WX

HILTON SOFTWARE LLC

WingX 2.6

User Manual - *Second Draft*
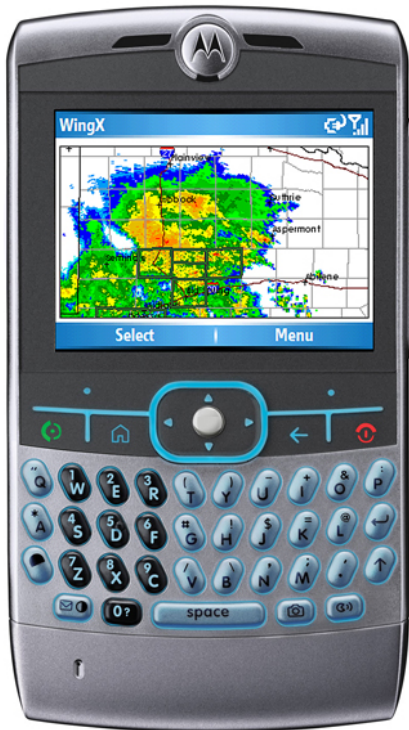
WingX User Manual
for Version 2.6

Table of Contents

WingX Introduction

WingX is a Windows Mobile aviation powerhouse – this chapter introduces some of its features and how these features can solve many flying challenges.

Wing X is a Windows Mobile application designed to run on Pocket PC, Pocket PC Phone Edition, and Smartphone devices. By using Microsoft .NET technology, Hilton Software designed WingX from the ground up to create an application that pilots can use for pre-flight, in-flight, and post-flight activities. WingX brings a powerful set of features together in a uniquely powerful handheld and portable package. No longer does it make sense to plan an entire trip at home on your desktop PC and assume that nothing will change over time. We are living in a life full of changes and as pilots, we know that weather, winds aloft, routes, passenger/baggage loads, and TFRs 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.

WingX enables pilots to obtain a legal Low Altitude, High Altitude, or Area Radius weather briefing. Using WingX's advanced presentation capabilities, weather briefings are easily readable. WingX collates NOTAMs to allow for quick and easy viewing of a specific airport's NOTAMs. WingX automatically shows TFRs as active, expired, or shows the time until the TFR becomes active. TFRs can be filtered by state.

WingX provides fast access to NACO charts including Airport Diagrams, Instrument Approach Procedures, Departure Procedures, and Takeoff Minimums. These charts can be shown in Night Vision mode which shows the charts in a way that does not affect a pilot's night adaptability. Using its GPS capability, WingX shows the aircraft on the airport diagram and WingX even goes one step further and visually and audibly warns pilots of a potential runway incursion.

As more and more devices become Internet capable, WingX continues to expand its Internet functionality. WingX can upgrade itself to the latest version, download the latest databases, get the current weather, download animated NEXRAD, file a DUATS flight plan, view real-time TFRs and much more all wirelessly anywhere you have an Internet connection. In fact, WingX's advanced internet technology includes a download resumption feature whereby a database download can be resumed if it was stopped as a result of connection problem or user input.

WingX's podcast technology is a great feature for pilots who want to keep up-to-date with the aviation and weather-related news. WingX also enables pilots to view specific information about an aircraft using its N-number.

A Look at WingX's Feature Set

Here are brief descriptions of WingX's main features. The chapters that follow delve into more detail.
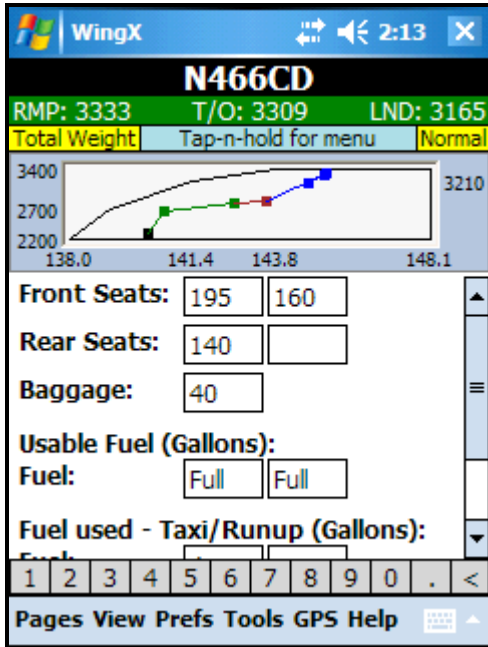
Weight and Balance

WingX currently stores hundreds of aircraft models in an aircraft model database. In addition, User-Defined Models can be entered. By associating a specific N-number with an aircraft model, WingX will '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. Any of the various envelopes can be selected; e.g. normal, utility, 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.

The graph can be removed from the screen to provide more space on height-limited devices such as those with 240x240 screen or in landscape mode. Conversely, the user can view the graphical display in full screen mode to make viewing the actual data points easier.
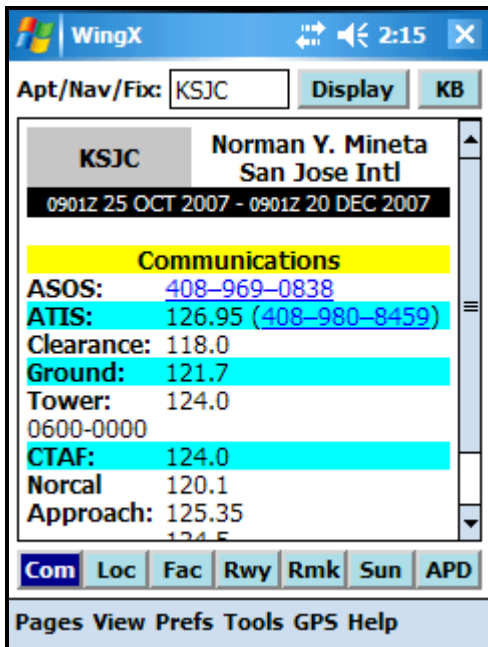
A/FD Information

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.

Phone devices will automatically dial underlined phone number including AWOS, ATIS, and any phone numbers in the Remarks section when the underlined phone number is selected.

Route Planning

WingX accurately calculates route information including leg distances, headings, wind correction angles, ETE, ETA, fuel burn, and ground speed. These calculations are based on current or manually entered winds aloft, The winds' effects are reflected in the average ground speed and difference from the no-wind conditions; e.g. +07:34 is shown if the flight would take 7 minutes and 34 seconds longer than the no-wind condition. Points along a route may include airports, navaids, fixes, intersections, user-defined waypoints, as well as arbitrary points defined by bearing and distance from an airport, navaid, fix, or intersection.

WingX can use current winds aloft information to calculate the optimum altitude for IFR or VFR flights based on their east/west direction of flight.

Routes may be saved, reverse, and renamed.

Dynamic Flight Navigator™

The Dynamic Flight Navigator™ (DFN) is a single screen that pulls together all the relevant information and shows it clearly and concisely while providing fast access to additional information. The DFN displays the relevant frequencies, Morse code, and additional useful information.

WingX uses GPS data to drive the Dynamic Flight Navigator. GPS is incredibly accurate and allows WingX to accurately calculate position, bearing and distance to the next waypoint, cross-track error, and required descent rate to the destination. WingX supports practically all GPS receivers including Bluetooth and Compact Flash GPS receivers.

To minimize 'heads down' time and finger tapping, WingX provides a single button to jump to the Airport Diagram upon landing. WingX also displays the required descent rate to the destination.
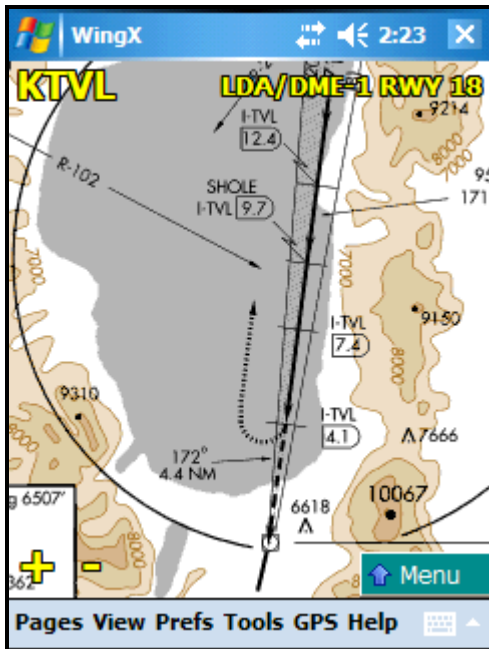
NACO Charts

Imagine having the entire set of all US Airport Diagrams, Departure Procedures, Instrument Approach Procedures, Minimums, and STARs in the palm of your hand. Now imagine being able to select a chart with just three taps of your thumb instead of paging through pages and pages in your approach binder at night.

WingX has a 'Night Vision' mode which will invert the colors to preserve your night vision; i.e the large areas of white change to black and the black text changes to white. If you'd prefer, WingX can color-tint the charts in red, green, or blue.

Don't fumble with a stylus trying to tap on a tiny scroll bar while bumping around in the clouds or even while just sitting at the FBO. Drag the chart around by sliding your finger over the screen. The chart can be reduced or enlarged by simply tapping on the "−" or "+".
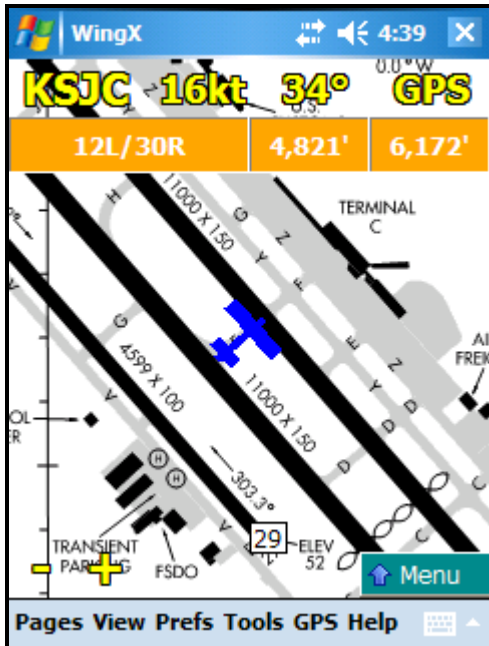
SmartTaxi™

Using our own patent-pending algorithm, WingX accurately places an aircraft icon at the exact location on the airport diagram that corresponds with the GPS coordinates of the aircraft.

WingX helps prevent runway incursions in two ways. Firstly, WingX shows the aircraft's location on the airport diagram very accurately. Secondly, when the aircraft gets close to a runway and/or on a runway, WingX will both visually and audibly warn the pilot(s). The audio output is an extremely important component because it means that the crew does not even have to pay attention to the Pocket PC's screen, but would still receive the potential runway incursion warnings.

When approaching a runway, WingX will show the length of runway remaining in both directions. When on a runway, WingX displays the length of runway remaining as well as the number of seconds that the aircraft has occupied the runway.
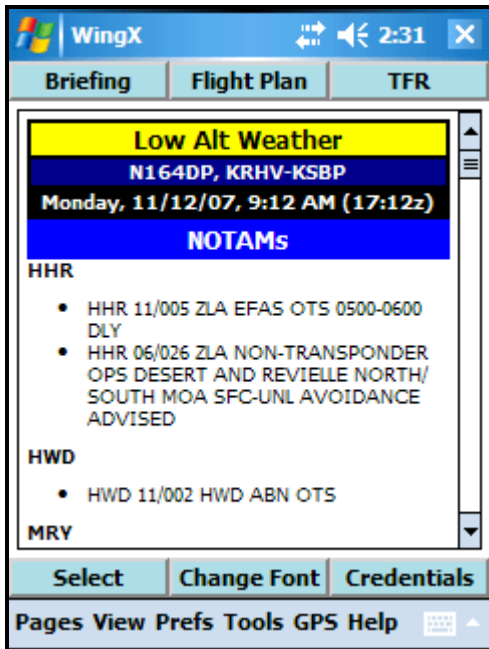
DUATS

WingX can download and display DUATS Weather Briefings and display the briefing in a very easy-to-read manner. WingX allows the briefing to be displayed at various levels. For example, the entire briefing could be displayed. Alternatively, only the NOTAMS or even a single airport's NOTAMS can be displayed.

WingX can also file, close, and cancel flight plans. The current aircraft's information and route information can be imported into the flight planning form thereby significantly reducing the amount of data required from the user.

WingX communicates directly with DUATS and therefore if WingX reports a flight plan as being filed, it will definitely have been filed. WingX cannot lose flight plans – ultimate reliability.
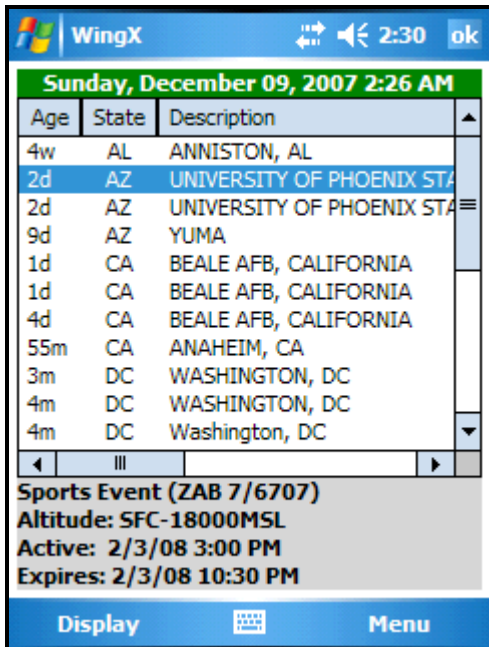
Temporary Flight Restrictions - TFRs

Temporary Flight Restrictions change continually during the day. While some TFRs can be created well in advance, many simply 'popup' during the day without warning.

Natural disasters often require a TFR over the area for search and rescue aircraft. Fires and volcano eruptions may be obvious areas to avoid while flying, but there are many other types of TFRs that occur regularly. Examples include mudslides, military activity, and presidential events.

WingX allows a pilot to quickly browse the full list of TFRs quickly and displays the type, altitude, as well as the date and time the TFR becomes active and the date and time the TFR expires. The full text of the TFR can also be viewed in its entirety.
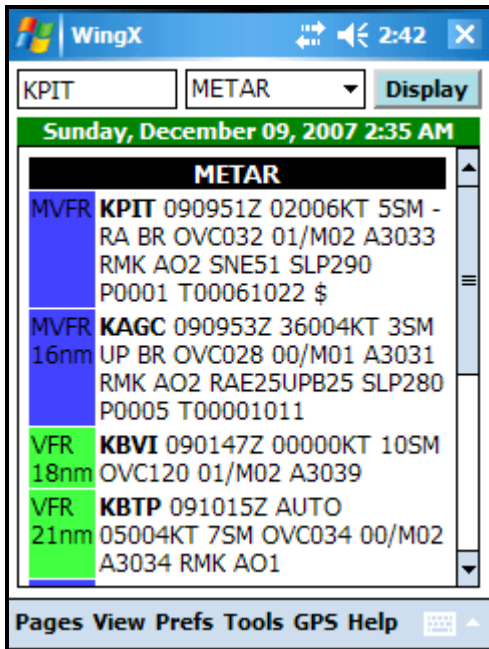
Weather Text

WingX interprets and color-codes the individual METARs. By looking at these colors, a pilot can quickly get an idea of the weather in an area or along a route.

If a route is entered, WingX will display the nearest METAR, TAF, winds-aloft, and temperature-aloft along the route. [Premier Edition only]

WingX extracts important pieces of METAR information and displays them in an easy-to-read color-coded METAR List.

WingX displays un-encoded winds and temperature aloft information of nearby winds aloft-reporting stations and automatically calculates the freezing level.

WingX also graphically displays trend information of METAR reports over the previous six hours.
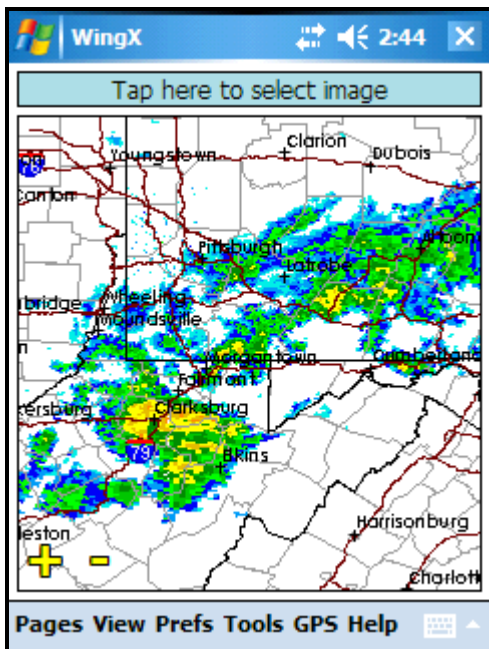
Weather Images

WingX will download and display a multitude of weather images such as the Latest Surface Analysis, Flight Conditions, RADAR Tops, RADAR Summary, Regional RADAR, AIRMETs and SIGMETs, Satellite, Current Icing Potential and many more.

Simply use your thumb to drag the image around the screen - no need to find the stylus and tap on a small scroll bar. The interface is superb and extremely slick. In addition, the weather images can be scaled also stylus-free.
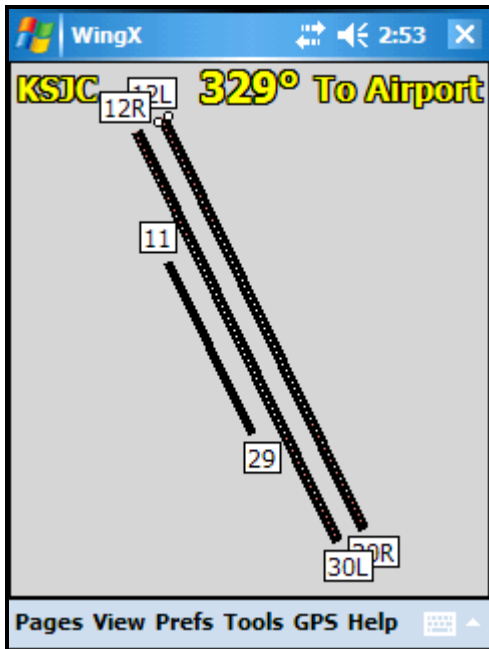
Airport Runway Layout

WingX's airport's runway layout feature shows an airport's runways, the runways' numbers, as well as centerline lighting and Runway End Identifier Lighting (REILs).

The runway layout can be set to North Up, it can be rotated by pressing the arrow keys or by simply moving your stylus or finger around the screen (on touch screen devices).

In addition, using a GPS receiver, WingX can rotate the runway layout based on Track Up or view To Airport, the latter being very useful when approaching an airport. Moreover, with a GPS receiver, WingX enables its SmartTaxi™ Runway Incursion Prevention Technology. This allows SmartTaxi™ to work at over 4,000 airports throughout the United States.
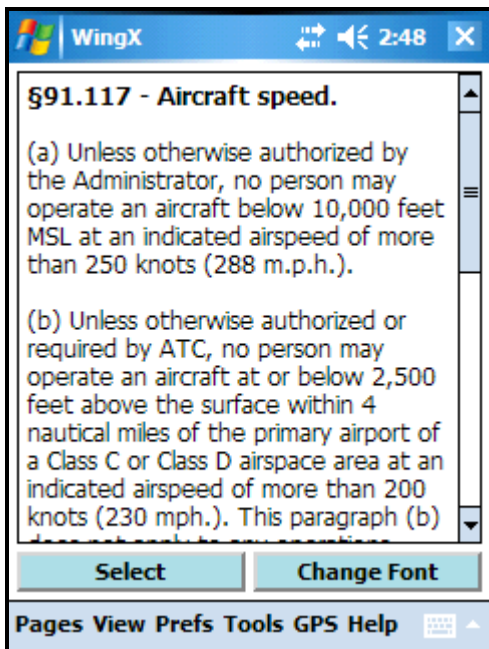
Documents and Forms

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, AC61-65E (endorsements), the NWS contractions, and the FSS phone numbers for various areas in the US. WingX stores all this information for you on your Pocket PC. Each of these documents is quickly accessible and easily viewable by using the document selection pull-down list controls.

Just like the Model Database and the Airport Database, the Document Database can be easily and quickly updated with just a few taps.

The extensive list of FARs includes: Part 1, 43, 61, 91, 119, 121, 135, 137, 141, NTSB 830, 1552, and 1562. Parts of the AIM are also included; e.g. Light Gun Signals.
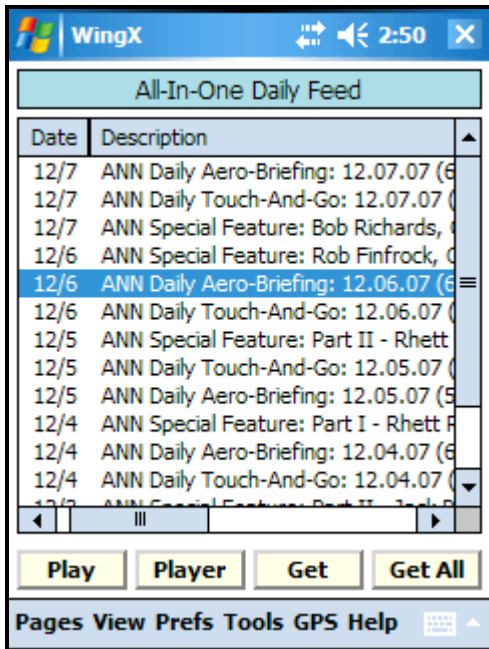
Podcasts – online and offline

Podcasts are an excellent way of getting news, current events, and other information out to pilots. Podcasts are downloadable via the Internet and WingX provides the pilot with the capability of listening to the podcasts in real-time and with storing these podcasts so that pilots can listen to them later when perhaps no Internet connection is available – great for the drive to work or the wait at the doctor's office!

Hilton Software is continually working with providers of podcasts and will continue to increase its coverage of aviation-related information as and when new podcasts sources become available.

WingX plays podcasts in the background so that you can continue to perform WingX calculations, navigation, or any other Pocket PC function.
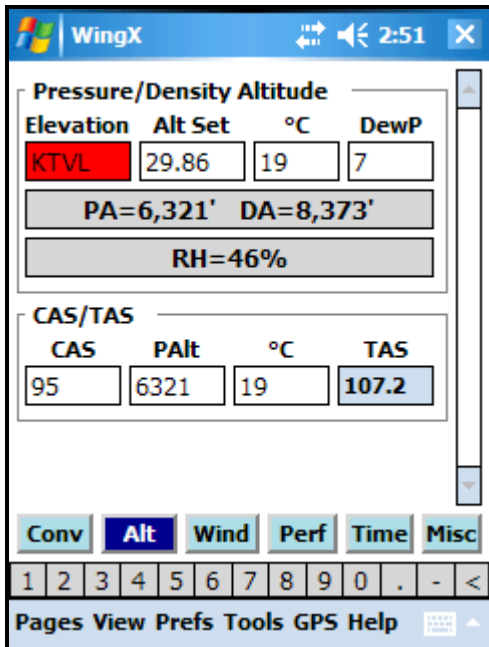
Multi-Page E6B

WingX's comprehensive multi-page E6B includes sub-pages for Conversions, Altitudes, Wind Calculations, Performance, Time, and Miscellaneous. WingX 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. Quickly and accurately determine pressure altitude, density altitude, IFR climb rates and angles, and more. Times can be added and subtracted in either HH:MM:SS or X.Y formats; e.g. "1.5 + 3:30:00" will show 5:00:00. Multi-day block time calculations are also available.

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.

WingX Installation and Registration

This chapter describes the WingX installation and registration process.

W ingX needs to be installed on the device. The installation process installs the WingX software and sample databases on the device. In addition, a shortcut link will be created in the Programs folder thereby allowing WingX to be run by selecting the WingX icon in the Programs Folder.

Windows Mobile Device Types

When Microsoft initially released mobile devices, they applied the following terminology:

- **Pocket PC** – a <u>touchscreen</u> device without mobile phone capability. An example is the iPaq.

- **Pocket PC Phone Edition** – a <u>touchscreen</u> device with mobile phone capability. Examples are the AT&T 8525, Palm 700wx, and the Verizon 6800.

- **Smartphone** – a <u>non-touchscreen</u> device with mobile phone capability. Examples are the Motorola Q, AT&T Blackjack, and T-Mobile Dash.

> Be certain to download and install:
>
> - "WingX for the Pocket PC" for touchscreen devices
>
> - "WingX for the Smartphone" for non-touchscreen devices.

Because of changing hardware, software, and to avoid confusion with the widespread use of the Smartphone name, Microsoft is moving to the following name changes although we continue to use the original naming convention.

- **Pocket PC** will be called **Windows Mobile 6 Classic**.

- **Pocket PC Phone Edition** will be called **Windows Mobile 6 Professional**.

- **Smartphone** will be called **Windows Mobile 6 Standard**.

There are three ways to install WingX on the device:

1. Over-The-Air using the device's Internet connection
2. Download the WingX install program to a desktop/laptop and install via the USB cradle
3. Install from a WingX CD

Over-The-Air Installation

Over-The-Air (OTA) installation allows WingX to be installed directly onto a device without requiring a physical connection to a desktop or laptop. OTA installation is suggested for phone devices, devices with a WiFi connection, and/or for users who may have a Mac as their primary desktop/laptop computer. To install WingX using OTA:

- Run Internet Explorer on the device
- Enter "mobile.hiltonsoftware.com" in the address bar.
- Select the appropriate download.

Downloading WingX Install Program to Desktop/Laptop

WingX is available for download directly from the Hilton Software LLC website. Using a web browser on the desktop/laptop, go to http://www.hiltonsoftware.com and click on "Download". Select the appropriate install programs.

