-in. There is no need to install the Compact Framework if you are running a Mobile 2003 device.

Pocket PC 2002 Users: The Microsoft .NET Compact Framework will need to be installed before WingX will run on your Pocket PC. The installation is very simple – just ensure that your Pocket PC is cradled and run the Compact Framework installation program either by double-clicking on the NETCFSetup.msi icon in an Explorer window, or enter "e:\NETCFSetup.msi" – change "e:" to whatever your CD drive is.

If you do not have the WingX CD or would like to download the latest Microsoft Compact Framework, please visit Microsoft's website: http://www.microsoft.com/downloads

dotnetfx.exe: Microsoft .NET Framework

WingX ships with a desktop utility called WingX Agent. The latest version of WingX Agent is also downloadable via the Hilton Software website. The Microsoft .NET Framework must first be installed on the desktop if you intend running WingX Agent.

WingX Agent will be discussed in more detail later in this manual.

The WingX Installation Process

The WingX installation is mostly automated. To start the WingX installation:

- **If you have a WingX CD:** Insert the WingX CD into the CD drive. After a few seconds, the WingX installation process should start. If the Wing installation does not occur, then double-click on "My Computer" on your desktop, then double-click on the "WingX icon" that is representing your CD drive to start the WingX installation process.

- **If you downloaded WingX via the Internet:** Double-click on the WingX-install.zip file. Then double-click on WingX-install.exe (displayed on a single line in the Zip window). This will start the WingX installation process.

Once the WingX installation begins, you will see the "Pocket PC installation" screen. Click on "Next >". The second screen is the License Agreement. If you agree with the terms, select the "I accept the terms in the license agreement" option and click on "Finish". WingX will then be installed onto your Pocket PC.
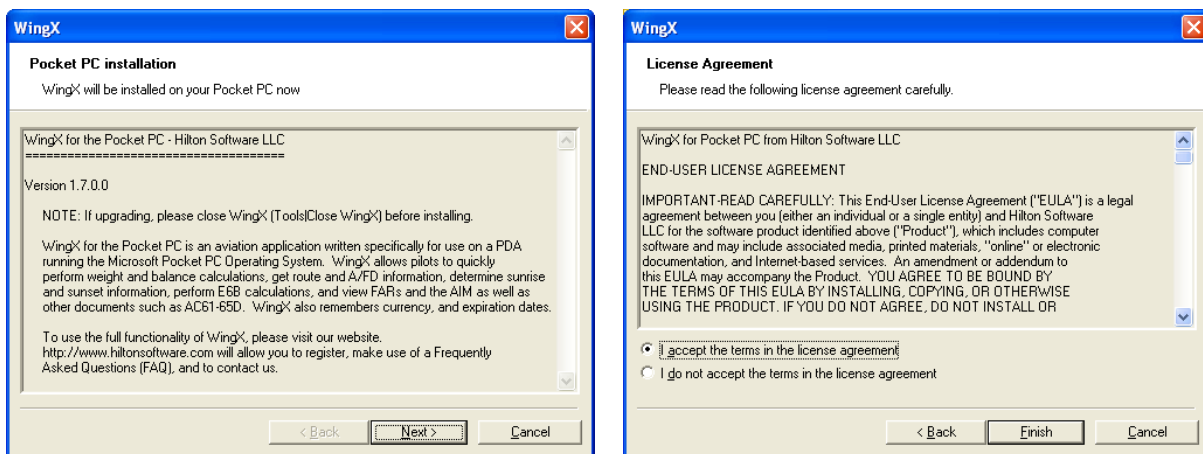
Note: If you are upgrading WingX to a newer version, you must ensure that WingX is not running on your Pocket PC. We suggest that you close WingX by tapping on the Tools, Close option on WingX's menu. In addition, just to be sure, we recommend that on your Pocket PC, you do the following:

- Tap on Start (top-left corner)
- Tap on the Settings menu item
- Tap on the System tab
- Tap on the Memory icon
- Tap on the "Running Programs" tab
- If WingX appears in the list, tap on it, then tap on the "Stop" button

If your Pocket PC was not cradled during the WingX installation, your desktop will store the WingX installation information and automatically install these files onto the Pocket PC next time it is cradled. If your Pocket PC is not cradled during the WingX installation process, the following dialog box will appear:
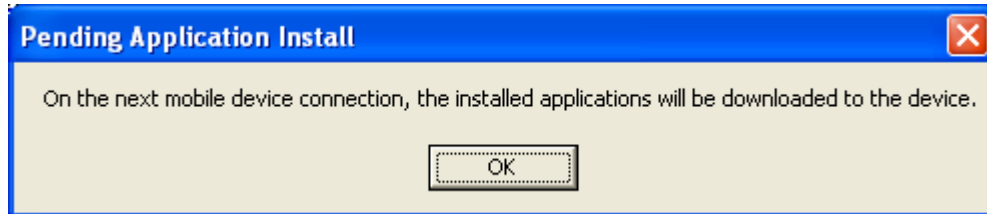
When the Pocket PC is cradled and the installation proceeds, you will be asked a question about the WingX destination directory. For a normal installation (not using a storage card), we suggest answering "Yes" to the following question:
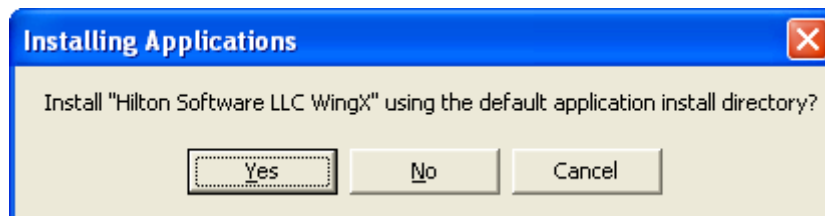
However, if WingX is to be installed on a storage card, answer "No". The "Select Destination Media" dialog will be displayed and will allow you to choose the installation destination.

During the installation copying of files, you will see the progress dialog box that looks similar to:
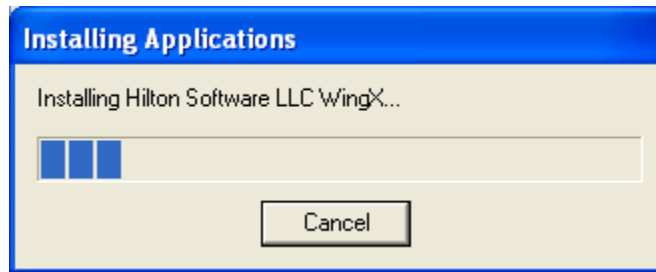
After the installation has completed, you will see the following dialog box – click "OK". Please look at the Pocket PC screen. If you are asked a Yes/No questions about copying newer files across, please tap on "Yes".

Running WingX

To run WingX, tap on "Start" and then select WingX from the drop down menu. After a few seconds, WingX will display the dialog box shown here on the right.

If you see the dialog box as shown on the right, it means that your Pocket PC already has the Compact Framework installed and you are ready to start exploring the powerful features of WingX. If this dialog box is not displayed, please refer to the "Missing Compact Framework" section later in this chapter.
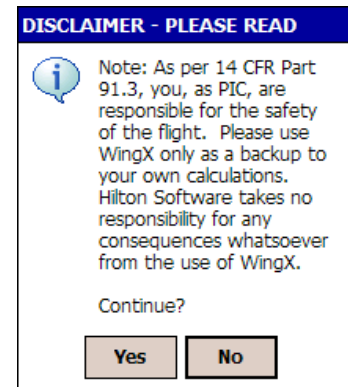
This important disclaimer dialog box states the following:

DISCLAIMER - PLEASE READ

"Note: As per 14 CFR Part 91.3, you, as PIC, are responsible for the safety of the flight. Please use WingX only as a backup to your own calculations. Hilton Software takes no responsibility for any consequences whatsoever from the use of WingX.

Continue?"

Flight Safety

While we take every precaution to ensure that the code is correct and the data is correct and current, we cannot guarantee that the results are absolutely 100% correct and safe. Therefore, please only tap on "Yes" if you understand and acknowledge that WingX should only be used as a backup and should not be the sole 'instrument' upon which you make your go/no-go (or any other) decisions.

Missing Compact Framework

If you see the dialog box shown on the right, it means that the Microsoft Compact Framework (CF) is not installed on your Pocket PC. Please install the CF as described earlier in this chapter and try again.

Please note, this **does not** mean that there is a problem with your WingX installation - there is no need to re-install WingX.

WingX.exe   ok

Cannot find 'WingX' (or one of its components). Make sure the path and filename are correct and all the required libraries are available.
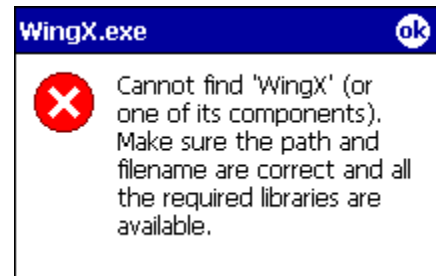
WingX Registration

WingX registration unlocks the tremendous feature set of WingX. The Pro Edition and XL Edition both offer exceptional price points and users can choose the level of functionality that best suits them.

R egistering WingX is easy. There are several methods of registration and these are described below. Registration always requires you to send us your WingX ID. Once the registration process has been completed successfully, you will be sent a WingX key and it is this key that unlocks WingX's functionality. Each WingX ID is unique to that Pocket PC. Therefore resetting your Pocket PC will not change the WingX ID and will not require another key from us, nor will updating your WingX to a newer version. We suggest you keep the "Registration Key" email just in case you require it in the future.

WingX Editions

WingX provides two levels of functionality and these levels are called Editions. WingX's two editions are called the 'Pro Edition' and the 'XL Edition'.

Pro Edition

The Pro Edition has all features enabled, all functionality available, access to all airports and navaids, etc. Subsequent chapters describe each of WingX's main functional areas in detail; these are as follows:

- **Weight and Balance** with over 370 pre-defined models and the unique CG Bar Display option.

- **Route Planning** with wind calculations, and Part 61/141 distances summary.

    o Includes the unique **Dynamic Flight Navigator** that walks you through the route, leg by leg, while showing frequencies, Morse codes, three closest VORs, and more.

- **A/FD Information** provides airport, navaid, and fix frequencies, locations, runway lengths, etc.

- Powerful **E6B** with headwind, crosswind, TAS, and even wind chill.

- **Document Database:** Parts 1, 43, 61, 91, 119, 141, NTSB 830, AC61-65D endorsements, Pilot/Controller Glossary, FSS Phone Numbers and much more.

- **Expiration Dates:** Remember your medical, tailwheel, night, IFR, BFR and other expiration dates

- **Sunrise/sunset times:** Don't be late getting home when you're no longer night current.

XL Edition

WingX is also offered at a lower price point, but with some features disabled. This allows users to balance the features they want with the price point of the product. The XL Edition contains all the functionality of the Pro Edition, except:

- The Dynamic Flight Navigator

- Expiration Dates

- Sunrise/Sunset times.

Obtaining Your WingX ID

To obtain your Pocket PC's WingX ID, tap on "Help" on the WingX main menu, and then select "Register". The registration dialog box will be shown – see example on the right. This dialog box will include both lines of the WingX ID and a text box to enter the key. You must send Hilton Software both lines of your WingX ID. For example, for the registration dialog box on the right, the WingX ID would is "7500-01F6-4A35-B6D1-3800-0050-BFE4-5CE5".

Note: On some older Pocket PC 2002 devices, it is possible for the WingX ID to be shown as "Unknown". If this occurs, your Pocket PC will not be able to be registered – we sincerely apologize in advance. Please mail your WingX packaging and CD to us, and we shall refund your purchase price.

Entering your WingX Key

The key you receive back from Hilton Software should be entered into the text box labeled "Key:" – see example on the right. The dashes are optional, but preferable since they make the key easier to read and verify for correctness. It is easy to confuse the letter "O" with the digit "0", however, the letter "O" will never appear in a key, so use the digit "0". Also the letter "B" may be confused with the number "8" – please ensure the correct value is entered. Once the key is entered correctly, you will either see "Pro Edition" or "XL Edition". This means that the registration has been successful and that all (or some - depending on the Edition) features of WingX are available to you.

Registering WingX

Registration consists of making a payment to Hilton Software and sending your WingX ID to us. A key will be sent back to you. Since we have different distributions methods, there is more than one way to register WingX and obtain your key. Please select the one most appropriate to you.

Registering via the Internet

WingX may be registered on the Hilton Software website by transferring funds via PayPal or by using a credit card. Note that none of you personal financial information (e.g. credit card numbers) is ever sent to Hilton Software – PayPal handles it all internally.

To register WingX on the Hilton Software website, first select which WingX edition you intend to register and do the following:

- Enter your WingX ID (both lines) as displayed on the Help|Register page on your Pocket PC.

- Enter how you heard about WingX (optional)

- Click on the "Add to Cart" button.

Your shopping cart will be displayed. Click on "Secure Checkout" to complete the registration process. Your key will be emailed to you within 24 hours, but usually sooner.

Registering via Phone

To register by phone, please call us at: 1-866-42-WINGX. Please have your Visa or Mastercard, your WingX ID, and your email address available. We will immediately provide you the WingX key, and we shall also email this WingX key to you so that you have a copy of it in case you require it in the future.

Registering a Pre-Packaged WingX

WingX is also sold in airport stores and Internet stores. With the purchase of the WingX CD, you will also receive a "Purchase Coupon". In this case, you may either register WingX using our Register page http://www.hiltonsoftware.com/Register.html or you may call us at 1-866-42-WINGX. We will require the following information:

- Your name

- Your email address

- Your Purchase Coupon number (found on the CD)

- Your WingX ID

Registering via the King Schools website

To obtain your key, please go to http://www.kingschools.com/wingx and follow the link to register WingX. To complete the registration process, you will need to enter:

- Your name

- Order Number

- Edition

- WingX ID

King Schools will immediately email your WingX key to you.

Beta Team Feedback

Whether or not you are a registered user, we strongly encourage you to provide feedback to improve your WingX experience. Hilton Software spends an extraordinary amount of time ensuring that WingX is intuitive, that the results are clear, concise, meaningful, and accurate, and that requested features are added in a way that fits into the integrated model of WingX.

In addition to our QA team, Hilton Software maintains a list of Beta Team users – these are pilots who want to be running the latest and greatest (and often not yet released) version of WingX. We take all user feedback very seriously and our WingX product truly is a reflection of the superb bug reports and User Interface enhancement suggestions that we receive from our users. If you want to be part of the Beta Team, please email us at support@hiltonsoftware.com with the subject line of "Beta Team". You will then be notified whenever we ship a new Beta or a full Release version.

Help define WingX. Get the feature you've always wanted right on your Pocket PC. Simply join our Beta Team – we'd love to have you onboard!!!

