Pilot's Guide to SkyRadar and the SkyRadar Receiver

3rd Edition, *rev. 6, September 2012, Version 2.84*

SkyRadar requires a valid subscription license in order to enable full use of the App. Without a valid subscription license SkyRadar will operate in Limited Mode. In this mode the SkyRadar map will only display airports with runways longer than 8000 feet.

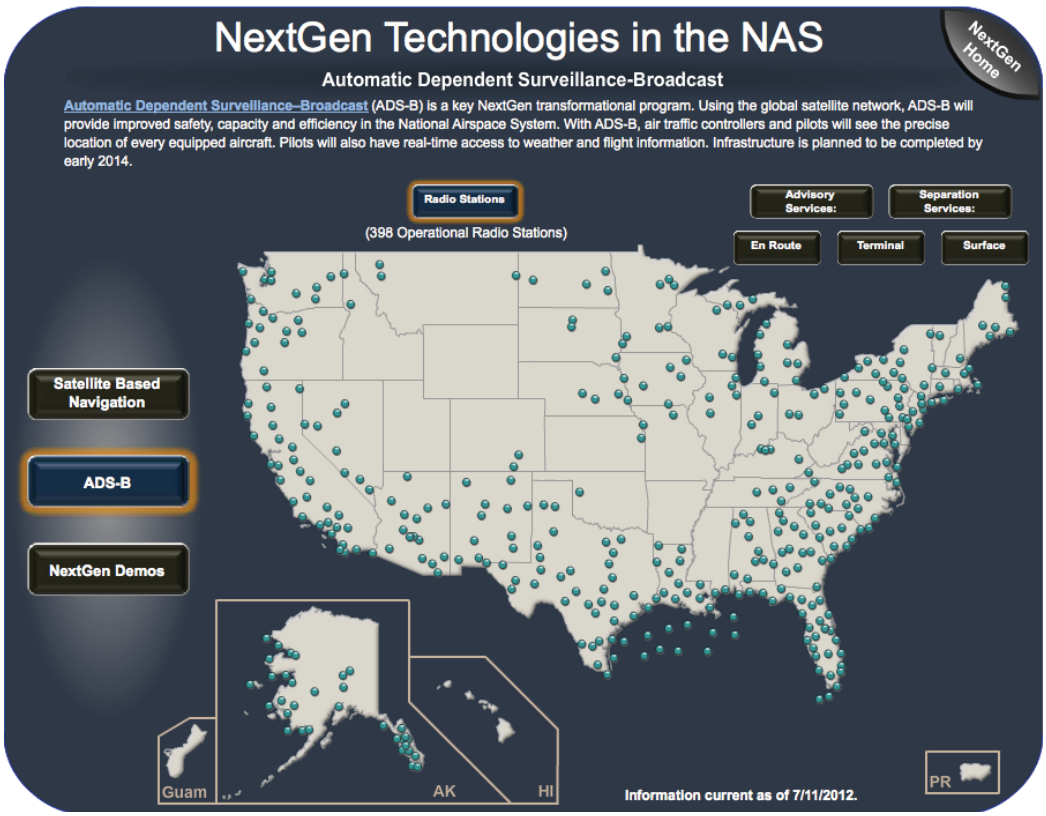
In order to allow users to test SkyRadar before purchasing a subscription license, a free one month subscription license will be granted upon activating the application. After one month the user must obtain a subscription license or run SkyRadar in Limited Mode.

A valid subscription also allows the user to download updated Sectional charts and NACO IFR flight database information. NACO typically updates every 28 days.

Introduction

SkyRadar is an Ipad App that provides the pilot with VFR Sectional, as well as IFR Enroute and Approach Procedure charts. It will provide Moving Map capability without the companion ***SkyRadar Receiver*** if the Ipad used has an internal GPS. METARS and TAFS can be retrieved from the Internet without the ***SkyRadar Receiver***. Geo-location of IFR Approach Plates is available with a ***Seattle Avionics*** subscription.

A ***SkyRadar Receiver*** is required to obtain full functionality of this App.The receivers are portable devices that receive ADS-B IN information that is broadcast on 978 MHz by the FAA from ground based stations across the United States. This information consists of **FIS-B** (Flight Information System) and **TIS-B** (Traffic Information System). FIS-B information contains METARS, TAFS, Winds Aloft, Notams, Pireps, Airmets, Sigmets, TFR's, and Local and CONUS NEXRAD. ***FIS-B is transmitted continuously. TIS-B is only transmitted when an aircraft sending ADS-B Out information is detected.*** You will receive TIS-B if you are within about 15 miles of an ADS-B Out equipped aircraft. This link will show current coverage (http://www.faa.gov/nextgen/flashMap/index.cfm) Unfortunately, since this link requires "Flash", it will not display on an Ipad, use a Mac or PC. Coverage as of July 11, 2012 is shown below. Coverage is expanding quickly with complete deployment in early 2014.The ADS-B IN transmissions are provided ***FREE*** of charge by the FAA. There are ***NO*** subscription charges by the FAA.



SkyRadar Receivers

The ***SkyRadar*** Receivers allow general aviation pilots to receive the FAA's ADS B In broadcasts. These broadcasts give pilots access to weather data (FIS B) and air and ground traffic data (TIS B).

FIS B (Weather) data is transmitted continuously on 978 MHz, but TIS B (Traffic) data is only transmitted within a 15 nm radius and +/- 3000 feet of an aircraft transmitting it's position by ADS B Out. ADS B Out data must be transmitted by an aircraft on 1090 MHz in Class A airspace (FL180 and higher). Below FL180, ADS B Out can be transmitted on either 1090 or 978 MHz. ***The TIS B traffic data is transmitted on the same frequency as the ADS B Out data was received.*** Since the ***SkyRadar*** Receivers do not transmit any information, TIS B information will only be available when you are within about 15 miles of an ADS B Out equipped aircraft.

The ***SkyRadar*** receiver is available in three versions. **SkyRadar-L** is a self contained low cost single channel 978 MHz unit. **SkyRadar-S** is a single channel 978 MHz unit conforming to the DO-282B standard. **SkyRadar-D** is a dual channel 978 and 1090 MHz conforming to the DO-260 standard. The dual channel receiver will receive TIS B data within a 15 mile radius of an aircraft transmitting ADS B Out information on either 978 or 1090 MHz. **There are quite a few airliners and bizjets that are ADS B equipped. These aircraft transmit on 1090 MHz. You will not receive traffic within 15 miles of 1090 MHz ADS B Out aircraft unless you have the *SkyRadar-D* (Dual channel) receiver.**

The ***SkyRadar*** receivers include a WAAS (non-TSO) GPS. Therefore the Ipad used does not need an internal GPS. However, if the Ipad has a GPS, the aircraft location will still be supplied by the ***SkyRadar*** GPS, eliminating the problem of lost GPS signal due to the position of the Ipad in the aircraft.

Connection to the Ipad/Iphone/Ipod Touch is wireless via Wi-Fi. Power required is 11 to 36 volts @ 5 watts, available from the aircraft cigarette lighter. Remote antennas are available so that the receiver can be mounted below the aircraft window line. Receivers are available at our website. (www.skyradar.net)

Connecting the SkyRadar Receiver

In order to display ADS-B IN data with the ***SkyRadar*** App, a Wi-Fi connection must be established between the ***SkyRadar Receiver*** and your Apple device. The steps below will configure the Wi-Fi connection. This configuration only needs to be done before the first use of the ***SkyRadar Receiver.***

Connect the GPS, both antennas and the power cord to the ***SkyRadar Receiver***. Plug the power cord into the cigarette lighter. Insure that the GPS antenna has a clear view of the sky, e.g., on the top of the glare shield. Insure that the long antenna is above the window line of the aircraft. An extension cable is available if necessary. The short antenna is the Wi-Fi antenna and its position is not critical.

- On your Apple device, go to **Settings** and set "**Airplane Mode**" to "ON"
- Next tap **"Location Services"**, and set ***SkyRadar*** to "ON"
- Next tap "**Wi-Fi**" to display the **Wi-Fi settings** page.
- On the **Wi-Fi settings** page set "**Wi-Fi**" to "ON"
- After a brief search you should see the "**SkyRadarXXXX**" (XXXX represents a number) network in the "**Choose a Network**..." list.
- For Receivers shipped since October 2010 you need only tap "**SkyRadar XXXX**"

If your Receiver was shipped before October 2010, use the following procedure:
Note*: These receivers will only connect to one Ipad at any one time. Insure that only one Ipad is operational within range of the receiver. If you would like your receiver upgraded, contact* (support@skyradar.net)

- Touch the blue arrow to the right of the "**SkyRadarXXXX**" name to bring up the "**Network settings**" page.
- Select "**Static**" under "**IP Address".**
- Tap on "**IP Address**" and enter **169.254.100.1** into the space provided.
- Tap on "**Subnet Mask**" and enter **255.255.255.0** into the space provided.
- Check that your Network Settings are as shown on the next page.

- Close "**Settings**" (Press "**Home**" button on Ipad)
- Start the ***SkyRadar*** application.
- Open the ***SkyRadar*** **Details/Settings** page by tapping the wrench symbol at the bottom of the screen.
- Open the "**Settings**" page by tapping "**Settings**"
- Set "**Connect to SkyRadar**" to "**ON**"
- Exit out of "**Settings**" back to the map display. ***SkyRadar*** will automatically connect to the receiver. In the future, when the ***SkyRadar*** application is started it will automatically look for and connect to the ***SkyRadar Receiver*** if present.