The File Download dialog box will appear: Click on "Open" (click on "Save" if you think you may need the installation program again later). The installation process will begin.
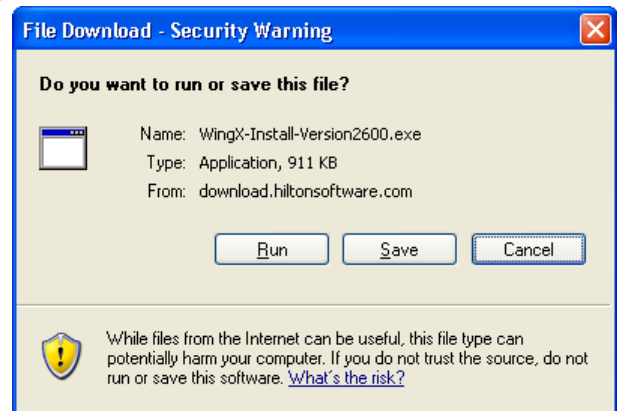
Installing using the WingX CD

The WingX CD contains the WingX installation program. Inserting the CD will start the WingX installation process. If the installation process does not start, you will need to manually run the WingX install program. This can be done by double-clicking on "My Computer", then double-clicking on the appropriate CD drive, and finally by double-clicking on WingX installation EXE. The installation process will begin.

The WingX Installation Process

Ensure that your device is connected via the USB cable and ActiveSync is running on the desktop before starting the WingX installation. Once the WingX installation begins, you will see the WingX 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 on your device.
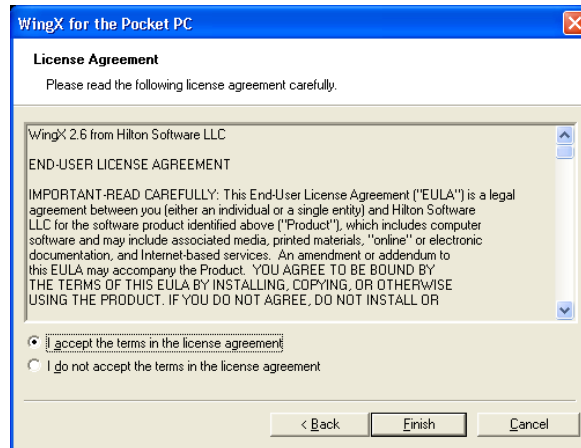
Note: If you are upgrading WingX to a newer version, you must ensure that WingX is not running on your Pocket PC. We suggest that you close WingX by tapping on the Tools, WingX, Close option on WingX's menu.

During the installation copying of files, you will see the progress dialog box that looks similar to:
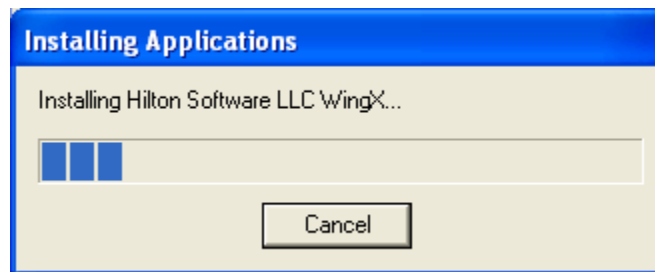
And then…
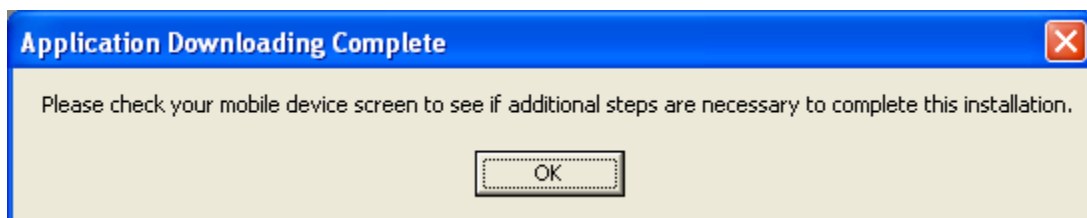
Your device may then give you the option of installing WingX in main memory or on a storage card.
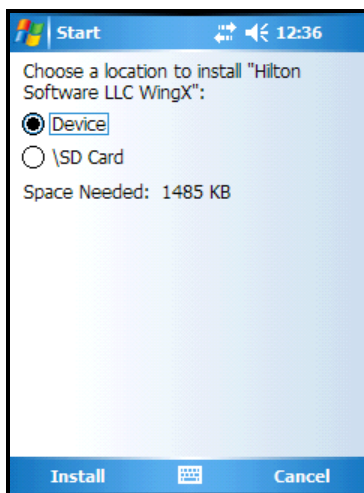
Install WingX in Main Memory, not on a Storage Card

During our extensive development and testing, we found what we believe to be a serious bug in the Microsoft design of the Pocket PC and how it interacts with storage cards. This bug can/will cause an application that is running on a storage card to crash after the Pocket PC has been turned off and then turned on some time later.

WingX Disclaimer

When WingX is started, a disclaimer screen is shown. As pilots, we are all aware that Part 91 says that the Pilot In Command is solely responsible for the flight. So while we work hard to ensure that WingX is bug-free and always works perfectly and always provides the correct information, we need to caution you that you must verify the information provided by WingX and do not base your go/no-go decision solely on information gathered from WingX.

Please read the disclaimer and this user manual carefully.
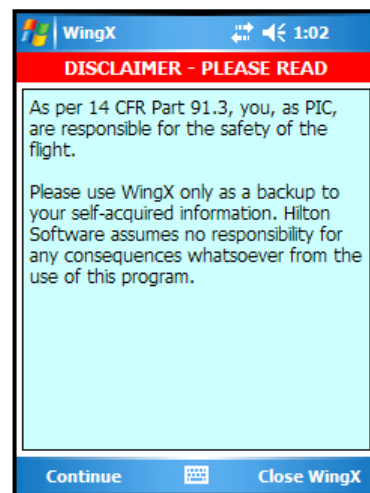
The WingX disclaimer dialog box states the following:

DISCLAIMER - PLEASE READ

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 self-acquired information. Hilton Software assumes no responsibility for any consequences whatsoever from the use of WingX.

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 "Continue" 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.

WingX Registration

WingX registration is required to 'unlock' the features of WingX. There are several methods of registration and these are described below. 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. We suggest that you keep the "Registration Key" email just in case you require it in the future.

Obtaining Your WingX ID

Registration always requires you to send us your WingX ID. 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.

> **Select Help, then Register to view this page.**

To obtain your Pocket PC's WingX ID, tap on Help, Register. The Register dialog box includes 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. You can do this via email to support@hiltonsoftware.com, or by selecting Menu, Send to Customer Support.

Entering your WingX Key

The key you receive back from Hilton Software should be entered into the text box labeled "Key:". Alternatively, if the device has an Internet connection, select Menu, Get Key and Subscription. When entering the WnigX Key manually:

- 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.

- 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 a "Pro Edition" or "Premier Edition" dialog box. This means that the registration has been successful and that all (or some - depending on the Edition) features of WingX are available to you.

> **Dashes and optional. Letters are automatically forced to uppercase.**

Registering a WingX CD

WingX is also sold in airport shops and Internet stores. With the purchase of the WingX CD, you will also receive a "Purchase Coupon" – this coupon can be found on the inside of the CD case. You may either register WingX using our Register page http://www.hiltonsoftware.com/cd 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

Quick Start

In this section, we'll discuss some of the WingX settings that should be considered as a first step after installing and registering WingX. After installing WingX, the following steps are suggested to ensure that the latest WingX software is running on your device, that the database storage location is appropriate, and that the databases are the most current and appropriate.

WingX Upgrades

Hilton Software continually upgrades the WingX software to ensure that known bugs are addressed as quickly as possible and that you have the latest WingX features. Thanks to WingX's new Automatic Software Upgrade System, upgrading WingX is easy. Ensure that the device has an Internet connection and then select Tools, WingX, Upgrade.

Database Location

WingX fully supports external storage cards such as SD Cards, CF Cards, and other storage cards for the storage of WingX databases and podcasts. Before downloading the latest databases and especially the larger chart database, we suggest choosing whether WingX should store the WingX databases in the Pocket PC's main memory or whether a storage card would be the more appropriate location. Due to the size of the chart database, the only viable option may be the storage card unless only a single state or only airport diagrams are downloaded. Storing the WingX databases on a storage card frees up space in the Pocket PC's main memory. To move the Database Location to the SD Card (for example), select Tools, Database, Location, SD Card.

Database Downloads

Once the database location has been selected, the next step is to download the most current databases. To minimize the size of the install program, WingX is installed with a database which contains on a few airports, FARs, and charts. Therefore you will need to update the WingX databases to ensure the most complete and up-to-date information. To view the current status of the databases, tap on Help, Status. If the database name shows "SD Card", then the databases are stored on a storage card. Update each database individually. If you download a database that is current, WingX will not download the database, but instead will stop and display a message stating that the database is current. The effective and expiration dates are also shown on the status and this provides a great way of verifying the currency of the information being used.
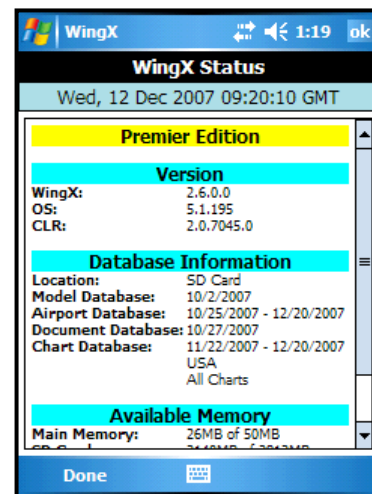
GPS Settings

WingX works well with practically all Bluetooth, hard-wired, and built-in GPS receivers. To set up a GPS receiver so that WingX can use the GPS coordinates in the Dynamic Flight Navigator™ and with SmartTaxi™, please see refer to Appendix B.

WingX 'Test Pilot' List

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 internal testing, Hilton Software maintains a list of users who wish to be notified of and test the latest Hilton Software products which may still be in its Beta cycle. These are generally 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 suggestions that we receive from our users. If you want to be part of the WingX Test Pilot List please email us at support@hiltonsoftware.com with the subject line of "Test Pilot". 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 Test Pilot List – we'd love to have you onboard!!!

WingX User Interface

WingX has been designed with a very intuitive user-interface. For example, WingX stores a list of the most-recently-used airports, navaids, fixes, airways, and waypoints for quick selection. WingX's main features are shown on the Pages screen

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, the UI design is critical to ensure a great user-experience. For pilots, UI design is even more critical since pilots can often be cramped, bouncing around in turbulence, and would prefer to eliminate the use of a stylus.

This chapter describes the basic usability issues of WingX and how the WingX UI design is used to maximize user 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 following chapters.

Menu System

WingX's menu system allows the user to perform actions such as selecting a page, setting various options, updating databases, and obtaining online help.

Pages Submenu

The mian features of WingX are divided into pages. Selecting "Pages" displays the Pages menu shown on the right. This menu is central to the navigation between pages in WingX and selecting a button will display that specific page. The pages in WingX are:

- **Aircraft Page** – Used to maintain an aircraft list and to perform Weight and Balance calculations.

- **A/FD Page** – Displays A/FD information about airports, navaids, fixes, intersections, and user-defined waypoints.

- **Route Page** – Used to plan routes
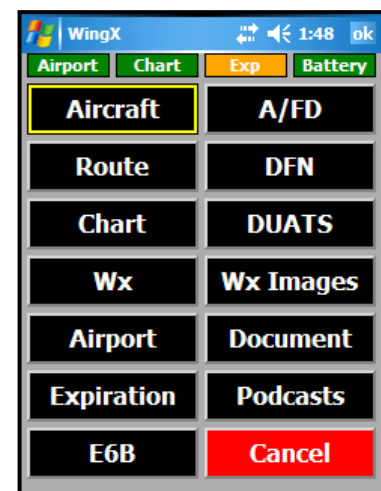
- **DFN Page** – The GPS-enabled Dynamic Flight Navigator™ walks a pilot through a route from point of origin to destination. *[Pocket PC only]*

- **Chart Page** – Displays NACO charts and invokes SmartTaxi™ for safe guidance around an airport.

- **DUATS Page** – Used obtain a weather briefing and to file, close, or cancel a flight plan.

- **Wx Page** – Used to view METARs, TAFs, Winds and Temperature Aloft, and graphical trends.

- **Wx Images Page** – Used to display animated RADAR, Satellite, Flight Conditions and many other weather-related images.

- **Airport Page** – Displays an airport's runway layout which is rotatable manually and through GPS input. SmartTaxi™ information is also shown.

- **Documents Page** – Display FARs, Advisory Circulars, AC61-65E endorsements, part of the AIM, and many other pieces of information.

- **Expiration Page** – Used to keep track of pilot expirations such as currency, BFRs, and medicals.

- **Podcasts Page** – Used to download and listen to podcasts.

- **E6B Page** – Used to perform advanced multi-page E6B calculations.

View Submenu

The View submenu is used to change the screen orientation between portrait and landscape. Some pages are best viewed in landscape whereas some users may find other pages better suited to viewing in portrait. For example, pages that display data in a wide format will be better suited to landscape mode. Examples are: Route Planning, and METAR List whereas pages such as Weight and Balance and Documents may be preferred to show in portrait mode.
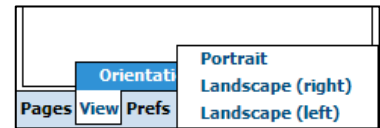
Prefs Submenu

The Prefs submenu is central to the setting of WingX's preferences. These preferences include the displaying of confirmation dialog boxes, display settings, defining which columns are shown in list boxes, defining the user's home airport and many other WingX settings.
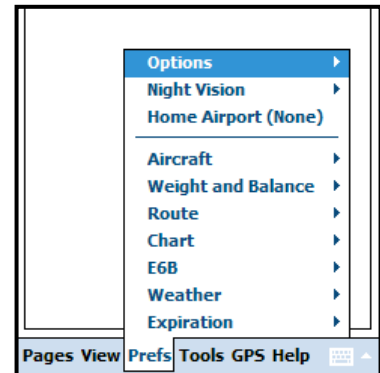
Tapping on Prefs will display a submenu consisting of the following items:

- **Options:** The options are:
    - o **Notify on add:** If checked, notifies the user when adding.
    - o **Confirm on remove:** If checked, prompts the user to confirm when removing
    - o **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.
    - o **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.
    - o **Default to Home Airport:** By selecting this option, WingX will use the identifier of the Home Airport (if one is defined) when no identifier has been specified.
    - o **Sound On:** To provide acknowledgement of a key press, WingX will emit a screen tap sound each time the screen is tapped.
    - o **Voice On:** During taxi operations, WingX is designed to provide audible warnings when the aircraft is approaching a runway and when the aircraft is on a runway. By feeding this audio into the intercom, a pilot can keep their eyes outside the aircraft and not be focused on the device's screen. This adds significantly to the safety of taxi operations.
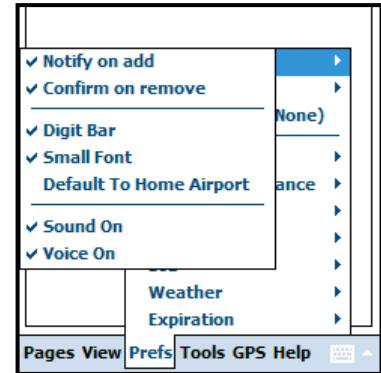
- **Night Vision:** When viewing charts and the Dynamic Flight Navigator during flight, night adaptation is very important to the safety of the flight. WingX provides a means of reducing the screen brightness of the pages that are used during flight.

- **Home Airport:** The home airport will always appear in most-recently-used airport popup lists.

- **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.

- **Weight and Balance:** The options are:
    - o **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, or out of, their limits.
    - o **Show Moment:** Some POHs show the weight and balance graphics with reference to moment instead of weight.
    - o **Show Graphics:** A user may wish to increase the usable screen area for data input by hiding the envelope graphics. This option is particularly useful for users with square screens such as the 240x240 devices. The summary information and error messages will continue to be shown.
    - o **Show Summary CG Range:** When viewing the Summary Table of the Weight and Balance calculations, WingX displays the allowable CG range at the various phases of the flight.

- **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.

- **Chart:** The options are:
  - **Show High Alert Areas:** Some airports have define High Alert Areas which are defined by the FAA as areas where runway incursion may occur or those areas that are confusing".
  - **Show Runway Warnings:** The SmartTaxi™ warnings are important while taxiing. However, WingX does provide the option of disabling the warning system using this option.
  - **Auto Nearest:** Causes WingX to always display the closest airport with an Airport Diagram and automatically show its Airport Diagram. By using this option, the pilot is assured that whenever the aircraft lands, that airport's Airport Diagram will be displayed (assuming that the airport has a NACO Airport Diagram).

- **E6B:** The option is:
  - **Use GPS:** By selecting this option, WingX automatically updates the E6B fields where appropriate based on GPS data (if a GPS is present). This allows the E6B to display real-time information based on the aircraft's performance.

- **Weather:** The options are:
  - **Celsius:** WingX can display temperatures in either Fahrenheit or Celsius.
  - **Quick Look:** Quick Look modifies METARs so that they are easier to read without displaying the entire English translation which would be quite verbose on the smaller-sized device screen. Quick Look will make the following changes to the METAR text:
    - Dates and Time will be shown in local times, not Zulu.
    - Altitudes are shown in feet; e.g. OVC060 would be shown as OVC6000'.
    - The RMK section is not displayed.
  - **Animation Speed:** Animation speeds for weather images are Slow, Medium, or Fast.
  - **Auto Download:** When the weather information is more than 15 minutes old, instead of prompting the user to download the latest weather setting this option will cause WingX to automatically download the weather information without prompting.
  - **Trend Information:** When WingX downloads weather information, current METARs and TAFs for the entire US as well as the previous 6 hours worth of METARs and TAFs are downloaded. This additional data allows WingX to display graphical trend information. If the user wishes to reduce the weather download time and/or bandwidth, this option can be unchecked. This will result in the download time being reduced significantly and graphical trend information will no longer be available.

- **Expiration:** The option is:
  - o **Show Dates:** WingX will either show the date of expiration of the number of days, weeks or months to go until expiration.

Tools Submenu

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

- **Aircraft Model Manager:** Create, delete, and modify User-Defined Aircraft models. For more information, see chapter titled "WingX Tools".

- **Waypoint Manager:** Create, delete, and modify User-Defined Waypoints. These waypoints can be based on GPS input, latitude and longitude coordinates, or distance and bearing from another point. For more information, see chapter titled "WingX Tools".

- **Airport Search:** Airports can be searched based on criteria such as airport name (or part thereof), city, or distance from a specific airport. This latter criteria is a very useful tool when planning Part 61-complient cross countries. The search can be restricted to a particular state.

- **N-Number Search:** Provides information based on an aircraft's N-Number.

- **Dial:** Windows Mobile Smartphones surprisingly are not able to dial alpha-numeric phone numbers such as 1-866-42-WINGX. This WingX module adds that capability. In addition, fast-dial phone numbers are provided for Flight Service Stations (FSS) and the Aircraft Owners and Pilots Association (AOPA) including the 1-866-GA-SECURE phone number which aids in the security of our airports.

- **Test Sound:** WingX's SmartTaxi™ uses voice prompts to alert the pilot to possible runway incursions. This option allows the pilot to test the audible output and to verify that the audio can be heard through the aircraft's audio system.

- **Database:** Database operations include:
  - o **Download:** The databases can be downloaded wirelessly to the device or device's storage card.
  - o **Location:** The user has the option of storing the WingX databases in the device's Main Memory or on a card. Using a card to store the database frees main memory and allows the larger Chart Database to be stored on the device.
  - o **Load New Databases:** This option is used in connection with WingX Agent. WingX Agent is a desktop utility that will download databases from the Hilton Software website and automatically upload these databases to your Pocket PC. Once the download/upload process is complete, WingX Agent will prompt the user to load the new database(s) - use this menu option.
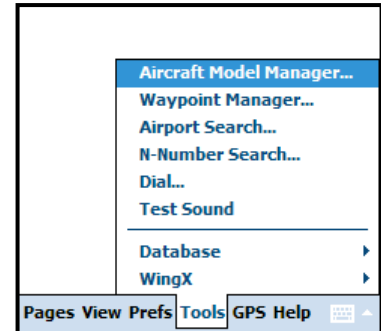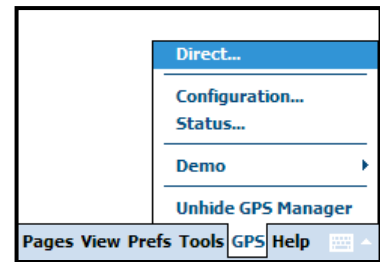
- **WingX:**
  - o **Close WingX:** WingX can be closed if required. Your aircraft list and your settings will be saved – these will be restored the next time WingX is started. Note: On Windows Mobile Pocket PCs, tapping on the "X" in the top-right minimizes applications, it does not close them.
  - o **Upgrade:** WingX's Software Update System will upgrade WingX when new releases become available. The upgrade can be done wirelessly or while connected to a desktop.
  - o **Change CF:** WingX uses the Compact Framework (CF) from Microsoft to allow it to run on practically all Windows Mobile Pocket PC, Pocket PC Phone Editions, and Smartphone. The Compact Framework is occasionally updated by Microsoft and is made available through their web site at http://www.microsoft.com. While WingX is engineered to run on CF 1.0, its performance is better when run on CF 2.0 (or later). For example, WingX's startup is reduced when moving from CF 1.0 to CF 2.0. After downloading and installing the latest Compacrt Framework from Microsoft, use this option for WingX to start using the new Compact Framework.
  - o **Repair Programs:** This option should only be used when suggested by Customer Support.
  - o **Debug Info:** If WingX shuts down unexpectedly, use this option to send debug information to Customer Support so that we can investigate and fix the problem expeditiously.

GPS Submenu

WingX is GPS-enabled. GPS information is used by WingX's SmartTaxi™ Technology, Dynamic Flight Navigator™ module, and the E6B. The GPS options are:

- **Direct:** Begin navigation to a specified point using the Dynamic Flight Navigator™.

- **Configuration:** GPS data is acquired via the Serial Port Profile (SPP). The configuration page allows the GPS to be enabled and the COM Port and Baud Rate set.

- **Status:** Show GPS status including latitude, longitude, satellite reception, and accurate GPS-based time.

- **Demo:** The options are:[1]

  - o **Taxi, Runup, Takeoff (KRHV):** Show the KRHV SmartTaxi™ demo.
  - o **Landing, Taxi, Takeoff (KSJC):** Show the KSJC SmartTaxi™ demo.
  - o **Speed:** Show the GPS demos at 1x, 2x, 4x, and 8x speed.
  - o **Stop:** Stop the GPS demo.

- **Unhide GPS Manager:** Some devices have their GPS Manager hidden. This option 'unhides' the GPS icon and makes it visible so that it can be used. *[Pocket PC only]*

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[1] GPS demos may be added or removed at any time by Hilton Software LLC.

Help Submenu

The Help submenu is used to read online help, view WingX's status, or for registration purposes. The Integrated Help System is essentially a summary of this user manual and provides concise and very useful instructions.

Selecting Help will display a submenu consisting of the following items:

- **Help for this page:** Displays help for the current page. Each page contains a "Quick Tips" section.

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

- **How to update databases:** Displays help on updating 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. We strongly encourage all users 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 will always have a very long 'to do' list, we are continually evaluating features for future upgrades. Please email you feedback to us at support@hiltonsoftware.com

- **Status:** Displays version information, database information, available memory, and the network IP address.

- **Register:** This option is used to register the WingX and to view subscription information. For more information, please see Help, How to register WingX.

- **About:** Shows WingX version information and copyright warning.
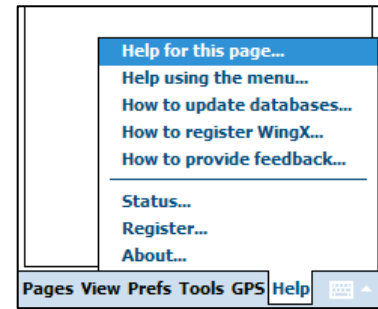
Popup Menus

Almost every text box that appears in WingX has an associated popup menu. Tap-and-hold the stylus on the text box to display that text box's popup menu. A popup menu with various options will appear. Popup menus are for quick data entry or if you're not sure exactly what to enter on a text box. The popup menu is also very useful on Pocket PCs since many Pocket PCs do not have physical keyboards.

[Pocket PC only]
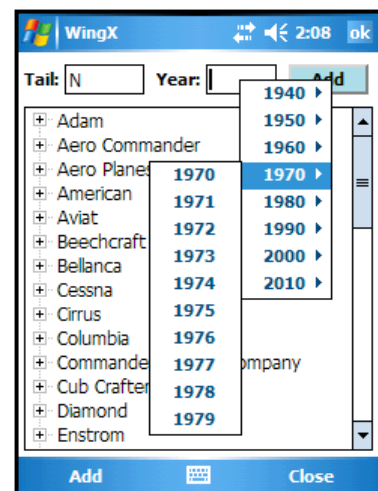
Numeric Text Boxes

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 weights in 10 pound increments. The menu will even display "Full" for all aircraft, and "Tabs" for aircraft such as the Piper Archer that has tabs in the fuel tanks.

Most Recently Used Points

Text boxes that expect identifiers have a popup menu that conveniently allows the user to select an identifier from a 'most recently used' list. The Home Airport will always appear in the most recently used airport list. The list is sorted alphabetically by 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 "…".