WingX User Interface

WingX has been designed with a very intuitive user-interface. Text boxes can be driven by tap-n-hold that displays a popup menu of potential values. The tremendous functionality has been divided into logical pages that are easily selected by tapping on the appropriate tab.

U ser Interface (UI) design is significantly more critical when designing a Pocket PC application than a desktop application. With its much smaller screen size and lack of keyboard, new UI design is critical to ensure a great user-experience. For pilots, UI design is even more critical since pilots can often be cramped and be bouncing around in turbulence.

This chapter describes the basic usability issues of WingX and how the WingX UI design is used to maximize your productivity and efficiency. This chapter does not discuss the UI issues for specific pages, but rather it acts as a UI primer – we discuss each page in detail in the upcoming chapters.

Menu System

WingX's menu system allows the user to configure various views, set usability options, update databases, and obtain online help.

View Submenu

To configure various views, use the View submenu. The View submenu provides fast access to any of the pages, allows configuration per WingX Profile, provides a simple way to define which columns are shown on both the Aircraft and Route pages, and also allows the user to quickly find and display A/FD information about any airport, navaid, or fix in the United States.
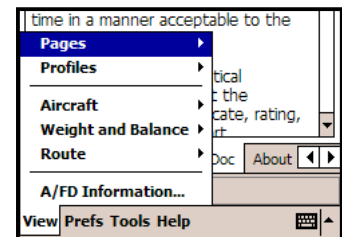
Tapping on View will display a submenu consisting of the following items:

- **Pages:** Displays a list of each of the pages – one for each of the tabs. While using the tabs near the bottom of the screen to navigate is quick and convenient, this option is added as an alternate way to select a page in case the tab has been scrolled out of view; i.e. instead of tapping on the left or right arrow several times to find the required page, the View|Pages may be faster. Some users have found this method of selected easier when not stylus is available.
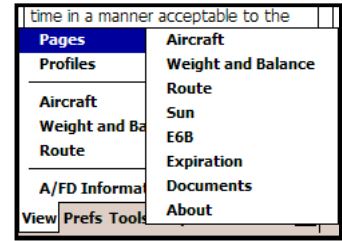
- **Profiles:** Based on the registration key, WingX is enabled for either the Pro Edition or the XL Edition. The Pro Edition Profile will display all available features, whereas the XL Edition Profile will only display features available to XL users. WingX may be switched between the Pro Edition and the XL Edition at any time – this will not affect WingX's functionality. Some XL Edition users find this option useful to provide a better user experience.
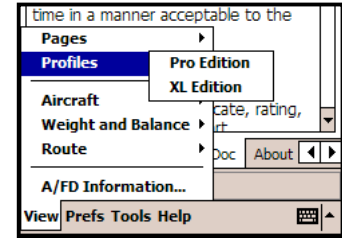
- **Aircraft:** Allows the user to add or remove columns in the aircraft list on the Aircraft page. When a column name is checked, it is selected to be displayed. In the example on the right, all columns will be displayed. To hide the Year column for example, tap on "Year" – the column "Year" will no longer be displayed when viewing the list of aircraft on the Aircraft page. By hiding columns, more screen space is available to display other pertinent information about the aircraft.
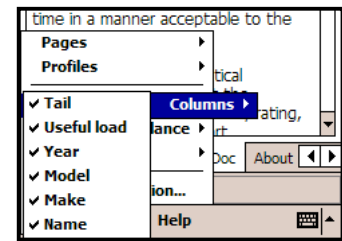
- **Weight and Balance:** Two options:
  - **Detailed:** If checked each seat, baggage, and fuel stations are drawn individually. If unchecked, each entity will be summarized into only one line on the W&B envelope view.
  - **Bar Display:** A unique and information-rich view - the Bar Display presents the W&B information using bars and warns pilots of CGs that are close to, our out of, their limits.
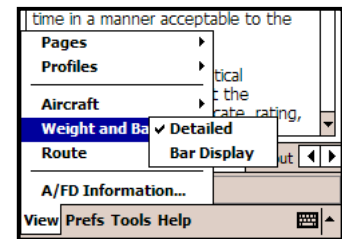
- **Route:** Allows the user to add or remove columns in the route leg list on the Route page. When a column name is checked, it is selected to be displayed. In the example on the right, all columns except ETA will be displayed. To show the ETA column, tap on "ETA" – the column "ETA" will now be displayed when viewing the list of route legs on the Route page. By hiding columns, more screen space is available to display other pertinent information about the route legs.
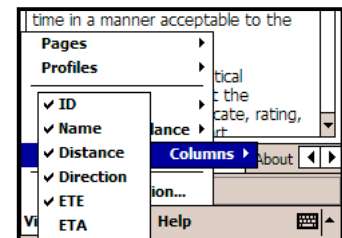
- **A/FD Information:** Provides instant access to A/FD information.

Prefs Submenu

The Prefs submenu is central to the setting of WingX's preferences. These preferences include the displaying of confirmation dialog boxes, display settings, and defining the user's home airport.

Tapping on Prefs will display a submenu consisting of the following items:

- **Notify on add:** If checked, notifies the user when an aircraft or route has been added successfully.

- **Confirm on remove:** If checked, prompts the user to confirm when removing an aircraft or user-defined route.

- **Digit bar:** If checked, displays a digit bar at the bottom of the screen to allow numeric input without having to display the much larger Standard Input Panel.

- **Small font:** When viewing aircraft, routes, FARs, Help, and other documents, the user has the options of displaying the text in the normal font size, or a smaller font size.

- **Thumb Control:** If checked, WingX will display a large-button keypad when the user tries to enter a value on the E6B page. This is perfect for turbulent conditions and/or for pilots that wear gloves.

- **Home Airport:** The home airport will always appear in popup lists. To select your home airport, tap on the airport identifier and name. The next time you view the list, you will notice that your home airport is checked – in the example on the right, Reid-HillView has been chosen as our home airport. If the required home airport does not initially appear in the list, go to a page requiring an airport identifier (e.g. Sun page) and type in the identifier - this will automatically add that identifier to the selectable list.
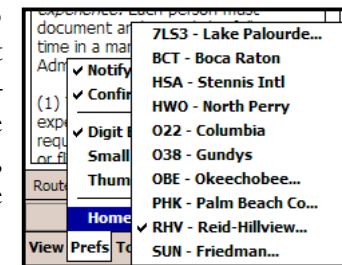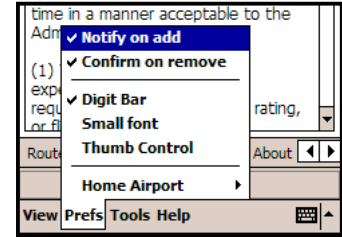
Tools Submenu

For housekeeping tasks, use the Tools submenu. Tapping on Tools will display a submenu consisting of the following items:

- **Close WingX:** When updating WingX to a newer version, be sure to first close WingX by tapping on Tools|Close before beginning the installation process. Answer "Yes" when prompted to ensure that you indeed want to close WingX. Your aircraft list and your settings will be saved – these will be restored the next time WingX is run.

- **Download:** When a Pocket PC device has a connection to the Internet via dialup, wireless, ActiveSync etc, the databases can be easily updated by simply tapping on Tools|Download and then the required database. If your Pocket PC does not have an Internet connection, the Download menu item will be disabled and will appear gray. The databases are downloadable individually. WingX is optimized so that if it detects that
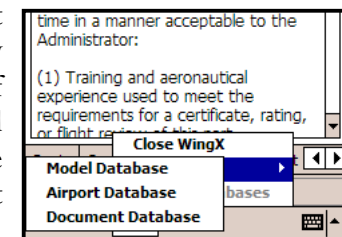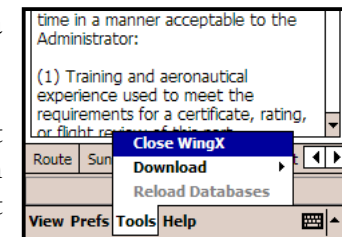
you already have the current database, it will not download the entire database.

- **Reload databases:** This option is used in connection with WingX Agent. WingX Agent is a desktop utility that will download databases fro the Hilton Software website and automatically upload these databases to your Pocket PC. Once the download/upload process is complete, WingX Agent will prompt you to reload your database - use this menu option to reload the databases.

Help Submenu

To view online help, WingX status, the WingX ID (for registration purposes), or version numbers, use the Help submenu. The Help submenu should be used when you need to access the integrated help to learn of all the features on a page. Also use the integrated help to learn about the menu system and what each menu option does.

Tapping on Help will display a submenu consisting of the following items:

- **Help for this page...:** Displays help for the current page.

- **WingX menu help...:** Displays help about the WingX menu.

- **How to update databases...:** Displays help on how to update the WingX databases.

- **How to register WingX...:** Displays help on the registration process.

- **How to provide feedback...:** User feedback drives future WingX development. Feedback to Hilton Software is critical. Every user is strongly encouraged to contact us and let us know what you like and what you'd like improved. Even if it is some 'out of the box' thought, please let us know. While we have a very long 'to do' list, we are continually evaluating features for the upcoming version. To contact us, email us at: support@hiltonsoftware.com

- **Status...:** Provides status information such as the date of the databases, as well as the IP address. If the IP address is 'None', then your Pocket PC has no internet connection.

- **Register...:** Displays the WingX ID and provides a text box for the user to enter the registration key. For more information, please see Help|How to register WingX.

- **About...:** Apart from displaying the WingX name, the Hilton Software company name, and the copyright warning, the About page also displays version numbers. For more information, please see Help|Help For Page on the About page.
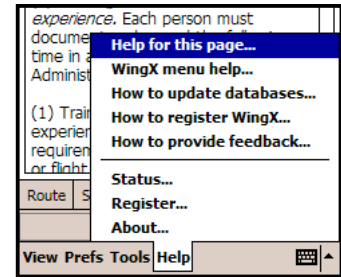
Page Selection

The major features of WingX are logically divided in pages. For example, there is the Weight and Balance page, the Route Planning page, the Documents page and so on. There are two ways to select a page.

1. Tapping on the appropriate tab at the bottom of the screen will immediately take you to that page. If the tab for which you are looking does not appear, use the left and right arrows to the right of the tabs (towards the bottom-right of the screen) to scroll the appropriate tab into view.

2. From the WingX menu, tap on View|Pages and then select the required page.

Popup Menus

Every text box that appears in WingX has an associated popup menu. To display a text box's popup menu, tap-and-hold the stylus on the text box. Within a second or two, a popup menu with various options will appear. If you're not sure what to enter on a text box, or you want to be able to enter data quickly and easily, simply tap-n-hold on a text box. The popup menu is a superb tool on the Pocket PC since many Pocket PCs do not have physical keyboards.

Numeric Text Boxes

WingX has numerous numeric text boxes. One example is the Year text box on the Add Aircraft page. Other examples are the speed and wind text boxes on the Route page, and all the text boxes on the E6B page.

On the Weight and Balance page, the popup menus display various weight in 10 pound increments, and even displays "Full" for all aircraft, and "Tabs" for aircraft such as the Piper Archer that has tabs in the fuel tanks.
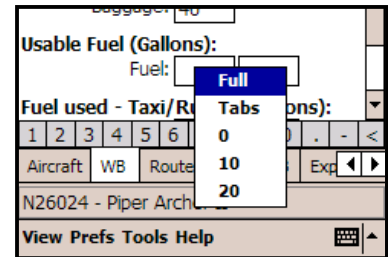
Airport, Navaid, and Fixes Text Boxes

Text boxes that allow for airport, navaid, or fix identifiers have a popup menu that very conveniently allows the user to select an airport, navaid, or fix from a 'most recently used' list. The most recently used lists consist of the most recently used airports, navaids, or fixes. The Home Airport, as selected as via the Prefs main menu option, will always appear in the most recently used airport list. If airports only (not navaids and fixes) are allowable for a specific text box (e.g. Sun Page – see example on the right), then only the most recently used airport list is displayed.

The list will be sorted alphabetically per the identifier. As seen in the example on the right, the longer airport names are truncated to ensure that the names fit within the popup menu. Truncated airport names end in "…".
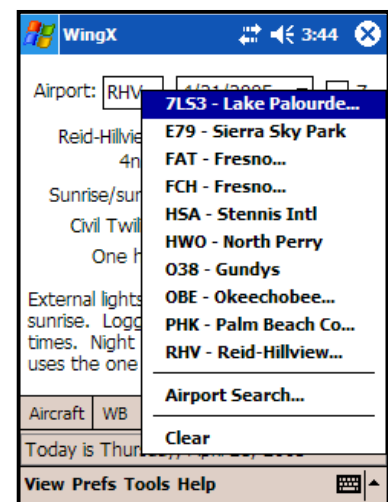
Airport Search Menu Option

Any text box that uses airport IDs includes an "Airport Search…" option in its popup menu. Airport search allows you to search for airports using the airport name or the name of the city near to the airport. In the example on the right, all public airports were searched to find all such airports that are close to Fresno (California). The case of the text is not important; i.e. "fresno" is the same as "FRESNO". A search can also be performed on the airport name. Tap on the pulldown on the top line and change "City" to "Name". Once you have selected Name or City and entered the search text, tap on "Go" to begin the search and have WingX populate the list box with suitable airports.
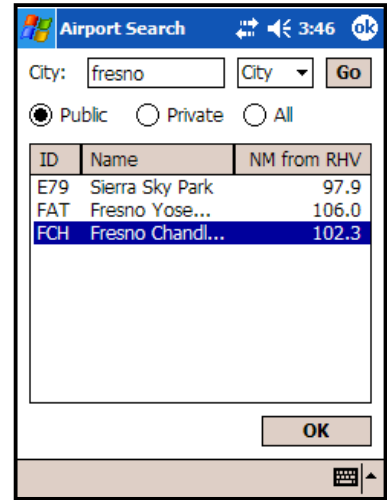
WingX searches on partial names, so searching for "palo" finds:

- Palo Duro

- Mc Clellan-Palomar

- Palo Alto Arpt of Santa Clara

Note that WingX also displays the distance from your Home Airport. This helps ensure that the correct airport is selected and not some airport hundreds or thousands of miles away. Tap on the column header, e.g. "NM from RHV", to cycle between distance from your home airport and distance from the last airport used. This feature is very useful when entering a route on the Route Page since the distance from the last airport in your current route will be displayed. To select an airport, tap on its line and tap on "OK".

Clear Popup Menu Option

Clear simply clears all the text from the text box.

Digit Bar

To simplify numeric input, WingX can display a Digit Bar near the bottom of the screen to make numeric data entry faster. The Digit Bar also prevents the need to display the Standard Input Panel that includes the entire QWERTY keyboard. The Digit Bar is intelligent and, in addition to the digits, will display a period when entering numbers and a colon when entering times. The display will change automatically – no user intervention is required.

To make the Digit Bar appear, tap on Prefs, then "Digit Bar". To make the Digit Bar disappear, repeat the process. When the Digit Bar appears on the screen, a check mark will appear on the "Digit Bar" menu item (in the Prefs submenu).