Getting Started

Ipad Operation

If you are new to the Ipad, you should review the iPad User Guide at (www.support.apple.com/manuals)

Become familiar with the Ipad's **SETTINGS** App, Multitasking, (how to switch between and close running Apps), Rotation lock and Brightness control. If you do not close Apps that you are not using, they run in the background and can slow down the Apps you are using. You also need to know how to stop and restart an App in the event of a problem.

The Ipad also has a white on black mode that inverts colors and could be useful at night. It can be set up to switch modes by triple clicking the "HOME" button by going to "**Settings**"; "**General**"; "**Accessibility**"; "**Triple-click Home**"; "**Toggle White on Black**".

Basic SkyRadar Operation

TOUCH CONTROLS (Located across the bottom of the screen)

DIRECT TO--Used to enter a route and Custom Waypoints, see **Flight Plans** chapter.

OVERLAYS---Accesses a sub menu that allows you to determine what kind of information is displayed. Tap outside the sub menu to close.

- ***Weather***---selects display of Local NEXRAD, CONUS NEXRAD, METAR (includes TAF and NOTAM), Winds and temp Aloft, AIRMET's and SIGMET's.
- ***Map***---selects display of Terrain *(if downloaded)*, VOR's, Intersections, Airspace, Airport Labels, Custom Waypoints, and Compass (shown around aircraft icon).
- ***Charts***---selects display of IFR Enroute Low, IFR Enroute High or VFR Sectionals.
- ***Traffic***---selects display of TIS-B airborne and ground traffic.
- ***Map Control***---selects North or Track Up. North Up should be used when charts are displayed. Track Up rotates the chart as the aircraft turns.

5, 15, 50, 300 (MAP SCALES)---allows zooming the map to a fixed scale, alternatively, zoom the map by placing two fingers on the screen and moving them apart or together.

APPROACH---opens IAP selection workspace, see *"**Flight Plan"*** Chapter.

PLAN---used to enter a route, see *"**Flight Plan**"* Chapter.

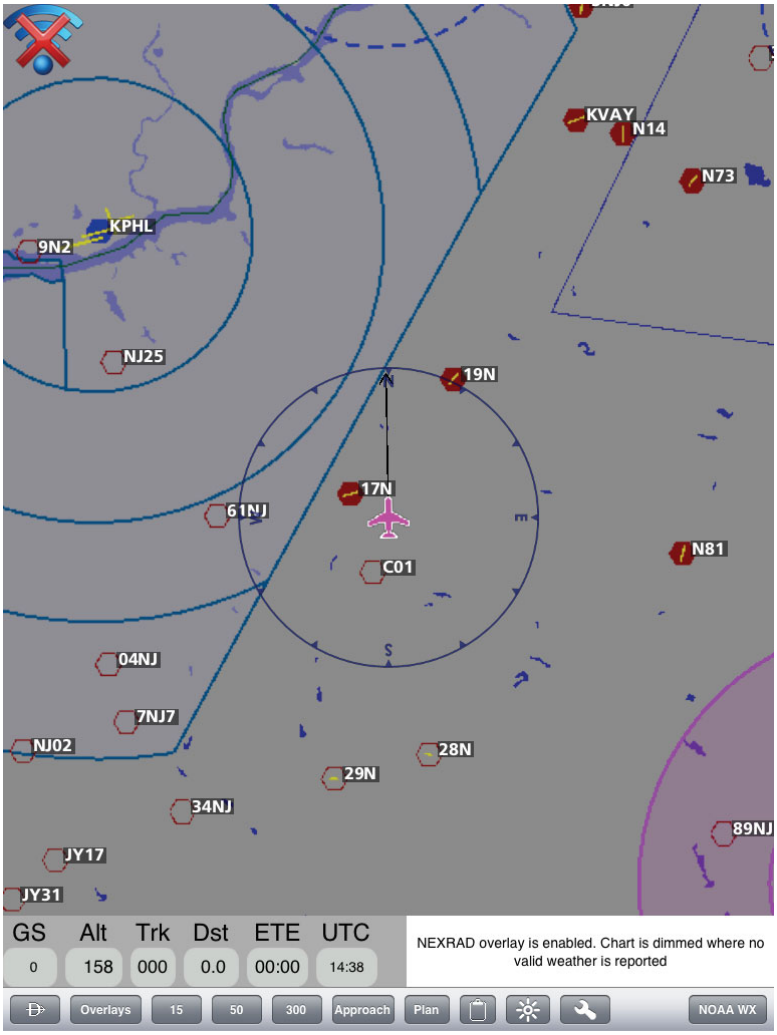
(Scratch Pad)---5 pages available.

(Brightness)---opens Brightness control slider.

(Details/Settings)---used to access Settings, Download Manager, Logs, Subscription and Account information, etc.

NOAA WX---retrieves METARS and TAFS from the Internet (while on the ground) The *METAR Indicator* and *Airport Label* overlays must be ***ON***.

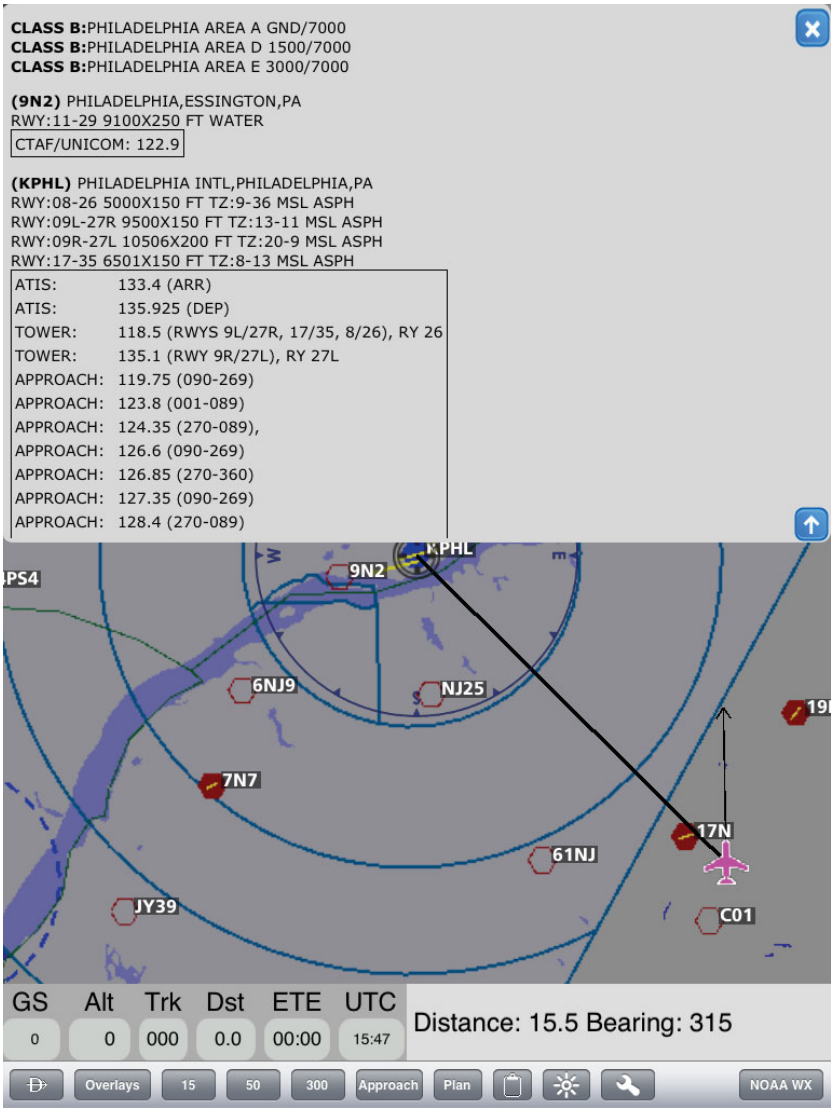
Map Basics



This is a view of the Vector Airspace map with 50 mile range selected. The aircraft icon shows current location. The red X icon in the upper left corner indicates that the ***SkyRadar Receiver*** is not connected. The **NEXRAD, Airspaces, Airport Labels, Compass,** and **North Up** overlays are turned ON. No NACO charts are displayed. The aircraft remains in the center of the map unless manually panned as described later.

The aircraft's current Ground Speed **(GS)**, GPS Altitude **(Alt)**, Ground Track **(Trk)**, Distance and Time to the ***Next*** Waypoint in the Flight Plan **(Dst)** and **(ETE)**, and GPS derived Universal Coordinated Time (Zulu time) **(UTC)** are displayed at the bottom left.

The map can be panned by placing a finger on the screen and dragging the map so as to place the desired location under the circular icon that appears in the center. You can pan from your location to any place in the contiguous US. Notice that as an Airspace, Airport, VOR or Fix is dragged under the circular icon, an information window shows up at the top of the display with details about them. Double tap on the information window or tap the "**down arrow**" icon to expand it to display additional information. If a larger amount of information is available, the information window can be scrolled. When the information window is expanded, panning the map or tapping the "**up arrow**" icon will shrink the information window. Close the information window by tapping the "**X**" icon at the top right corner. Tap the circular icon to center the map on the current GPS position and enable moving map mode.



This is a view of the map as in the above example, again with the 50 mile range selected, but with the map panned so that KPHL is centered under the circular icon. Note the KPHL Class B and Airport details in the information window. The "**up arrow"** and window closing "**X"**can be seen on the right side of the information window.

NOTE: It is not necessary to have the **Airspaces** or **Airport labels** overlays turned on to obtain information.