The popup menu shows the most-recently-used airports, navaids, fixes, intersections, and waypoints. In addition, there is also an option to search for an airport.
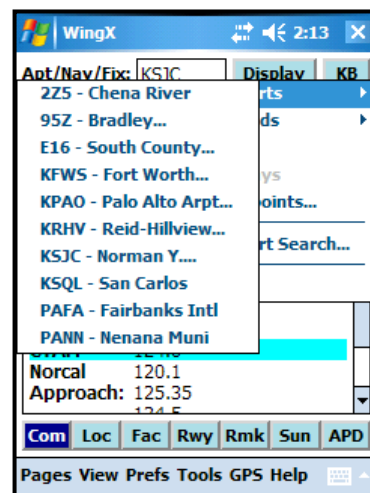
Airport Search Menu Option

See chapter "WingX Tools".

Digit Bar

On touch screen devices, 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.
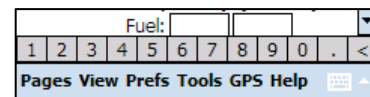
To make the Digit Bar appear, tap on Prefs, Options, Digit Bar. To make the Digit Bar disappear, repeat the process.

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 for other applications. 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. Microsoft unfortunately chose to use the "X" button on the Pocket PC to minimize the application.

Note: WingX adheres to the Microsoft specification and minimizes itself when the "X" button is tapped.
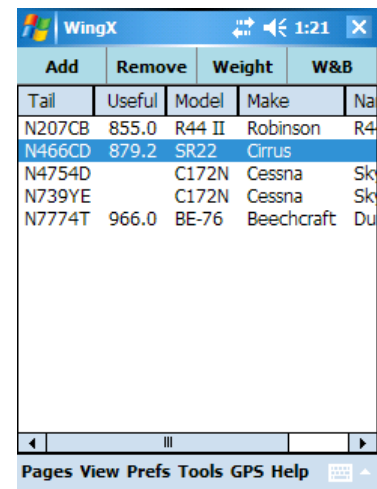
[Pocket PC only]

Aircraft Page

WingX has a database of aircraft models that makes Weight and Balance calculations a snap. Aircraft information is entered once, stored, and easily selected on the Aircraft Page with a single tap. WingX also enables users to define their own aircraft's weight and balance information.

W ingX 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 chapter explains how to build a list of aircraft that you fly. This list of aircraft will be used when you perform Weight and Balance calculations as described in the following chapter.

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 second step is to enter these values. Once you have entered this information, WingX has enough information to perform complex weight and balance calculations.

WingX			⇄ ◀€ 1:21	✕
Add	**Remove**	**Weight**	**W&B**	

Tail	Useful	Model	Make	Na
N207CB	855.0	R44 II	Robinson	R4
N466CD	879.2	SR22	Cirrus	
N4754D		C172N	Cessna	Sk
N739YE		C172N	Cessna	Sk
N7774T	966.0	BE-76	Beechcraft	Du

Pages View Prefs Tools GPS Help

Adding a new Aircraft

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

- **Tail:** Enter the N-number. WingX will convert all letters to uppercase.

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

- **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 ⊞.

Aircraft Models can also be user-defined. For more information, please see chapter "WingX Tools".

Example: Once the manufacturer's node has been expanded, select one of the Cessna models that appear directly below Cessna. For example, to add N739YE that is a 1978 Cessna 172N:

- Enter "N739YE" in the N-number text box.

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

- To select a year, enter "1978" in the year text box, or simply tap-n-hold in the year text box to get a list of possible years. To choose 1978, first tap on 1970 – this will show all the years from 1970 to 1979. Then tap on 1979.
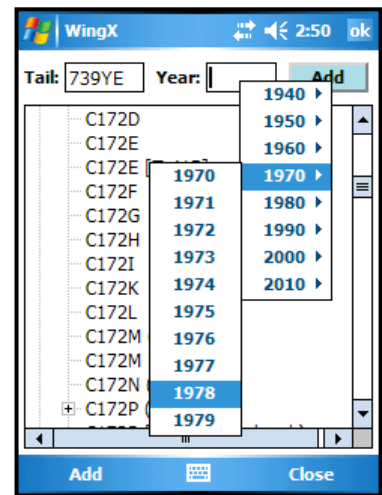
Select the Add soft-key. A dialog box will be displayed notifying you of the successful addition of the aircraft to the list. This notification dialog box may be turned off – see the Prefs, Options menu option and its "Notify on add" submenu option. If an aircraft with the same N-number already exists, an error message will be displayed.
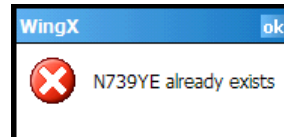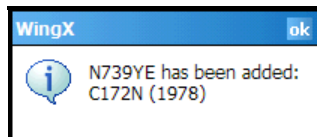
WingX knows (at least) the following aircraft model information:

- 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

Selecting an N-number

To select a specific aircraft, tap anywhere on that aircraft's row in the table. WingX will use the selected aircraft to remove, enter the weight and moment, and on the Weight and Balance page.

Removing an N-number

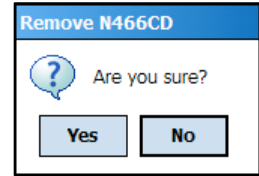To remove an aircraft, first select it by highlighting its row, then tap on the Remove button. A confirmation dialog box is displayed. This warning is displayed by default. This confirmation dialog box may be turned off – see the Prefs, Options menu option and its "Confirm on remove" submenu option.

Aircraft Weight and Moment

In addition to the pre-defined or user-defined model information, 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 Weight button. Enter the aircraft's empty weight in pounds and the aircraft's longitudinal empty moment in pound.inches - do not enter this value divided by 1000. While entering these numbers, WingX automatically calculates the CG value and displays it. In our example on the right, WingX has calculated the CG to be 38.80 and is displaying that value on the Longitudinal Moment line.
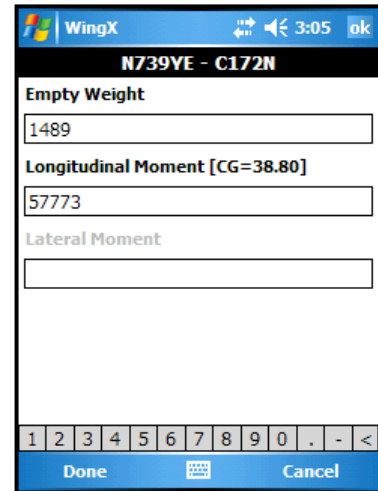
Helicopter pilots must enter the lateral moment to enable the lateral envelope CG and envelope calculations. Enter the aircraft's longitudinal empty moment in pound.inches - do not enter this value divided by 1000.

> **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, but not 123.456. WingX catches potential mistakes and shows this warning message.

Once the Empty Weight and the Empty Moment have been entered, select "Done". WingX now displays a Useful Load value for the aircraft. The Useful Load is calculated as the Maximum Ramp Weight minus the Empty Weight. If the aircraft has no specific Maximum Ramp weight, WingX uses Maximum Takeoff Weight as the Maximum Ramp Weight.
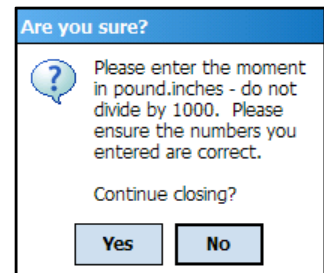
Sorting the Aircraft Data

WingX allows the aircraft data to be sorted according to the N-number, the useful load, or the make or model by tapping on the appropriate column header. It is particularly useful to sort by the Useful Load when weight is an issue for a flight. 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". The screen shot shows the aircraft sorted by useful load.

Popup Menu

The aircraft list view also provides a popup menu that will provide options to Add, Remove, and change its Empty Weight and Empty Moment. 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 speeds up this process.

Tapping on "Modify..." causes a dialog box similar to "Add Aircraft" dialog box shown earlier. However, the N-number will not be editable - everything else works the same as the Add dialox box.
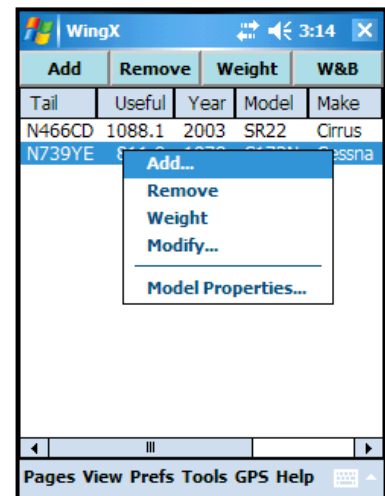
Model Properties

WingX displays pertinent information about an aircraft model to allow a user to verify that the information being used in the critical weight and balance calculations are indeed correct. WingX shows:

- Weight limitations

- Envelope Information

- Seats, Fuel, and Baggage information

- Unusable Fuel

- Fuel Markings; for example Full and Tabs
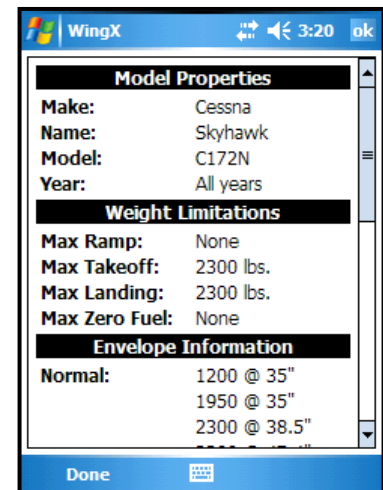
Weight and Balance Page

Weight and Balance calculations are a critical go/no-go part of the pre-flight preparation. WingX's aircraft model database, 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 this pre-flight process. WingX's Model Database stores hundreds of aircrafts' arms, fuel capacities, maximum weights, and other information. If using a pre-defined Aircraft Model, WingX does not require the pilot to enter the W&B information. 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. WingX will warn the pilot if known limits are exceeded.

Using 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 are correct and that your aircraft will remain within its Weight and Balance envelope and will not exceed 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

Just below the N-Number, the top-most line on the page is the Status Section and is shown in green to indicate a valid weight and balance 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

<div style="border:1px solid black; padding:1em; text-align:center">

Tap on the N-Number to return to the Aircraft page.

</div>

<div style="border:1px solid black; padding:1em; text-align:center">

To alternate between Total Weight, Below Gross, and CG, tap on the Status Section.

</div>

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.
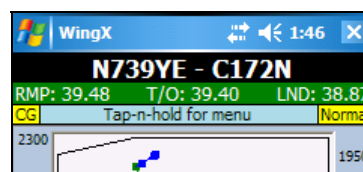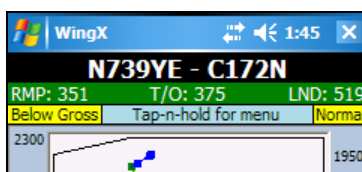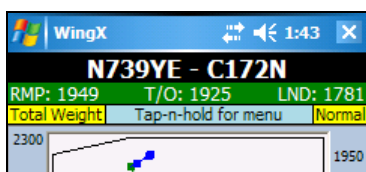
When WingX determines that no limit has been exceeded, the appropriate values for the Ramp, Takeoff, and Landing phases of the flight are displayed on a green background. The green background is used to quickly convey a "within limits" weight and balance situation.

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 when the user has entered text which is not valid. The offending text box will 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; e.g. "-9" or "9H7" when WingX expects numbers.

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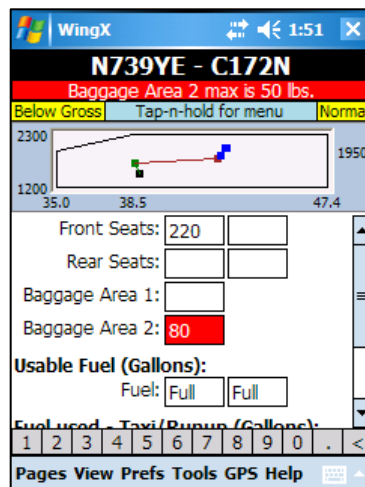
- **Tap-n-hold for menu:** Use the popup menu to configure various settings of the Weight and Balance page. This text never changes and its only task is to serve as a reminder that tap-n-hold is the way to change configuration settings.

- **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.

Graphical Section

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

- Display the Weight and Balance Envelope

- Display the Weight and Balance Bar Display

- Display the Weight and Balance Popup Menu

Weight and Balance Popup Menu

The Weight and Balance popup menu provides several configuration options.

Envelope Selection
WingX can use any one of the aircraft's weight and balance envelopes. These are listed under the Envelopes selection.

Options
WingX has multiple ways of displaying Weight and Balance information:

- **Bar Display** – show bar display instead on conventional envelope.

- **Show Moment** – show moment plot.

- **Show Graphics** – show or hide the envelope graphics.

- **Show Summary CG Range** – Selecting this option will cause WingX to display the allowable CG at each phase of the flight. Note that these CG ranges are not taken from the POH, but rather are calculated for the actual weight at that phase of flight using the selected envelope.
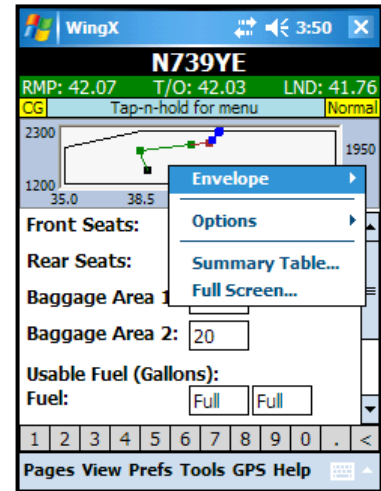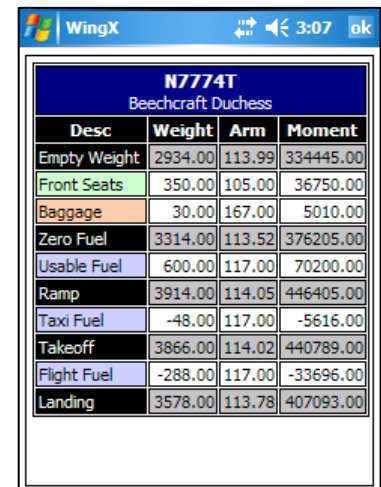
Summary Table
WingX's Weight and Balance Summary Table consolidates the passenger, fuel, and baggage information into a conventional looking table with weights, arms, and moments. The Summary Table lists each station of the passengers, baggage, and fuel. Passenger stations, baggage stations, and fuel stations are shown in green, brown, and blue respectively. Note that this is consistent with the color scheme used on the Weight and Balance envelope display.

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

The Summary Table displays the Weight and Balance calculations in a table in a format as shown in most POHs; i.e. a weight x arm = moment table.

This is an excellent tool since it allows pilots to verify that WingX is using the correct arms for each station. The Summary Table is equally an excellent tool for CFIs as it allows one to quickly verify and compare a student's weight and balance calculations prior to a flight.

Full Screen
Selecting this option removes all controls from the screen other than the actual graphics portion and causes that graphics portion to occupy the entire screen within WingX. This allows the actual graphical data points and line to be viewed more accurately. Tapping on the graph returns WingX to non-Full Screen mode.

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. WingX displays the selected envelope, the empty weight and CG and each point along the 'snake' showing the effect each station has on the CG.

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.
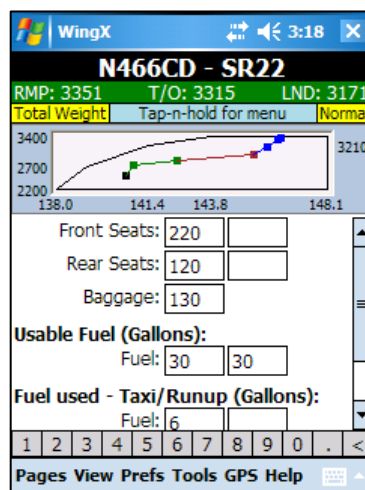
Weight and Balance Bar Display

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.

The Status and Configuration sections show the same information as when the envelope is displayed. The Bar Display displays a different view of the Weight and Balance information.

Four 'phase of flight' lines are displayed on the Bar Display, these are:

- The Zero Fuel CG (if applicable)

- The Ramp CG

- The Takeoff CG

- The Landing CG
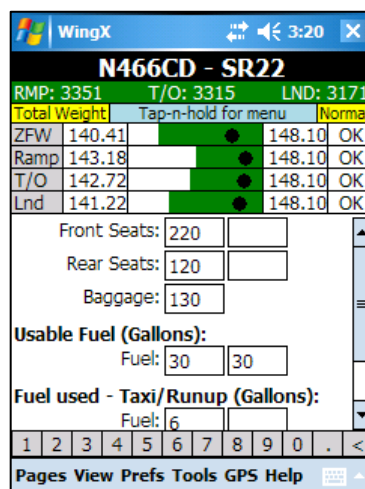
At the Maximum Zero Fuel Weight (ZFW) and using the Normal category envelope, the CG range is 140.86-148.10 inches and the CG at that weight is 147.83 inches, quite far aft, but not within 10%. The value is graphically denoted by a rounded square. The green bar shows the allowable CG range at the Maximum ZFW. The CG values for the Ramp, Takeoff, and Landing lines should be interpreted similarly. Notice how, on the Ramp and Takeoff lines, the green bar shortens as the weight increases. 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. The rightmost column displays 'OK' for each of the columns since the CG lies within the allowable CG range; i.e. the black squares 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 are displayed and the same warnings are 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

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. If the forward of aft limit is exceeded the message will change to 'Fwd' or 'Aft' respectively and be displayed in red.

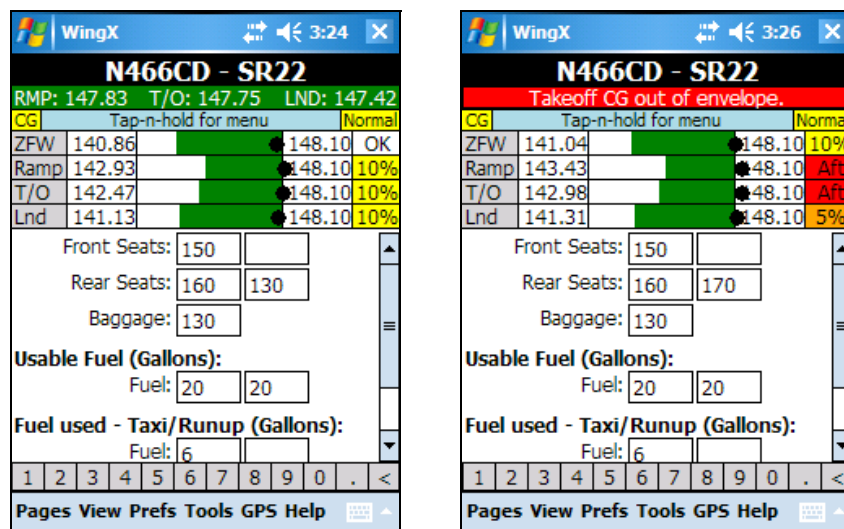In the first example above, two passengers decided to sit in the rear seats. This configuration moves the CG further aft than had one of the passengers sat next to the pilot in the front-right seat. A recalculation shows that the CGs for all phases of flight are within 10% of the allowable range. Concerned with this, the pilot asks this passenger to verify that his weight really was only 130 pounds. It turned out that he was wearing additional clothing, boots, and was carrying a camera bag – these additions increases his total weight to 170 pounds. Changing the "130" entry to "170" moves both the Ramp and Takeoff out of the Normal envelope as shown by the 'Aft' messages as well as the Status Section now displaying 'Landing CG out of envelope.' This is an unsafe condition, and it would be safer for one of the passengers to be seated in the right-front seat. All these Weight and Balance calculations took just a few taps and the use of popup menus to calculate.

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. When any weight is entered or modified, 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 an error message will be displayed in the Status Section.

Popup Menus

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.

The popup menu for a baggage area only contains values at or below the maximum allowable weight for that baggage area. Similarly, if fuel is being entered in gallons, then the popup menu only shows 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 reduces the time required to enter and calculate aircraft weight and balance.
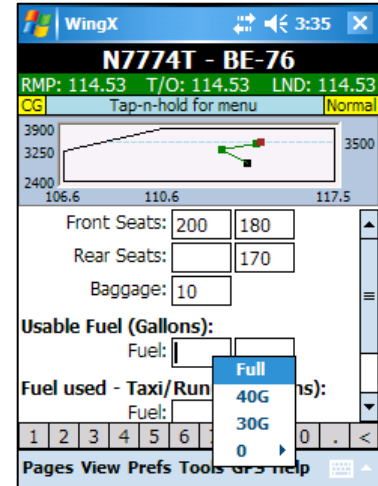
Helicopter Weight and Balance

WingX displays two envelopes for aircraft such as helicopters that have a lateral envelope defined. The warnings messages will include both envelopes; i.e. if the weight and balance calculations determine that either the longitudinal CG or the lateral CG is out of the defined envelope, a red error message will be displayed with the appropriate text.

The status information can be cycled between Total Weight, Below Gross, CG, and CG (Lat) by tapping on the status information.
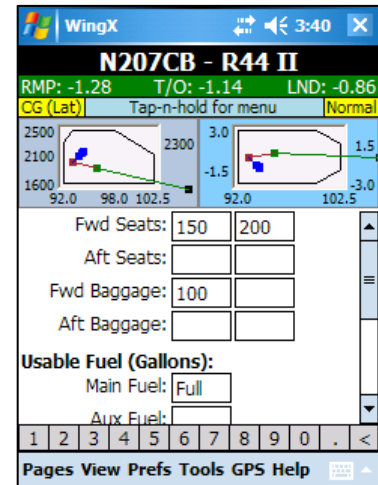
User-Defined Aircraft Models

WingX enables pilots to define their own aircraft models. This is particularly useful if a pilot has an aircraft that has one or more modifications such as tip tanks or additional seats. For more information, please refer to the chapter title "WingX Tools"

Airport/Facilities Directory Page

Fast access to Airport/Facilities Directory is a superb tool during pre-flight planning as well as in-flight, especially at night when digging around in sectionals and other resources in a dark red light environment is the only alternative.

WingX contains extensive A/FD information and displays it in a concise and easy to read color-coded format. The page consists of seven sub-pages. These sub-pages are the Communications, Location, Facilities, Runway, Remarks, Sunrise/Sunset, and Airport Runway Layout sub-pages. Each sub-page contains specific information about the airport, navaid, fix, intersection, or waypoint. Some sub-pages may not always be visible. For example, the Runway sub-page is not visible when not displaying an airport. In this chapter, San Jose International Airport (KSJC) will be used.

Communications

The Communications information includes the airport's ASOS, ATIS, Clearance, Ground, Tower, CTAF, and Approach and Departure frequencies.

In addition to the frequencies, note the underlined phone numbers. If a highlighted phone number is selected, phone devices will automatically dial the phone number.

The hours that the tower is in operation are also shown. These hours are 0600-0000 in our example.
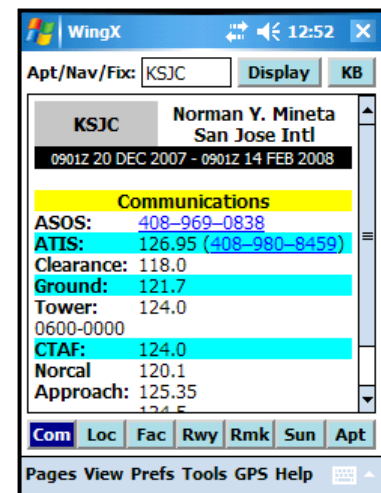
Location

The Location information includes various pieces of information including the sectional, state, city, latitude, longitude, elevation, and magnetic variation. In addition, the three closest airports, VORs, and NDB are also shown together with relative bearings, distance, frequencies and other information are displayed.

If any of the closest public airports, VORs, or NDBs is selected, WingX shows the A/FD information for that point.
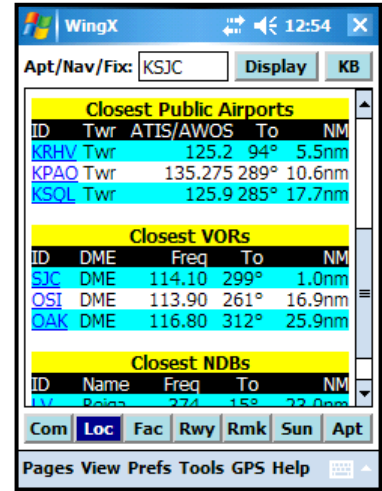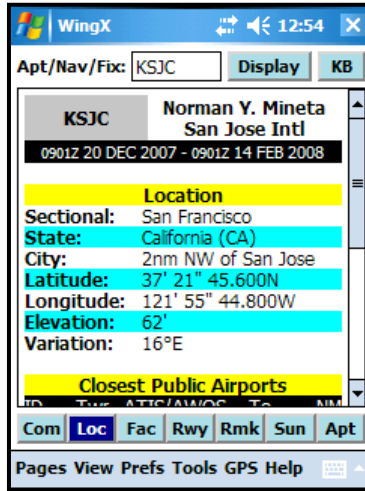
Facilities

The Facilities information includes the attendance schedule, available fuel, airframe and powerplant repairs, as well as the oxygen availability:
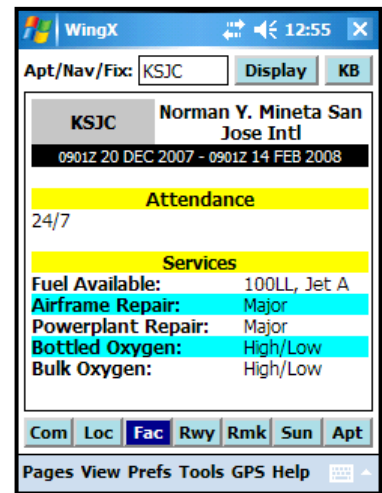
Runway

The Runway page includes the FAA-defined or estimated traffic pattern altitude, longest runway, runway dimensions, surface, condition, and edge lights and many more pieces of specific runway information. A summary of the airport's runways are summarized and displayed at the top of the page. Tapping on a runway name displays that runway's details – see screen shots on the right.