Status Bar

The Status Bar appears in the lowest part of the screen and displays quick summary type of information. For example, when entering Pilot Expirations, the Status Bar will show the current date. When on the Route Planning page, the Status Bar will show certain statistics about the route being flown – please refer to the Route Planning chapter for more specific information.
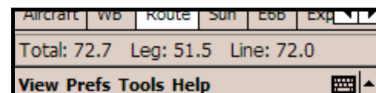
Minimizing and Closing WingX

Minimizing an application will keep the application loaded and its status preserved, but the application screen will be hidden so that the user can use the screen space. Closing an application terminates the application, perhaps saving some state, and removes its window from the screen. The application must be restarted to use it again.

On the Windows desktop, for example, Internet Explorer shows three buttons in the top-right corner of its window (as do almost all other applications) – see image to the right. The leftmost button minimizes the application (hides the window), the middle button maximizes the application window (occupies the full screen), and the rightmost closes the application.

The convention on the Pocket PC is that the application uses the full screen area; i.e. is essentially always maximized thereby rendering the middle button unnecessary. However, Microsoft chose to use the "X" button on the Pocket PC to minimize the application and not have a button to close the application.

Note: WingX adheres to the Microsoft specification and minimizes itself when the "X" button is tapped.

Why discuss this?

The main purpose of this discussion relates to the process of upgrading WingX. Hilton Software regularly updates WingX to ensure that bug fixes are available as soon as practical, and also to regularly add new features. WingX (or any other application) cannot be upgraded while it is running, and you must first close WingX before upgrading – please refer to Tools Submenu section discussed earlier in this chapter. A warning message is displayed during every WingX installation to this effect – see chapter titled "WingX Installation".

Aircraft Page

WingX has a database of aircraft models that make Weight and Balance calculations a snap. Aircraft are entered once, stored, and quickly selected on the Aircraft Page with a single tap.

WingX uses an Aircraft Model database that holds the information of hundreds of aircraft models. This information is primarily used to perform Weight and Balance calculations. This Weight and Balance functionality is fully described in the following chapter. This chapter explains how to build the list of aircraft that you normally fly and how to use this list to find the most appropriate aircraft for your flight. This list of aircraft will be used when you perform Weight and Balance calculations.

The first step in performing Weight and Balance calculations is to enter the N-number and associate that N-number with an aircraft model. Since each N-number's empty weight and moment is unique, the next step is to enter these values. Once you have entered this information, WingX has enough information to perform complex weight and balance calculations.

Adding a new N-number

To add a specific aircraft, tap on the "Add" button and enter the following information:

- **N-Number:** Enter the N-number by using one of the Pocket PC's input methods such as the Soft Input Panel (SIP) or any other preferred method. WingX will convert all letters to uppercase.

- **Aircraft Model:** The aircraft models are shown in a tree structure with the highest level being the manufacturer. To expand a node of the tree (e.g. Cessna), tap on the ⊞.

- **Year:** The year is usually informational, but in some cases, it allows WingX to differentiate between two aircraft models from different years.

Example

Once the node has been expanded and its sub-nodes shown, select one of them. For example, to add N4754D that is a 1979 Cessna 172N:

- First enter "N4754D" in the N-number text box.

- Tap on the ⊞ to the left of Cessna. The tree will then show all the Cessna aircraft in the WingX Aircraft Model Database. Using the vertical scroll bar on the right, scroll down until you see "C172N" - tap on it.

- To select a year, enter "1979" in the year text box, or simply tap-n-hold in the year text box to get a list of possible years. To choose 1979, first tap on 1970 – this will show all the years from 1970 to 1979. Then tap on 1979.
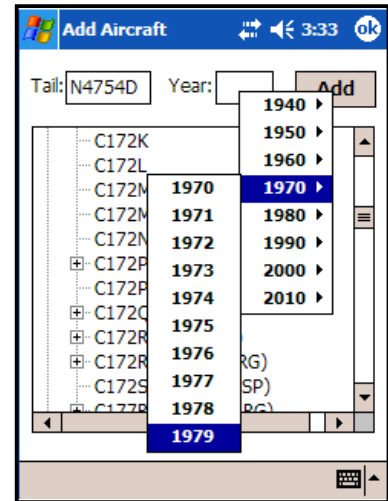
You have now told WingX that Cessna N4754D is a 1979 Cessna 172N. Finally, tap on the Add button. A dialog box will be displayed saying "N4754D added.". This notification may be turned off – see the "Prefs" menu option and its "Notify on add" submenu option.
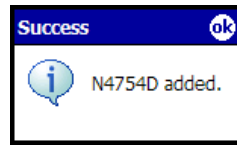
If an aircraft with the same N-number already exists, an error message will be displayed.
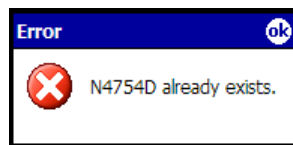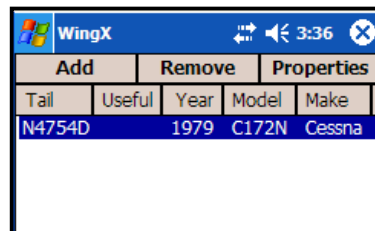
WingX knows (at least) the following aircraft model information:

- The number of seats

- The number of fuel tanks and the capacity of each

- The number of baggage areas and the maximum allowable weight of each

- The moment arms of each station

- The normal, utility, acrobatic, and solo CG envelopes

- The maximum ramp weight, takeoff weight, zero fuel weight, and landing weight – some of these limits pertain only to higher-performance aircraft.

Selecting an N-Number

To select a specific aircraft, tap anywhere on that aircraft's row in the table. The selected row will be highlighted and the aircraft's information will appear in the status bar at the bottom of the screen.

Note: WingX will use the selected aircraft on its Weight and Balance page.

Removing an N-number
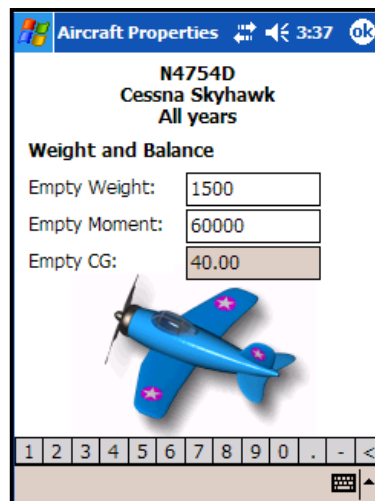
Occasionally it will be necessary to remove a specific aircraft. Removing an aircraft is as simple as selecting the aircraft and tapping on the Remove button. Tapping on the Remove button will display the following dialog box – tap on Yes to remove the N-number. This warning will be displayed by default. To turn it off so that WingX immediately removes the aircraft without asking, see the Prefs menu option and its "Confirm on remove" submenu option.
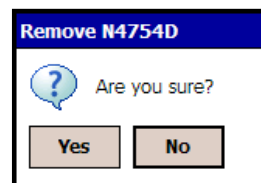
Aircraft Properties

In addition to the model information that WingX will automatically use for weight and balance calculations, empty weight and empty moment are values that are specific to each aircraft. These numbers are typically stored in the aircraft's POH/AFM.

To enter an aircraft's empty weight and moment, first select the aircraft. Then tap the Properties button. A dialog box that allows you to enter the aircraft's empty weight and moment will be displayed. Enter the aircraft's empty weight in pounds and the aircraft's empty moment in pound.inches - do not enter this value divided by 1000.

Flight Safety

This information is specific to each aircraft (N-number). Always use the most current information contained in the Weight and Balance section of the specific aircraft's POH.

Note: The Empty Moment value must be entered in pound-inches and not in thousands of pound-inches. For example, it would be correct to enter 123456 and not 123.456. WingX will warn you if it believes that you have entered the Empty Moment using the incorrect units.
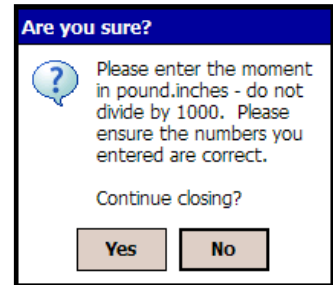
Enter the empty weight and the empty moment in pounds and pound-inches respectively. As the Empty Weight and Empty Moment values are entered, the Empty Weight CG is calculated and displayed. When both the Empty Weight and Empty Moment have been entered, the pilot should verify that the CG that WingX has calculated and displayed is correct.

Once you have entered the Empty Weight and the Empty Moment, tap on "OK". If you look at the N-number on the aircraft list, you will see that a value for Useful Load is now displayed. The Useful Load is calculated as the Maximum Ramp Weight minus the Empty Weight. If the aircraft has no specific Maximum Ramp weight listed, WingX will use Maximum Takeoff Weight minus the Empty Weight instead.

Sorting the Aircraft Data

WingX allows the aircraft data to be sorted according to the N-number, the useful load, or the make or model. It is particularly useful to sort by the Useful Load when weight is an issue for a flight. To sort the aircraft list by a specific attribute, tap on that attribute's column header. For example, to sort the aircraft list by Useful Load, tap on "Useful". Another example would be to group the Cessna 172 or Piper Archer aircraft together. To do this, tap on "Model".
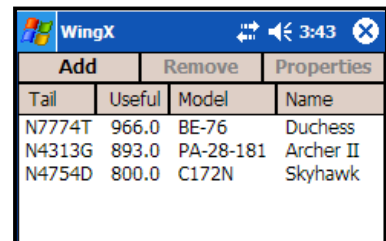
Popup Menu

The aircraft list view also provides a popup menu that will provide options to Add, Remove, and enter its Properties; i.e. empty weight and empty moment. There is one additional menu item that is particularly useful. The "Modify" option allows the pilot to change an attribute of an aircraft. Without this option, the only other way to change the model or year of an aircraft would be to delete it, and re-add it. That is both time-consuming and cumbersome – the Modify menu option was added to speed up this process.

Tapping on "Modify..." will cause a dialog box similar to "Add Aircraft" dialog box shown earlier. However, the N-number will be grayed out - everything else works the same as the Add dialox box.
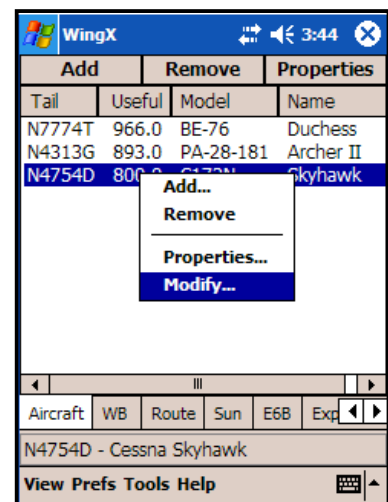
Weight and Balance Page

Weight and Balance calculations are a critical go/no-go part of the pre-flight preparation. WingX's aircraft model database, its advanced user interface with popup menus, and its unique graphical display allow fast and accurate weight and balance computations. WingX graphically displays the weight distribution and notifies the pilot if limits are exceeded.

W ingX has a database of aircraft models that greatly simplifies Weight and Balance calculations. By knowing aircraft model arms, fuel capacities, maximum weights, and other information, WingX does not require the pilot to enter the W&B profile. Moreover, WingX will warn the pilot if known limits are exceeded. WingX really excels with its weight and balance calculations and this chapter will explain the superb functionality, flexibility, and easy-of-use of WingX's Weight and Balance page.

In this chapter, you will learn how to:

- Enter or select a weight for each passenger

- Enter or select a fuel quantity for each tank on the ramp, taxi/runup fuel used, and for the fuel burned in flight

- Enter or select a baggage weight

Using the values you enter, WingX will accurately calculate the weight and CGs for each phase of flight. In addition, WingX will also ensure that you do not exceed the maximum gross weight limits, the maximum zero fuel limit (if one exists), or any baggage limits.

> **Flight Safety**
>
> **As PIC, it is your responsibility to ensure that the results displayed by WingX is correct and that your aircraft will remain within its Weight and Balance envelope as well as any limitations throughout the entire duration of the flight. In addition, always use the most current information contained in the Weight and Balance section of the specific aircraft's POH.**

The W&B page consists of four primary sections; namely:

- Status Section
- Configuration Section
- Graphical Section
- Data Entry Section

Status Section

The top-most line on the page is the Status Section and is shown in green to indicate a valid W&B condition and in red to indicate a warning condition. The Status Section summarizes and displays the Weight and Balance conditions for the ramp, takeoff, and landing phases of the flight. The numbers are always shown in pounds for weights and inches for CGs. The three phases of flight are:

- **RMP** - Ramp
- **T/O** - Takeoff
- **LND** - Landing

Within Limits

WingX will show the following attributes for each phase of flight:

- **Total Weight** - This is the total weight of the aircraft for that phase of flight.
- **Below Gross** - This is the number of pounds that the aircraft is below the maximum allowable weight for that phase of flight.
- **CG** - This is the CG of the aircraft for that phase of flight.
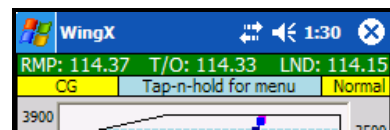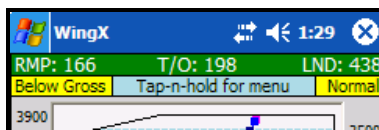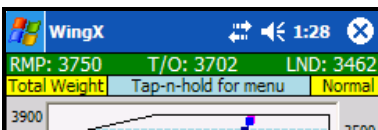
When WingX has determined that no limit has been exceeded, the appropriate values for the Ramp, Takeoff, and Landing phases of the flight will be displayed on a green background. The green background is used to quickly convey a "within limits" weight and balance situation.

Exceeding Limits

If a warning condition occurs, the Weight and Balance Status Section will be displayed on a red background. The red background is used to quickly convey an "out of limits" weight and balance situation. The Status Section will also use a red background to display an "Input bad" warning message since WingX cannot make a weight and balance determination. The offending text box will also have a red background.

There are various types of warnings that may occur. Some examples are:

- Exceeding Maximum Zero Fuel Weight, Ramp weight, Takeoff weight, and/or Landing weight

- Exceeding baggage limits

- Out of CG

- Input bad

All are self-explanatory; "Input bad" occurs when an inappropriate value is entered and is marked by the text box changing to a red background. Below are some examples:
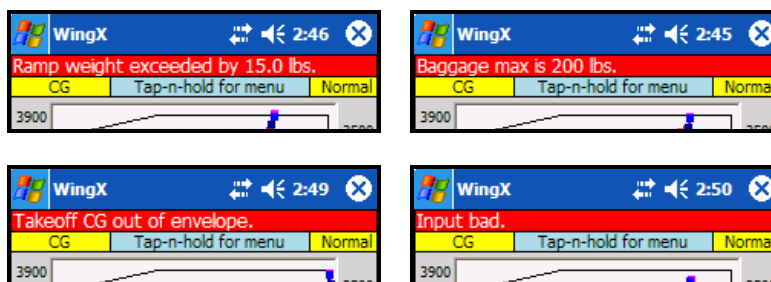
Configuration Section

The second line of information is called the Configuration Section as it contains three pieces of information related to the Weight and Balance display configuration. For screen shots, please see the ones in the Status Section. The pieces of information are:

- **Total Weight, Below Gross, or CG:** The text message indicates whether the Status Section is displaying the aircraft's total weight, pounds below maximum gross weight, or its CG for each of the phases of flight. To change this setting, use the popup menu – see its description later in the chapter.