The distance and bearing from the aircraft location to the center of the circular icon is shown at the lower right when the map is panned. To find the distance between points, place a finger on each point for 2 seconds to bring up distance in nm.

Subscriptions and Downloads

Subscriptions

You will need a ***SkyRadar*** subscription to obtain full functionality of the ***SkyRadar*** software as well as the ability to download Charts and Instrument Procedures. The ***SkyRadar*** moving map will show your location on the ***SkyRadar*** Vector Airspace map and VFR Sectional Charts. It also provides NACO Low and High Altitude Enroute Charts and Instrument Approach Procedures (without geo-location), as well as Terrain. However, if you want to see your location on an IFR Approach plate, (geo-located Approach plates), you will need to purchase an additional subscription from **Seattle Avionics**, who provides the additional data required for these features. Both of these subscriptions will notify you when the current charting cycle expires so you can keep your charts current.

SkyRadar also has a subscription, ***Weather Voice Over Announcements***, that will provide spoken METARs when you tap the blue icon near the METAR display of the desired Airport. The Ipad can then be paired to a **Bluetooth** equipped headset. The Speaker icon in the lower left of the ***SkyRadar* Subscription** sub menu is used to download the speech synthesizer. This is a large (40 MB) file.

In order to set up or renew a ***SkyRadar*** subscription, first establish an Internet connection.Then, tap the **Details/Settings icon** at the bottom of the Map page. When the **Details/Settings** menu page appears, tap **Subscription**. The ***SkyRadar* Subscription** menu will appear.

Tap the subscription item desired and follow the instructions that appear to purchase, renew or check the status of an existing subscription. The "**Refresh Purchases**" button (Arrow icon at the lower left) can be used to load purchased subscriptions to new or additional Ipads. You can have ***SkyRadar*** on up to 5 Ipads on 1 subscription. Tap **Details/Settings** at the upper left to return to the **Details/Settings** menu or **Done** at the upper right to return to the Map.

If you would like to have geo-located approach plates, tap the **Seattle Avionics account** on the **Detail/Settings** menu and follow the instructions that appear to purchase, renew or check the status of an existing subscription. Tap **Details/Settings** at the upper left to return to the **Details/Settings** menu or **Done** at the upper right to return to the Map.

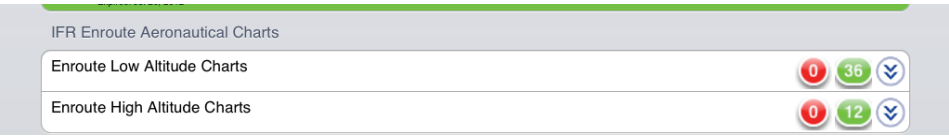
Downloads

In order to download and store Charts, first establish an Internet connection.Then, tap the **Details/Settings icon** at the bottom of the Map page. When the **Details/Settings** menu page appears, tap "**Download Manager"**. The **Download Manager** menu will appear. Scroll the **Download Manager** to locate the Charts or States desired. Downloaded items are green as long as the information is current. When information has expired, the item will be red. An update reminder will also show on the ***SkyRadar*** icon on the Ipad Home page when charts expire.

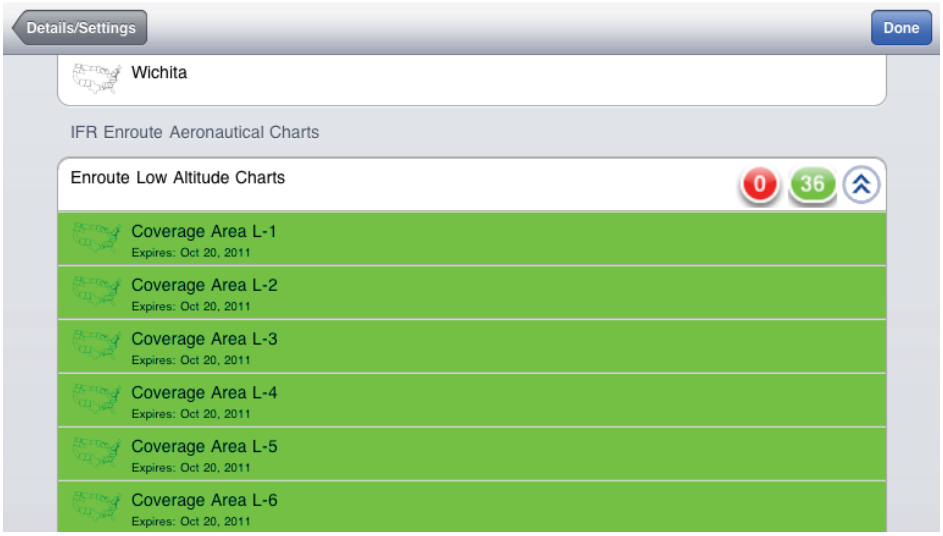
SkyRadar Downloads

SkyRadar Downloads are listed as **Airports and airspaces** (Vector Airspace Map), **VFR Sectional Charts**, **IFR Enroute Aeronautical Charts**, and **Maps and charts** (Instrument Approach Procedures and Terrain). Download the Vector Airspace Map by tapping "**The contiguous US airports and airspaces**" bar under **Airports and airspaces**. To Download a VFR Sectional chart, tap on the bar with the desired chart's name. The example below shows that the Montreal Sectional is not stored, the New Orleans Sectional is in the process of downloading (tapping the red X icon will abort the download), and the New York Sectional is stored and current.

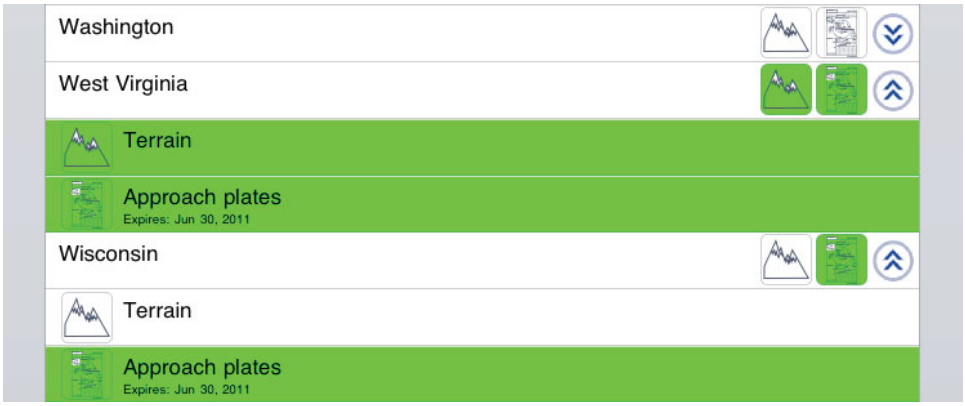
To download NACO Low or High Altitude Enroute Charts, tap the down arrow to expand the selection and then tap the chart desired. The red and green indicators show the number of charts that have been downloaded and their currency status. The example below shows that 36 Low Altitude and 12 High Altitude charts are downloaded and all are current.



The example below shows part of the Enroute Low Altitude Chart selection expanded, showing that charts L-1 through L-6 have been stored and are current.



To Download NACO Instrument Approach Procedures or Terrain, locate the State desired and tap the bar or the down arrow to expand the State selection to Terrain and Approach Plates. Tap the selection desired to download. NOTE: Terrain files can be quite large. It is recommended that you only download States that are important to you. In the example below, Washington State is not expanded and has no charts stored, West Virginia is expanded and has both Terrain and Approach Plates stored and current, Wisconsin is expanded and only Approach Plates are stored and current.



SeattleAvionics Downloads

If you have a Seattle Avionics Subscription, you can download Geo-references for Approach Procedures which allow the aircraft location to be shown on the Plate. The example below shows that Geo-references for approach plates is downloaded and current. A Seattle Avionics Subscription also provides alternative access to Enroute

charts. They can be downloaded by selecting Seattle Avionics for the **"IFR chart data source"** under the **Settings** menu.

Tapping the "**Update"** button at the lower left of the **Download Manager** sub menu will automatically update all chart selections that have expired.

Tapping the **"Download All"** button will download all charts.

Deleting Charts

If you wish to delete an item, Tap the "**Delete"** button at the lower left of the **Download Manager** sub menu. This will cause a list of the downloaded charts to appear with a "**Do not enter**" type icon at the left of each selection bar. Tapping the icon will cause the horizontal bar in the icon to rotate to vertical and a "**Delete"** button to appear at the right of the selection bar. Tap this "**Delete"** button to delete that selection. When you are finished deleting, tap **"Done Deleting"** at the lower left of the sub menu. Tap "**Details/ Settings"** to return to the **Details/Settings** menu or "**Done"** at the top of the sub menu to return to the Map. The example below shows that the Billings Sectional has been selected to delete.

Charts and Terrain

Airports and Airspaces Map Overlays

The Vector Airspace map is the default map that underlies the VFR Sectionals and IFR Enroute Charts. It cannot be disabled or removed. The basic map with all overlays turned off will still show special use airspace, towered airports in blue, and non-towered airports in red. The minimum runway length of visible airports may be selected by tapping the **"Details/Settings icon"** and selecting "**Settings**" from the **Detail/Settings** menu. Enter the minimum visible runway length desired in the space provided, then tap "**Done"**.

The following Map Overlays are available by tapping the "**Overlays**" button at the bottom left of the Map page. When the Overlays panel appears, tap the switch icon off or on to remove or select the desired Overlay.

Terrain---If terrain data has been downloaded for the aircraft location, terrain that is less than 500ft from your present altitude will be shown in RED, terrain that is between 500 and 1000 feet from your present altitude will be shown in YELLOW and terrain that is greater than 1000ft from your present altitude will be shown in green. Areas where terrain data is not available are shown in BLUE.