Tapping on an instrument chart will display that approach chart.
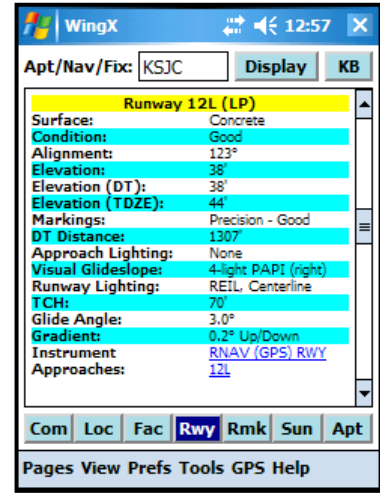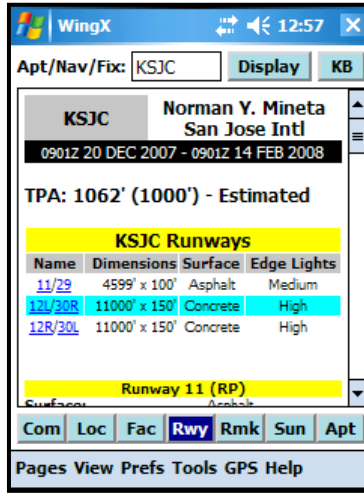
Remarks

The Remarks page includes tower remarks as well as general airport remarks such as taxiway restrictions, birds in vicinity of the airport, noise abatement procedures, and contact phone numbers. If a highlighted phone number is selected, phone devices will automatically dial the phone number.
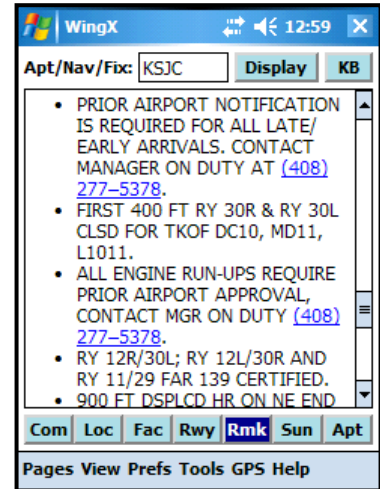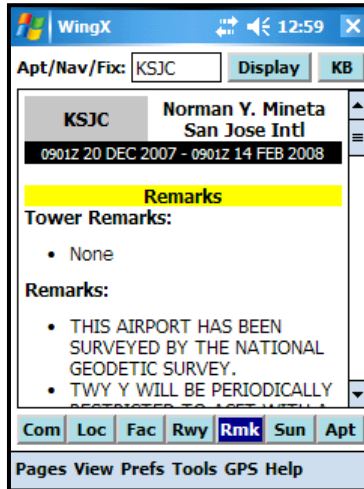
# Sunrise and Sunset

The Sunrise and Sunset page displays the sunrise and sunset times (lights required) for any date and at any airport. In addition, time for civil twilight times (logging night) and one hour pre-sunrise and post-sunset (passenger currency) are shown. See Appendix C.

Tapping on the name or pressing the keyboard's OK button (Smartphone) will show the year plot for the sunrise and sunset times.

The time deltas for one day, one week, and one month for both sunrise and sunset are shown in black.
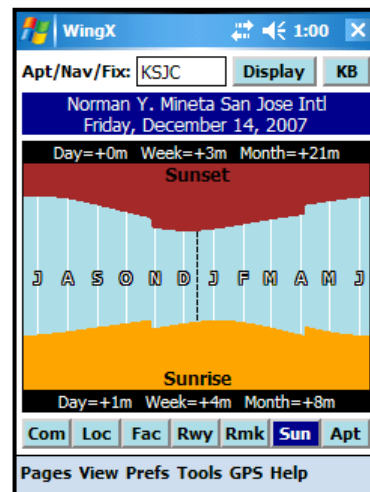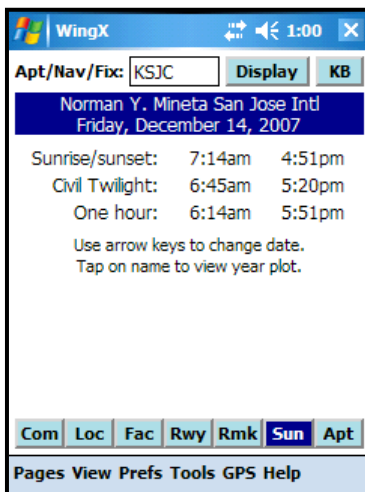
Airport Runway Layout

The Airport Runway layout page displays the airport's runway layout together with their runway IDs, centerline lighting and Runway End Identifier Lights (REILs).

For more runway layout information, see chapter titled "Airport Runway Layout".
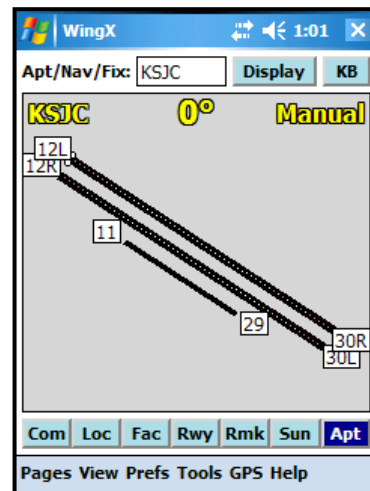
Route Planning Page

WingX's Airport Database contains airports, navigational aids, fixes, and intersections,
Victor Airways and Jetways. Using a combination of these, a route can be planned
between any two points and WingX will calculate headings, ETE, fuel burn and other
pertinent information. WingX can use the route to file a DUATS flight plan and to walk
you through the route as you fly it using the GPS-enabled Dynamic Flight Navigator™.

W ingX's Route Page simplifies route planning and also calculates route distances pertinent to 14 CFR Part 61 and Part 141's Aeronautical Experience requirements. A route is entered in a single text box. WingX shows each leg on a separate line. The information for each leg consists of Magnetic Heading (MH), Distance (NM), Estimated Time Enroute (ETE), Wind Correction Angle (WCA), Fuel Consumption and more. A status bar shows Part 61/141-related cross-country distances.

Constructing a Route

A route consists of ICAO identifiers separated by a space. Each identifier represents an airport, a navaid, a fix, an intersection, a Victor Airways or Jetway, a VFR waypoint, a user-defined waypoint, or a point relative to one of the above.

Identifier	Description	Type
KSJC	Norman Y. Mineta San Jose Intl	Airport
SJC	San Jose	VOR/DME
LV	REIGA	NDB
KLIDE	KLIDE	Fix
SUNOL	SUNOL	Intersection
V334	Victor Airway or Jetway	Victor Airway
VPWAM	VPWAM	VFR Waypoint
MYHOUSE	My House	User-Defined Waypoint
LAX180005.3	5.3nm on the 180° bearing from LAX VOR	Relative Point

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

For this example, the airspeed is 120 knots, the wind at our altitude is manually entered as 330° at 15 knots, and the average fuel burn is 12 gallons per hour (GPH). These numbers can be entered using popup menus, a keyboard, or the SIP. The number 120 is entered in the Speed text box, the numbers 330 and 15 are entered in the wind direction and wind speed text boxes respectively, and 12 is entered in the Fuel Per Hour (FPH) text box.
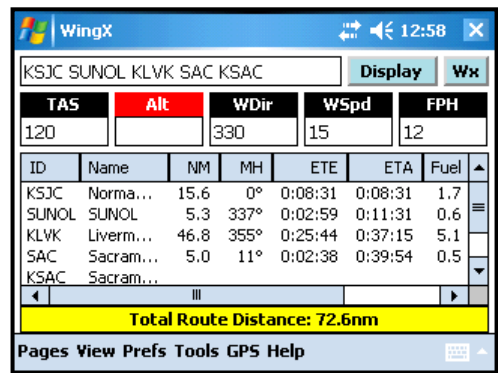
> **To alternate between Longer than Great Circle, Total Route Distance, Maximum Airport to Airport, and Maximum Airport from Origin distances, tap on the yellow summary section below the table.**

Using this information, WingX calculates the route and navigational information as:

ID	Name	NM	TC	WCA	TH	MH	ETE	ETA	Fuel
KSJC	San Jose Intl Airport								
SUNOL	SUNOL intersection	15.6°	21°	-6°	16°	0°	0:08:31	0:08:31	1.7
KLVK	Livermore Muni Airport	5.3°	355°	-3°	352°	337°	0:02:59	0:11:31	0.6
SAC	Sacramento VOR	46.8°	16°	-5°	11°	355°	0:25:44	0:37:15	5.1
KSAC	Sacramento Exec Airport	5.0°	33°	-6°	27°	11°	0:02:38	0:39:54	0.5

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 tapping on the column header. For example, MH is initially displayed. 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 Prefs, Route, Columns submenu, the route list view can be configured to show or hide specific columns. For example, in the example on the right, the Name column has been unselected thereby allowing the Ground Speed column to be visible without scrolling.

The Name column is generally wider than the other columns and since pilots are often familiar with the airport/navaid identifiers, the Name column is a prime candidate to be unselected. Of course, the Name column (or any other column) can be added back by tapping on Prefs, Route, Columns from the WingX main menu.

Performance and Wind Effects

An additional feature of the route table is the summarization of performance and any wind effects on the overall flight time.

In our example above, the summary information is shown to the right. The total distance is shown as 72.6nm, the total ETE is 00:39:54, total fuel burn is 8.0 gallons average ground speed is 109 knots, and the effect of the wind has lengthened the flight time by 00:03:34; i.e. 3 minutes and 34 seconds. A negative time value would indicate that the wind has shortened the total flight time.

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. The popup menu is divided into four sections; namely the Most Recently Used points, routes, airport search, and one option to clear the route text box.

> **Identifiers 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. Separate lists are provided within the popup menu; one each for airports, navaids, fixes, airways, and waypoints.

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 "…".

> The selected Home Airport will always appear in the most recently used airport list.
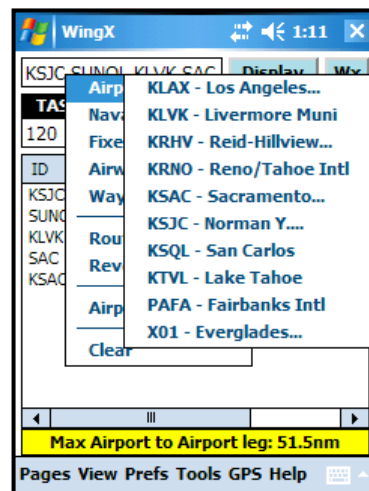
User-Defined Routes

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 using the departure and destination points to construct the title.

- **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.
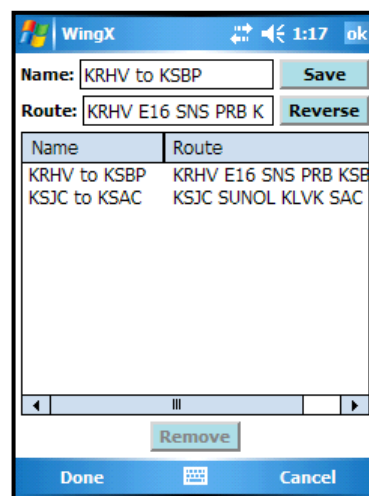
Dynamic Flight Navigator™ Page

WingX's unique GPS-enabled Dynamic Flight Navigator™ page is a very information-rich presentation of the aircraft's position and increases situational awareness by showing pertinent information about the closest three airports and VORs.

WingX's GPS-enabled Dynamic Flight Navigator™ page walks a pilot through the route, leg by leg, while showing frequencies, Morse codes, the three closest airports or VORs, required descent rate, and more. The page's heads-up information-rich display increases flight safety by reducing the time (and difficulty) in searching for many pieces of information in sectionals and other resources during a flight. This is especially true for night flying. The Dynamic Flight Navigator™ page consolidates a large amount of information onto a single easy-to-read screen.

Screen Layout

The DFN screen is divided into several sections. The sections are:

- **The Identifier Section** displays the identifiers of both the origin and destination of a flight leg. The back ground is green for the current leg and blue otherwise. In addition to the identifier, some text and graphics that describe the entity is displayed.

  Using our example on the right, the leg's origin is SJC VOR and it is a low-altitude VOR that has DME. Its frequency is 114.1 and its Morse code is ■■■ ■———— —■—■. The leg's destination is the KSFO airport which is towered and has a frequency of 120.5.

  WingX displays the next leg's information right on a yellow informational bar below the identifiers so that while a pilot is flying the current leg, the aircraft navigation systems can be configured for the next leg. In our example, our final destination was SFO airport, but if the route's next leg was from KSFO airport to the STS VOR, the informational bar would be: **SFO to STS VOR: 321° 57.2nm**

> **Tap on the identifier to display A/FD information for that airport, navaid, fix, intersection, or waypoint.**

- **The GPS Data Section and Flight Data Section** display information is derived directly from a GPS receiver and positional information related to the GPS information. For example, using the screen shot above, the GPS receiver is showing the aircraft on a track of 292°, a groundspeed of 67 knots, an approximate MSL altitude of 3,999', course to SFO airport is 295°, nautical miles to go is 14.7, and it would take 13:12 to get there at the current ground speed. SmartTaxi™ calibrates the displayed MSL altitude upon departure, but if a pilot were to note a discrepancy between what was being displayed on the DFN and the altimeter, tapping on the Altitude box would allow the pilot to enter the current MSL altitude. By entering nothing on the altitude entry screen returns the display to GPS Altitude.

Tap on Altitude to alternate between raw GPS altitude and calibrated MSL Altitude.

Altitude (GPS)	Altitude (±MSL)
222'	4,500'

Tap on NM to alternate between distance to go (NM) and crosstrack (XTK).

NM	XTK
14.7	0.6 »

- **The Closest Airport/VOR Section** is an excellent aid to a pilot's positional awareness. WingX determines, in real-time, the three closest airports and VORs to the aircraft's position and displays navigational and communications information for these airports and VORs thereby increasing a pilot's 'see-and-avoid' time – no more heads-down in a sectional or flight guide. The following details are displayed:

ID	To	NM	TWR	ATIS
RHV	10°	7.2	119.8	125.2
SJC	330°	8.6	124.0	126.95
E16	107°	16.2	122.7	

ID	To	NM	Freq	Morse
SJC	327°	9.5	114.1	··· ▪▪▪▪ ▪▪▪▪
OSI	283°	21.5	113.9	▪▪▪ ··· ··
SFO	300°	33.3	115.8	··· ··▪▪ ▪▪▪

  o **Airports:** The bearing to, distance to, tower frequency, and ATIS frequency.

  o **VORs:** The bearing to, distance to, VOR frequency, and VOR Morse code.

Tap on the Closest Airport/VOR Section to alternate between showing airport and VOR information.

- **Arrow Keys** are used to display the various legs on the route and to select the active flight leg. There are four arrow keys as well as a green diamond button. The arrow keys are used to show the first leg, the previous leg, the next leg, and the last leg respectively. Tapping on the green diamond makes the currently displayed leg the active leg. The active leg is shown with a light green background and all the flight navigation information is related to the active leg. This allows the pilot to view any leg in the route whilst continuing to monitor the active leg's progress.

  To select the current leg as the active leg, tap on the green diamond. For example, assume the route is "KSJC KLVK ECA KTVL" and the aircraft is currently flying the KSJC-KLVK leg. ATC instructs the pilot to proceed "Direct Manteca VOR" (ECA is the identifier for Manteca VOR). The pilot would tap once on the right arrow. WingX would display the KLVK-ECA leg in blue since it is not the current leg. Then a tap on the green diamond sets KLVK-ECA as the active leg. The identifier background changes to green signifying that it now was the active leg and the navigational information is calculated according to the newly designated active leg.

NACO Chart Page

WingX displays NACO charts such as Instrument Approach Procedures (IAP), Departure Procedures (DP), Standard Terminal Arrival Procedures (STAR), Minimums, and Airport Diagrams. The charts can be scrolled and scaled – no stylus required. With a GPS attached and using its patent-pending SmartTaxi™ technology, WingX shows the aircraft's location on the airport diagram and warns of a potential runway incursion.

W ingX provides fast access to NACO charts. The chart selection, image scrolling, and image scaling can all be controlled without the use of the stylus. This is of primary importance since this module of WingX is expected to be used in flight, perhaps in turbulent conditions when using the stylus might prove difficult. In addition to displaying the charts, a GPS-enabled Pocket PC will enable WingX to display the aircraft's position on an airport diagram and display runway information as well as potential runway incursions – we call this WingX's SmartTaxi™ technology.

NACO Charts

The National Aeronautical Charting Office produces charts on a 28-day schedule. These charts include Instrument Approach Procedures (IAP), Departure Procedures (DP), Standard terminal Arrival Procedures (STAR), Minimums, and Airport Diagrams. For VFR pilots, the Airport Diagrams are particularly important especially in light of the fact that Runway Incursions are a known problem and indeed a growing problem.

WingX provides fast access to any required chart and once displayed, any chart can be scrolled or scaled without the use of a stylus. In addition, chart's colors can be shown in one of several Night Vision modes. The Night Vision modes are (see examples on following page):

- Invert
- Invert (Keep Color)
- Red Tint
- Green Tint
- Blue Tint
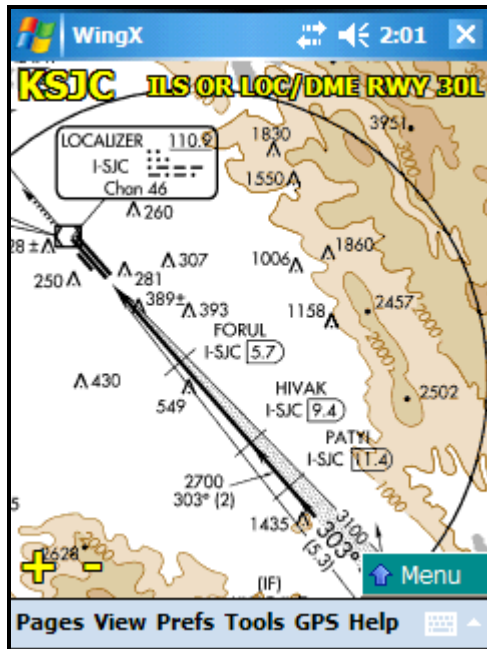
The SJC ILS or LOC/DME 30L approach.

Inverted – note how the mountains did not maintain their orange color.

Inverted (keep color) – note how the mountains did maintain their orange color.
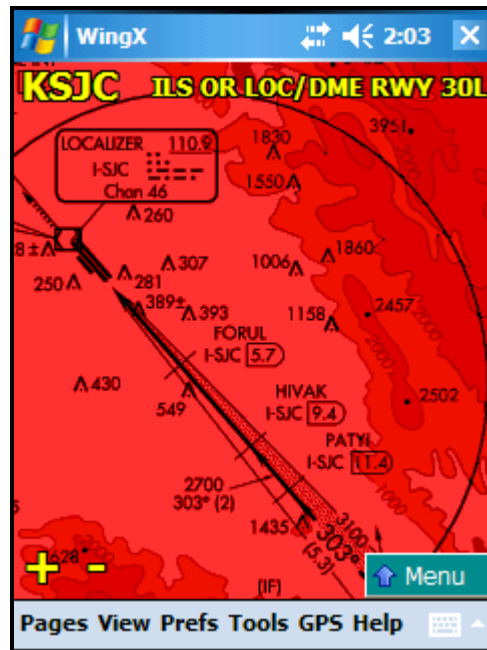
Night Vision with a red tint.

| Night Vision with a green tint. | Night Vision with a blue tint. |

Chart Page Layout

The charts are displayed in a way that maximizes screen usage and allows control of the chart display and options to be controlled without a stylus. The chart occupies most of the screen.

Title Text

At the top of the screen, WingX displays the airport ID. To the right of the airport ID, WingX displays the GPS groundspeed and track and also provides a 'link' to the GPS status page. Below the first line of text, the name of the chart being displayed is shown.

- Tap on the Airport ID to set the Airport ID to another airport.

- Tap on the chart name to select another chart for this airport.

> **Tap on the ID in the top-left corner to enter a new airport ID.**
> **Tap on the chart name to select a new chart for the airport.**

Zoom Out and Zoom In

There are two ways to zoom in and out while viewing a chart:

- In the bottom-left corner, WingX displays a "+" and a "−" symbol. Tapping on these will zoom in and zoom out respectively.

- Pressing the "OK" hardware key (the key in the center of the arrow keys) enters Zoom mode. WingX displays the word "Zoom" on the image. Pressing the up and down arrow hardware keys will zoom in and zoom out respectively. Press "OK" again will exit zoom mode.

Chart Popup Menu

In the bottom-right corner of the Chart page is a popup menu. When tapped on, this menu expands to display a list of options. The items in the first group display additional information:

- **ID…:** Displays the ID selection dialog box so that an airport ID can be entered.

- **Charts…:** Displays all the charts available for the selected airport. The charts are logically separated into the Airport Diagram, Departure Procedures, Instrument Approach Procedures, Minimums, and Standard Terminal Route lists.

- **A/FD Information…:** Display the A/FD information for the currently selected airport.
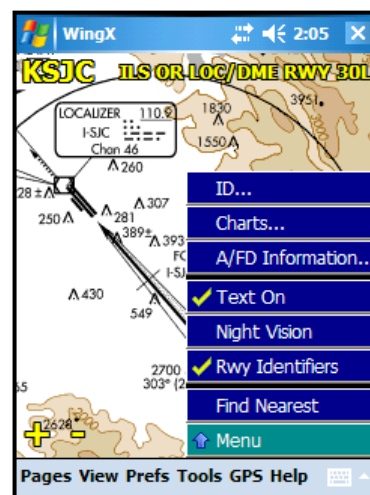
The second group of items are options of the on/off variety. When one of these options is selected, a checkmark ✔ appears on the left of that option. The options in the popup menu are:

- **Text On:** This option selects whether the airport ID and chart name are displayed at the top of the chart.

- **Night Vision:** This option selects whether the chart is shown in its normal colors or with night vision colors. The night vision color scheme is set via the Prefs, Night Vision option.

- **Rwy Identifiers:** This option selects whether runway identifiers are displayed on airport diagrams or not.

The **Find Nearest** option is used on GPS-enabled device to find and display the nearest airport that has an Airport Diagram. WingX will automatically show its Airport Diagram.

Runway Identifiers

Displaying the runway identifiers is an important aspect of viewing an airport diagram which has a complex runway layout and also when the airport diagram may be zoomed out. If the runway identifiers prove to be distracting, they can be turned off via the Chart menu.
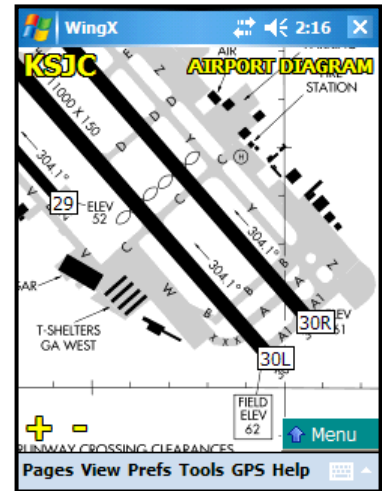
Chart Selection

Once an airport's ID is selected, a specific chart for that airport may be chosen. To select a chart, either tap on the chart name on the screen, or use the popup menu in the bottom-right of the screen and select "Charts…". The Chart Selection dialog will be displayed.

The Chart Selection dialog uses big buttons to make it easier to be used in flight especially in turbulent conditions. The chart types are shown along the bottom, scroll buttons are shown on the right, and the chart names are listed alphabetically. Tapping on a chart name will cause that chart to be displayed on the Chart page.
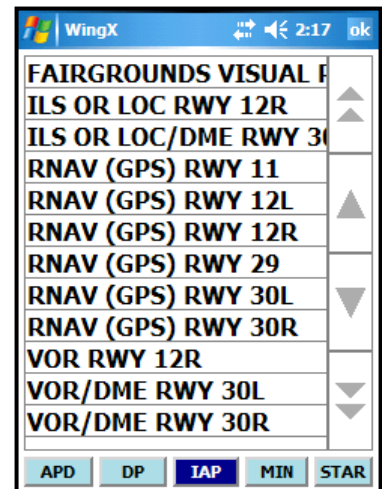
Please refer to the chapter on SmartTaxi™ Technology.

DUATS and TFR Pages

WingX enables pilots to obtain DUATS weather briefings, file flight plans, and view TFRs. The DUATS feature is integrated with other modules within WingX and will use information from the Weight and Balance and Route Planning and pre-populate many of the pieces of information required for DUATS.

WingX's DUATS feature enables pilots to get direct access to DUATS weather briefings and DUATS flight plan operations. These DUATS operations use the pilot's DUATS-assigned Access Code and Password and are therefore recorded by the FAA. The TFR information is obtained in real-time and WingX summarizes these by displaying pertinent information for each TFRs including its status such as active or expired.

Weather Briefings and Flight Plans

WingX's comprehensive DUATS support is like having a Flight Service Station in your pocket. Real-time weather briefings can be obtained wirelessly and recently obtained weather briefings can be stored and viewed later. This enables the pilot to obtain a weather briefing during the pre-flight and take that briefing on the flight without having to print out reams of paper. WingX collates pieces of information when it makes sense.

DUATS Credentials

Before using WingX's DUATS features, the DUATS Credentials must be entered. To display the DUATS Credentials screen, press the "Credentials" button on the DUATS page. The Access Code and Password should be entered exactly as they were assigned by DUATS. To obtain an Access Code and Password for the first time, or to retrieve a forgotten Access Code and/or Password, please contact DUATS directly at http://www.duats.com.

Pilot Information: WingX will automatically populate the Pilot Information fields of a flight plan. On Pocket PCs, we suggest entering your name and address into the device's Owner Information under Settings using the Pocket PC's Start menu, not via WingX. WingX will automatically use this information when filing flight plans. On Smartphones (non-touch screen

devices) or if you wish to use something other than the device's Owner Information, enter the Pilot Name, Address, and Phone Number to be used when filing flight plans on the Credentials page. The "Use Pilot Information" option needs to be enabled.