- **Tap-n-hold for menu:** Use the popup menu from the graphical section to configure various settings of the Weight and Balance page. This text never changes and its only task is to serve as a reminder that tap-n-hold is the way to change configuration settings.

- **Normal, Utility, Acrobatic, or Solo:** This configuration message informs the user as to which envelope is being displayed in the Graphical Section and ultimately, to what envelope the aircraft loading is being constrained. To change the envelope, use the popup menu – see its description later in the chapter.

Data Entry Section

The input section of the Weight and balance page is the Data Entry Section. Each seat, each fuel tank, and each baggage area has a text box for data entry. As a weight is entered into any of the text boxes, the Summary and Graphical sections are updated dynamically – the results you see are always up-to-date. If invalid data is entered for any of the text boxes, that text box will turn red, and the following message will be displayed in the Status Section:
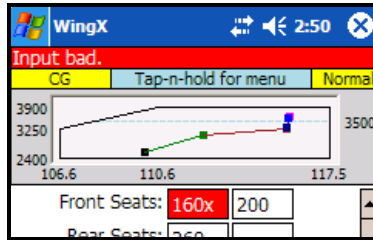
Popup Menus

Consistent with the rest of the WingX user interface, the Data Entry Section can be driven using popup menus. To display the popup menu for any specific text box, simply tap-n-hold on the text box. A popup menu appropriate to that specific text box will appear.

For example, the popup menu for a baggage area will only contain values at or below the maximum allowable weight for that baggage area. Similarly, if fuel is being entered in gallons, then the popup menu will only show possible gallon amounts at or below the capacity for that fuel tank. Moreover, WingX's fuel popup menus will also show meaningful capacities such as "Full" or "Tabs". In the example on the right, the popup menu for the Duchess' fuel tank provides values in 10 gallon increments, but also has "30G", "40G", and "Full" since these are markings on the fuel tab. Using these popup menus greatly reduces the time required to enter and calculate aircraft weight and balance.
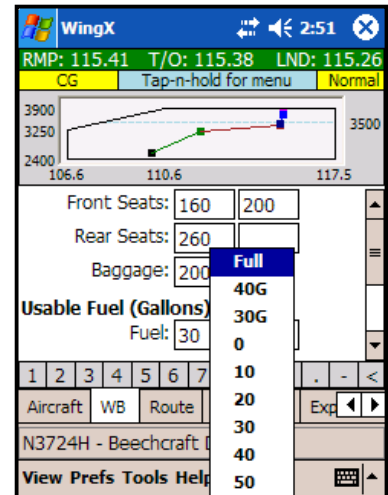
An example would the Piper Archer II. This aircraft model has tabs in the fuel tanks giving the pilot the option of reducing the fuel load to a known quantity. Filling the fuel tanks "to the tabs" is usually done if full fuel tanks are not required, or are not desired for weight and/or performance reasons. In this case, WingX will also show the "Full" and "Tabs" options in the fuel popup menus.

Graphical Section

The Graphical Section is really central in performing a Weight and Balance determination. This section has three primary functions:

- Display the Weight and Balance Popup Menu

- Display the Weight and Balance Envelope

- Display the Weight and Balance Bar Display

Weight and Balance Popup Menu

The Weight and Balance popup menu provides numerous options and configuration options.

Summary Selection

The first three options; namely 'Total Weight', 'Below Gross', and 'CG' have been described above. Note that the one currently selected has a check box next to it (in this case 'Total Weight') and this is also shown in the Configuration Section (shown in yellow).

- Select 'Total Weight' to show the total weight of the aircraft for each phase of flight.

- Select 'Below Gross' to show the number of pounds below the maximum allowable for each phase of flight.

- Select 'CG' to show the CG for each phase of flight.
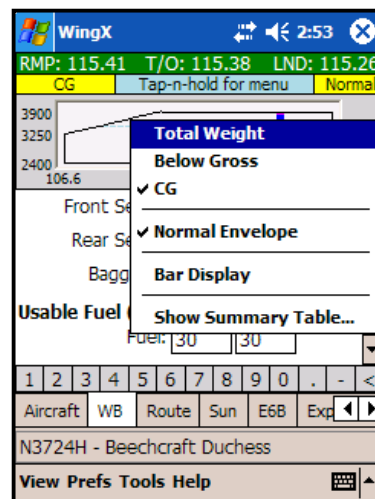
Envelope Selection

Following the Summary Selection is a list of possible envelopes for the selected aircraft. In our example above, the Beechcraft Duchess only has the Normal Envelope. If, for example, we had selected a Cessna 172N, the popup menu would have included both the Normal Envelope and the Utility Envelope. Again, note that since the Normal Envelope is selected, it has a check mark next to it. This is also shown in the Configuration Section (shown in yellow). When the envelope is changed, the graphical envelope will change to reflect the new envelope and all calculations and warnings will be in accordance with the newly selected envelope.

Display Mode

WingX has two ways of displaying Weight and Balance information, both of which are described in much more detail later in this chapter:

- Weight and Balance Envelope

- Weight and Balance Bar Display

When 'Bar Display' is checked, the graphical display will show the Bar Display, and when it is unchecked, the conventional Weight and Balance Envelope is displayed.

Show Summary Table

Selecting this option will display a complete summary of the Weight and Balance information in a form very similar to what is seen in most aircraft manuals. The Summary Table is described in greater detail later in this chapter.

Weight and Balance Envelope

The Weight and Balance Envelope view is very much the standard way for pilots to view their aircraft's weight and balance calculations and results. In this mode, WingX displays the selected envelope, the empty weight and CG and each point along the 'snake' as each seat, fuel tank and baggage area is filled.

The 'snake' is a line that extends from the empty weight and CG to the landing weight and CG in a series of lines. The snake is made up of a series of color-coded lines, one color each for seats, fuel, and baggage. Seats are denoted in green, baggage in brown, and fuel in shades of blue - one for ramp fuel, fuel used for taxi and runup, and fuel used during the flight portion. As each passenger's weight is entered, the green line will extend to the new point in the envelope. Similarly, as each baggage area's weight changes or a fuel value is entered, the brown and blue lines will change accordingly.

By default, WingX will display one green line for each row of seats, and one brown line for baggage area. If your aircraft has several seat rows and/or several baggage areas, the 'snake' could potentially become difficult to read and may end of cluttering the display. To unclutter the snake, there is an option in the main menu that is accessible from the View|Weight and Balance|Detailed submenu. If this submenu option is checked, each row of seats and baggage area has their own line. If unchecked, all seat rows and all baggage rows are summarized into a single green or brown line respectively. This reduces the detail of the snake, but it also unclutters the display somewhat. In the example below, note that the two seat rows have been combined into a single line. Clearly, this feature will be most useful on aircraft that have numerous rows of seats, multiple baggage areas, and/or several fuel tanks.
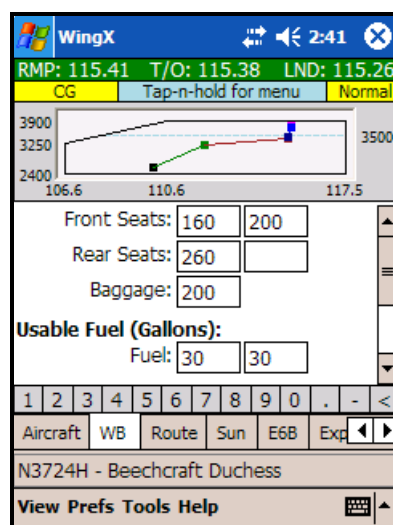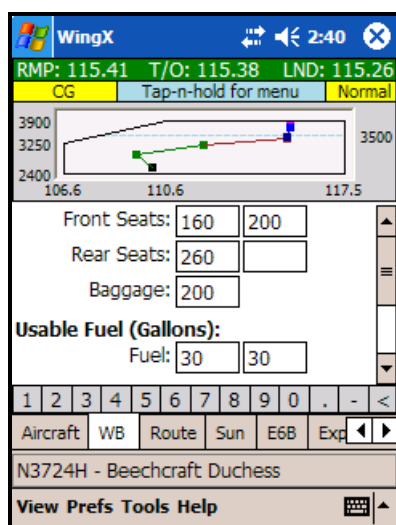
Weight and Balance Bar Display

WingX's Bar Display is a very unique view of the Weight and Balance of the aircraft. As described above, tap-n-hold on the Graphical Section to display the popup menu, then select "Bar Display". The familiar graphical envelope view will be replaced by an information-rich CG-centric view.

It is important to note that the Status and Configuration section function exactly the same as when the envelope is displayed. The Bar Display merely displays a different view of the Weight and Balance information. In this example, the Status and Configuration Sections show that 136 pounds, 192 pounds, and 432 pounds below the maximum allowable Ramp, Takeoff, and Landings weights. Also, we are using the Normal envelope for our calculations.

Four 'phase of flight' lines are displayed, these are:

- The Zero Fuel CG (if applicable)

- The Ramp CG

- The Takeoff CG

- The Landing CG

Let's look at each one individually. At the Maximum Zero Fuel Weight (ZFW) , and using the Normal category envelope, the CG range is 107.65-117.50 inches and the current CG at that weight is 115.24 inches. The value is graphically denoted by a black diamond. The green bar shows the allowable CG range at the Maximum ZFW. The CG values for the Ramp, Takeoff, and Landing lines should be interpreted similarly. Notice how the green bar shortens as the weight increases; i.e. on the Ramp and Takeoff lines. This is consistent with the CG range shortening as the weight increases – see the screen shots showing the normal envelope and notice how, as the weight increases, the forward CG moves aft, yet the aft CG does not change. Also note that the CG values shown on the Ramp, Takeoff, and Landing lines; namely 115.41, 115, 38, and 115.26 respectively are the same numbers shown earlier when we were viewing the normal envelope. The rightmost column displays 'OK' for each of the columns since the CG lies within the allowable CG range; i.e. the black diamond is within the green bar.

It is important to understand that the weight, calculated CGs, allowable CG ranges etc have not changed. The same CG values will be displayed and the same warnings will be displayed as with the Weight and Balance Envelope display. The Bar Display is a different and unique way of showing the same information.

Near limits, and exceeding limits notifications

A superb feature of the Bar Display is its CG-range summary on the right side of the display. If the CG approaches the forward or aft limits of the allowable CG range, the 'OK' message will change to '5%' or '10%' depending on how close to the limit the CG actually is. In other words, if the CG lies within the first or last 5% or 10% of the green bar, the message will change from 'OK' to either '5%' or '10%'. If the forward of aft limit is exceeded the message will change to 'Fwd' or 'Aft' respectively and be displayed in red.
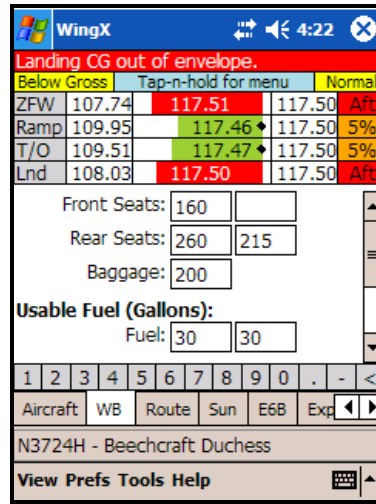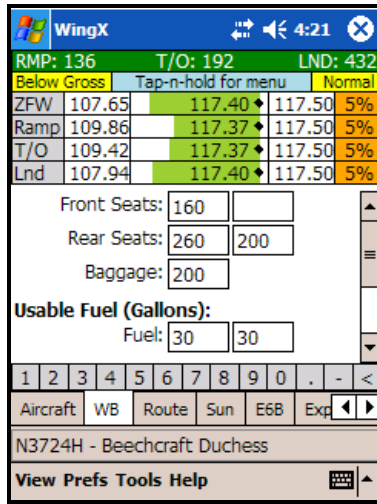
In the first example above, the 200-pound passenger moved from the right-front seat to the right-rear seat. A recalculation showed that the CGs for all phases of flight were within just 5% of the allowable range. Concerned with this, the pilot asked this passenger to verify that his weight really was 200 pounds. It turned out that he had recently put on 15 pounds. This newly acquired weight gain moved the Maximum ZFW and Landing CGs out of the Normal envelope as shown clearly by the 'Aft' messages as well as the Status Section now displaying 'Landing CG out of envelope.'. Clearly this is not safe, and it would be safer for this passenger to be seated in the right-front seat. All this took just a few taps and the use of popup menus to calculate.

Weight and Balance Summary Table

WingX's Weight and Balance Summary Table consolidates the passenger, fuel, and baggage information into a conventional looking table with weights, arms, and moments. The Summary Table will list each station of the passengers, baggage, and fuel. Passenger stations are shown in green, baggage stations are shown in light red, and fuel stations are shown in blue. Note that this is consistent with the color scheme used on the W&B envelope display.

The fuel calculations will be broken down into the zero fuel, ramp, takeoff, and landing phases. In addition, for each CG that is calculated, WingX will display the allowable range of CGs for that weight.

To return to the Weight and Balance page, tap on the "Close" button.

No Aircraft Selected

If no aircraft is selected on the Aircraft page, and the user changes the view to the Weight and Balance page, the following warning message is displayed:
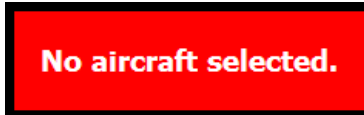
To resolve the issue, change the view back to the Aircraft page and select an aircraft by tapping on its N-number or anywhere else on that line. Then return to the Weight and Balance page. The Weight and Balance page always uses the selected aircraft, therefore the information and envelope of the selected aircraft will be displayed.

Adding an Aircraft Model to WingX's Database

WingX has an extensive database of aircraft models. A partial list of supported aircraft manufacturers is: Aero Planes, American, Bellanca, Beechcraft, Bellanca, Cessna, Cirrus, Diamond, Funk, Global Amphibians, Grumman, Letecke Zavody, Liberty, Maule, Mooney, Navion, OMF, Piper, Pitts, Robinson, Schempp-Hirth, Schweizer, Sikorsky, Socata, Taylorcraft, Vans, Vickers-Slingsby, and Zenair. WingX has over 370 aircraft models in its database and we are continually adding more.