VORs---The location of VOR stations is shown by a green square with a 10 mile radius green circle centered on the location. The three letter identifier is shown in yellow. The identifier is removed when the Map range exceeds about 100 miles and the location circles are removed at about 200 miles in order to declutter the Map.

Intersections---The location of Intersections is shown by a red "x". The five letter identifier is shown in white. Intersections are removed when the Map range exceeds 25 miles.

Airspaces---Class B airspace is shown by solid blue lines with pale blue fill. Class C airspace is shown by solid magenta lines with pale magenta fill. Class D airspace is shown by dashed blue lines. The Airspace overlay is not removed at any range.

Airport Labels---Airport identifiers are shown next to the airport location. Airport Labels for small airports are removed when the Map range exceeds about 150 miles.

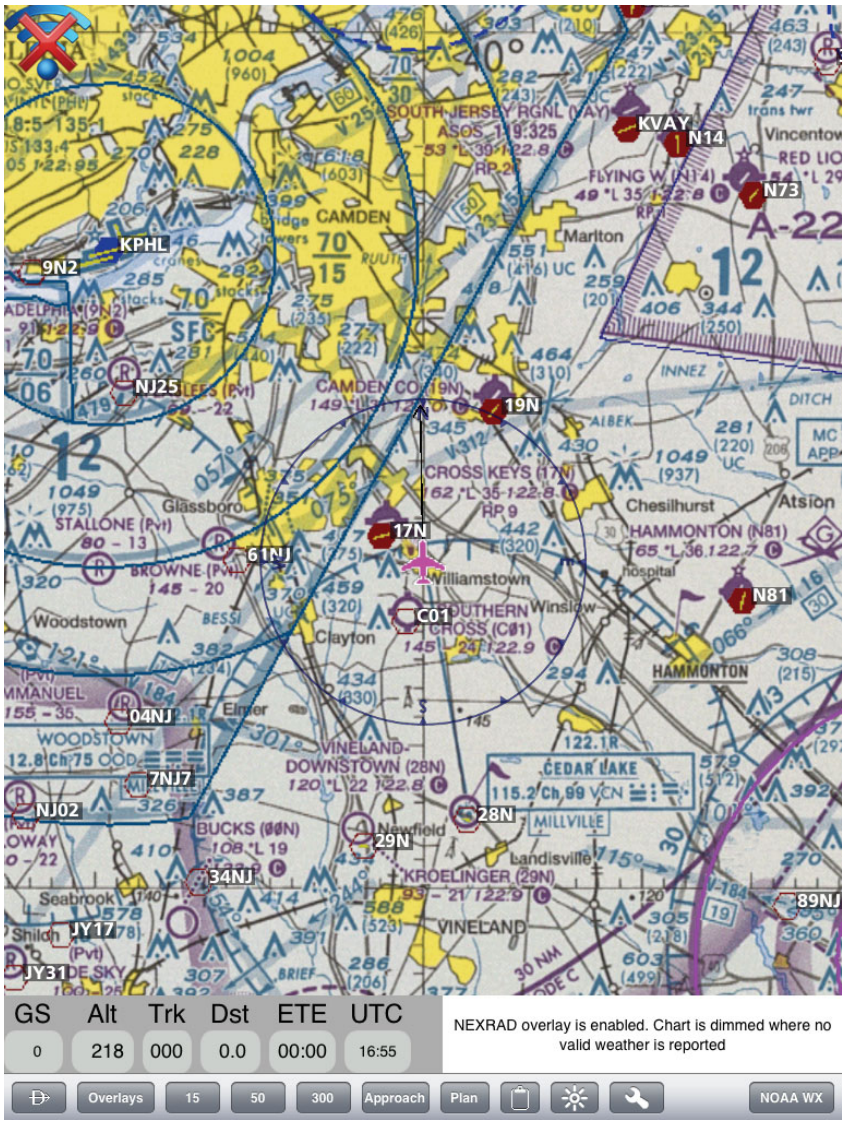
Custom Waypoints---Custom Waypoints are shown by a yellow "x". The identifier is shown in green. The Custom Waypoint overlay is not removed at any range.

Charts Overlays

VFR Sectional and IFR Low or High Altitude Enroute Charts can be displayed over the Vector Airspace Map if they have been downloaded for the aircraft's location. Only one of these chart types can be displayed at a time. Any one of the Map Overlays except Terrain can be displayed with the Charts. VFR Sectional display shown below.

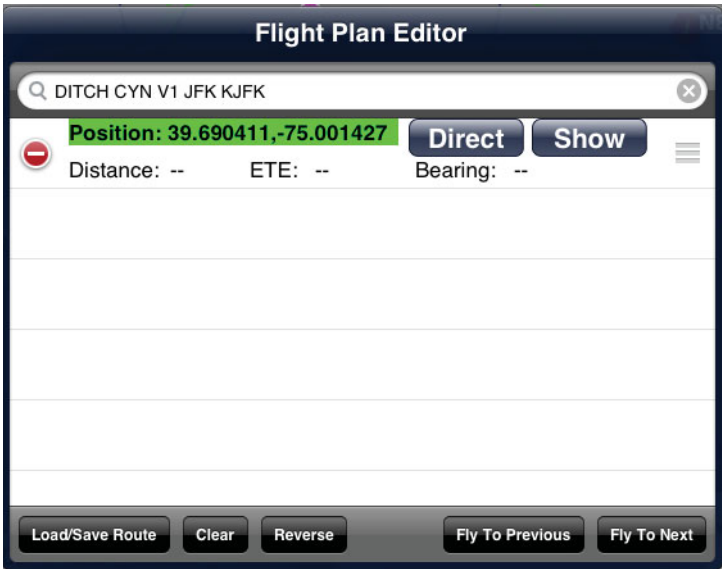
Note: The Sectional chart does not line up exactly with the ***SkyRadar*** Vector Airspace Chart. This is because the Sectionals are not as accurate as the ***SkyRadar*** Chart. Small features on the ***SkyRadar*** chart (Airports, VORs) are within 4 Meters (13 Ft.). Large features (Airspace) within 0.25 nm. Sectionals can be up to almost a mile in error.

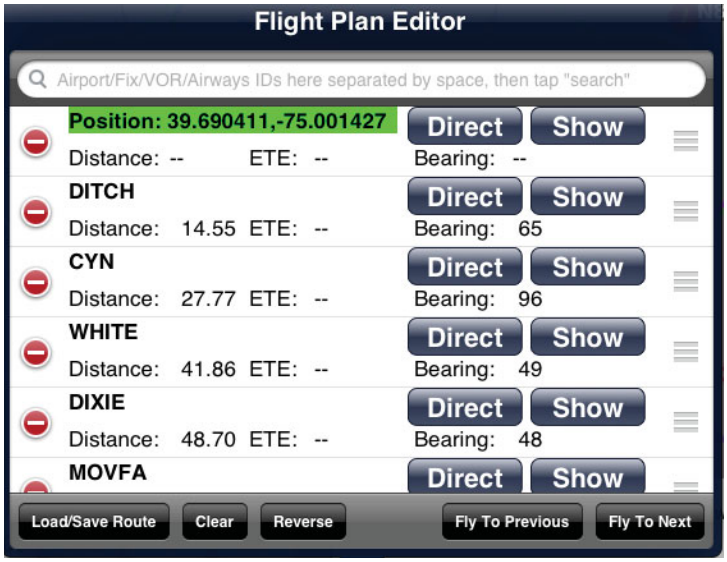
You must download and store the charts necessary for a flight during preflight planning when you have an Internet connection.



Flight Plans and Instrument Procedures

Flight Plan Editor





To enter or modify a Flight Plan, tap the "**Plan**" button at the bottom of the Map page.The **Flight Plan Editor** will appear. The Lat/Long of the aircraft's current position is shown in green. To enter a route, tap the open area at the top of the **Flight Plan Editor**. Then use the Ipad keyboard to enter the Airport, Waypoint or VOR identifiers separated by spaces to define the route. Here we have entered a route from our present location to JFK by way of the Ditch intersection, Coyle VOR, and Victor 1. After you have defined the route, tap **Search** (on the Ipad keyboard). The route will be entered in the **Flight Plan Editor** as shown at left. Distances shown are cumulative along the defined route. ETE's are updated based on current ground speed. Bearings shown are to the waypoint from the preceding waypoint. The route will show on the map as a solid magenta line from waypoint to waypoint, with the waypoints labeled. The route line will change to white (green on IFR charts) after a route segment is completed. A dashed magenta line will show from the aircraft position to the next waypoint.

Tap "**Show**" to center the selected waypoint under the circular icon on the map. When flight planning, with an internet connection, tap "**NOAA WX**" to retrieve METAR, TAF and NEXRAD information near the waypoint. If you want to delete a waypoint, tap the red icon at the left of the waypoint to bring up the "**Delete**" button. Tap "**Delete**" to delete the waypoint. You can add waypoints to an existing route by entering the waypoints the same way you entered the route. The new waypoints will be appended to the route. By placing a finger on the 3 bar icon at the right, you can slide a waypoint up or down to change the order of the waypoints. You can "**Clear**" or "**Reverse**" a route by tapping the buttons at the bottom of the Flight Plan Editor. Tap "**Fly to Next**" to bypass a waypoint or "**Fly to Previous**" to return to a waypoint. Tap **"Direct"** to fly to the desired waypoint.