Test Credentials: Once the DUATS credentials have been entered, these credentials can be tested and verified that they are indeed correct before using the DUATs service. When selecting this option, WingX will test the DUATS credentials and verify that this device's subscription is still current. WingX will display a message showing the results.
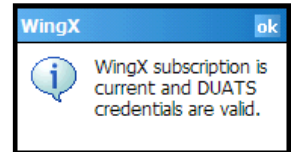
DUATS Weather Briefings
DUATS Weather Briefings are obtained and viewed by tapping on the "Briefing" button. A popup menu is displayed that has options to obtain Low Altitude, High Altitude, and Weather Radius weather briefings. In addition, the most-recently-obtained weather briefing can be viewed. Therefore, a weather briefing can be obtained during the preflight and viewed in-flight. Most-recently-obtained weather briefings for each Low Altitude, High Altitude, and Weather Radius are each stored and are only overwritten when a more-recent weather briefing of that type is obtained.
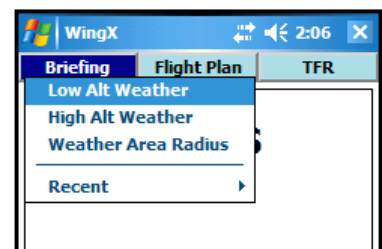
When selecting a Low Altitude or High Altitude weather briefing, WingX displays a dialog box with many of the fields populated with information from other modules [optional]. For example, if a flight had been planned from KRHV to KSBP via E16 airport, SNS VOR, and PRB VOR on the Route Page, the departure and destination points as well as the route would be populated and by default WingX will assumed departure in one hour; i.e. "+60".
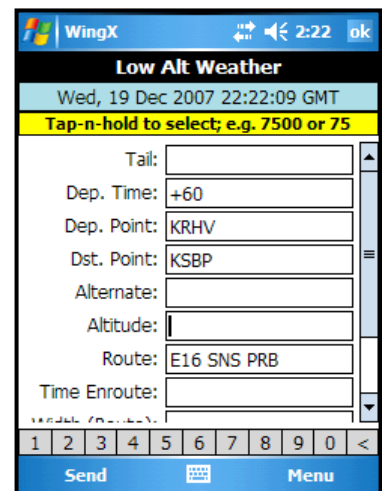
Integrated Help System: Contextual help is displayed for each text box on the dialog box. In the example on the right, the cursor is in the Altitude text box and help for entering Altitude is displayed in the yellow display area. In addition, selecting Menu, Help displays more comprehensive help including guidelines for each field.

After entering all pertinent information, clicking on the "Send" button sends this information together with the Access Code and Password to DUATS. If DUATS detects an error in any of the fields, WingX will report this error. If the fields all contain valid information, WingX downloads the weather briefing, summarizes the weather briefing sections, and displays the weather briefing.
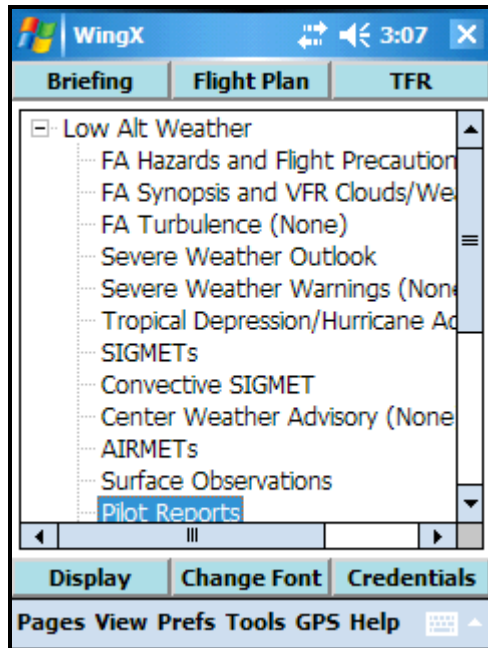
Low Altitude Weather sections.
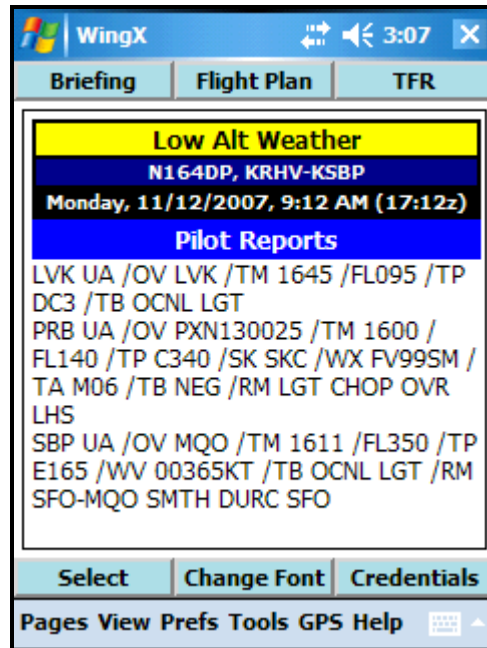
Viewing Pilot reports.
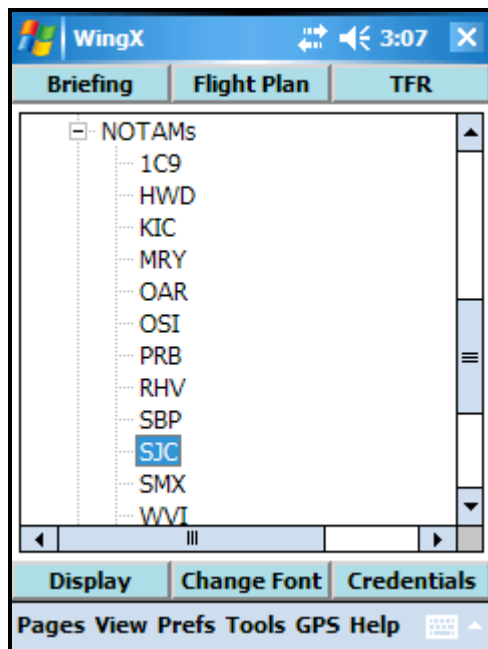
All NOTAMs can be display. However, if a single airport is highlighted…
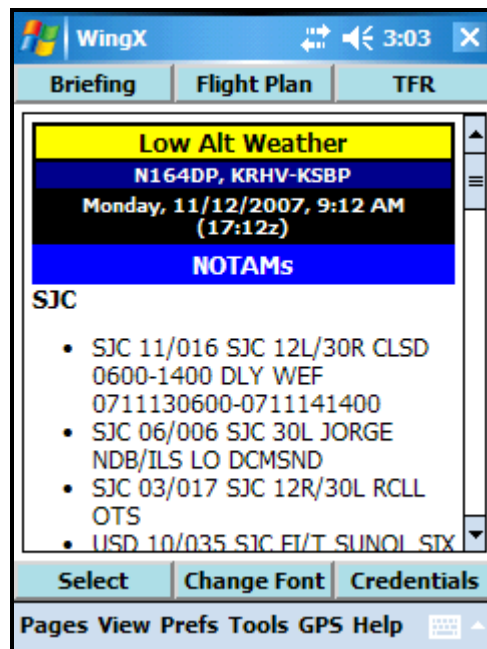
…then all NOTAMs for that airport are collated and displayed together.

DUATS Flight Plans

WingX can file, close, and cancel flight plans directly with DUATS. Flight plans may be filed for VFR, IFR, VFR DC ADIZ, and IFR DC ADIZ flight plans. WingX assists in many ways by populating the various fields as well as filing the DC ADIZ flight plans with the appropriate modifications required by the FAA. See "DUATS Credentials" earlier in the chapter about having WingX automatically populate pilot information.

Equipment and Color Persistence: WingX stores the equipment and color per aircraft so that filing flight plans in the future will have the equipment and color fields automatically populated according to the Tail number entered.

Tap-and-hold displays a popup menu which contains 'most probable' options. In this example, the user did a tap-n-hold on the Departure Time text box and WingX displays various departure time options.

Integrated Help System: Contextual help is displayed for each text box on the dialog box. In the example on the right, the cursor is in the Departure Time text box and help for entering Altitude is displayed in the yellow display area. In addition, selecting Menu, Help displays more comprehensive help including guidelines for each field an Aircraft Color Table, and an Aircraft Equipment Suffix table.

After entering all the required information, select "Send" to File, Close, or Cancel the flight plan.
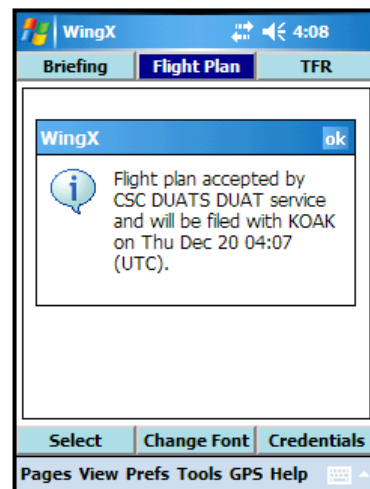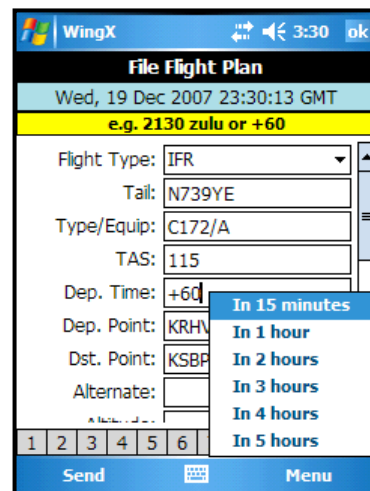
Temporary Flight Restrictions (TFRs)

Temporary Flight Restrictions change continually during the day. While some TFRs can be created well in advance, many TFRs simply 'popup' during the day without warning.

WingX allows a pilot to quickly browse the full list of TFRs quickly and displays the type, altitude, as well as the date and time the TFR becomes active and the date and time the TFR expires. The full text of the TFR can also be viewed in its entirety.

Viewing TFRs

WingX displays TFRs in a list format. One TFR in the list is selected (highlighted) and a summary of that TFR is displayed below the list box. Use the hardware arrow keys or the stylus to change TFRs. To view the full details of a TFR, select "Display" or press the "OK" hardware key.

The TFR download time is shown above the list box. When the TFR data is more than 15 minutes old, the TFR download date will be shown in blue, and when more than one hour old, the TFR download date will be shown in red. In the latter case, the TFR information being used is potentially out-of-date and no longer valid.
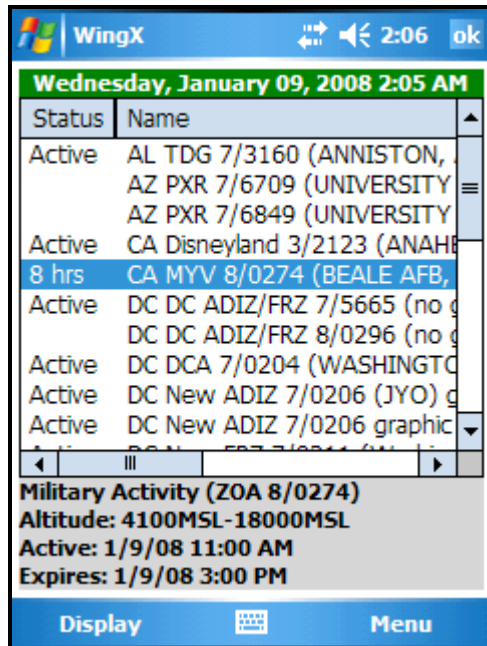
List of TFRs with summary information displayed below the list box.
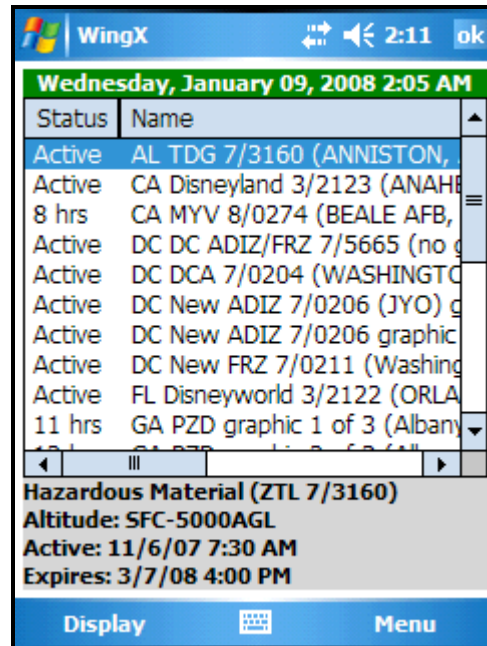
Showing only active and pending TFRs.
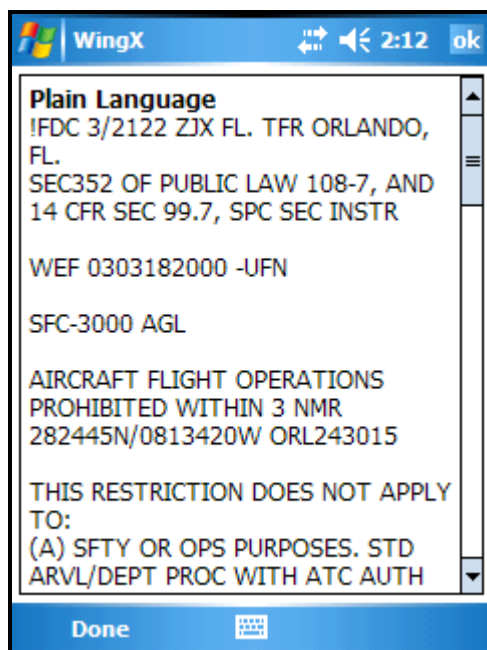
Viewing the full details of the TFR.
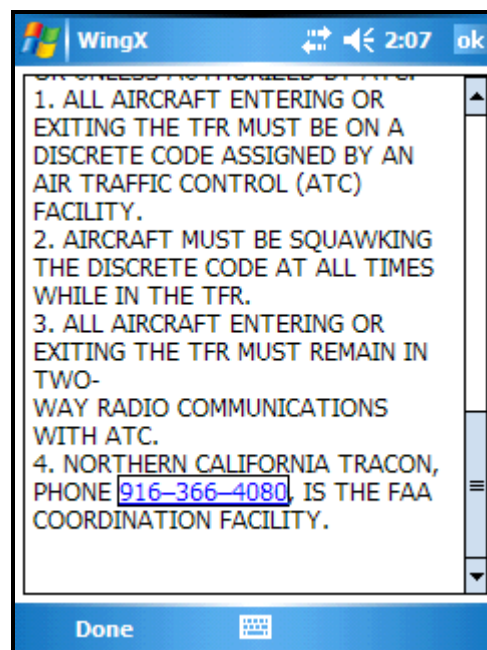
Note the auto-dial phone number.

Filtering TFRs

TFRs may be filtered by:

- **State** – Most GA flights are limited to a single state. Therefore this option seems appropriate for pilots whose flights occur within a single state.

- **Active and Pending** – WingX shows the status of a TFR as either Active, Expired, or shows the number of hours or minutes until the TFR becomes active. For most flight, TFRs that have expired or occur well in the future are of no consequence. When the "Active and Pending" option is checked, WingX only shows TFRs that are active and those that will become active within 24 hours.
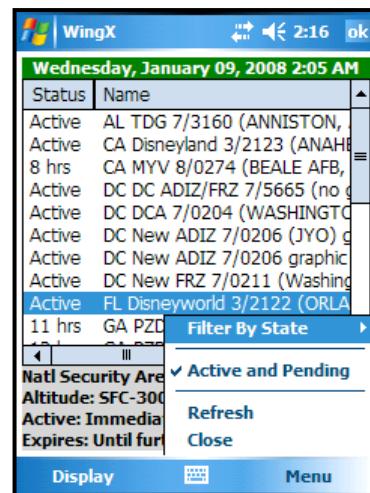
> **Tap on the "Status" column heading to alternate between showing all TFRs and only the Active and Pending TFRs.**
> **[Pocket PC only]**

Weather Textual Reports Page

Weather reports are a fundamental piece of the go/no-go decision making process. Pilots are at a disadvantage that weather text is not easily available for viewing away from their desktop and are based primarily on instantaneous and singular observations.

WingX takes plain old METARs, TAFs, winds aloft, and temperatures aloft and displays the data in a rich, color-coded format that makes the weather information easy to read. In addition, WingX has some views and settings that can really help pilots get a better understanding of the weather conditions. WingX also shows route weather by showing those METARs, TAFs, winds loft, and temperatures aloft along the route of flight.

Downloading the Latest Weather

WingX obtains its weather information from www.aviationweather.gov – NOAA's National Weather Service. Hilton Software's servers process and compress the information so that download times to the device and the memory requirements on the device are drastically reduced. This translates into faster access to weather information, reduced bandwidth and lower costs when paying for a wireless data plan (for phone users).

How and When to Download Weather

An Internet is required to download the weather information. This internet connection can come in many forms including having the Pocket PC cradled, an 802.11a/b/g wireless connection, a Bluetooth connection to a cell phone that has wireless data capability, and using a Pocket PC Phone Edition with a data plan. As long as WingX can find an internet connection, it does not matter what kind of connection it is, WingX will use what connection it can get. By not being specific about its internet connection requirements, WingX provides the ultimate flexibility.

When the weather data is more than 15 minutes old, the weather download date will change from green to blue. When the data is more than one hour old, the weather download date will change to red thereby clearly showing the user that the weather information being used is old, potentially out-of-date and no longer valid. Anytime the weather is more than 15 minutes old, WingX will prompt the user to download the latest weather database – WingX also has an option to bypass the prompt and automatically download the weather when the weather data is more than 15 minutes old.

WingX has a unique capability to allow users to view textual weather and trends even with no internet connection. Once WingX has downloaded the weather database, the device can be disconnected from the internet connection and the user will still have full access to all the functionality on the Weather Text page. This is particularly useful during flight. For example, by downloading the latest weather information immediately prior to takeoff, a pilot can view the METARs, TAFs, winds aloft, temperatures aloft and graphical trend information while in flight.

<div style="border:3px solid black; background:red; color:white; text-align:center; padding:1em;">

<u>Flight Safety</u>

The user must take note of the age of the weather database. If the weather database date and time are shown in blue, caution should be used as the weather data is more than 15 minutes old. If the weather database date and time turns red, then extreme caution should be used as the weather data is more than one hour old.

</div>

Trend Information

The Weather Database contains six hours of METARs. This large amount of data enables WingX to display graphical trend information for specific airports. As shall be discussed later, this trend information is an extremely important component of understanding the weather and anticipating the weather trend.

This additional information increases the download time and bandwidth. For users where this might be an issue (i.e. they wish to reduce either/or the download time and bandwidth), this trend information can be disabled. The menu option can be found in Prefs, Weather, Trend Information.

Color-Coding Scheme

WingX uses the following color-coding scheme when showing METARs and the trend bar in the 6 hour trend graphical display (as defined on http://www.aviationweather.gov):

Green	VFR conditions
Blue	Marginal VFR conditions
Red	IFR conditions
Magenta	Low IFR conditions

Weather Textual Reports views

There are five views, each of which is selectable from a pull-down menu. The five views are:

- **METAR:** Displays color-coded METARs

- **TAF:** Displays TAFs

- **METAR List:** Displays a summary of the most important pieces of the METARs.

- **Winds Aloft:** Displays a color-coded table of the winds aloft in an easy-to-read format.

- **Temperatures Aloft:** Displays a color-coded table of the temperatures aloft in an easy-to-read format. Also displays the freezing level.

- **6 hr Trend:** Graphically displays the trend information for Visibility, Ceiling, Temperature and Dew Point, Wind Direction, Wind Speed, and Pressure.

METAR View

METAR-reporting airports that are within the vicinity of the reference airport, navaid, fix, intersection, or waypoint entered will be displayed. The METARs will be color-coded according to the reported conditions. In addition, the distance from the reference point will be displayed. If a route is entered, WingX will display METAR-reporting airports along the route. [Premier Edition only]

If the Quick Look option is selected (see Prefs, Weather, Quick Look):

- The times are converted to local; e.g. 5:41AM instead of 1041Z

- The altitudes are decoded; e.g. OVC5500' instead of OVC055

- The remarks section will not be displayed.
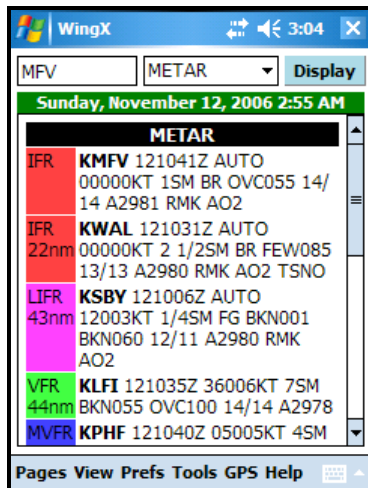
METARs of airports close to MFV.   Same METARs as the in the image on the left, but using QuickLook
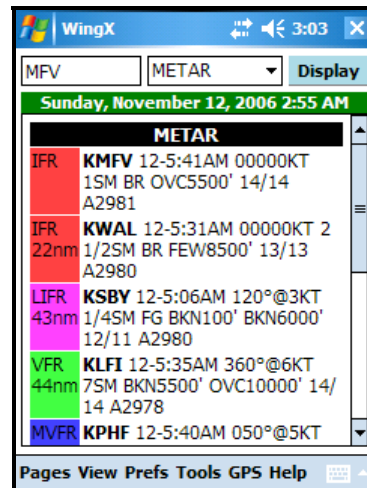
TAF View

TAF-reporting stations that are within the vicinity of the reference airport, navaid, fix, or intersection entered will be displayed. In the example on the right, the Small Font option was enabled for illustration purposes.

If a route is entered, WingX will display TAF-reporting airports along the route.
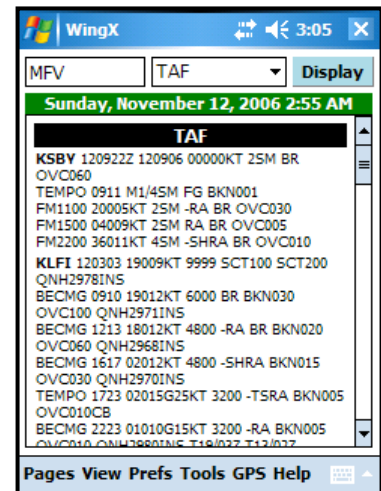
METAR List View

WingX extracts important pieces of METAR information and displays them in an easy-to-read color-coded table with each METAR-reporting airport being displayed on a single line.

The METAR List consists of 10 columns:

- **Airport ID** - this column is color-coded.

- **Wind Direction and Speed**

- **Visibility**

- **Ceiling** - the lowest reported ceiling.

- **Temperature** - the reported temperature in Fahrenheit or Celsius.

- **Dewpoint** - the reported dewpoint in Fahrenheit or Celsius.

- **Altimeter Setting** – in inches of mercury

- **Field Elevation** - as reported in the A/FD.

- **Density Altitude** - the density altitude at the airport using the METAR's weather conditions.

- **Airport ID** - this column is color-coded and is a duplicate of the first column to help interpretation when the METAR List is scroll to the far-right.

If a route is entered, WingX will display METAR-reporting airports along the route.

METAR List of airports close to MFV

Same METARs, but scrolled to the right. Identifiers are shown on both the left side and on the right side.

Winds Aloft View

WingX displays winds aloft information of nearby winds aloft-reporting stations. The format is very similar to the familiar DUATS columnar format except that the display is a lot cleaner and easier to read. Wind components with wind speeds greater than 99 knots are reported as 230@150 instead of the DUATS-encoded 730@50 (for example).

If a route is entered, WingX displays winds aloft-reporting airports along the route. [Premier Edition only]

Temperatures Aloft View

WingX displays temperatures aloft information of nearby temperatures aloft-reporting stations. The format is very similar to the familiar DUATS columnar format except that the display is a lot cleaner and easier to read. Negative temperatures are shown as negative numbers. WingX will automatically calculate the freezing level and display it in the first column.

If a route is entered, WingX will display temperatures aloft-reporting airports along the route. [Premier Edition only]

6 Hr Trend View

Trend information is very difficult for a pilot to visualize from textual METAR reports. More often than not, only the latest METAR is shown via DUATs or given verbally by a briefer. Even if hourly METARs could be obtained, piecing together the full METAR reports together with amendments for six parameters is essentially an impossible task. In addition, the Visibility and Ceiling graphs have an Airport Condition Trend bar at the top to indicate how the conditions have changed over time. All colors used in this view are:

Graphical Trend Information is displayed for the following pieces of information:

- **Visibility** – the visibility in statute miles (SM). An Airport Condition Trend bar is shown at the top of the graph.

- **Ceiling** – lowest reported ceiling in the METAR. An Airport Condition Trend bar is shown at the top of the graph.

- **Temperature and Dew Point** – tap on graph to switch between Celsius and Fahrenheit

- **Wind Direction** – degrees magnetic

- **Wind Speed** – in knots

- **Pressure** – in inches of mercury
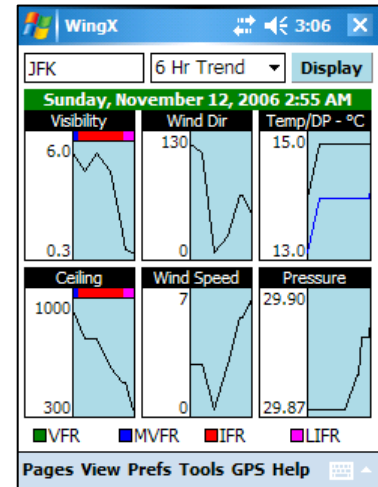
Weather Images Page

Animated RADAR, satellite, flight conditions, pilot reports, turbulence, and icing weather images help a pilot tremendously in understanding the flight environment. Together with METARs, TAFs, winds and temperatures aloft, weather images paint a visual picture of the current and forecast conditions. These images can and should make a significant difference in the pre-flight go/no-go decision-making process.