If there is an aircraft model that you would like added, please email us at support@hiltonsoftware.com and tell us the make, model, year, and even the N-number if possible. We will do our best to obtain all the appropriate information to add that specific model. If we cannot locate all the required weight and balance and fuel information, we will contact you asking that you provide us with this data either via email or fax.

Route Planning Page

WingX has a downloadable database that contains airports, navigational aids, and fixes. WingX will do your Route Planning and even walk you through the route as you fly it using the Dynamic Flight Navigator™.

WingX's Route Page significantly simplifies route planning, wind correction calculations, and even calculates route distances pertinent to 14 CFR Part 61 and 14 CFR Part 141's Aeronautical Experience requirements. A route is entered in a single text box, and together with the speed and wind vector, the route will be displayed by listing each leg of the flight. The information for each leg consists of Magnetic Heading (MH), Distance (NM), Estimated Time Enroute (ETE), Wind Correction Angle (WCA) and more. The status bar will display the Part 61/141-required cross-country distances.

Constructing a Route

A route consists of multiple identifiers. Each identifier can represent an airport, a VOR (or similar), an NDB, a fix, an intersection, and VFR waypoints.

Identifier	Name	Type
SJC	Norman Y. Mineta San Jose Intl	Airport
SJC	San Jose	VOR/DME
SUNOL	SUNOL	Intersection
KLIDE	KLIDE	Fix
LV	REIGA	NDB
VPWAM	VPWAM	VFR Waypoint

To differentiate a navaid from an airport, always prepend navaid identifiers with a ".”; e.g. use ".SJC" instead of "SJC" for the San Jose VOR instead of the San Jose Intl Airport.

There are three important rules when entering a route:

1. Separate identifiers with a space

2. Prepend navaids with a period.

3. Use the ICAO or shortened identifier; e.g. KSJC is the same as SJC

Example:

Let's work through an example from San Jose International Airport (SJC) to Sacramento Executive Airport (SAC) via the SUNOL intersection, Livermore Airport (LVK), the SAC VOR, and finally to SAC Airport. The route would be entered as: "SJC SUNOL LVK .SAC SAC".

Assuming our airspeed was 120 knots and the wind at our altitude was 330° at 15 knots. Using popup menus, the number 120 is entered into the Speed text box, and the numbers 330 and 15 are entered into the wind text boxes.

Note the distances displayed in the status bar just above the main menu. These are distances that are used in determining Part 61, Part 91, and Part 141 cross-country compliance.
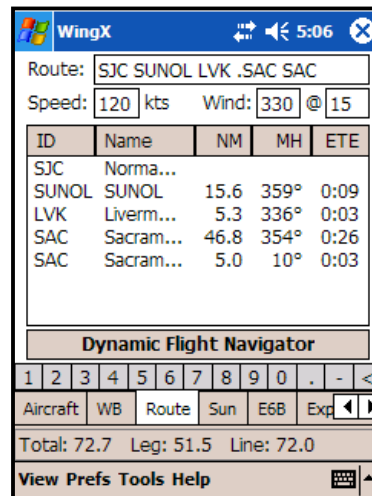
At this point, WingX has the information it needs to completely calculate the route information. Using our example, the full route would be:

ID	Name	NM	TC	WCA	TH	MH	ETE	ETA
SJC	San Jose Intl Airport							
SUNOL	SUNOL intersection	15.6°	21°	-5°	15°	359°	0:09	0:09
LVK	Livermore Muni Airport	5.3°	354°	-3°	351°	336°	0:03	0:12
.SAC	Sacramento VOR	46.8°	15°	-5°	10°	354°	0:26	0:37
SAC	Sacramento Exec Airport	5.0°	33°	-6°	27°	10°	0:03	0:40

Note the period preceding the Sacramento VOR identifier. Due to screen space constraints on handheld devices, WingX conveniently displays TC, WCA, TH, and MH all in one column and allows each one to be viewed in sequence by simply tapping on the column header. For example, MH will initially be displayed in the column. To view TC, tap on the column header "MH". Similarly, tap on the column header to view WCA, TH, and then back to MH.

> **Tap on the heading column header to cycle through TC, WCA, TH, and MH.**

Column Selection

Using the View|Route|Columns submenu, the route list view can be configured to show or hide specific columns. For example, you may wish to hide the Name column since it requires a large column width to be useful. This would allow you to then show the ETA column.

Route Page with Name column

Route Page with ETA column

The Status Bar

The Status Bar displays very useful information and will cycle through the following pieces of information:

- **Great Circle Route:** The distance difference between the defined route and the great circle route.

- **Federal Aviation Regulation Distances:** Distance information related to the 14 CFR Part 61 and Part 141 pilot certification processes.

  o **Total:** Total distance of the route.

  o **Leg:** The longest leg between airports of the route.

  o **Line:** The distance from the origin airport to the furthest airport from the origin airport. If the starting point is not an airport, WingX reports this value as "?" since it cannot be calculated.

- **Average Ground Speed and the Wind Effect:** The average ground speed, and by how many minutes the flight will be faster or slower with the given wind.

The user-defined route is 0.6 NM longer than the great circle route.

Total distance is 72.7 NM, longest airport-to-airport leg is 51.5 NM, and from the original airport to the furthest airport is 72 NM.

The Average Ground Speed is 109 knots. The wind increases the flight time by 4 minutes.

Popup Menu

To both simplify and speed up route entry, WingX provides a popup menu for the route text box that is extremely useful when entering routes. To display the popup menu, tap-n-hold on the route text box. As can be seen from the screen shot on the right, the popup menu is divided into four sections:
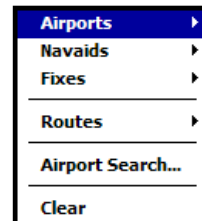
- **Most Recently Used Lists:** Airports, Navaids, Fixes

- **Routes:** Select, Save, Reverse, or Remove Routes

- **Airport Search:** Search for airports based on name or nearby city.

- **Clear**

> **Any text to be inserted will be inserted at the cursor's position within the route text box. Therefore, tap-n-hold at the point within the route text that the new identifier is to be inserted.**

Most Recently Used Lists

WingX remembers the airports, navaids, and fixes most recently used and provides quick access to them via the route popup menu. Three separate lists are provided within the popup (see popup image above); one for airports, one for navaids, and one for fixes and intersections. Tap on Airports, Navaids, or Fixes to display the appropriate list. Then tap on the required identifier to insert that identifier into the route text box.

Longer names may have to be truncated slightly to ensure that the names fit within a reasonable sized popup menu. Truncated airport names always end in "…".
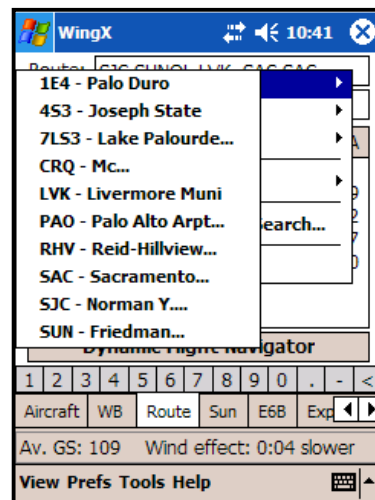
User-Defined Routes

The popup's Routes menu option consists of four submenu options that are provided to manage and manipulate routes:

- **Select Route:** Selecting this option will display a list of saved routes from which the desired route may be selected.

- **Save Route:** Selecting this option will save the route currently in the route text box under the title of "SJC to SAC" where SJC and SAC are the departure and destination points respectively (for example).

- **Reverse Route:** Selecting this option simply reverses the route in the route text box.

- **Remove Route:** Selecting this option displays a dialog box that allows for the removal of specific routes.
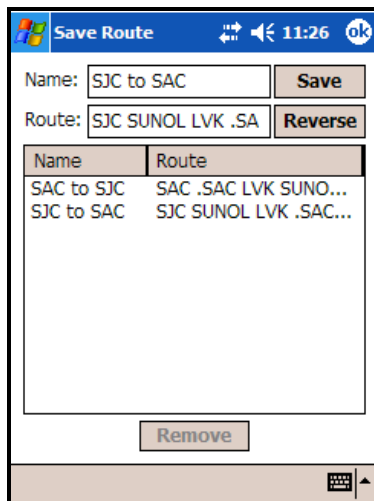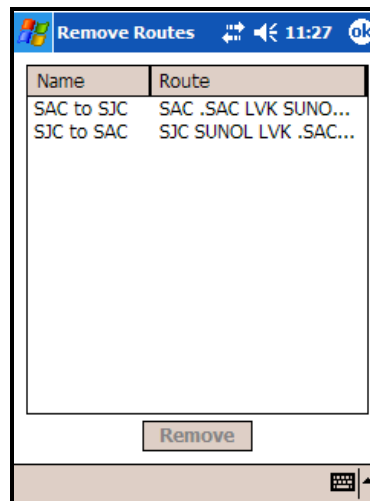
The Save Route page.   The Remove Route page.

Clear Popup Menu Option

Clear simply clears all the text from the text box.

Dynamic Flight Navigator™

The Dynamic Flight Navigator™ page walks you through the route, leg by leg, while showing frequencies, morse codes, the three closest VORs, and more. The Dynamic Flight Navigator™ heads-up information-rich display significantly increases flight safety. No more searching for airport and VOR frequencies, searching for Morse codes on a sectional at night, and no more paging through a flight plan. It's all on one concise screen, it's all clearly visible at night, and it is the Dynamic Flight Navigator™.

The new Dynamic Flight Navigator (DFN) adds a whole new dimension to route planning by flying the route and providing up-to-date A/FD information along the route. While this version of WingX does not use GPS, it does provide the pilot with an information-rich way to monitor the flight's intended route and is therefore extremely useful both in aircraft that have and do not have GPS. Having said that, we feel it is prudent to include the following warning:

> ## Flight Safety
>
> **The Dynamic Flight Navigator does <u>not</u> use GPS input to determine your position. The position shown is derived purely from a time estimate and WingX mathematically determines your position not according to any GPS, but rather by simply showing where WingX assumes you will be if you follow the route appropriately.**
>
> **Do not use the Dyanmic Flight Navigator as a tool to determine your position!**

Screen Layout

The DFN screen is divided into three logical sections denoted by the thick purple lines on the screen shot on the right (note that these purple lines do not appear on the Pocket PC – they are for illustration only):

- **The Identifier Section** displays the identifiers of both the origin and destination of a flight leg. In addition to the identifier, some text and graphics that describe the entity is displayed. Using our example on the right, we see that the leg's origin, SJC, is a towered airport (APT and TWR) whose tower frequencies are 120.7 and 124.0. The leg's destination is SNS. SNS is a VOR with DME, its frequency is 117.3 and it Morse code is ■■■ ▬■ ■■■.

> **Tap on the identifier to display A/FD information for that airport, navigational aid, or fix.**
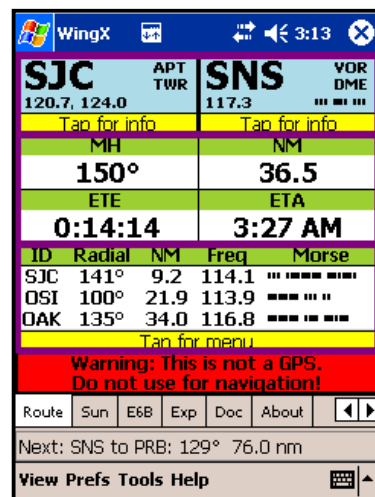
- **The Flight Data Section** displays pertinent navigation information regarding the leg from its origin to its destination. This information includes the Magnetic Heading (MH), Distance in nautical miles (NM), Estimated Time Enroute (ETE), and Estimated Time of Arrival (ETA). The distance and ETE will count down towards zero. When the ETE reaches zero, WingX sequences to the next leg automatically. The new data for that leg will be displayed in the appropriate sections.

- **The Positional Awareness Section** is an extremely powerful aid in helping a pilot's positional awareness. WingX determines, in real-time, the closest three VORs to the aircraft's calculated position and displays the VORs' identifiers together with the radial and distance information from the VOR. To aid in safety, WingX keeps your head out of the charts by displaying the VORs' frequencies as well as their Morse Codes. This is an important factor contribution to the safety of your flight and significantly increases your ability to 'see-and-avoid'. The radial and distance values change in real-time as WingX calculates the aircraft's time-based position.

> **Tap on the Flight Data Section or the Positional Awareness Section to display the Control Menu.**

Control Menu

The Control Menu allows control over both what is shown on the Dynamic Flight Navigator screen as well as how the legs are sequenced. Note that the buttons are deliberately large so that a pilot can easily 'tap' on these buttons with their thumb while flying in turbulent conditions. While the Dynamic Flight Navigator is active, the following buttons will be displayed:

- **Start/Stop:** Tapping on this button starts or stops the Dynamic Flight Navigator. If the Dynamic Flight Navigator was running, this button would have displayed "Start SJC-SNS" (in our example).

- **Start Next:** Tapping on this button sequences to the next leg. In our example, WingX would automatically assume that we have reached the Salinas VOR (SNS) and would begin navigating to PRB. This button is useful if you arrive at your checkpoint a little earlier than planned.

- **Show Previous:** Tapping on this button will show the previous leg in the route. Note that the active leg will continue to countdown to its destination even though you will be viewing a different leg.

- **Show Active:** Tapping on this button will show the active leg.

- **Show Next:** Tapping on this button will show the next leg in the route. Note that the active leg will continue to countdown to its destination even though you will be viewing a different leg.
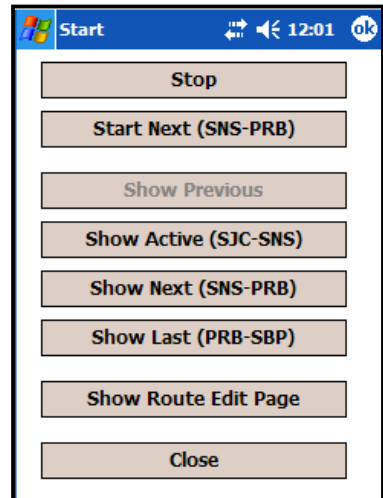
- **Show Last:** Tapping on this button will show the last leg in the route. Note that the active leg will continue to countdown to its destination even though you will be viewing a different leg. Viewing the last leg is useful in that it allows you to view the route's destination information including the A/FD information by tapping on the destination's identifier as described earlier in this chapter.

- **Show Route Edit Page:** Tapping on this button simply switches back to the Route page. Note that the active leg will continue to countdown to its destination even though you will be viewing a different page. You may change the route (add or remove waypoints), change the airspeed, and/or change the wind speed/direction. However, if the Dynamic Flight Navigator is running, you must ensure that the active leg still exists in the route, otherwise WingX will display the following message and the Dynamic Flight Navigator will stop running.
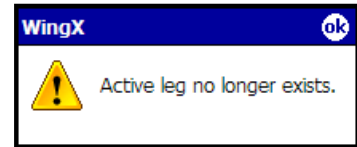
> **If the Dynamic Flight Navigator is running when you modify the route, ensure that the active leg still exists in the route**

- **Close:** Tapping on this button closes the Control Menu as displays the Dynamic Flight Navigation page.