Direct to Function

Flight Plan routes can also be entered by using the "**Direct to**" icon at the bottom left of the Map page. First pan the Map until the desired Airport, waypoint or VOR is approximately under the circular icon, then tap "**Direct to**". The "**Select Destination**" panel will appear with a list of the Lat/Long and the closest named Airport and waypoints to the circular icon. Tap the selected waypoint to enter it into a new or current Flight Plan route. Tap "**Plan**" to edit the sequence of the waypoint if desired.

To search for a location using the Direct to Function, tap the "**Direct to**" button. When the "**Select Destination**" Panel appears, tap "**Search**". The "**Set Destination**" menu will appear. *Insure that "Auto-Capitalization" (under Settings, Keyboard) is enabled on the Ipad.* Select the type of destination by tapping Airports, Fixes, VORs, or Custom, tap ID, then use the Ipad keyboard or tap the bar to the right of the character desired to enter the identifier. It may be easier to use the character bars in turbulence. As you select characters, the software will show a list of valid identifiers. When the desired identifier appears, tap it and then select "**Add to Route**" or "**Set as New Destination**" to enter it into the Flight Plan.

To enter a Custom waypoint, access the "**Set Destination**" menu and tap "**Custom**". Enter a name and the Lat/Long of the Custom waypoint, using the Ipad keyboard. Then tap the appropriate button to Save, Update, Delete or Enter into a Flight Plan. Alternatively, pan the map by placing the circular icon over the position desired. The Lat/Long of the circular icon will be shown in the Latitude and Longitude windows. Enter a Name and Save the waypoint.

To save a route or load a stored route, tap **"Load/Save Route".** The **Manage Routes** sub menu will appear. Enter a name for the route in the space provided. Tap the "**Save**" button to store the route.

To call up a stored Flight Plan route from the Map page, tap "**Plan**". When the **Flight Plan Editor** appears, tap "**Load/Save Route**". When **Manage Routes** appears, tap the desired route, then tap "**Load Plan**". The **Flight Plan Editor** will appear with the selected route.

You can edit a saved route with the **Flight Plan Editor** as previously described. After editing the route, tap "**Load/Save Route**". Next tap the route name, then tap **"Replace Plan".** The modified route will be stored under the same name. Tap anywhere on the Map to close the **Flight Plan Editor**.

To delete a stored Flight Plan route, open the **Manage Routes** sub menu and tap the "**Trash can icon**" at the lower right. A red "**Do not enter**" icon will appear to the left of each stored route. Tap this icon at the desired route and a "**Delete**" button will appear at the right of the selected route. Tap "**Delete**" to erase the route.

Instrument Procedures

In order to access Instrument Approach Procedures, a destination airport must be specified in a Flight Plan or the map must be panned to place the Circular icon near the desired airport. The IAPs for the airport the aircraft is located on are also available. The IAPs must also have been downloaded and stored on the Ipad using the procedure in the "***Subscriptions and Downloads"*** chapter.

You must download and store the charts necessary for a flight during preflight planning when you have an Internet connection.

Tap the "**Approach**" button, the **Approach Workspace** panels appear. The airport selection is made at the bottom of the left panel. A list of the airports procedures will appear in the left hand panel sorted in the following order; Airport Diagram, Approach Procedures, Minimums, Arrivals and Departures. Tap the desired procedure name to display the procedure or tap the arrow at the right to store the selected procedure to the right hand panel. Tapping on the procedure will display the procedure and cause a control bar to appear at the bottom of the display.

Close---Returns to the Map page.

Approach---Brings up the **Approach Workspace** panels to allow selection of another procedure.

Previous Page and **Next Page**---used if the procedure has multiple pages.

Lock---used to block the ability to expand the chart beyond the screen. If unlocked, chart can be expanded by the Ipad two finger zoom.

Brightness Slider---used to adjust brightness without using the Ipad's controls.

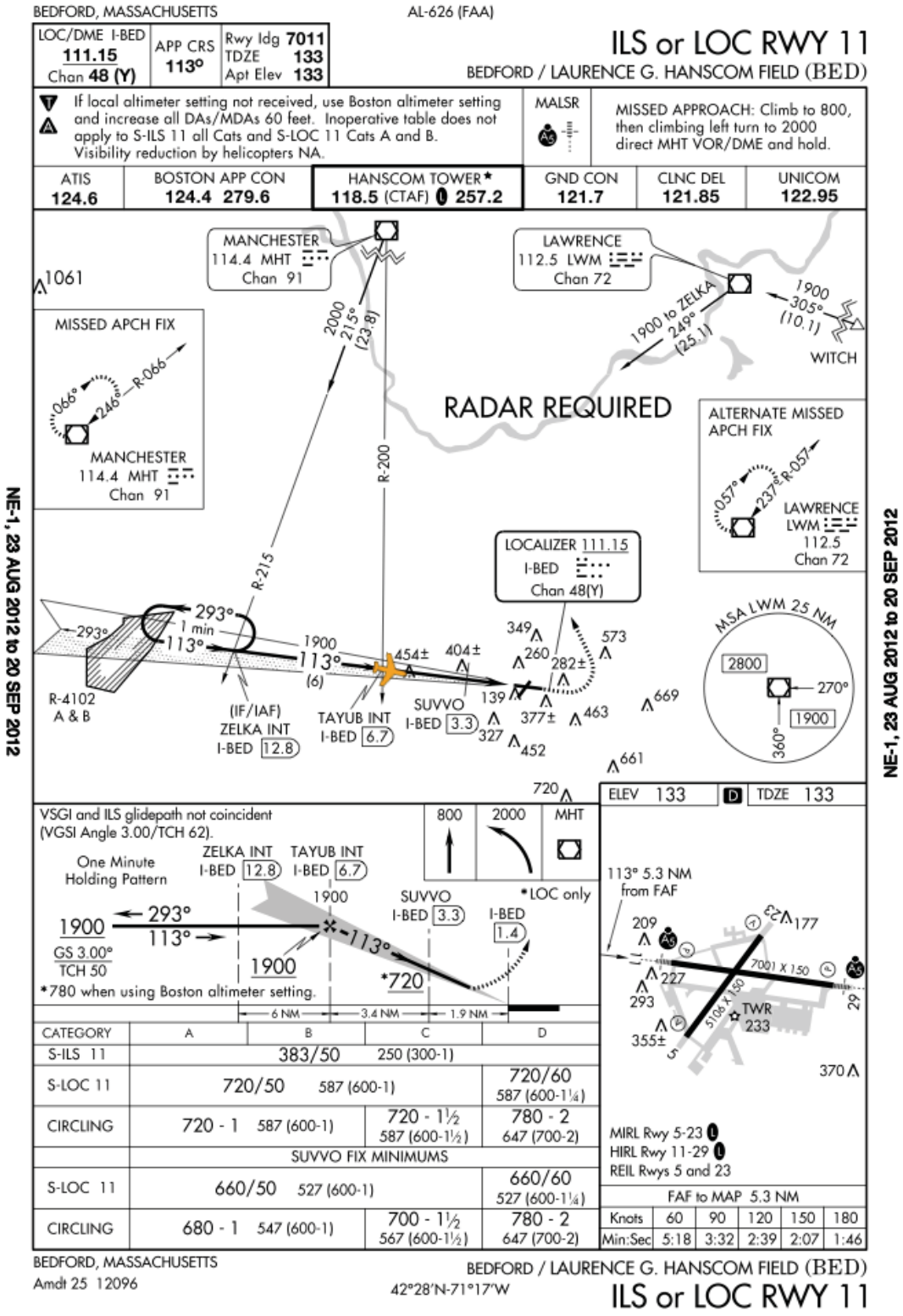
*If the Map page is centered on the aircraft location, you will be able to switch between the Map and the selected Instrument Procedure without the necessity of reselecting the procedure from the **Approach Workspace** panels.*