WingX Weather Images present a visual picture of the past, current, and forecast weather conditions. WingX uses the same graphical user interface as that used on the NACO Charts page with regards to scrolling and scaling of the images. Therefore, images may be scrolled simply by dragging a finger across the images and image scaling is achieved by tapping on the "+" and "−" symbols in the bottom left of the image or by using the "OK" hardware key.

Downloadable Images

WingX includes a comprehensive set of weather images[2]. The images are downloaded in real-time off the Internet and are NOAA images[3].

An Internet connection is required to download Weather Images.

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[2] Hilton Software can and will continually update this list as necessary. Weather images may be added and/or removed at any time at the discretion of Hilton Software.

[3] Some weather images may be downloaded from non-NOAA sources as appropriate to provide the latest and most-up-to-date images available.

The list of weather images includes:

- **Local and Animated:** Base, Long Range, Storm Motion, and Precipitation.

- **METARs and PIREPs**

- **Analysis/Forecast Surface Conditions:** Latest Surface Analysis, 12, 24, 36, and 48 hour forecast

- **Flight Conditions**

- **RADAR Tops**

- **RADAR Summary**

- **RADAR Regional:** Regional images such as "Pacific Northwest"

- **Weather Forecast**

- **AIRMETs and SIGMETs:** Icing, Turbulence, Convection, and Volcanic Ash

- **Convective SIGMETs and Outlooks**

- **Current Convection Watches**

- **Satellite:** West CONUS, East CONUS, Alaska, Hawaii

- **Lowest Freezing Level:** Latest Analysis, and 3, 6, 9, 12 forecast

- **Lightning Probability:** CONUS, and regions such as "North West"

Example Screen Shots

Here are some example screen shots:
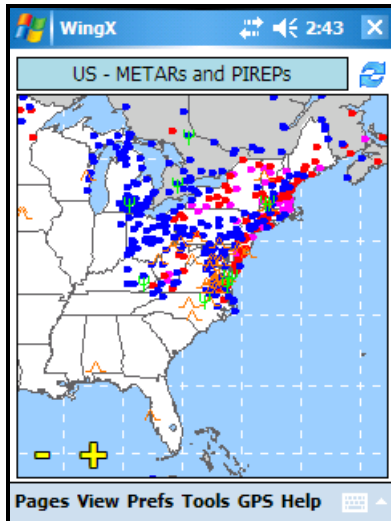
METARs and PIREPs
The US East Coast showing
wide-spread MVFR, IFR,
and LIFR conditions.
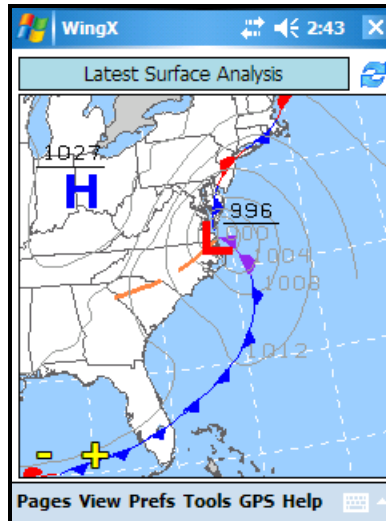
Surface Analysis
The weather system that is
causing the sub-VFR
weather conditions.
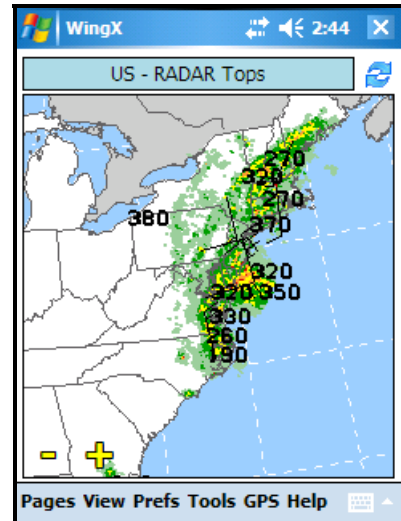
RADAR Tops
Most of the activity extends up
above 30,000' along the East Coast.
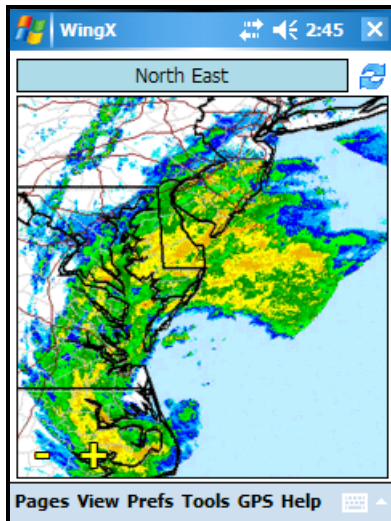
Regional RADAR
A closer view of the RADAR
along the East Coast.

Weather Forecast
Cold weather moves into the
North West.
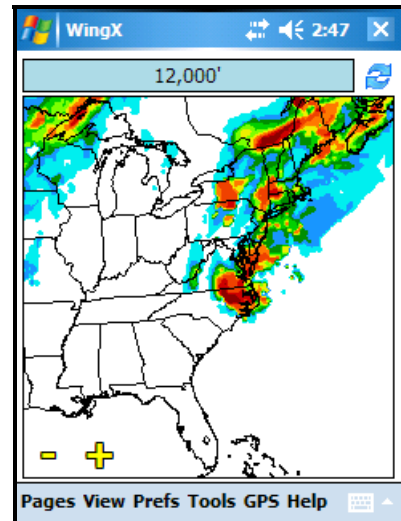
Predicated Icing
Icing predication shows the
effects of a weather system
in the North East at 12,000'.

Airport Runway Layout Page

An airport's runway layout is a great visual aid when used both in the air and on the ground for situational awareness. WingX adds GPS input, runway lighting, runway identifiers, rotatable surface, and SmartTaxi™ Technology to make the Airport Page a very valuable feature.

W ingX's Airport Runway Layout combines many features of WingX. By utilizing input from a GPS receiver, WingX is able to add SmartTaxi™ to the page. WingX also uses its A/FD database to color the runways; i.e. grass runways and water runways are displayed in green and blue respectively.

Viewing the Airport Runway Layout

The runway layout has the notion of a Viewing Angle and has four display modes of setting this viewing angle.

Viewing Angle

The Viewing Angle is the angle at which the viewer is looking at the airport. More simply put, if the aircraft is east of the airport flying directly to the airport, the viewing angle would be 270° (West). If the aircraft was heading directly to the airport on a heading of 213°, then the viewing angle would be 213°.

Four Display Modes

The Airport Runway Layout has four display modes:

- **Manual** – the entire runway layout can be rotated manually by using the left and right hardware arrow keys, or by dragging the stylus or a finger in a circular motion on the screen [Touch screen devices].

- **North Up** – The Viewing Angle is fixed at 0°.

- **Track Up** – The Viewing Angle is set to the GPS Track.

- **To Airport** – The Viewing Angle is set to the course to the airport.
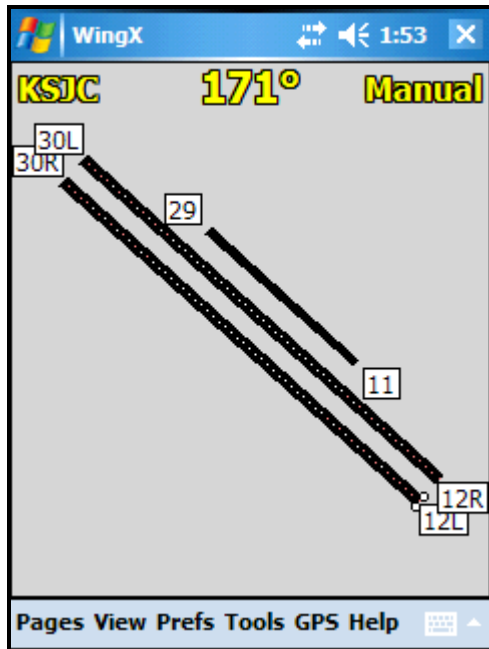
Manual
User selects viewing angle.
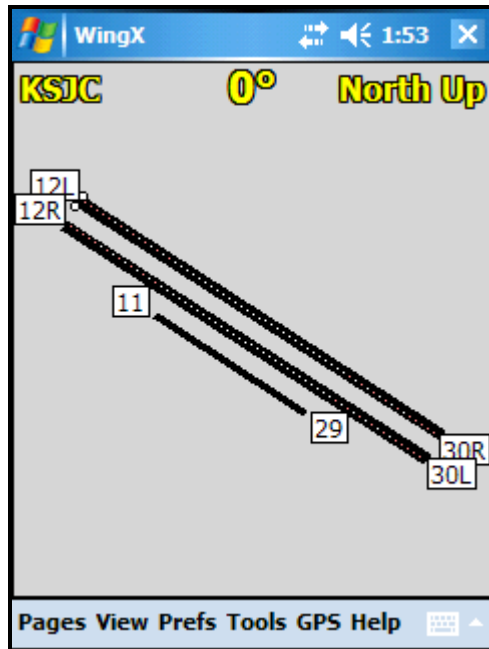
North Up
Viewing angle is fixed at 0°.
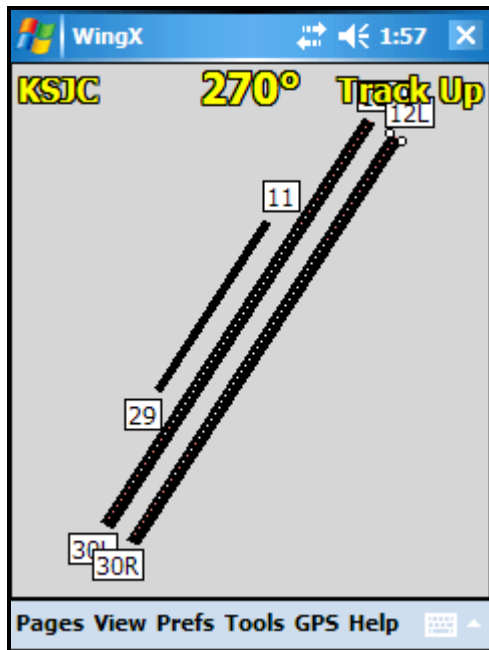
Track Up
Viewing Angle is set to GPS track.
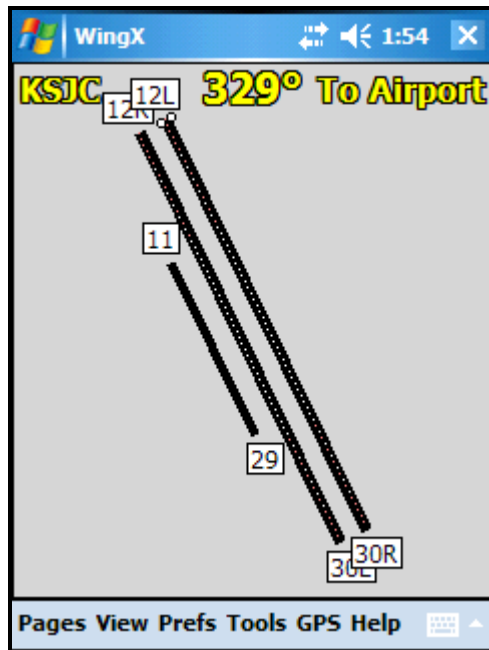
To Airport
Viewing Angle course to airport.

WingX displays centerline lighting and REILs when installed on a runway.

Runway Types and Surfaces

Runways and heliports can have a variety of surfaces. The most common surfaces are asphalt, turf, dirt, and water. WingX displays these surfaces use black, green, brown, and blue respectively.
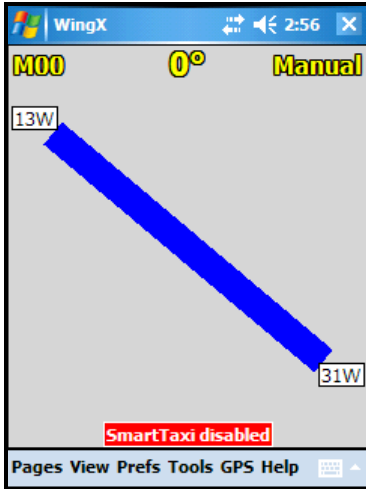
Water Runways	**Grass Runways**	**Helicopter Pads**
Water Runways are shown in blue.	Grass Runways are show in green.	Grass helipads are also shown in green.
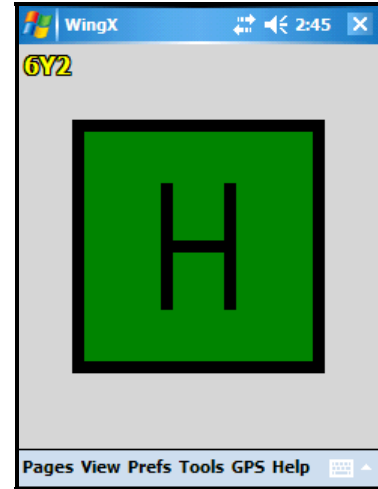
SmartTaxi™ Technology

WingX's SmartTaxi™ Technology works in the same manner as it does on the Charts page when displaying the NACO Airport Diagram. However, enabling SmartTaxi™ on the Airport Page enables WingX to provide runway incursion graphics and audio and visual warnings at about 4,000 airports versus just a few hundred on the Chart page. Another advantage is that by using the "Track Up" display mode, the runway layout will reorient itself as the aircraft turns while taxiing. Please refer to the chapter on SmartTaxi™ Technology.
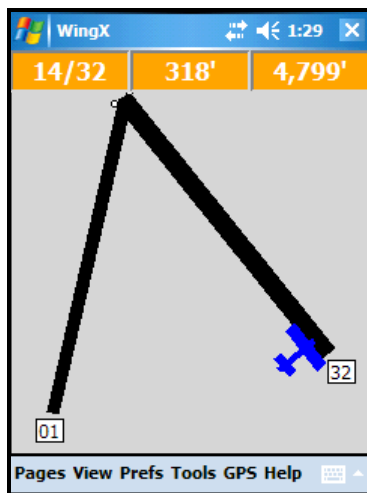
Helicopter Pads	**Grass Runways**
Helicopter pads look somewhat authentic.	Grass Runways are show in green.
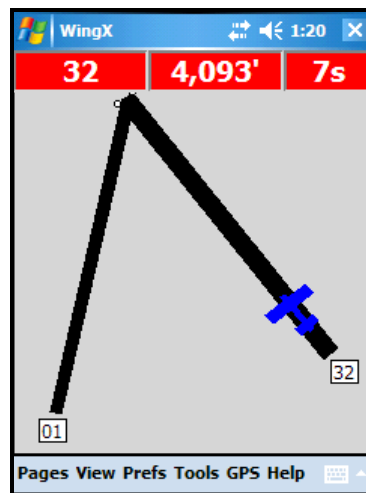
Document Page

WingX stores a tremendous amount text and makes it quickly accessible and searchable. The FARs, parts of the AIM, CFI endorsements, FSS phone numbers, and many other documents are 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 (CFIs), there is Advisory Circular 61-65E (endorsements). The Pilot/Controller Glossary, NWS Contractions, FSS Phone Numbers and also made available. The documents available on WingX include[4]:

- 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 121 – Operating Requirements: Domestic, Flag, And Supplemental Operations
- FAR Part 135 – Operating Requirements: Commuter And On Demand Operations And Rules Governing Persons On Board Such Aircraft
- FAR Part 137 – Agricultural Aircraft Operations
- 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
- FAR Part 1552 – Flight Schools
- FAR Part 1562 - Operations In The Washington, DC, Metropolitan Area
- AIM Preflight Briefing
- AIM Flight Plan Form
- AIM Aircraft Equipment Suffixes
- AIM PIREP Element Code Chart

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[4] Hilton Software can and will continually update this list as necessary. Documents may be added and/or removed at any time at the discretion of Hilton Software.

- AIM Light Gun Signals
- Pilot/Controller Glossary
- AC61-65E – Certification: Pilots and Flight and Ground Instructors
- NWS Contractions
- FSS Phone Numbers

Selecting a Document and a Subpart

WingX displays its document selection window in a tree structure. Therefore, to select a specific FAR for example, first the FAR Part is selected, then the Subpart is selected, and finally the specific FAR. The granularity proves to be very productive.

Example

Let's assume we're looking for "the required Aeronautical Experience required for the Private Pilot Practical Test". WingX displays the headings of the entire list of documents. Since our required document has to do with the certification of pilots, tap on the ⊞ to the left of "Part 61" to we expand "Part 61". WingX expands Part 61 to display the various Subparts. We are looking for the Private Pilot requirements, so that Subpart is expanding, and thirdly we select "61.109 – Aeronautical Experience" and select Display.
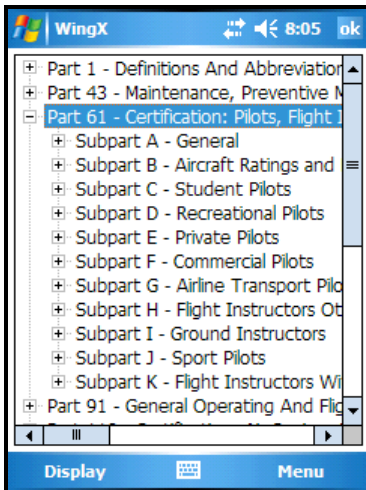
Select the Main Document	**Select the Subpart**	**Display the Document**
Its subparts are displayed below.	Its documents are shown below.	Select the document and tap Display.
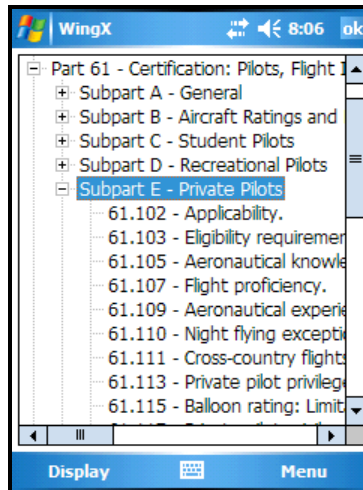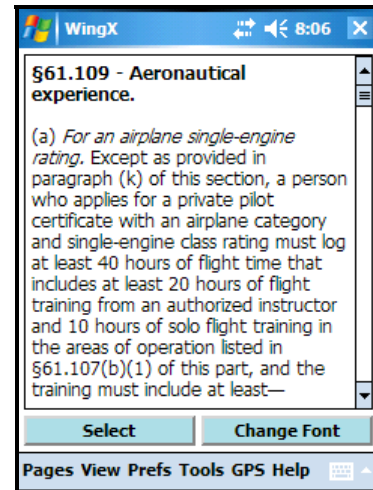
Document Searching

Document searching is accomplished by selecting menu, and then Search. A dialog box is displayed which allows a search term to be entered. As an example, if it wasn't known where to look for Part 61.109 (see above example), a search could be performed on the word "experience".
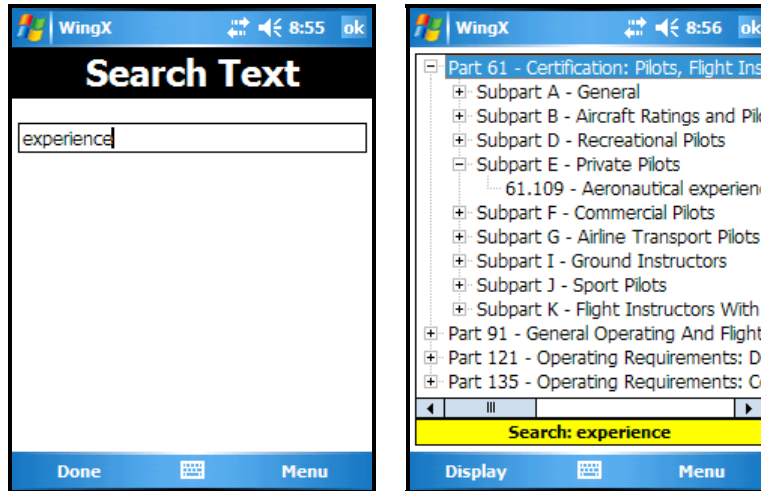
Note that from the long list of documents, only Part 61, Part 91, Part 121, and Part 135 are now shown. By selecting "Part 61", and "Subpart E – Private Pilot", we see that only one FAR is shown and it is Part 61.109 which is the required FAR.

Text Size

Depending on the device type, and screen size, and quality of eyesight, it may be preferable to display the text using a smaller font. A smaller font allows more text to appear on the screen simultaneously thereby providing the user with more information and also minimizes scrolling. WingX allows the user to change the font size by tapping on the "Change 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.
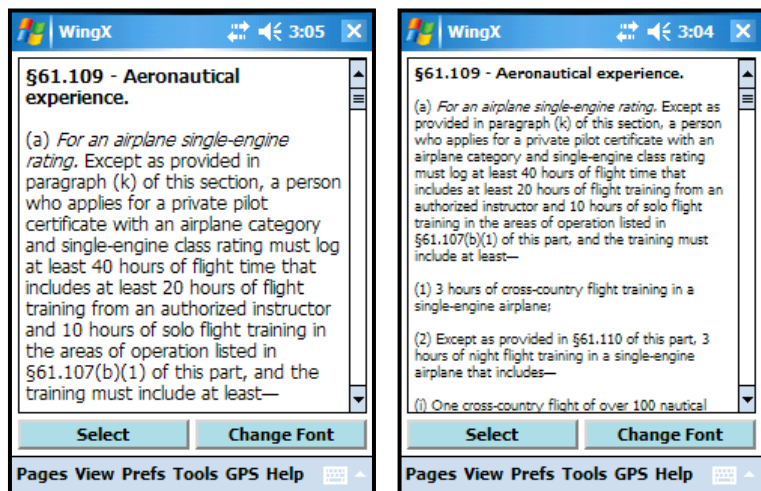
Pilot Expirations

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 or phone.

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

It is often difficult, or at least time consuming, to add 90 days to a date, yet this is what the FARs require pilots to do. It is also sometimes difficult to remember if the currency period is 90 days, 6 months, 1 year, or 12 calendar months. WingX automatically adjusts dates according to the appropriate FAR.

For example, if you were to select November 26, 2007 as the date you did your 3 take-offs and landings in a tail-wheel aircraft, WingX automatically calculates February 24, 2007 as the expiration date; i.e. WingX added 90 days to November 26, 2007.
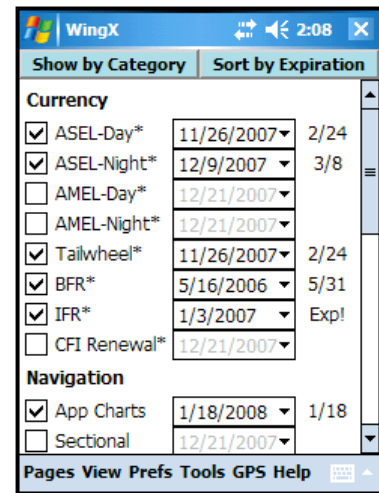
> **Items marked with an asterisk "*" will automatically increment the input date, whereas the items without an asterisk will not.**

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		
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 auto-increments 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.
Expiration Date or Days To Go	The Expiration Date or 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. "Exp!" means that the item has expired.

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

Changing the Display Order

The expiration items can be shown by category or sorted by expiration by tapping on the "Show by Category" or "Sort by Expiration" buttons:

- **Show by Category**
    - Collates expiration items into categories with headings such as "Currency" and "Navigation".
    - Shows all items (both checked and unchecked).

- **Sort by Expiration**
    - Sorts the expiration items according to their expiration date. This will remove the headings as well as non-selected items from the display list.
    - Only displays checked items.

Example

Assume that two hours after sunset on December 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 December 9th. WingX automatically calculates that the expiration date for that flight would be March 8th and sets the date accordingly. In fact, since achieving night currency also achieves day currency, WingX automatically update the "ASEL (day)" date similarly.

After adding a few more currency and navigation items, we would view these expirations as:
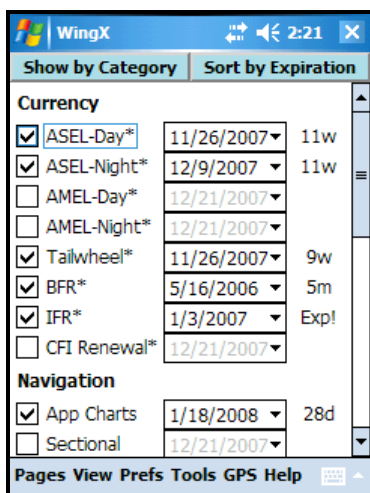
Show by Category	**Show Dates**	**Sort by Expiration**
The items are grouped by category.	Show dates instead of Days To Go.	The items sorted by expiration date.
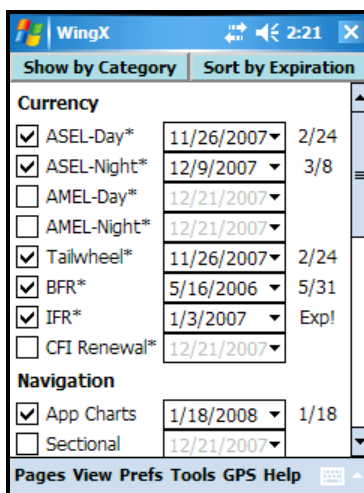
Podcasts Page

*Keeping up with aviation's fast moving pace is challenging. Some downtime at the airport is
a perfect time to get caught up. With WingX's podcast feature, you can literally do it with
your eyes closed.*

WingX downloads podcasts, stores podcasts, and plays podcasts and simplifies the entire process. An Internet connection is obviously required to download podcasts, but is not required while listening. With an Internet connection, WingX can simultaneously play a podcast whilst downloading other podcasts in the background. With or without an Internet connection, WingX plays podcasts enabling access to the latest aviation news, commentary, and weather while walking around the EAA AirVenture, waiting for a doctor's appointment, riding on the train, or anywhere else you feel like listening. WingX's podcast feature is a perfect tool for the Aviation Road Warrior.