Status Bar

The status bar provides great heads-up information. There is a saying in aviation circles that goes something like: "The two most important things are the next two things." WingX therefore displays the next leg's information right on the status bar so that while a pilot is flying the current leg, the aircraft navigation systems can be configured for the next leg. In our example, the route's next leg (after arriving at SNS VOR) is to proceed to the PRB (Paso Robles VOR) on a course of 129 degrees for a distance of 76 nautical miles.
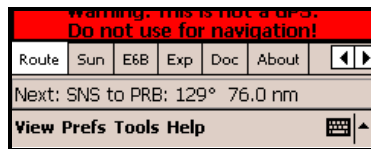
Sunrise and Sunset Page

An often-overlooked piece of preflight information is the sunrise or sunset time. These times are not only important from a legality point of view, but are also important for safety reasons. For example, if you are flying a J3 Cub, or any other aircraft that has a non-functional electrical and lighting system, you must land by sunset. As for safety, flight risk is increased at night – let WingX tell you when the sun will set, when twilight will occur, and when it effectively becomes night that is so dark that you need to maintain currency just to take passengers on-board with you.

S unrise and sunset times are closely tied to aviation both for safety and legal reasons. WingX's database of airports allows it to quickly calculate both the Zulu and local time that the sunrise and sunsets will occurs at that airport. In addition, WingX will also display the times at which twilight occurs which is important for the logging of night flying. The third listed time is "One Hour" meaning the time occurring "one hour before sunrise" or "one hour after sunset". These times are important for currency purposes when a pilot wishes to act as Pilot In Command (PIC) of an aircraft with passengers.

All three of these times are explained in greater detail in this chapter. A partial quote of each of the relevant FAR is included for quick reference.
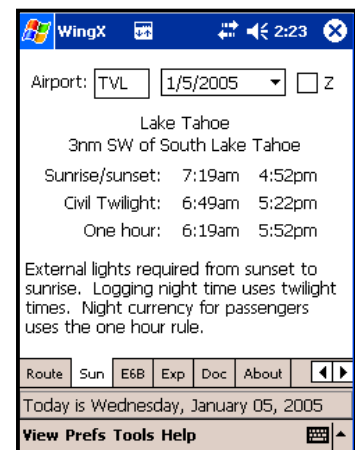
> **We believe the FARs quoted are current at the time of writing this manual.**
> **Please ensure that you always refer to the most current FARs to ensure compliance.**

Safety

Darkness increases the risk when flying. For example, emergency landing areas are not as easy to find, instruments may be more difficult to read, objects that have fallen on the floor will be more difficult to find, and mountains may be impossible to see on a moonless night. The risks and dangers associated with flying at night are very well documented in many books and videos on the subject. Use WingX to determine the sunset time, when it is starting to get dark, and when it probably might not be a good idea to be flying in the mountains in a single-engine aircraft.

Legality

WingX displays six times – three are related to the sunrise and three are related to the sunset. While the actual sunrise and sunset times are physical events, the other four times are associated with particular FARs with which pilots should be familiar. In the following paragraphs, we'll discuss all six times and how the relate to regulatory requirements.

Sunrise and Sunset Times

One Federal Aviation Regulation (FAR) regarding sunrise and sunset times is:

FAR 91.209 - Aircraft lights

No person may:

(a) During the period from sunset to sunrise (or, in Alaska, during the period a prominent unlighted object cannot be seen from a distance of 3 statute miles or the sun is more than 6 degrees below the horizon) –

(1) Operate an aircraft unless it has lighted position lights;

(2) Park or move an aircraft in, or in dangerous proximity to, a night flight operations area of an airport unless the aircraft–

(i) Is clearly illuminated;

(ii) Has lighted position lights; or

(iii) is in an area that is marked by obstruction lights;

* partial listing of the FAR

Therefore the WingX sunrise and sunset times define the times before which and after which, respectively, an aircraft may not be moved on the surface (without the above-mentioned safeguards), or flown legally.

Civil Twilight Times

Two Federal Aviation Regulation (FAR) regarding civil twilight times are:

FAR 1.1 - Definitions and Abbreviations

Night means the time between the end of evening civil twilight and the beginning of morning civil twilight, as published in the American Air Almanac, converted to local time.

FAR 61.51 - Pilot logbooks

(a) Training time and aeronautical experience. Each person must document and record the following time in a manner acceptable to the Administrator:

(1) Training and aeronautical experience used to meet the requirements for a certificate, rating, or flight review of this part.

(2) The aeronautical experience required for meeting the recent flight experience requirements of this part.

(b) Logbook entries. For the purposes of meeting the requirements of paragraph (a) of this section, each person must enter the following information for each flight or lesson logged:

(1) General

[deleted for brevity]

(2) Type of pilot experience or training–

[deleted for brevity]

(3) Conditions of flight–

(i) Day or night.

(ii) Actual instrument.

(iii) Simulated instrument conditions in flight, a flight simulator, or a flight training device.

* partial listing of the FAR

Therefore the WingX twilight times define the times before which and after which, respectively, a pilot may log "night" time for the purposes of satisfying Part 61, Part 91, and other "night flying" requirements.

One Hour Rule

One Federal Aviation Regulation (FAR) regarding "one hour before sunrise" and "one hour after sunset times" is:

FAR 61.57 - Recent flight experience: Pilot in command.

(b) *Night takeoff and landing experience.* (1) Except as provided in paragraph (e) of this section, no person may act as pilot in command of an aircraft carrying passengers during the period beginning 1 hour after sunset and ending 1 hour before sunrise, unless within the preceding 90 days that person has made at least three takeoffs and three landings to a full stop during the period beginning 1 hour after sunset and ending 1 hour before sunrise, and–

(i) That person acted as sole manipulator of the flight controls; and

(ii) The required takeoffs and landings were performed in an aircraft of the same category, class, and type (if a type rating is required).

* partial listing of the FAR

Therefore the WingX "one hour before sunrise" and "one hour after sunset" times define the times before which and after which, respectively, a pilot must maintain currency to legally carry passengers.

E6B Page

WingX's E6B page packs a tremendous amount of pre-flight and in-flight functionality.
This chapter describes the many conversions, density altitude, winds aloft, fuel consumption
and endurance, headwind/crosswind, distance-groundspeed-time, and wind chill calculations.

WingX adds E6B functionality that allows pilots to quickly make calculations that are useful during pre-flight and during flight. Fast calculations are made possible by WingX's extensive use of pull-down menus (for conversions) and popup menus for fast data entry.

Propagation

To aid with data entry in turbulence, to speed up data entry, and to reduce the possibility of errors when entering numbers, WingX automatically propagates results down the E6B page when appropriate. For example, when a temperature is calculated, the equivalent value in Celsius is propagated to the Density Altitude calculations.

Our Example Scenario

Our examples will assume the following scenario:

- Indicated Temperature is 90°F

- We are in the vicinity of Reno International and intend to use runway 25

- Pressure Altitude at Reno is 4415 feet

- The aircraft's Calibrated Airspeed (CAS) is 140 knots

- The aircraft's track is 320°, the heading is 315°, and the Ground Speed is 150 knots

- Distance of 324 NM to our destination

- The aircraft's fuel burn is 12 gallons per hour

Conversions

Often a pilot will need to make a temperature, distance, weight, volume, or pressure conversion. WingX offers well over 100 different conversions using simple pull-down and popup menus. WingX provides the following conversions:

Conversion Types	Units
Temperature	Celsius Fahrenheit Kelvin
Distance	Nautical Miles (NM) Statute Miles (SM) Inches Feet Yards Millimeters (MM) Centimeters (CM) Meters Kilometers (KM)
Weight	Pounds Ounces Kilograms (KG) Grams Gallon of 100LL Gallon of Jet A Quart of Oil
Volume	Gallons (US) Gallons (UK) Liters
Pressure	Mercury (inches) Mercury (millimeters) Millibars

Example

The aircraft's thermometer reads 90°F. What is the equivalent temperature in Celsius? The following steps are performed:

1. The Conversion type pull down menu initially has "Temperature" selected. Since this is a temperature conversion, we do not change it.

2. The left-hand and right-hand conversion unit pull down menus will initially have "Fahrenheit" and "Celsius" selected. Since this type of conversion is common, WingX defaults to these initial settings.

3. Now enter "90" in the left-hand text box and notice that WingX automatically calculates that the equivalent temperature in Celsius is 32.3°C.
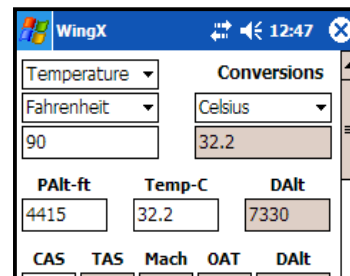
Also notice how WingX has propagated the temperature of 32.3°C downwards through the E6B page.

Gray text boxes are read only and cannot be edited.

Density Altitude

Every pilot knows that Density Altitude is a critical factor related to aircraft performance. This is especially true operating at hot or high airports. The density altitude of a hot and high airport could be thousands of feet above the airport's elevation. Since the aircraft performance is directly related to the density altitude, a pilot must know and understand the effects of density altitude and must calculate the density altitude when arriving and departing a hot and high airport. In fact, some mountain airports have digital displays in the run-up areas that calculate the density altitude and alert pilots when the density altitude is much higher than the airport elevation.

Since density altitude is so critical for safe operation, WingX allows a pilot to quickly and accurately calculate it with just a few taps.

Example

To determine the density altitude in Reno with an ambient temperature of 90°F, Reno's pressure altitude and ambient temperature in Celsius are required. If Reno was the last airport entered in the route, WingX automatically sets the Pressure Altitude to "4415", thereby saving the pilot the need to look up the altitude. Due to pressure changes "4415" might not be the exact number for that day's conditions, but it will be really close. We encourage pilots to enter the exact pressure altitude of the airport. Note that the 32.3°C temperature has been automatically propagated and WingX has determined that the Density Altitude at Reno with an ambient temperature of 90°F is 7330 feet.
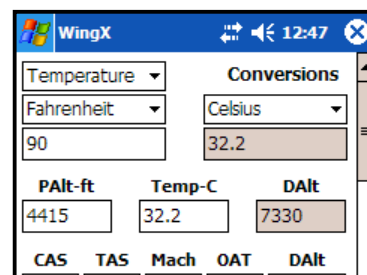
To calculate density altitude using Fahrenheit:

- Select the conversion type to be Temperature.

- Select Fahrenheit on the left text box and Celsius on the right text box.

- Using the digit bar, enter "90" on the left text box.

- WingX will calculate the equivalent Celsius temperature to be 32.2°C and the Density Altitude as 7330 feet.

> **There are three possible ways for data to be entered on the E6B page. The data for the last airport will be used, a user can use the popup menus, or the values can be entered using the Software Input Panel, keyboard or other input device.**

Airspeeds

WingX will convert Calibrated Airspeed (CAS) into True Airspeed (TAS), and its Mach number. Since air friction will heat up the air temperature probe somewhat, WingX will remove this friction-related error and on the same line of the E6B, WingX will display the actual outside ambient air temperature. This value will be lower that the temperature you see on the temperature gauge and have entered on the density altitude line. In addition, WingX will display a lowered density altitude related to this newly calculated outside ambient air temperature.

Example

In our example scenario, our Calibrated Airspeed (CAS) is 140, so that is entered into the CAS field. Using the propagated temperature of 32.2°C, WingX calculates that the True Airspeed (TAS) is 155 knots, and its Mach number is 0.23. Since the aircraft is a high-performance aircraft at a hot and high airport, the density altitude is critical. WingX calculates the actual outside temperature to be 29°C (after removing air friction heating of the temperature probe) and the density altitude at the airport to be 6990 feet. Note the more than 400-foot difference by using the actual outside air temperature versus what was read on the air temperature gauge.

Unknown and Known Winds Aloft

WingX provides the advanced capability of calculating winds aloft and desired headings if the winds aloft are known. Using known variations for airports, navaids, and fixes adds to the accuracy of the results.

Calculating Winds Aloft (Unknown Wind Aloft)

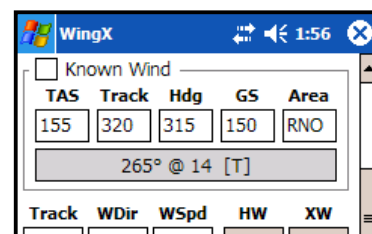WingX allows a pilot to calculate the winds aloft by entering:

- **True Airspeed (TAS):** The TAS can either be entered directly or calculated by WingX if the pilot enters their Calibrated Airspeed and Temperature (see Airspeeds above). WingX propagates the TAS value down into the TAS text box for winds aloft thereby freeing the pilot of entering the TAS.

- **Track over the ground:** The known track that the aircraft is making over the ground. For example, if the aircraft is following a VOR radial outbound, then the pilot can use that track. Alternatively, a GPS or LORAN system may display track.

- **Heading:** The aircraft heading that is usually read directly off the Heading Indicator. Note that to obtain an accurate aircraft heading, the compass heading should be noted, then the appropriate deviation should be applied as noted by the compass card.

- **Groundspeed:** The known groundspeed. This value can be read from the Distance Measuring Equipment (DME) or from a LORAN or GPS readout.

- **Area (optional):** Without entering the area in which the flight is occurring, the winds aloft can only be reported relative to Magnetic North. This is not consistent with Flight Service weather reports since they report the winds aloft relative to True North. To convert to True North, enter a nearby airport, navaid, or fix and WingX will calculate the winds aloft more appropriately relative to True North.

> **If a valid area airport, navaid, or fix is not entered, the winds aloft are reported relative to Magnetic North – the output will have the [M] suffix.**
>
> **If a valid area airport, navaid, or fix is entered, the winds aloft are reported relative to True North – the output will have the [T] suffix.**

Example (Unknown Wind)

Ensure that the "Known Wind" checkbox is unchecked to calculate the winds aloft; i.e. that the winds are unknown. Using our example scenario, the True Airspeed has propagated into the TAS field, and 320°, 315°, and 150 should be entered into the Track, Heading, and Groundspeed text boxes repsectively. Using this information, WingX will calculate the winds aloft relative to Magnetic North. However, winds aloft should be displayed relative to True North and "RNO" is entered in the Area text box. WingX will use the magnetic variation for Reno to accurately determine the winds aloft relative to True North.