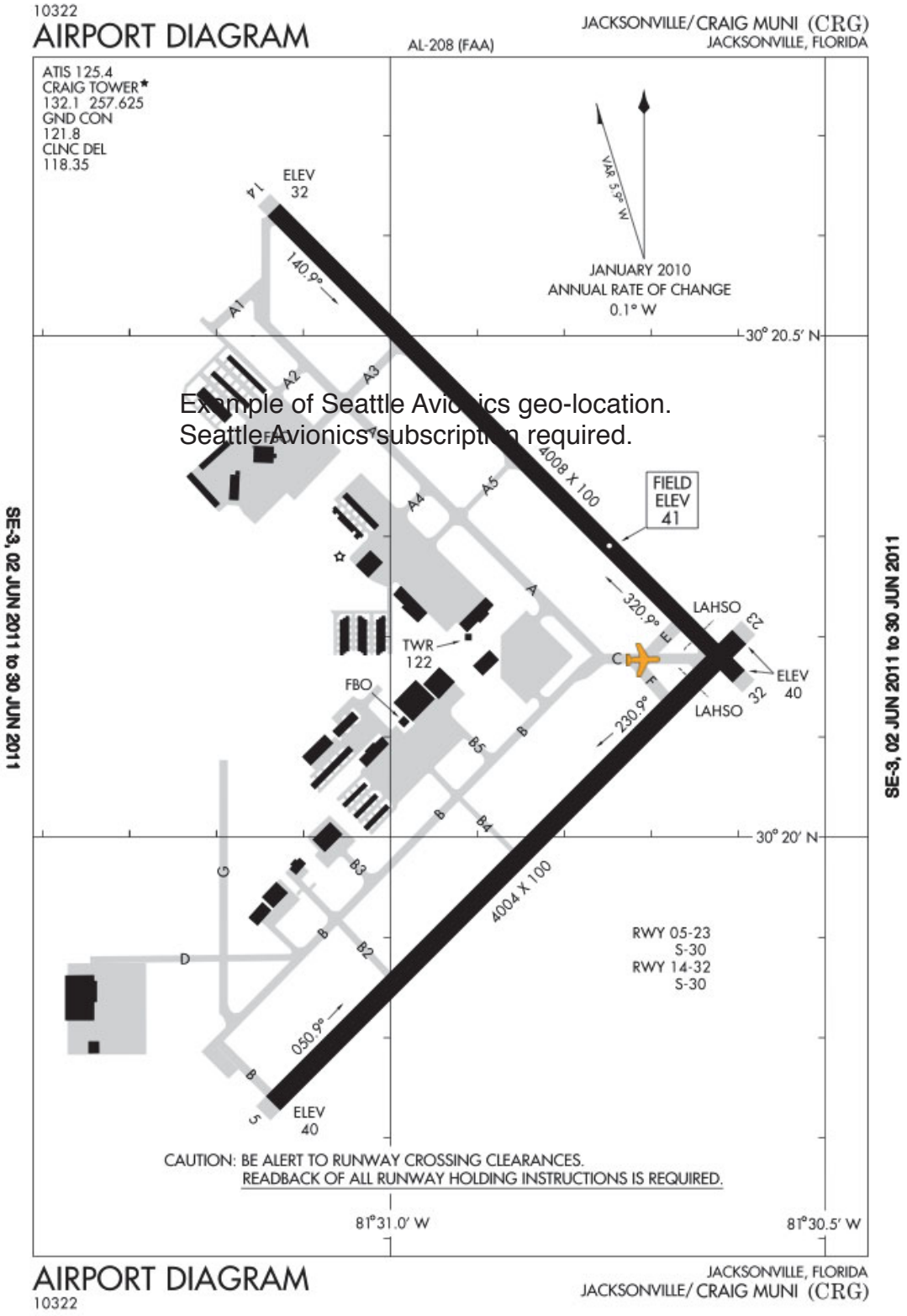
If you do not have a ***Seattle Avionics*** subscription, you will still be able to download and store NACO IAPs, but you will not see your aircraft location on the procedure. The ***Seattle Avionics*** subscription geo-locates the Approach plates and Airport Diagrams so that an aircraft icon will show your location on the chart. See pages 21 and 22.

NOTE: Arrival and Departure Procedure Charts are ***NOT TO SCALE*** and any Aircraft Position shown on these charts is ***NOT ACCURATE.***

In the following example, a flight plan from KPHL to KJFK has been entered. The KPHL Airport Diagram, the KJFK CAMRN 4 Arrival, and the KJFK ILS 04R procedures have been stored for rapid access.

Example of Seattle Avionics geo-location. Seattle Avionics subscription required.





Example of Seattle Avionics geo-location.
Seattle Avionics subscription required.

Flight Information Service (FIS-B)

General

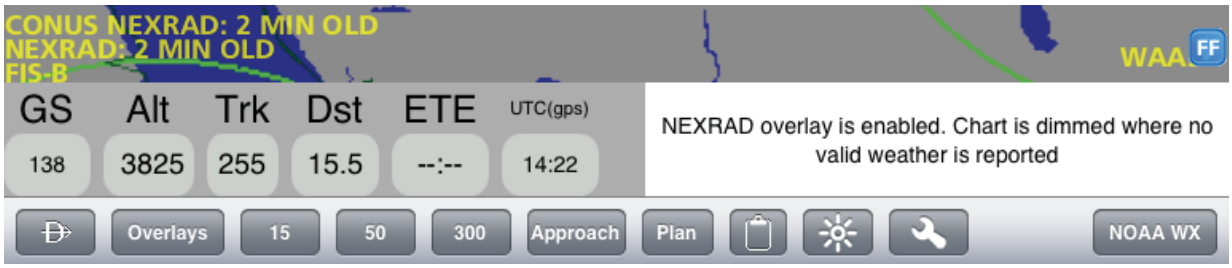
ADS-B IN FIS-B Information is transmitted by FAA ground stations in the 978 Mhz band. This band has enough bandwidth to transmit data much faster than WX WORX.

Because this frequency band, like all VHF/UHF transmissions is "line of sight", and the FAA transmitters are ground based, you must be airborne to receive the data. The minimum altitude necessary will depend on your distance from a transmitter, but coverage is usually available below 2000 feet.

The data is updated continuously, there are no subscription charges, and the entire Contiguous US is scheduled to be covered by the beginning of 2014. The data transmitted includes NEXRAD (both Local and Continental US), METARs, TAFs, Winds and Temperatures Aloft, AIRMETs, SIGMETs, NOTAMs, PIREPs and TFRs.

To display FIS-B information, refer to page 5, ***Connecting the SkyRadar Receiver***. Verify that the blinking red "**X**" icon at the upper left of the Map display is extinguished. Tap the "**Overlays**" button to access the **Overlays** sub menu. Use the switch icons to turn **ON** the "**Local NEXRAD**", "**Continental NEXRAD**", "**METAR Indicators**", and "**Winds**" under "**Weather Overlays**" and "**Airport Labels**" under "**Map Overlays**".

When you turn either NEXRAD Overlay On, the Map display will dim until valid NEXRAD data is received. As shown below, the age of the NEXRAD displays will show at the lower left. FIS-B will show at the lower left when data is received.



METARS/TAFs

Airports with METARs and TAFs available will have a colored ball (red-IFR, yellow-MVFR, green-VFR) beside the Airport Label. Airports with an asterisk (*) have weather, but a METAR is not available at the time. Tap the Airport or pan the airport under the circular icon to display the information. To display the METAR in decoded form, tap the **"Details/Setting icon"**, then "**SETTINGS**", then switch "**Decode METARs**" to "**ON**"

If you have the ***Weather Voice Over Announcement*** subscription, a blue "***Speech***" icon will appear at the left of the METAR display. When you tap this icon, the METAR will be announced over the Ipad speakers or a Bluetooth headset if you have paired the headset with your Ipad. **NOTE**: Insure that the Ipad is not muted. To check the Ipad Mute control, double tap the Home button. The Mute control is located at the extreme left of the App running icons list.

Winds Aloft

Airports which report Winds Aloft will have a blue ball to the right of the METAR colored ball. Winds Aloft will be reported along with the Airport information. Panning just slightly off of current aircraft location will bring up the closest winds aloft report automatically.

PIREPS

A blue ball at a VOR or Airport indicates that a PIREP is available. Tap on the VOR or Airport or pan it under the circular icon to access the PIREP.

TFRS

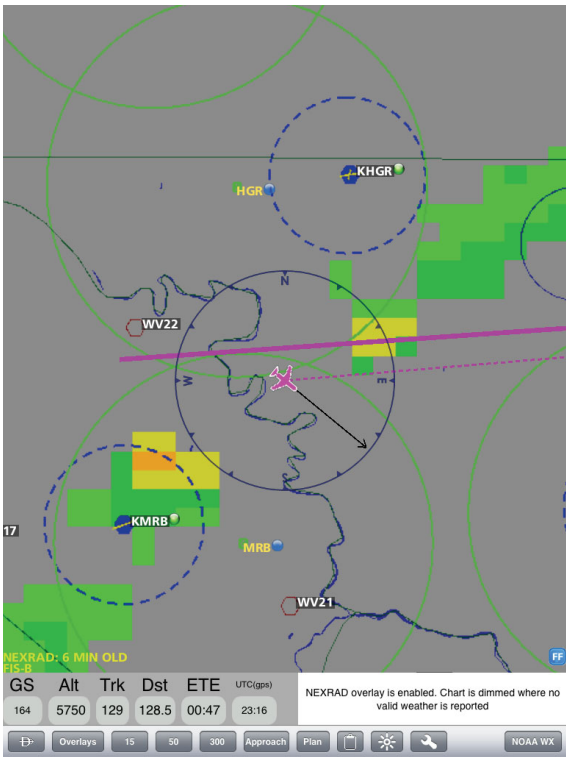
TFRs are shown by a red circle. Tap on the TFR or pan it under the circular icon to access the TFR information.