Select the Podcasts

The first step is to select the podcast source. Hilton Software has teamed up with various news resources and other podcast creators to bring the latest aviation news, aviation commentary, and aviation weather.

Tapping on the large rectangular "Tap here for podcasts" area displays a popup menu. This lists the podcast sources available. Selecting a source displays that source's groups. Selecting a group causes WingX to show all podcasts available from the selected source in the selected group. Podcasts are shown by displaying their creation date and description. Embedded at the end of the description is the podcast duration and size in bytes. If an "X" precedes the date in the Cached column, then that podcast has already been downloaded and is stored on the device. Cached podcasts do not require an Internet connection to be played.

WingX plays podcasts in the background so that WingX can continue to operate normally.

| Select the Source and Group | The Podcasts List | Podcasts play in Media Player |
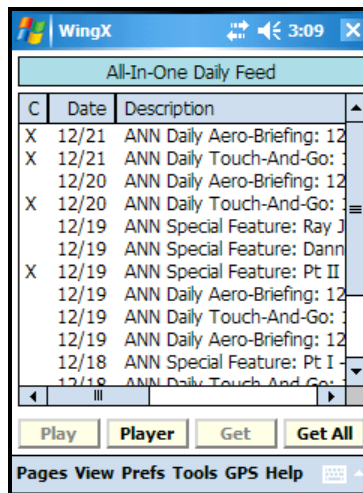
There are four buttons on the page that have the following functionality:

- Play – Tapping on this button will play the current selected podcast.

- Player – Tapping on this button with display the Windows Media Player to give you full control over the playing of the podcast.

- Get – Tapping on this button will download the selected podcast. Once the podcast has been downloaded and is stored on the device, an "X" will appear to indicate that the podcast is cached.

- Get All – Tapping on this button will download all of the podcasts listed that have not already been downloaded.

E6B Page

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

W ingX's multi-page E6B adds functionality and separates the functions into logical sub-pages to make navigating the E6B easier. Fast data entry is made possible by WingX's extensive use of pull-down menus (for conversions) and popup menus for fast data entry. In addition, values are propagated to other textboxes when it makes sense to do so, thereby eliminating the double-entry of values.

The E6B sub-pages are:

- **Conversion:** For temperature, distance, speed, weight, volume, and pressure conversions. In all, WingX has over 135 possible conversions.

- **Altitude:** For pressure altitude, density altitude, heat index, relative humidity, and true altitude calculations.

- **Wind:** For winds aloft, heading, ground speed, wind correction angle, as well as headwind and crosswind calculations.

- **Performance:** For distance/speed/time, fuel usage and consumption, and IFR climb rate and climb angle calculations.

- **Time:** For adding and subtracting times, and for calculating flight/block times.

- **Miscellaneous:** For Wind Chill calculations.
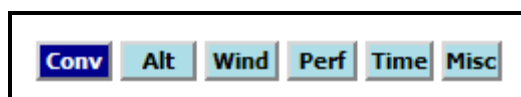
Conversion Sub-Page

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)
Speed	Knots MPH KM per hour (KM/H) Feet per second (FT/S) Meters per second (M/S)
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 32.222°C.
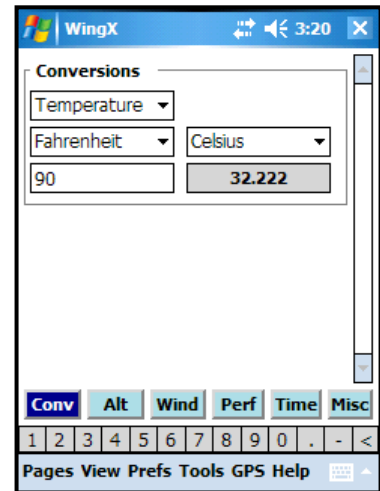
> Gray text boxes are read only and cannot be edited.

Altitude Sub-page

Density Altitude is a critical factor related to aircraft performance. This is especially true operating at hot and/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.

> **WingX uses very accurate equations to calculate Density Altitude. These equations use the dew point (if available). Therefore, WingX's calculated Density Altitude will probably be different that what you will obtain from a less sophisticated calculator.**

Example 1: To determine the density altitude in Reno, there are several pieces of information required. Firstly, the airport's elevation is required. Reno's airport elevation is 4415', but WingX accepts airport identifiers, so we "KRNO". Secondly, environmental conditions are entered; these include Altimeter Setting, Temperature and Dew Point. After entering the required numbers, WingX determines that the Pressure Altitude is 4,462' and the Density Altitude is 6,608' and the Relative Humidity is 44%. Interestingly, the 12C dewpoint raised the Density Altitude about 200'.

WingX automatically propagates the Pressure Altitude and temperature down to the CAS/TAS group box. Therefore, only the Calibrated Airspeed CAS needs to be entered and WingX calculate the True Airspeed (TAS).
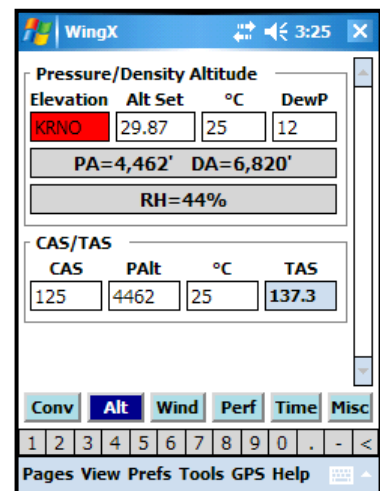
> **Hint: Tap on "°C" to change to "°F" and vice versa.**

Wind Sub-page

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. WingX can use the GPS information as real-time input for the Track and Ground Speed values.

Calculating Winds Aloft

To calculate the winds aloft enter:

- **True Airspeed (TAS):** The TAS can either be entered directly from the reading on the airspeed indicator (after adjusting for altitude) or calculated on the Altitude page.

- **Track over the ground (Track):** 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 (Hdg):** 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 used with the appropriate deviation applied (as listed on the compass card).

- **Groundspeed (GSpd):** The known groundspeed 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 FSS report winds aloft relative to True North. To convert to True North, enter a nearby airport, navaid, or fix.

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

Example: Ensure that the "Known Wind" checkbox is unchecked to calculate the winds aloft; i.e. that the winds are unknown. Using an 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 respectively. 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 uses the magnetic variation for Reno to calculate the winds aloft relative to True North.

Calculating Heading, Ground Speed, and WCA

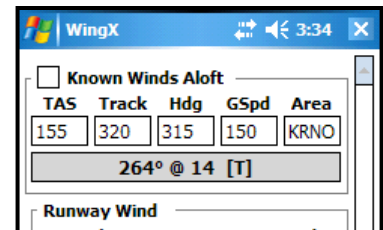To calculate the required heading, the groundspeed and Wind Correct Angle (WCA), the following pieces of data must be entered:

- **True Airspeed (TAS):** The TAS can either be entered directly from the reading on the airspeed indicator (after adjusting for altitude) or calculated on the Altitude page.

- **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.

- **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 are 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.

Example: Ensure that the "Known Wind" checkbox is checked to use the known winds aloft; i.e. that the winds are known from a source such as DUATs or Wingx's Weather page. Using an example scenario, the True Airspeed is 155 knots, the Course is 10° and the wind is 330@25. For purposes an example, in these calculations the Area field has been left blank thereby causing the results to be displayed relative to Magnetic North.
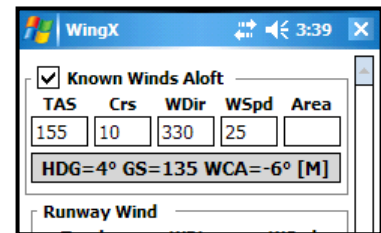
Runway Wind - Headwind and Crosswind Components

Many aircraft accidents occur on landing and wind is often listed as a factor. 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 a limitation for a student's solo flight.

Example: 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 encourage pilots to use the actual runway heading and not to simply add a zero to the runway number for the most accurate results.
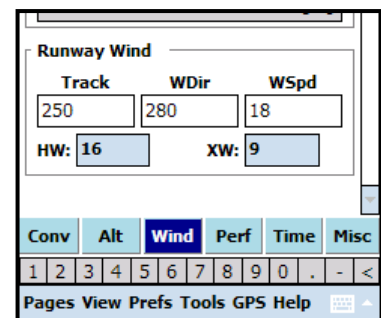
Note: A negative headwind implies a tailwind. A negative crosswind is a crosswind from the left.

Performance Sub-page

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.

> **Enter 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 required is calculated to be 2 hours, 9 minutes, and 36 seconds or just 02:09:36. With GPS input enabled for the E6B, the FPM and Angle calculations will update in real-time.
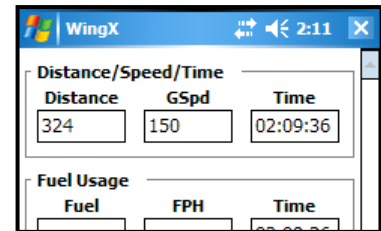
Fuel Usage

Fuel calculations are an important part of flight planning and are part of WingX' E6B:

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

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

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

Example: The Distance/Speed/Time time is automatically propagated into the fuel calculations. Entering "12" in the Fuel Per Hour (FPH) text box results in WingX calculating the fuel required as 25.9 gallons. Note that pounds per hour may be used as the fuel units. We use gallons in this example.

To determine endurance, enter the number of gallons (or pounds) and the Fuel Per Hour (FPH) value, WingX will calculate the endurance in HH:MM:SS.
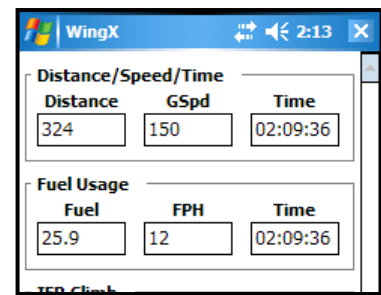
IFR Climb Rate and Climb Angle

IFR climb rates and climb angles are critical for safe flight in instrument conditions. IFR departure procedures are designed and published with specific criteria and these are printed right on the departure procedure. However, these 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 calculates the required climb rate in feet per minute (FPM) and the climb angle in degrees. Using a GPS receiver, pilots can carefully monitor the climb performance during the climb to ensure that the minimum climb gradient is being achieved.

Example: A climb procedure specifies 300 ft/nm as the required climb gradient and the ground speed will be 120 knots. The required climb rate is calculated to be 600 ft/minute with a climb angle of 2.83°. With GPS input enabled for the E6B, the FPM and Angle calculations will update in real-time.
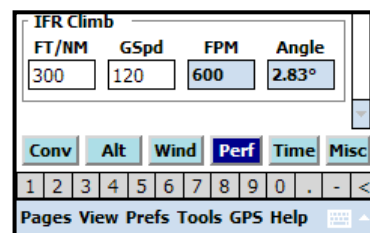
Time Sub-page

WingX makes adding and subtracting times fast and accurate. In addition, calculating Flight/Block times is easy.

Adding and Subtracting Times

Times can be added or subtracted using either format HH:MM:SS or decimal hours.

Example: If the first time is entered as "1:30:00" and the second is "2.3", then WingX adds these together and displays both "3:48:00" and "3.8" as the result. Times may also be negative thereby allowing the subtraction of times.
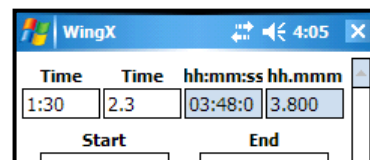
Flight/Block Times

Flight/Block times use specific dates and times for Out, Off, On, and In; i.e. time out the gate, time off the runway, time on the runway, and time in the gate. Using the differences between Off and On and the difference between time Out and In, WingX will calculate the Flight and Black times respectively.

Example: The aircraft is out the gate on December 21, 2007 at 11:56pm, off the runway at 11:58pm. The aircraft lands at 2:23am the following day and is in the gate at 2:27am. WingX calculates the flight and block times as 2:25:00 (or 2.4) and 2:31:00 (2.5) respectively.

> Tap on "Down" to change to round up.
>
> Tap on "Up" to change to round down.
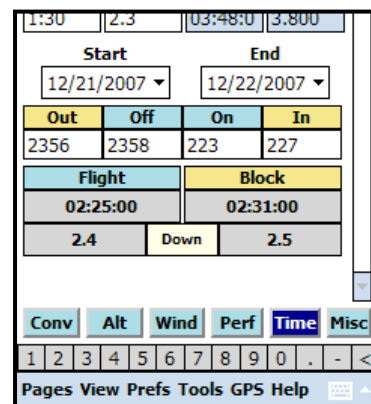
Miscellaneous Sub-page

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.

Four Examples: Let's assume that a cold front has moved through the area and that the METAR on the Weather page area shows an ambient temperature of -28°C. Wind Chill and frost bite time are strongly dependant on the wind speed when in such cold weather.
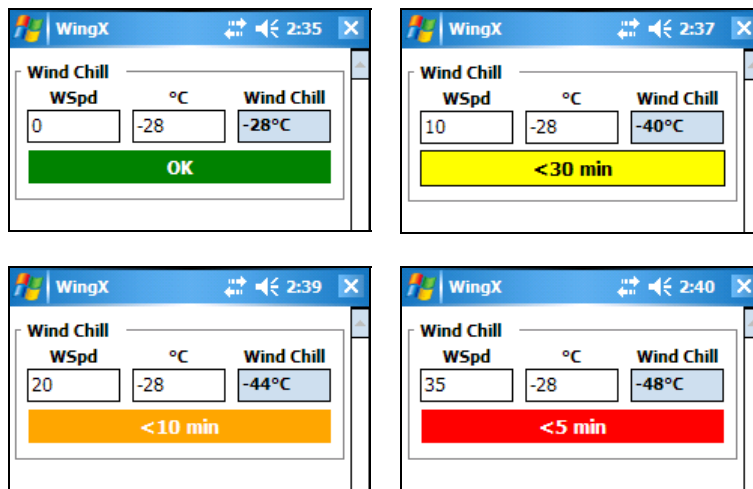
Thumb Control

Thumb Control allows a pilot to to use WingX while in flight in turbulence or while wearing gloves - perfect for General Aviation and Military pilots alike.

Anytime an editable text box on the E6B page is expecting input, press the "OK button (center hardware button) and a dialog box with large buttons will be displayed appear allowing values to be entered with 'finger taps'.

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. Pressing the "OK" button confirms the value and automatically enters it into the appropriate text box.
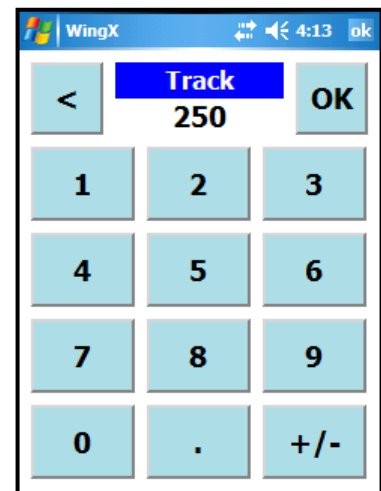
SmartTaxi™ Technology

WingX's SmartTaxi™ Technology is a solution to the every-increasing problem of runway incursions. Runway Incursions occur daily and have been on the NTSB's Most Wanted List since its inception. There continue to be so-called near-misses and by their nature, a collision will involve two aircraft and potentially hundreds of passengers.

W ingX's SmartTaxi™ Technology is a portable an inexpensive solution for the runway incursion problem. SmartTaxi™ shows the aircraft position on a NACO Airport Diagram or Runway Layout. NACO Charts are more detailed and allows the pilot to see taxiways and other airport features. However, using Runway Layouts allows SmartTaxi™ to be enabled at approximately 4,000 airports in the United States. In addition, the runway layout can be rotated to continually be track up.

About SmartTaxi™

Bad signage, poor visibility, poor markings, and a high workload all contribute to the dangers and increase the likelihood of a Runway Incursion and/or loss of Situational Awareness on the airport surface. There have been numerous accidents with significant loss of life as a result of incorrect 'ground procedures' such as taking off from the incorrect runway, taking off from a taxiway, missing a taxiway during taxi, and so on.

WingX's SmartTaxi™ Technology performs two functions:

- SmartTaxi™ displays the aircraft location and direction on the Airport Diagram or Runway Layout.

- SmartTaxi™ warns the pilot both visually and audibly of a potential runway incursion.

Using a patent-pending algorithm, WingX shows the aircraft's location on the airport diagram very accurately. Secondly, when the aircraft gets close to a runway and/or is on a runway, WingX warns the crew both visually and audibly. The audio output is an important component to alert a crew whose attention might be focused elsewhere in the aircraft or outside.

> **Before using the SmartTaxi™ technology at an airport, we suggest that you display the Airport Diagram with Runway Identifiers shown. If the runway identifiers are correctly shown at the runway endpoints, then the aircraft position will also be shown correctly. However, if the runway identifiers are not collocated with the appropriate runway endpoints, please contact us as soon as possible.**

Approaching a Runway

When approaching a runway, WingX provides audible and visual warnings and shows the length of runway remaining in both directions.
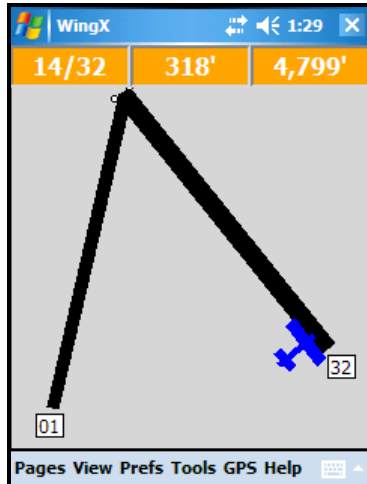
SmartTaxi™ on Runway Layout
WingX shows that there are
318' and 4,799' remaining on
runways 14 and 32 respectively.
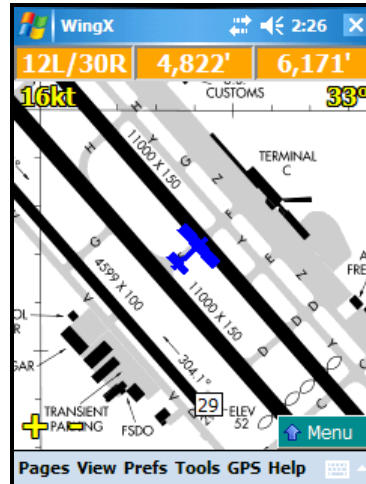
SmartTaxi™ on Airport Diagram
WingX shows that there are
4,822' and 6,171' remaining on
runways 12L and 30R respectively.

On a Runway

When on a runway, WingX provides audible and visual warnings, shows the length of runway remaining, and displays the length of time that the aircraft has been on the runway – useful for "Taxi into position and hold".
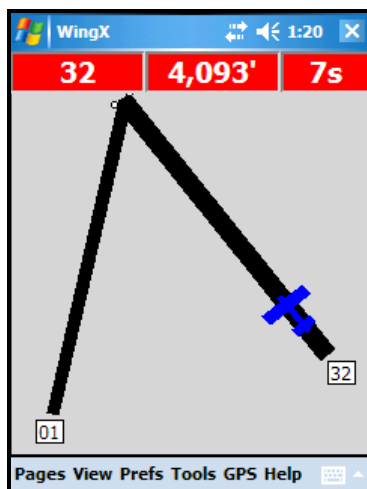
SmartTaxi™ on Runway Layout
WingX shows that there are
4,093' remaining on runway 32,
aircraft on the runway for 7 seconds.
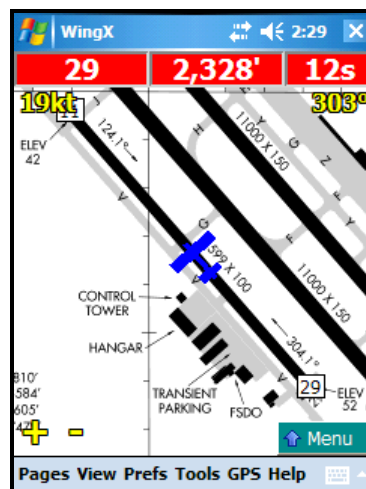
SmartTaxi™ on Airport Diagram
WingX shows that there are
2,328' remaining on runway 29,
aircraft on the runway for 12 seconds

WingX Tools

WingX includes several so-called "tools" which are used to create User-Defined Aircraft Models and Waypoints, perform Airport Searches, N-Number Searches, and even dial using an alphanumeric phone number on Smartphones. Database and application housekeeping is also part of the WingX Tools.

W ingX Tools can be thought of as achieving three purposes; firstly WingX adds flexibility by allowing the creation of User-Defined Aircraft Models and Waypoints; secondly WingX adds additional search and phone functionality; and thirdly, WingX include housekeeping tasks such as database operations, and application maintenance. Each of these functions is described in this chapter.

WingX Managers

There are two managers in WingX. The Aircraft Model Manager is used to create User-Defined Models (UDM). The second is the Waypoint Manager which is used to create waypoints for route planning.

Aircraft Model Manager

The Aircraft Model Manager enables a pilot to create their own aircraft models. WingX's aircraft model database has close on 500 different aircraft models. These models should satisfy most pilots' requirements. To define an aircraft which is not in WingX's Model Database, a pilot can use the Aircraft Model Manager to define their own aircraft model either from scratch or by using an existing aircraft model as a starting point. After defining an aircraft model, an aircraft must be added to WingX and associated with this new UDM to it to be used in W&B calculation. Simply put, define a UDM using the Aircraft Model Manager and then add an N-Number as shown in the chapter "Aircraft Page".

There are various pieces of information to enter when defining a UDM. The entire process consists of seven pages. Each page has its own integrated help – you are encouraged to use this help to guide you through the process. To view the help, select Menu, Help for this Page. In addition, each page has one or two yellow lines that provide quick info.

The first screen is used to define the aircraft make, model, name, and any applicable year range. The maximum Ramp, Takeoff, Landing, and Zero Fuel limitations are defined on the second screen. The third screen is used to enter the W&B envelopes of the aircraft. WingX has the capability of defining the Normal, Utility, Acrobatic, Solo, and Helicopter Lateral envelopes.

WingX 4:46 ok	WingX 4:39 ok	WingX 4:40 ok
Make/Model Information	**Weight Limitations**	**Normal Envelope**
Example: Cirrus, Cessna, Piper	Maximum Ramp Weight [optional]	Envelope point per line; e.g. 2200,15.
Make: Cessna	Max Ramp:	2300 ... 1950
Model: C172XYZ	Max Takeoff: 2300	1200 / 35.0 38.5 47.4
Name: Skyhawk	Max Landing: 2300	1200@35
Year From:	Max Zero Fuel:	1950@35
Year To:		2300@38.5
		2300@47.4
		1200@47.4
	1 2 3 4 5 6 7 8 9 0 . <	1 2 3 4 5 6 7 8 9 0 . @ <
Next Menu	Next Menu	Next Menu

| **Make, Model Information** | **Maximum Weight Limitations** | **Weight and Balance Envelopes** |
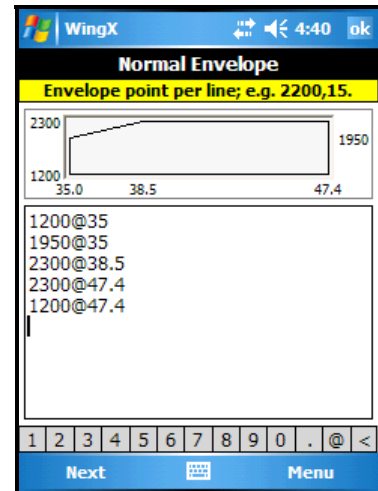
Next, the seats, baggage, and fuel stations are defined. These stations are defined in the same general manner, but with a slightly different syntax. WingX shows the required items in the help text above the input area.

WingX 4:44 ok	WingX 4:41 ok	WingX 12:10 ok
Seat Information	**Baggage Information**	**Fuel Information**
arm,#,desc	arm,#,desc,max*	arm,#,desc,full,unusable*
* is optional	* is optional	* is optional
37,2,Front Seats	97,1,Area 1,120	46,2,Main,21.5,0
73,2,Rear Seats	123,1,Area 2,50	
1 2 3 4 5 6 7 8 9 0 . , <	1 2 3 4 5 6 7 8 9 0 . , <	1 2 3 4 5 6 7 8 9 0 . , <
Next Menu	Next Menu	Next Menu
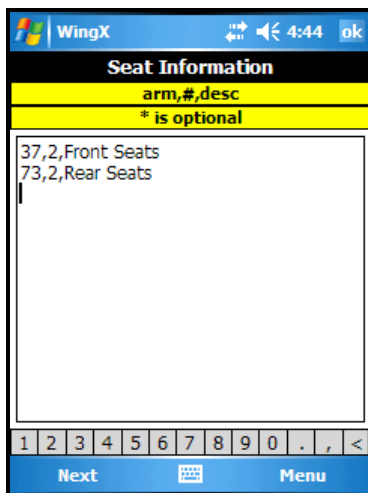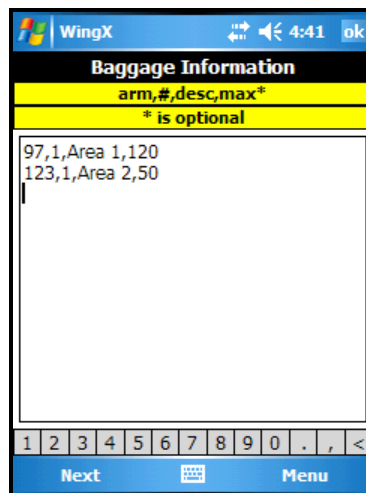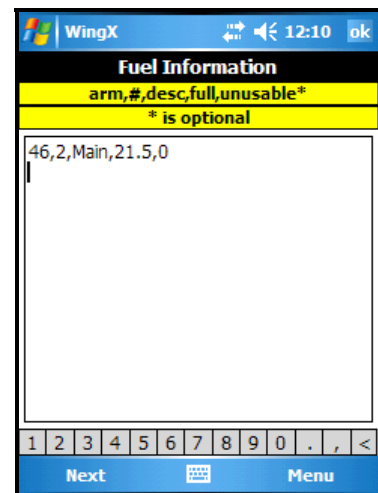
| **Seat Information** | **Baggage Information** | **Fuel Information** |

Finally, the fuel type and fuel units are defined. After selecting "Done" on this final screen, the User-Define Model will be added to WingX, and saved on the device.
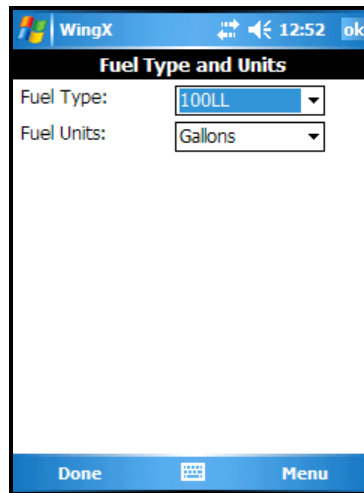
Fuel Type and Units

Waypoint Manager

User-defined waypoints (UDW) are a very powerful tool that makes route planning more flexible. UDWs can be defined in various ways and WingX can also use GPS coordinates.