Calculating Heading, Ground Speed, and WCA (Known Wind)

By using known winds aloft, WingX allows a pilot to accurately calculate the required heading and the resulting groundspeed and Wind Correct Angle (WCA). The following pieces of data must be entered:

- **True Airspeed (TAS):** The TAS can either be entered directly or calculated by WingX if the pilot enters their Calibrated Airspeed and Temperature (see Airspeeds above). WingX propagates the TAS value down into the TAS text box for winds aloft thereby freeing the pilot of entering the TAS.

- **Course (Crs):** The course that the aircraft is required to make over the ground. For example, if the aircraft dead reckoning to an airport, then the pilot should use the calculated direction to the airport. Alternatively, the GPS or LORAN system may display desired course.

- **Wind Direction (WDir):** The winds aloft direction as reported by the FSS Weather Report, Flight Watch, or other weather reporting entity.

- **Wind Speed (WSpd):** The winds aloft speed as reported by the FSS Weather Report, Flight Watch, or other weather reporting entity.

- **Area (optional):** Without entering the area in which the flight is occurring, the winds aloft can only be assumed to be relative to Magnetic North. This is not consistent with Flight Service weather reports since they report the winds aloft relative to True North. To have the winds aloft be assumed to be relative to True North, enter a nearby airport, navaid, or fix and WingX will perform the necessary variation adjustment for accurate results.

Headwind and Crosswind Components

The majority of aircraft accidents are of the "fender-bender" variety that occur on landing and more often than not, the word "wind" appears in the accident report. Crosswind takeoff and landing skills diminish quickly without practice and this is exacerbated by the fact that runways are usually built to face into the prevailing wind thereby increasing the lack of crosswind practice.

Another advantage to being able to calculate both the headwind and crosswind is that these numbers are often written in a solo student's logbook by a Certificated Flight Instructor (CFI) as one of the conditions for that student's solo flights.

Example

Let's assume we're departing RNO's runway 25 with a wind of 280@18 on a windy afternoon. "250" is entered is the Track text box, and "280" and "18" are entered in the wind textboxes respectively. WingX calculates and displays the headwind and crosswind as 16 knots and 9 knots respectively. We do encourage pilots to use the actual runway heading and not to simply add a zero to the runway number for the most accurate results.

Note: A negative headwind implies a tailwind. A negative crosswind is a crosswind from the left.

Distance, Groundspeed, Time

Distance, groundspeed, and time calculations are fundamental to cross-country flying. Three such examples are:
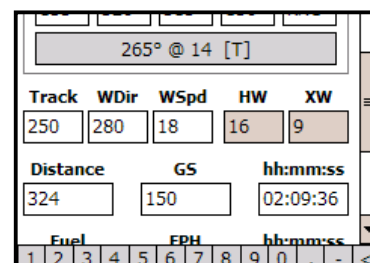
- **Known distance and groundspeed:** A pilot knows the leg's distance and the aircraft's ground speed, and needs to calculate the ETE for that leg for fuel consumption calculations, an ATC report, etc.

- **Known groundspeed and time:** A pilot knows the aircraft's groundspeed and has calculated the "time in the tanks" and wants to determine how far the aircraft will fly.

- **Known distance and time:** The pilot knows the distance to the upcoming fix. The pilot wants to know how fast (or slowly) to fly to arrive at that fix at a certain time.

> **By entering any two of the three values, WingX will calculate the third.**

Example

The distance of 324 NM to our destination is entered into the Distance text box, and the groundspeed is 150. The time to cover this 324 NM at 150 knots is calculated to be 2 hours, 9 minutes, and 36 seconds or just 02:09:36.

To see what this time is using a decimal format, simply tap on the text box. Look in the status bar – the following text will appear: "02:09:36 or 2.160".

Fuel Consumption and Endurance

Fuel calculations are an important part of flight planning. As such, fuel consumption and fuel endurance calculations are an integral part of WingX's E6B page.

Fuel Consumption: By entering the Fuel consumption Per Hour (FPH) and the time, WingX will calculate the total fuel required.

Endurance: By entering the Fuel consumption Per Hour (FPH) and the usable fuel on board, WingX will calculate the endurance in HH:MM:SS.

> **By entering any two of the three values, WingX will calculate the third.**

Example

The time to cover the 324 NM at 150 knots is "02:09:36". This time was automatically propagated down and assumed to be the 'fuel time'. By entering "12" in the "FPH" text box (i.e. 12 gallons as the Fuel Per Hour), WingX calculates the fuel required for that portion of the flight as 25.9 gallons. Note that pounds may also be used as the fuel units. We use gallons in this example.
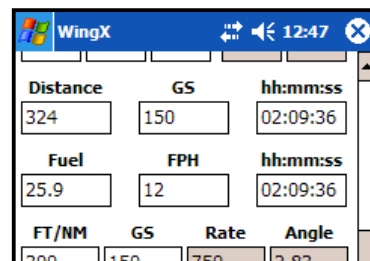
To determine endurance for a specified fuel load, enter the number of gallons (or pounds) and the Fuel Per Hour (FPH) value and WingX will calculate the endurance in HH:MM:SS.

IFR Climb Rate and Climb Angle

IFR climb rates and climb angles are critical for safe flight in non-visual conditions. IFR departure procedures are designed and published with specific criteria and these are printed right on the departure procedure. However, the requirements are provided in terms of climb rate per NM, but this is not easily measurable in the aircraft and neither is it easily determinable during pre-flight preparations. By entering the required climb gradient as published on the departure procedure, as well as the calculated ground speed, WingX will accurately calculate the required climb rate in feet per minute (FPM) and the climb angle in degrees. Using this valuable information, pilots can carefully monitor the climb performance during the climb to ensure that the minimum climb gradient is being achieved thereby significantly increasing the safety of the flight.

Example

If the climb procedure specified 300 ft/nm as the required climb gradient and we were capable of a ground speed of 150 knots, then the required climb rate is calculated to be 750 ft/minute with a climb angle of 2.83˚.

Note: WingX will calculate the groundspeed if the track, wind speed and wind direction are entered.
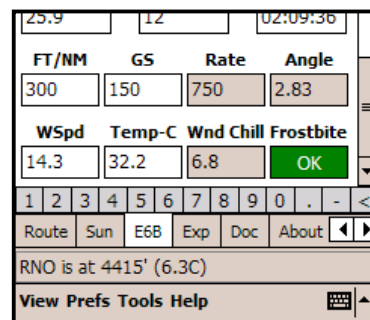
Wind Chill and Frostbite

While not specifically aviation-related, calculating wind chill and frostbite values can be extremely valuable in cold climates. Wind chill is defined as "The temperature of windless air that would have the same effect on exposed human skin as a given combination of wind speed and air temperature." and is therefore a function of wind speed and temperature. Frostbite is defined as "Injury or destruction of skin and underlying tissue, most often that of the nose, ears, fingers, or toes, resulting from prolonged exposure to freezing or subfreezing temperatures." and is a function of wind chill and exposure time.
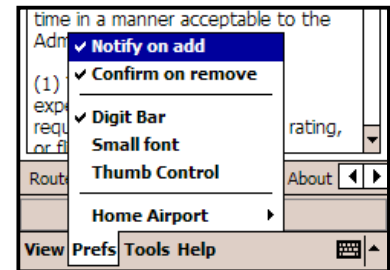
Example

Using our example scenario, but just to make things more interesting, let's assume that our previous calculated temperature was a more frigid -32.3°C instead of the balmy 32.3°C. Using the wind speed and the -32.3°C temperature, the Wind Chill is calculated to be -47.6°C and frostbite is predicted to occur in less than 10 minutes. We would suggest that the necessary precautions should be taken.
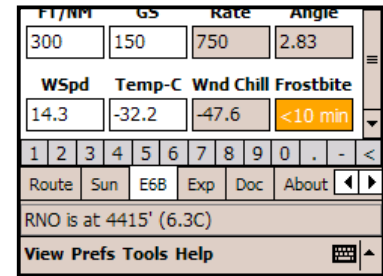
Thumb Control

Thumb Control allows a pilot to continue to use WingX while in flight in turbulence or while wearing gloves - perfect for General Aviation and Military pilots alike. To enable Thumb Control, tap on the "Prefs" menu option, then select "Thumb Control". If the option is checked, it means that Thumb Control is enabled. Once enabled, anytime an editable text box on the E6B page is selected (i.e. you tap on the text box), a dialog box with large buttons will appear allowing values to be entered while in turbulence or while flying with gloves.

The Thumb Control dialog box is show on the right. Its prominent heading shows the data to be entered. In the example on the right, the user is requested to enter a temperature in Fahrenheit. The entered value appears, and is updated as buttons are pressed, below the heading. At this point in the example, the user has entered "90". Pressing the "OK" button would confirm this value and automatically enter it into the appropriate text box.

The Thumb Control Dialog consists of digits as well as a +/- button, decimal point button, and a backspace button. The digit buttons simply add a digit to the number shown. The decimal point button is enabled only if the number does not already contain a decimal point. The backspace button is only enabled when there are digits to delete.
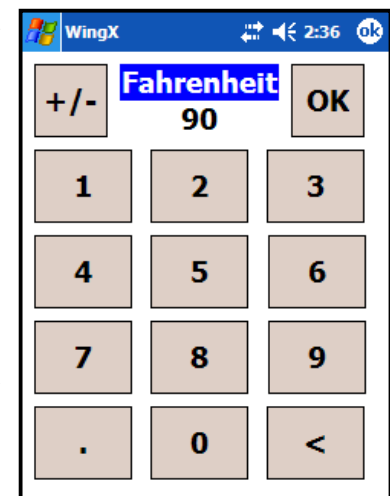
Pilot Expirations

WingX provides a unique feature called Pilot Expirations to allow pilots to store their many expiration dates in one convenient and portable place. Keep your expiration dates sorted in chronological order right on your Pocket PC, right in your flight bag.

WingX maintains a list of commonly-used expiration dates allowing a pilot to quickly check their currency for any particular aspect of flying including single-engine land, multi-engine land, BFR, IFR etc. In addition, there are several other categories that are also very useful such as navigation medicals, insurance, and aircraft expirations. The complete list of WingX supported expirations is given below.

Auto Increment

A key feature of WingX's expiration page is that it is often difficult, or at least time consuming, to calculate 90-day expirations, and sometimes it is difficult to remember if the expiration is 90 days, 6 months, 1 year, or 12 calendar months out. WingX will automatically adjust certain dates according to the appropriate FAR; for example, if you were to select November 26, 2004 as the date you did your 3 take-offs and landings in a tail-wheel aircraft, WingX would automatically use February 24, 2005 as the expiration date; i.e. WingX automatically added 90 days to November 26, 2004.

Expiration Dates

The extensive list of expiration dates is shown below as well as a reference to the relevant FAR:

Currency		
ASEL (day)	90 days	14 CFR FAR 61.57
ASEL (night)	90 days	14 CFR FAR 61.57
AMEL (day)	90 days	14 CFR FAR 61.57
AMEL (night)	90 days	14 CFR FAR 61.57
Tailwheel	90 days	14 CFR FAR 61.57
Biennial Flight Review (BFR)	24 calendar months	14 CFR FAR 61.56
Instrument Flight Rules (IFR)	6 calendar months	14 CFR FAR 61.57
CFI Renewal	24 calendar months	14 CFR FAR 61.197
Navigation		
Approach Charts	N/A	N/A
Sectional	N/A	N/A
Terminal Area Chart (TAC)	N/A	N/A
Wide Area Chart (WAC)	N/A	N/A
Airport/Facility Directory (A/FD)	N/A	N/A
Medical		
1st Class	6 calendar months	14 CFR FAR 61.23
2nd Class	12 calendar months	14 CFR FAR 61.23
3rd Class	36 calendar months	14 CFR FAR 61.23
3rd Class (over 40 years)	24 calendar months	14 CFR FAR 61.23
Insurance	N/A	N/A
Owners Insurance	N/A	N/A
Renters Insurance	N/A	N/A
Aircraft		
Annual	12 calendar months	14 CFR FAR 91.409
VOR (IFR)	30 days	14 CFR FAR 91.171
Altimeter/Static	24 calendar months	14 CFR FAR 91.411
Transponder	24 calendar months	14 CFR FAR 91.413
Emergency Locator Transmitter (ELT)	24 calendar months	14 CFR FAR 91.207
GPS Database	N/A	N/A

Expiration Item Components

Each expiration item is contained on a single line and consists of several components:

Component	Description
Checkbox	Check this checkbox to enable the expiration item and to have the item appear when Sort by Expiration is selected.
Text	A self-explanatory description of the expiration item.
Asterisk	If an asterisk appears after the text (e.g. "Tailwheel*"), WingX will auto-increment the selected date.
Date	If an asterisk appears in the text, the date should be selected as the date when currency was achieved. If no asterisk appears in the text, the actual expiration date should be selected.
Days To Go	This number is the number of days, weeks, or months to go before the item expires. For example, "4", "4w" and "4m" mean four days, four weeks, or four months until expiration respectively. A negative number means that the currency for that item has elapsed.

> **The "Days To Go" are continually updated and will always be relative to "today".**

Changing the Display Order

The expiration items can be shown in one of two ways by tapping the "Show by Category" or "Sort by Expiration" buttons:

- **Show by Category**

    o Groups expiration items into categories with headings such as "Currency" and "Navigation".

    o Shows all items (both checked and unchecked).

- **Sort by Expiration**

    o Sorts the expiration items according to their expiration date. This will remove the headings as well as non-selected items from the display list.

    o Only displays checked items.

Example

Let's assume that two hours after sunset on May 9th we flew a single-engine aircraft around the pattern for an hour making three full-stop landings. To record this, we check the "ASEL (night)" item, pull down its calendar and select May 9th. WingX automatically calculates that the expiration date for that flight would be August 7th and sets the date accordingly. In fact, since achieving night currency also achieves day currency, WingX automatically updated the "ASEL (day)" date similarly.

Also, on May 21st, we flew a multi-engine Duchess on a long cross-country landing at several airports; WingX calculates an expiration date of August 19th. In addition, a few months ago on January 4th, we got to fly the Citabria a little and achieved tailwheel currency. Finally, we successfully completed our BFR on May 21st with the calculated expiration to be 24 calendar months out on May 31st. We had our medical in early May and we paid up our Renter's Insurance that is now due to expire on May 8th, 2006.

> **Items marked with an asterisk "*" will automatically increment the input date, whereas the items with an asterisk will not.**

Using the dates provided above, our Expirations page would look something like the following two left-most images. To present the data in a more meaningful way (chronologically), tap on the "Show by Expiration" button. The right-most image shows the result.

Document Page

WingX uses its own proprietary algorithms to store a tremendous amount text and to make it quickly accessible. The FARs, the AIM, CFI endorsements, FSS phone numbers, and many other documents are quickly displayed with just a few taps.