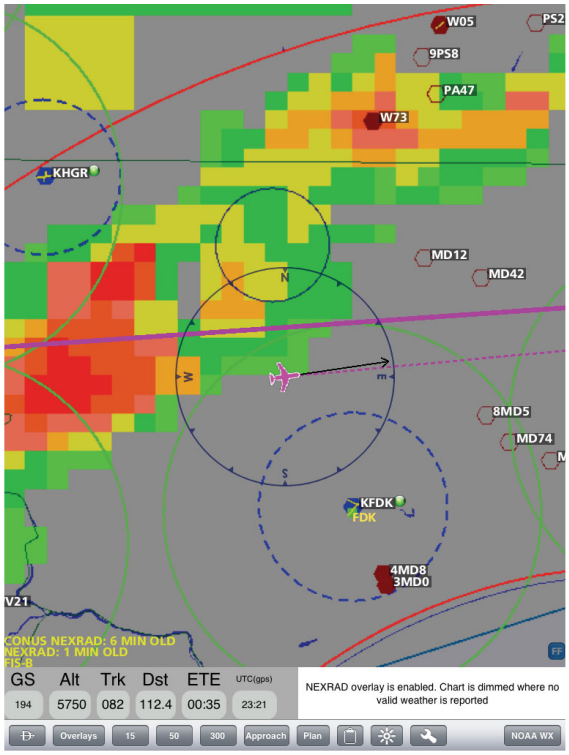
NEXRAD CAUTION

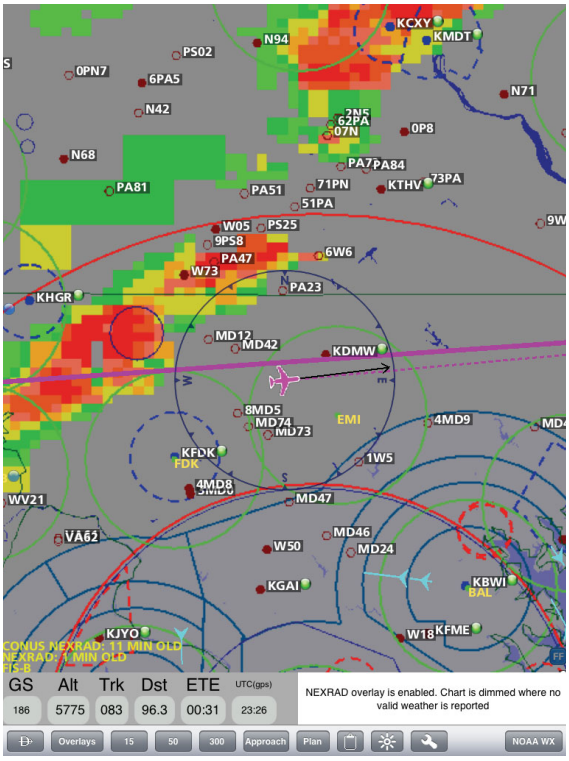
*Remember that NEXRAD is not **REAL** time. Thunderstorms can build and move a substantial amount in the time between NEXRAD updates. The NEXRAD display shows where the thunderstorm cell **WAS** not where it **IS**. If you do not have sferic (Stormscope or Strikefinder) equipment on board, it is best to avoid rainfall rates yellow and above.*

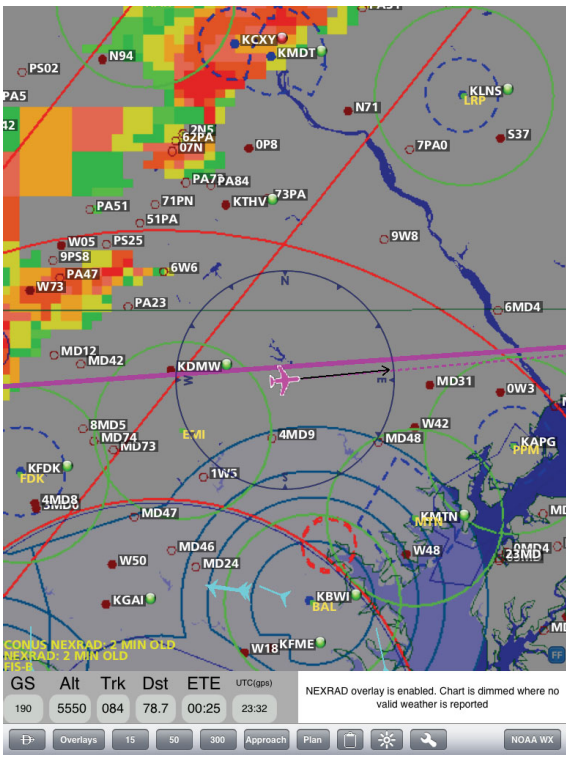
Page 25 shows how fast thunderstorms can build. The first screen shot shows us detouring around a small shower. The subsequent shots are each succeeding update of the NEXRAD display, which in this case was about every 5 minutes. There is a total of 10 minutes between the first and third shots and a total of 10 minutes between the third and last shots. Note the UTC time at the bottom of the display shots. The first lightning strikes were seen on the Stormscope about 3 minutes into the sequence.

Pages 26 through 28 show examples of FIS-B display data.

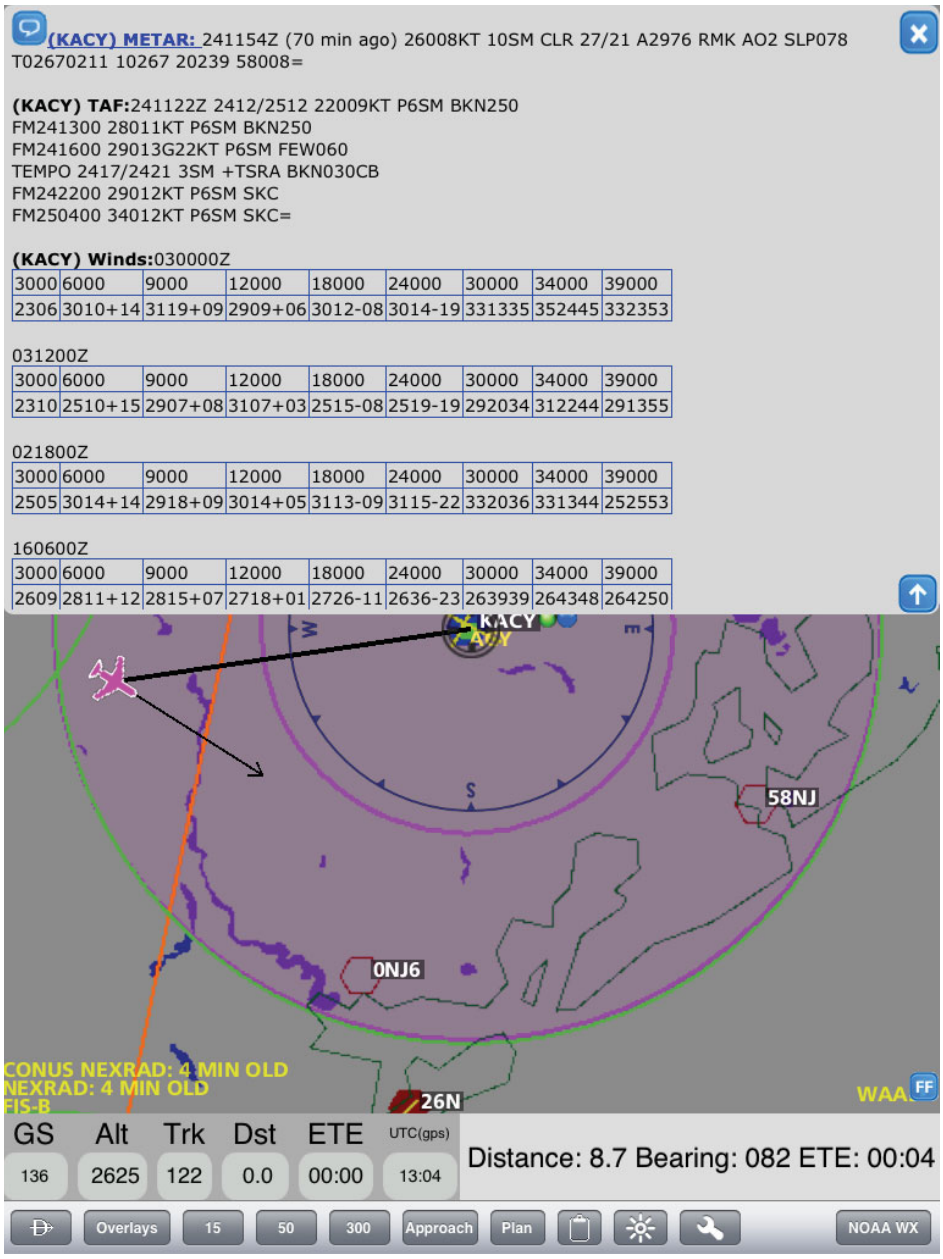

KHGR
HGR
WV22
KMRB
MRB
WV21
NEXRAD: 6 MIN OLD
GS Alt Trk Dst ETE UTC(gps)
164 5750 129 128.5 00:47 23:16
NEXRAD overlay is enabled. Chart is dimmed where no valid weather is reported
Overlays 15 50 300 Approach Plan NOAA WX


W05
PS2
9PS8
PA47
W73
KHGR
MD12
MD42
8MD5
MD74
KFDK
FDK
4MD8
3MD0
CONUS NEXRAD: 6 MIN OLD
NEXRAD: 1 MIN OLD
GS Alt Trk Dst ETE UTC(gps)
194 5750 082 112.4 00:35 23:21
NEXRAD overlay is enabled. Chart is dimmed where no valid weather is reported
Overlays 15 50 300 Approach Plan NOAA WX