Latitude/longitude coordinates can be in the following formats where negative coordinates for latitude and longitude imply South and West respectively:

Latitude/Longitude	Example	Result
DD MM SS.X	37 21 45.6	37 21' 45.6"W
DD MM.X	37 21.76	37 21' 45.6"W
DD.X	37.3626667	37 21' 45.6"W

Waypoints can also be defined using the format <ID><BRG><NM> (entered in the Latitude text box):

- The identifier (ID) can be that of an airport, navaid, fix, intersection, or user-defined waypoint; examples are "KSJC" (KSJC airport), "SJC" (SJC VOR), "MYHOUSE" (UDW), etc…

- The bearing (BRG) is always three digits and an integer value.

- The distance (NM) is always a three digit value plus an optional decimal value; examples are "015", "015.3", or "015.456".
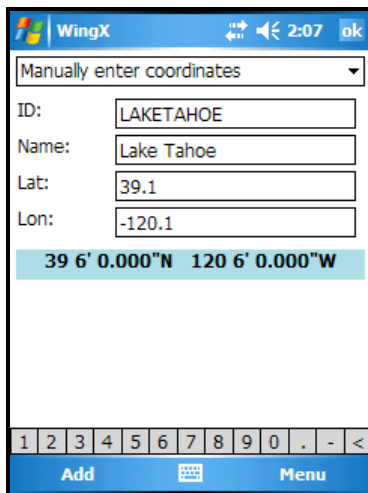
Adding a Waypoint	Adding a Waypoint	Waypoint Manager
Numerical latitude and longitude.	Bearing and distance from a point.	Showing both waypoints just added.
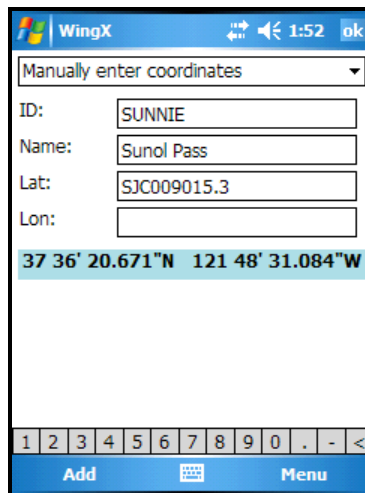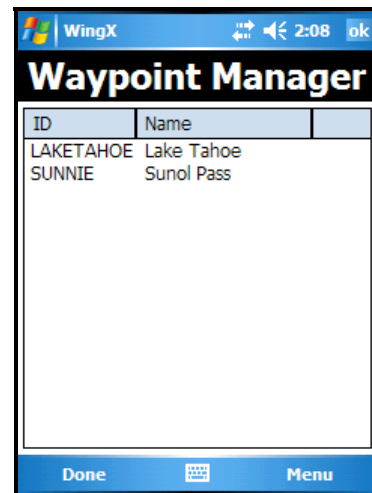
GPS Coordinates

WingX can use the current GPS coordinates when defining a waypoint. There are two options when using GPS coordinates:

- **Use GPS coordinates [real time]:** Use this option when moving (e.g. in-flight). WingX uses a single instantaneous GPS coordinate. It is slight less accurate than the averaging method, but will be more accurate in flight when the aircraft is moving.

- **Use GPS coordinates [average]:** Use this option when stationary (e.g. on the ground). WingX will average the GPS coordinates over time and the resulting coordinate will be a slightly more accurate representation of the position as a result of the averaging algorithm effectively canceling out the 'noise' or slight inaccuracies of the GPS coordinates.

WingX Searching

WingX has two types of searching capabilities. Firstly, the Airport Search can be invoked from the Tools menu or from an airport popup menu. Secondly, the N-Number search uses an Internet connection to search for and display information about a specific aircraft.

Airport Search

WingX can search for airports using part of the airport name, part of the city name near the airport, or distance from an airport. In the first example, all public airports are being searched for those having "hope" in their name. The search is not case sensitive; e.g. "hope" is the same as "HOPE". WingX also calculates the distance and MH each airport is from KSJC (in our example). Tap on "OK" to begin searching.

In this example, WingX found seven public airports with the word "hope" in their name. The airport identifier, name and distance and magnetic heading from KSJC are shown in a listbox. Tapping on the column headers sorts the airports based on that column's information. Tapping on the NM column header sorts the airports by distance from KSJC.

Filtering by State: To filter the airport list by state, append the state ID after the name. For example, enter "hope,ca" to limit the search to those airports in California.

Viewing an Airport's A/FD or Charts: To view the A/FD page for Bob Hope Airport, tap-n-hold on the airport name to display the popup menu. Then tap on A/FD to view specific A/FD information for Bob Hope Airport.

Searching by Distance: WingX can search for airports that are within a range of distances from an airport. For example, if a pilot is looking for an airport that lies just beyond the 250nm range for Part 61 requirements, WingX will find all applicable airports and list then in order of distance.
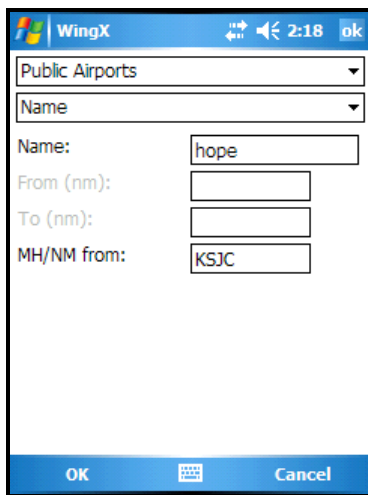
Searching for a public airport Search for "hope" in the name.	**Searching for a public airport** Limit "hope" search to California	**Search Results** Use, show A/FD, or chart of airport.
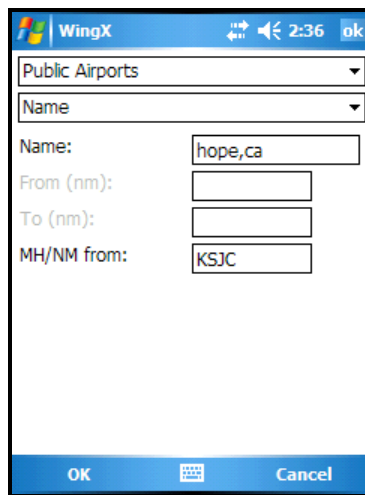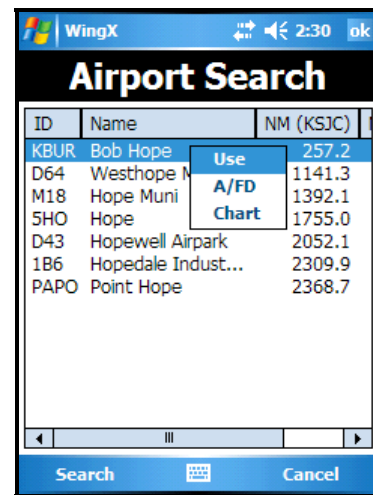
N-Number Search

Searching for an N-number can be both recreational and business-related. For example, a pilot can, while watching aircraft at the airport, obtain specific information about any aircraft. On a more serious side, aircraft information can be very important for organizations such as the Civil Air Patrol (CAP).

The N-number Search dialog is very simple. The page has a text box for the N-number (the 'N' being optional) and a "Display" button to get the information via the internet. Once the appropriate N-number has been entered and the Display button tapped, detailed information will be displayed in the space below. Here is an example using the aircraft in which our CEO took his very first checkride.
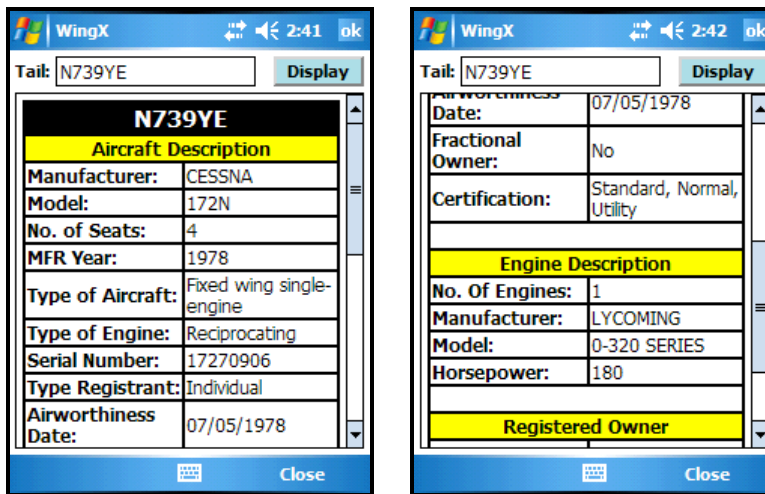
Dial

Windows Mobile Smartphones do not allow a user to enter alphanumeric phone numbers such as 1-800-WX-BRIEF. Moreover, the Smartphone keyboards do not display the equivalent digits for each letter of the alphabet thereby making it practically impossible to dial alphanumeric. WingX also provides quick dialing for some FSS and AOPA numbers.
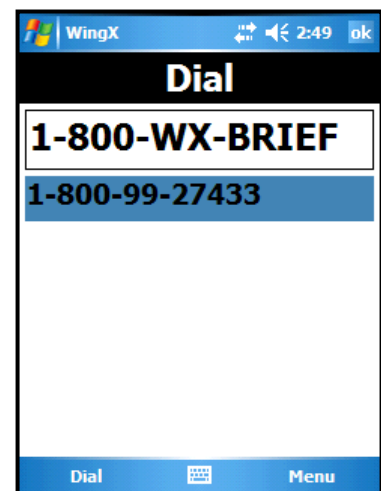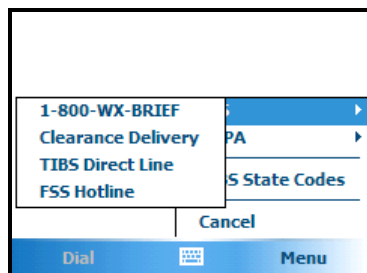
Database Operations

Up-to-date databases are vital for safety of flight. Pilots are encouraged to ensure that their WingX databases are always current. Database currency can be verified is several ways. Firstly, WingX displays the currency status for the Airport Database and the Chart Database prominently on the main menu page. Secondly, the Help, Status page shows both the effective date and the expiration date. Databases are downloaded directly from the Internet, often wirelessly without the need for a desktop or to log in the any web sites.

Downloading Charts

WingX's advanced image compression algorithms reduce the file size of the charts. These smaller file sizes result in faster downloads and less memory required to store the charts. In addition, WingX provides two options; namely region selection and whether or not all the charts or only the airport diagrams are required.

WingX downloads and stores charts as regions. WingX only stores one region at a time. Therefore downloading California and then Nevada, for example, will cause the Nevada region to erase the California region. Instead, the Western region to be downloaded. The following regions are selectable:

Region	Description
AK, AL, AR, AZ, CA…	Any single individual US state
Western Region	AZ, CA, CO, ID, MT, NM, NV, OR, UT, WA, WY
Central Region	AR, IA, IL, IN, KS, LA, MI, MN, MO, ND, NE, OK, SD, TX, WI
Eastern Region	AL, CT, DE, DC, FL, GA, IL, IN, KY, MA, MD, ME, MI, MS, NC, NH, NJ, NY, OH, PA, RI, SC, TN, VA, VT, WI, WV
USA	All charts in the US

Airport Diagrams Only

This option is ideal for pilots who do not require the instrument charts, but would like to make full use of the airport diagrams and WingX's SmartTaxi™ technology. By only downloading the airport diagrams, the download time and storage requirement are reduced by approximately 95%.

Storage Card Support

WingX fully supports storage cards. Depending on the device, these might be an SD Card, a mini-SD Card, a micro-SD Card, or a Compact Flash Card. We recommend a 2GB card (or larger) and the fastest card speed available to reduce download and access times; e.g. 150X for SD cards.

To use the storage card, select Tools, Database, Location, and then select the appropriate card. WingX will move the WingX databases out of main memory and onto the storage card.

Load New Databases
This option is used in conjunction with WingX Agent and is not used in normal operations.

WingX Housekeeping
Occasionally some WingX housekeeping is required for optimal operation. The so-called housekeeping tasks are described below.

Close
This seldom-used option closes WingX. This operation is suggested before rebooting the device to ensure that WingX saves open files before rebooting.

Upgrade
WingX's Software Upgrade Technology enables WingX to upgrade itself to newer versions anytime while connected to the Internet. This means that WingX can upgrade itself, for example, even while out on the ramp.

Change CF
WingX is a .NET application and it requires Microsoft's Compact Framework to be installed on the device. Fortunately, all Windows Mobile devices are now sold with Compact Framework 1.0 pre-installed. To upgrade to Compact Framework 2.0, download and install it from Microsoft, then use Tools, WingX, Change CF.

Upgrading to Compact Framework 2.0 (or later) provides two main advantages:

- WingX will startup and run faster.

- WingX will send much more detailed debug information to Customer Support when it encounters a problem.

Repair Programs
If, when tapping on the WingX icon under "Programs", an error message is displayed, run WingX manually using File Explorer and use this option to repair the Windows link to WingX. This should only be required when users manually move files on their device. This option is not used in normal operations.

Debug Information
If WingX encounters a problem, it gathers various piece of information such as version numbers and what is called a stack trace. The stack track is information which describes which part of WingX encountered the problem. This is all very useful information in tracking down and fixing the problem. Use this option to View this debug information or to Send it to Customer Support.

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
CAP	Civil Air Patrol		RMP	Ramp
CAS	Calibrated Airspeed		SD	Secure Digital
CF	Compact Flash Card		SIP	Software Input Panel
CF	Compact Framework		SPP	Serial Port Profile
CFI	Certificated Flight Instructor		TAC	Terminal Area Chart
CFR	Code Of Federal Regulations		TAS	True Airspeed
CLR	Common Language Runtime		TC	True Course
CPU	Central Processing Unit		T/O	Takeoff
DAlt	Density Altitude		TH	True Heading
DFN	Dynamic Flight Navigator™		UDW	User-Defined Waypoints
ELT	Emergency Locator Transmitter		VOR	Very High Frequency Omni Range
ETA	Estimated Time of Arrival		WAC	World Aeronautical Chart
ETE	Estimated Time Enroute		WAP	Wireless Access Point
FAR	Federal Aviation Regulations		WCA	Wind Correction Angle
GPS	Global Positioning System		WDir	Wind Direction
GS	Ground Speed		WSpd	Wind Speed
Hdg	Heading		XTRK	Cross Track
HW	Headwind		XW	Crosswind
ICAO	International Civil Aviation Organization			
IFR	Instrument Flight Rules			
KTS	Knots			
LND	Landing			

GPS Setup

Wing X is GPS-enabled. The GPS information includes very accurate latitude, longitude, ground speed and other information. Whether the GPS receiver is internal, on a card, or connected via Bluetooth, it delivers its data via a COM port. WingX must be configured to use the GPS's COM port at the appropriate baud rate (data rate). Fortunately WingX provides an Auto Detect feature to detect the GPS's COM port.

If the GPS receiver is connected via Bluetooth, the Bluetooth connection must be configured prior to running Auto Detect.

GPS Bluetooth Setup

The Bluetooth setup requires that the device partners with the Bluetooth GPS receiver and that the communication between the two devices occurs on the correct COM Port. To establish a Bluetooth connection between the device and the Bluetooth GPS receiver, do the following:

1. Tap on the Connection tab under Settings
   1. Tap on the Bluetooth icon
      1. In the Mode tab:
         1. Ensure that "Turn on Bluetooth" is checked
      2. In the Devices tab:
         1. Tap on "New Partnership..."
         2. Tap on the GPS that it finds, then tap on Next
         3. Enter "0000" as the passkey, tap Next (see GPS User Manual)
         4. Check the Serial Port option, tap Finish
      3. In the COM Ports tab:
         1. Tap on "New Outgoing Port"
         2. Tap on the GPS, and tap Next
         3. Select COM7 (see GPS User Manual)
         4. Uncheck "Secure Connection"
         5. Tap on Finish
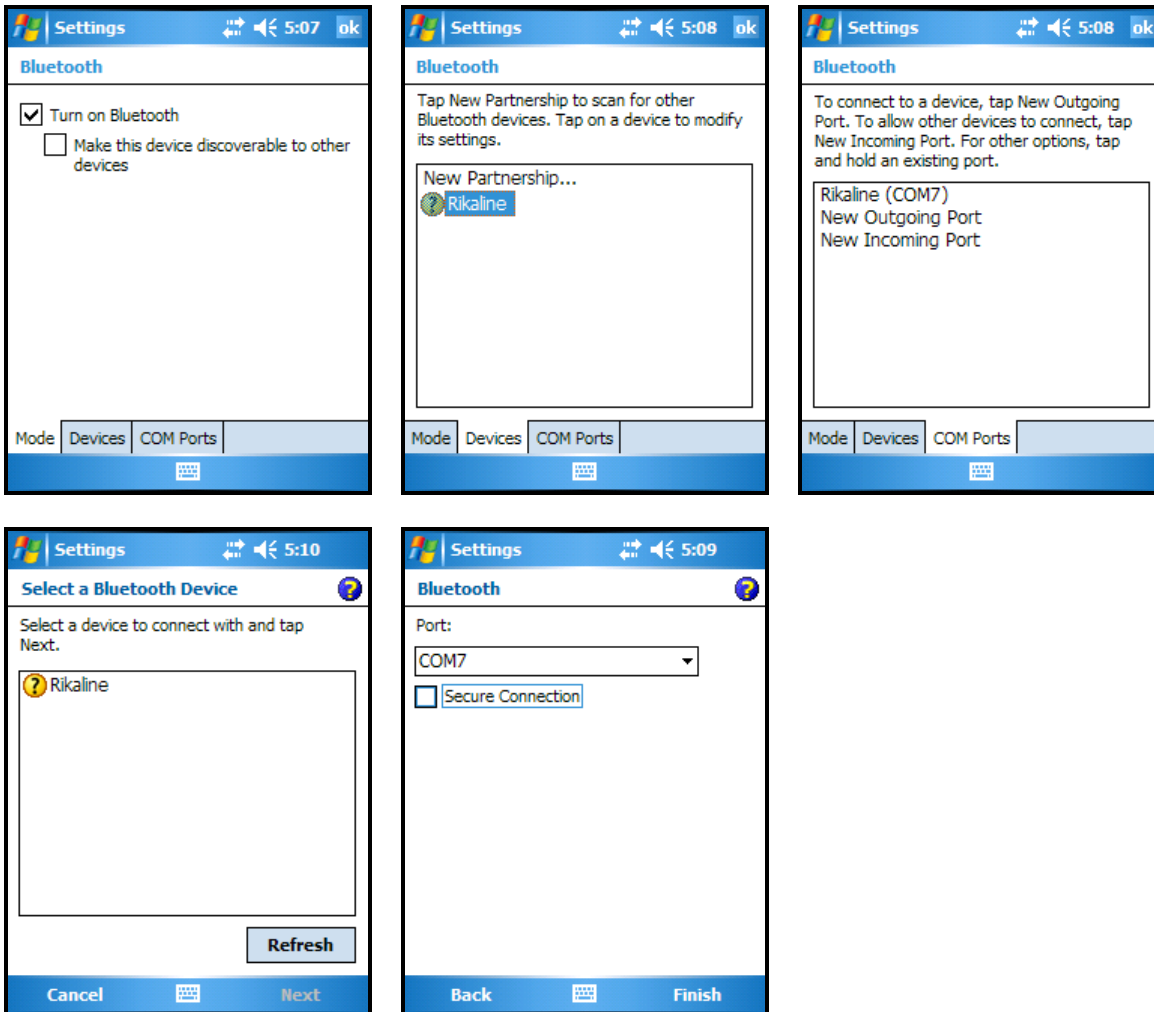
Configuring the GPS Manager

Optional: Windows Mobile 5 and 6 add a GPS Manager that adds yet another layer of functionality and complexity to the GPS setup.

1. Tap on Start, Settings, then System tab (might also be Connections tab)
    1. Tap on the GPS Manager icon.
        1. In the Programs tab, select COM8
        2. In the Hardware tab, select COM7 (see GPS user manual)
        3. In the Hardware tab, select 19200 (see GPS user manual)[5]
        4. In the Access tab, ensure that "Manage GPS..." is checked

---

[5] Higher is better but some GPS receivers may only work at 4800 or 9600

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5. Click OK to close that screen
2. Under the GPS, Configuration menu in WingX, select "Auto Detect".
3. Tap on GPS, Status to verify that the setup works

We have assumed that the GPS COM port is COM7 and that a baud rate of 19200 is appropriate. Change these settings to whatever is noted in the GPS's User Manual.

Settings 🔀 ◀€ 5:07 ok	Settings 🔀 ◀€ 5:07 ok	Settings 🔀 ◀€ 5:07 ok
GPS Settings	**GPS Settings**	**GPS Settings**
Choose the port that programs will use to obtain GPS data. Any program that uses GPS will need to communicate with this port.	Specify the hardware port to which your GPS device is connected. For more information, see the GPS device manufacturer's documentation.	Windows Mobile manages access to your GPS device and allows multiple programs to obtain GPS data simultaneously. If you clear this check box, some programs may not be able to obtain GPS data.
GPS program port:	GPS hardware port:	☑ Manage GPS automatically (recommended)
COM8	COM7	
	Baud rate: 19200	
Programs | Hardware | Access	Programs | Hardware | Access	Programs | Hardware | Access

---

Configuring WingX

Use GPS, Configuration to configure WingX to use the appropriate port. Either the COM port and baud rate can be manually entered or "Auto Detect" can be selected to have WingX detect the appropriate COM port.

WingX 🔀 ◀€ 3:55 ok
GPS Configuration
☑ Enabled
COM Port: COM7:
Baud Rate: 19200
Auto Detect
Auto Detect
Cancel
Done ▦ **Menu**
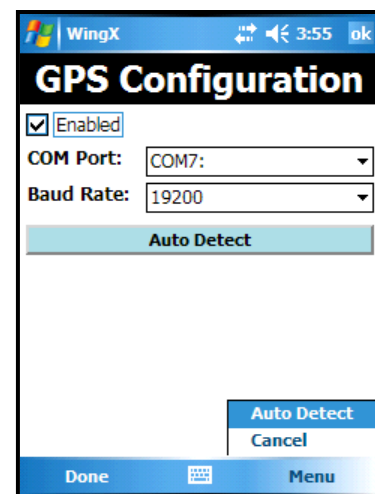
Please refer to our FAQ for the latest GPS Configuration information.

Applicable Regulations

W ingX's makes references to several Federal Aviation Regulations. In particular, the Sunrise/Sunset information on the A/FD page provides times which are important for legalities, logging, and currency. These, and other, FARs are provided below.

> **The FARs change regularly. The text provided in this chapter must not be relied upon for either the safety or legality of aviation operations.**

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 important Federal Aviation Regulations (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.

Troubleshooting

W indows Mobile provide the capability for excellent Internet-based communication. WingX uses these capabilities to upgrade itself, to download databases, to obtain the latest textual and graphical weather, and in any other operation that requires an Internet connection. Sometimes, WingX will report a "Download failure". Fortunately resolving this error message is usually straightforward and quick.

Troubleshooting ActiveSync

Placing the device in the cradle and having ActiveSync running on the desktop provides an Internet connection to the device assuming that the desktop has an Internet connection and that ActiveSync has been configured correctly.

However, there are a couple of things that can 'get in the way' and prevent WingX having a reliable Internet connection.

The most common problems are:

- **ActiveSync Version**

    o Newer versions of ActiveSync do a better job of Internet connectivity. Also, some of the newer devices require ActiveSync 4.5 or higher. We recommend at least ActiveSync 4.2 or higher.

- **ActiveSync Connection Settings**

    o ActiveSync's Connection Settings should be set to "Allow USB connections" and connected to "The Internet" or as appropriate for environment.

- **Antivirus Software**

    o The device is essentially another computer attached to your laptop or desktop. Therefore, antivirus software may prevent 'unexpected' communication between the two and therefore prevent the device from accessing the Internet. Temporarily disabling the antivirus software or altering the setting may resolve the problem. For specific antivirus software settings, please refer to its user manual and/or information found on the web.