WingX includes the most GA-pertinent Federal Aviation Regulations (FAR) parts, as well as sections of the Aeronautical Information Manual (AIM). For Certificated Flight Instructors (CFI), there is Advisory Circular 61-65D that contains endorsements for pilot training. The Pilot/Controller Glossary, NWS Contractions, FSS Phone Numbers and more are quickly accessible on this page. The documents available on WingX include:

- FAR Part 1 -- Definitions And Abbreviations
- FAR Part 43 -- Maintenance, Preventive Maintenance, Rebuilding, And Alteration
- FAR Part 61 -- Certification: Pilots, Flight Instructors, And Ground Instructors
- FAR Part 91 -- General Operating And Flight Rules
- FAR Part 119 -- Certification: Air Carriers And Commercial Operators
- FAR Part 141 -- Pilot Schools
- FAR Part 830 -- Notification And Reporting Of Aircraft Accidents Or Incidents And Overdue Aircraft, And Preservation Of Aircraft Wreckage, Mail, Cargo, And Records
- AIM Preflight Briefing
- AIM Flight Plan Form
- AIM Aircraft Equipment Suffixes
- AIM PIREP Element Code Chart
- AIM Light Gun Signals
- Pilot/Controller Glossary
- AC61-65D -- Certification: Pilots and Flight and Ground Instructors
- NWS Contractions
- FSS Phone Numbers

Note that Hilton Software regularly adds to this list and since a new Document Database can be uploaded to your WingX with just a few taps, you may have some additional documents on your Pocket PC

Selecting a Document and a Subpart

Displaying any piece of text is a two-step process. The first step is to select the document in which the text is contained, and then to narrow down the selection by selecting one of its subparts. Some PDA applications only allow the user to select the document (and not its subparts) thereby requiring the user to page through the document to find the relevant part. WingX makes all the sub-parts instantly available for selection and viewing. We shall see how simple WingX makes the viewing of any specific FAR.

> **Select the appropriate document using the upper selection box and then using the lower selection box, select the appropriate subpart of that document to view.**

Example

Let's assume we're looking for "the required Aeronautical Experience required for the Private Pilot Practical Test". To access and display this specific text, tap on the upper selection box to locate the appropriate FAR part. Since we know our request has to do with the certificates of pilots, we select "Part 61 - Certification: Pilots, Flight Instructors, And Ground Instructors". Once "Part 61" has been selected, the lower selection box is populated with Part 61's subparts. Note that the lower selection box also contains headers. Using the scroll bar on the right of the lower selection box, scroll down to "61.109 Aeronautical experience" that is listed under "Subpart E – Private Pilots". Part 61.109 will then be displayed in the display window.
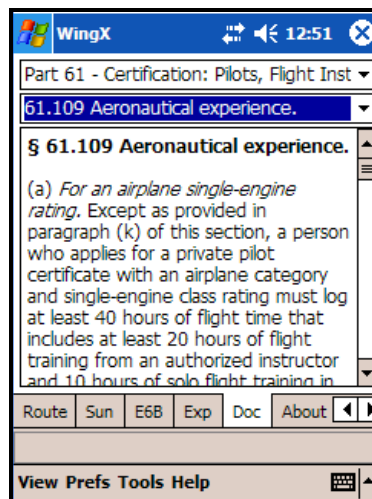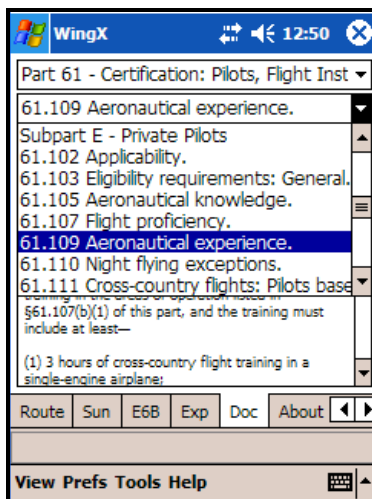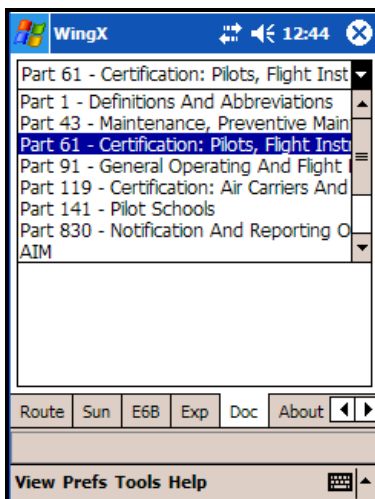
Text Size

Depending on your requirements, and your device type and screen size, it may be preferable to display the documents using a smaller font. A smaller font allows more text to appear on the screen simultaneously thereby providing the user with more information at any one time and minimizes scrolling. WingX allows the user to select an option called "Small font" from the "Prefs" menu option. If the option is checked, the document will be shown using a smaller font. To change its setting from checked to unchecked or vice versa, simply tap on "Small Font". The document text will change immediately. Note that since the "Small font" setting is global to all of WingX, text in list boxes (such as on the Aircraft Page) will also appear smaller.
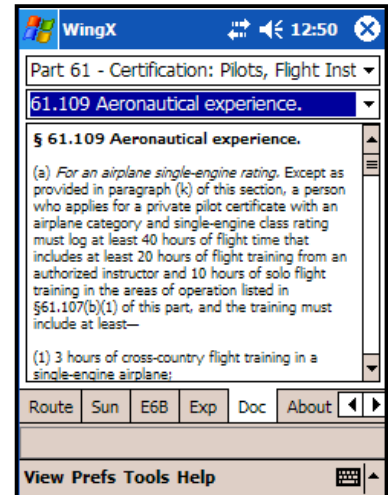
About Page

The About page displays product and company information as well as pertinent version numbers. When submitting a new feature request or a possible bug, please include each of the version numbers shown below. This will expedite the handling of the request.

T he About page displays version numbers and this information is very valuable to us when you submit bugs or feature requests. By knowing what version of WingX you are running, as well as the Operating System and Compact Framework versions, we will be better equipped to reproduce your environment and expedite the request. We encourage you to include these numbers in emails you send to us at support@hiltonsoftware.com.

Version Numbers

WingX's About Page displays various version numbers that will potentially help Hilton Software debug a reported problem. When submitting a potential software bug, please include all of the version numbers listed on the About Page.

Version

This number is the WingX version. We suggest that you upgrade to the latest WingX version when a newer version is published on our website. Please refer to our download page:

http://www.hiltonsoftware.com/Download.html

OS Version

This number is the Pocket PC Operating System version. Therefore, the Pocket PC 2002, Mobile 2003, and Mobile 2003 Second Edition will all have different version numbers. WingX is tested on all of these systems.

CLR Version

This version number is the Microsoft Compact Framework version, also known as the Common Language Runtime (CLR). If you are having problems with WingX, we would suggest upgrading to Microsoft's latest Compact Framework.

We develop and test WingX on early versions of the CLR (as well as later versions) and sometimes add code to workaround some Microsoft bugs. Therefore, we generally do not expect the CLR Version to cause problems.

The following Compact Framework version numbers are known at the time this WingX version was released:

Compact Framework	Version
CF 1.0 RTM	1.0.2268.0
CF 1.0 SP1	1.0.3111.0
CF 1.0 SP2 Recall	1.0.3226.0
CF 1.0 SP2 Beta	1.0.3227.0
CF 1.0 SP2 Final	1.0.3316.0
CF 1.0 SP3 Beta	1.0.4177.0
CF 1.0 SP3	1.0.4292.0

WingX should work with any of these Compact Framework versions, but it is definitely worth noting the OS Version when submitting a bug report.

WingX Agent Desktop Application

WingX Agent Desktop Application is a .NET desktop application that simplifies the downloading of database files as well as providing housekeeping functionality.

W ingX Agent can be considered a bridge between the WingX Pocket PC and the Internet. The WingX application itself does not store aircraft model information, airport information, or document text. Rather, this information is stored in multiple databases resident on the Pocket PC and these databases can be quickly and easily downloaded off the web. Users with Pocket PCs that can connect to the Internet do not need to use WingX Agent's download capability. WingX allows users to download databases directly onto their Pocket PCs without using their PC (or WingX Agent) at all.

Types of Internet connectivity include wireless such as 802.11b, 802.11g, using the phone portion of the Pocket PC Phone Edition devices, using a direct connection to a LAN, Bluetooth, etc… Assuming that it is proving difficult to connect the Pocket PC to the Internet, WingX Agent allows you to download the relevant databases. WingX Agent also provides housekeeping tasks that may be useful when debugging a problem.

> **If a valid ActiveSync connection to the Pocket PC exists, the message "Device Present" will appear. If a valid ActiveSync connection to the Pocket PC does not exist, the message "Device Not Present" will appear.**
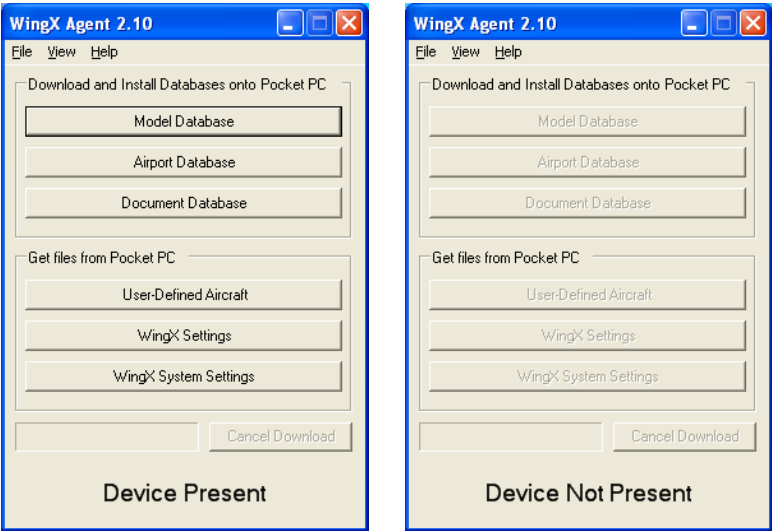
Downloading Databases

Downloading databases is an extremely important element of keeping WingX up-to-date. For example, as necessary, Hilton Software adds aircraft models to the Model Database. To obtain this new database, the Model Database will need to be downloaded via the Internet and copied to your Pocket PC. The good news is that WingX Agent is designed to do just that for you.

Download and install WingX Agent from:
http://www.hiltonsoftware.com/Download.html

Downloading a new database is as easy as performing these simple steps:

1. Cradle the Pocket PC

2. Run WingX Agent

3. Tap on "Model Database", "Airport Database", or "Document Database" as required.

4. Follow the onscreen instructions to reload the databases on the Pocket PC.
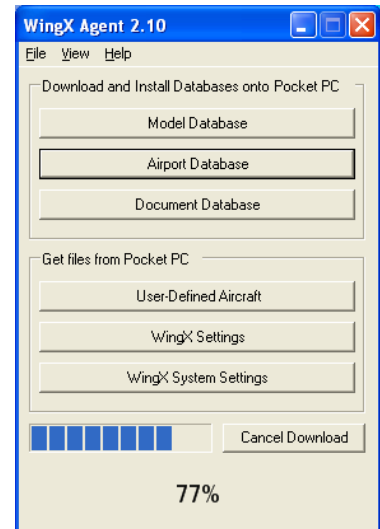
During the download process, a progress bar will be updated. For example, when 77% of the database has been downloaded off the Internet, the update status would look something like the example on the right.

Once the new database has been installed onto your Pocket PC, you will see the following dialog box. If you do not follow the instructions, the new database will not be correctly installed on your Pocket PC
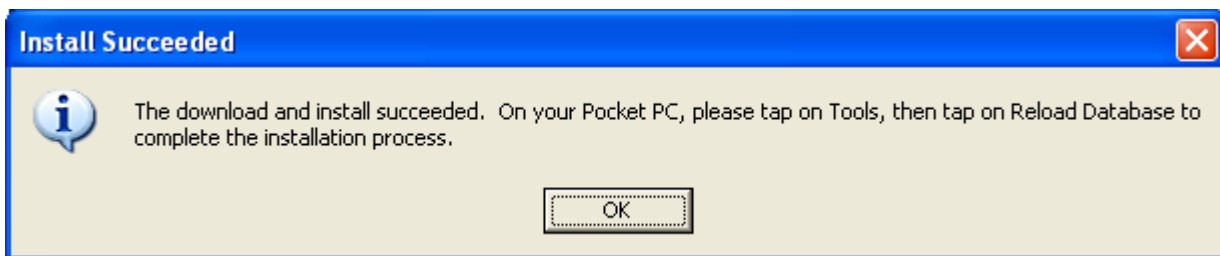
Copying Files From the Pocket PC

User-Defined Aircraft
WingX stores the aircraft entered by the user in an XML file called "AircraftDatabase.xml". You can copy this file to the desktop by first cradling your Pocket PC and then clicking on the "Use-Defined Aircraft". The AircraftDatabase.xml file will be copied from the Pocket PC to your desktop (assuming you're running WingX Agent from your desktop).

WingX Settings
WingX stores the various settings, routes, and other information in an XML file called "WingX.xml". You can copy this file to the desktop by first cradling your Pocket PC and then clicking on the "WingX Settings". The WingX.xml file will be copied from the Pocket PC to your desktop (assuming you're running WingX Agent from your desktop).

WingX System Settings
WingX stores various version numbers, your WingX ID and key in a text file called "WingX.txt". You can copy this file to the desktop by first cradling your Pocket PC and then clicking on the "WingX System Settings". The WingX.txt file will be copied from the Pocket PC to your desktop (assuming you're running WingX Agent from your desktop).

Glossary

AC	Advisory Circular		PAlt	Pressure Altitude
A/FD	Airport and Facilities Directory		MH	Magnetic Heading
AIM	Aeronautical Information Manual		MRU	Most Recently Used
ASEL	Airplane Single Engine Land		NDB	Non-Directional Beacon
AMEL	Airplane Multi-Engine Land		NM	Nautical Miles
BFR	Biennial Flight Review		OAT	Outside Air Temperature
CAS	Calibrated Airspeed		RMP	Ramp
CFI	Certificated Flight Instructor		SIP	Software Input Panel
CFR	Code Of Federal Regulations		TAC	Terminal Area Chart
DAlt	Density Altitude		TAS	True Airspeed
DFN	Dynamic Flight Navigator™		TC	True Course
ELT	Emergency Locator Transmitter		T/O	Takeoff
ETA	Estimated Time of Arrival		TH	True Heading
ETE	Estimated Time Enroute		VOR	Very High Frequency Omni Range
FAR	Federal Aviation Regulations		WAC	World Aeronautical Chart
GPS	Global Positioning System		WCA	Wind Correction Angle
GS	Ground Speed		WDir	Wind Direction
Hdg	Heading		WSpd	Wind Speed
HW	Headwind		XW	Crosswind
ICAO	International Civil Aviation Organization			
IFR	Instrument Flight Rules			
KTS	Knots			
LND	Landing			