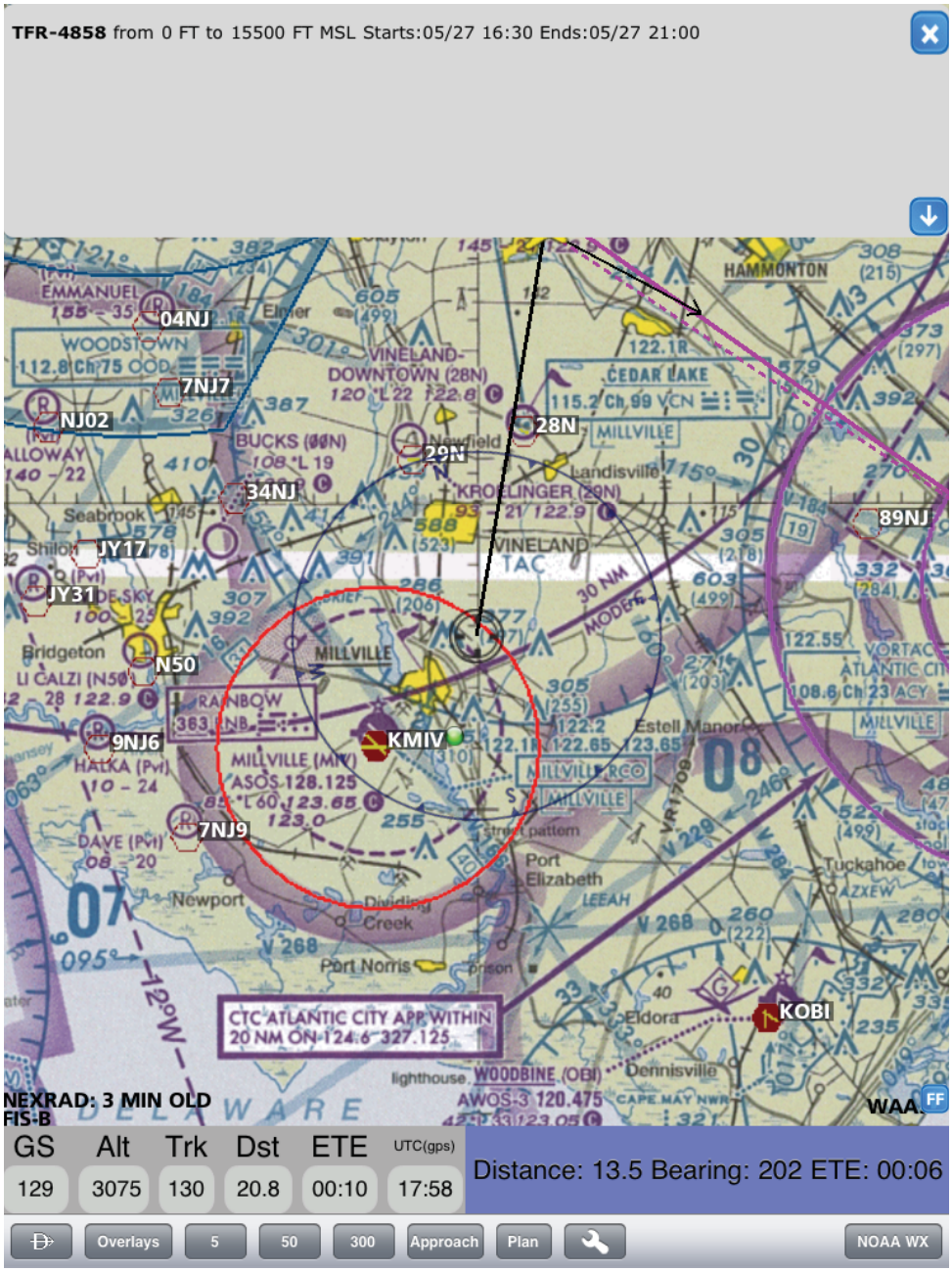

KCXY
KMDT
N94
PS02
0PN7
6PA5
N71
N42
2NS
62PA
07N
0P8
N68
PA7
PA84
73PA
PA81
PA51
71PN
KTHV
51PA
W05
PS25
9PS8
6W6
PA47
W73
KHGR
PA23
MD12
MD42
KDMW
8MD5
MD74
MD73
EMI
4MD9
KFDK
FDK
1W5
4MD8
WV21
MD47
VA62
MD46
MD24
W50
KGAI
KBWI
BAL
KJYO
W18
KFME
CONUS NEXRAD: 11 MIN OLD
NEXRAD: 1 MIN OLD
GS Alt Trk Dst ETE UTC(gps)
186 5775 083 96.3 00:31 23:26
NEXRAD overlay is enabled. Chart is dimmed where no valid weather is reported
Overlays 15 50 300 Approach Plan NOAA WX


KCXY
KMDT
N94
PS02
PA5
KLNS
LRP
N71
S37
2NS
62PA
07N
0P8
7PA0
PA7
PA84
73PA
PA51
71PN
KTHV
51PA
9W8
W05
PS25
9PS8
6W6
PA47
W73
PA23
6MD4
MD12
MD42
KDMW
MD31
0W3
8MD5
MD74
MD73
EMI
4MD9
W42
MD48
KAPG
PPM
KFDK
FDK
1W5
4MD8
MD47
KMTN
MTN
MD46
W48
23MD
W50
MD24
KGAI
KBWI
BAL
W18
KFME
CONUS NEXRAD: 2 MIN OLD
NEXRAD: 2 MIN OLD
GS Alt Trk Dst ETE UTC(gps)
190 5550 084 78.7 00:25 23:32
NEXRAD overlay is enabled. Chart is dimmed where no valid weather is reported
Overlays 15 50 300 Approach Plan NOAA WX

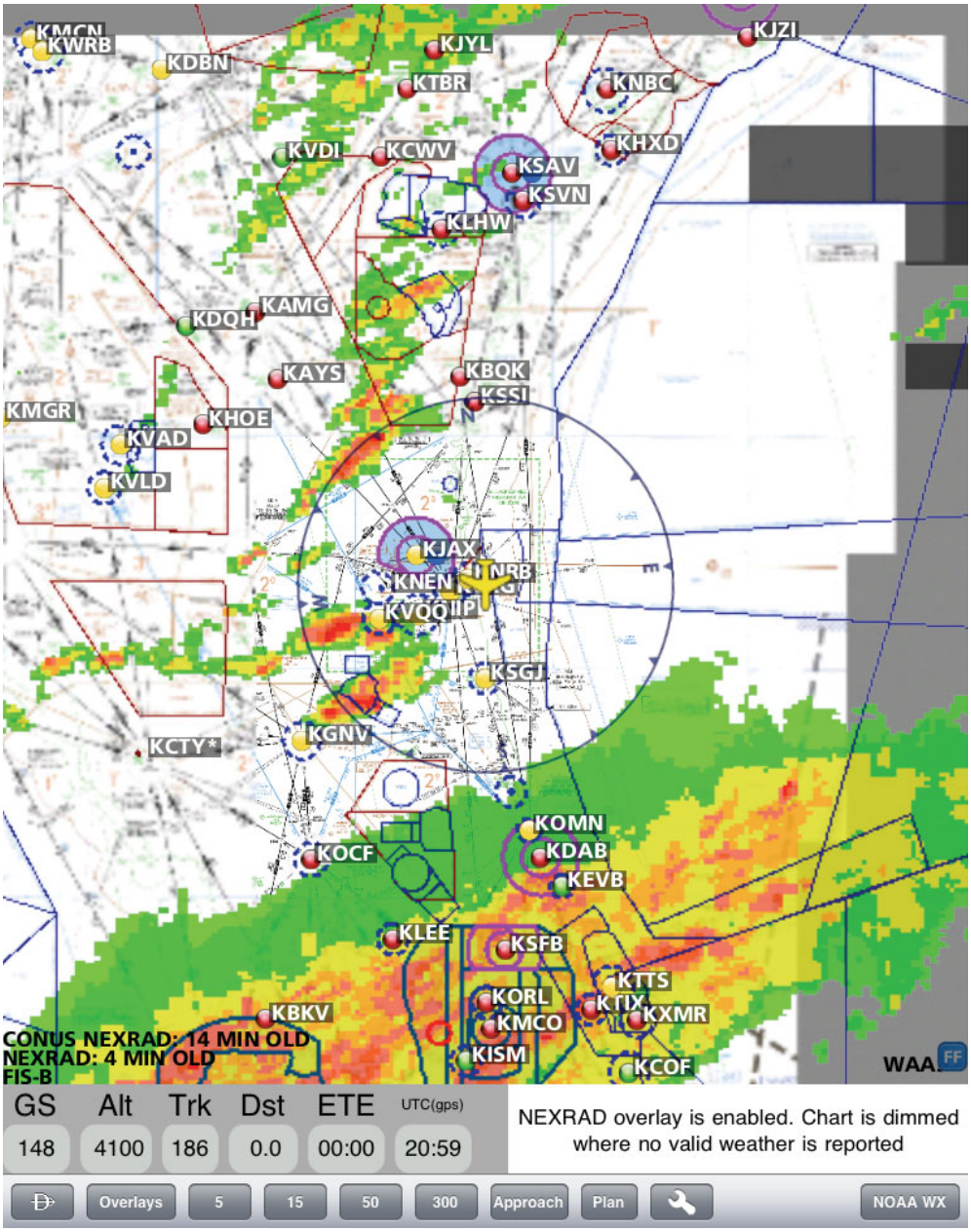
This example shows information for KACY, which also reports Winds Aloft. The METAR is shown in raw format. The blue icon next to the METAR shows that the Weather Voice Over Announcement subscription is active. Note the green and blue balls next to the Airport Label denoting that a VFR METAR and Winds Aloft are available.



This example shows a TFR around KMIV. This was an air show TFR.



This example shows NEXRAD radar on 3/31/11, the day the tornado hit Sun'n'Fun. The small red TFR circle at the bottom center is around the Lakeland, FL airport. We stayed overnight at KCRG. The Stormscope showed intense lightning.



A tip to verify Stormscope or Strikefinder accuracy is to pan a NEXRAD cell under the circular icon and check the range and bearing to the cell by checking the bearing and distance panned (which shows up on a blue background at the lower right), against the bearing and range shown to the lightning strikes on the sferics equipment.

Traffic Information Service (TIS-B) Single Channel (978 MHz) Receiver

General

TIS-B is transmitted on 978 MHz within about 15 miles and +/- 3000 feet of an aircraft which is transmitting its GPS position via ADS-B Out on 978 MHz. Transponder equipped aircraft positions are also transmitted, but, *you must be near an aircraft transmitting ADS B Out on 978 MHz to receive traffic.*

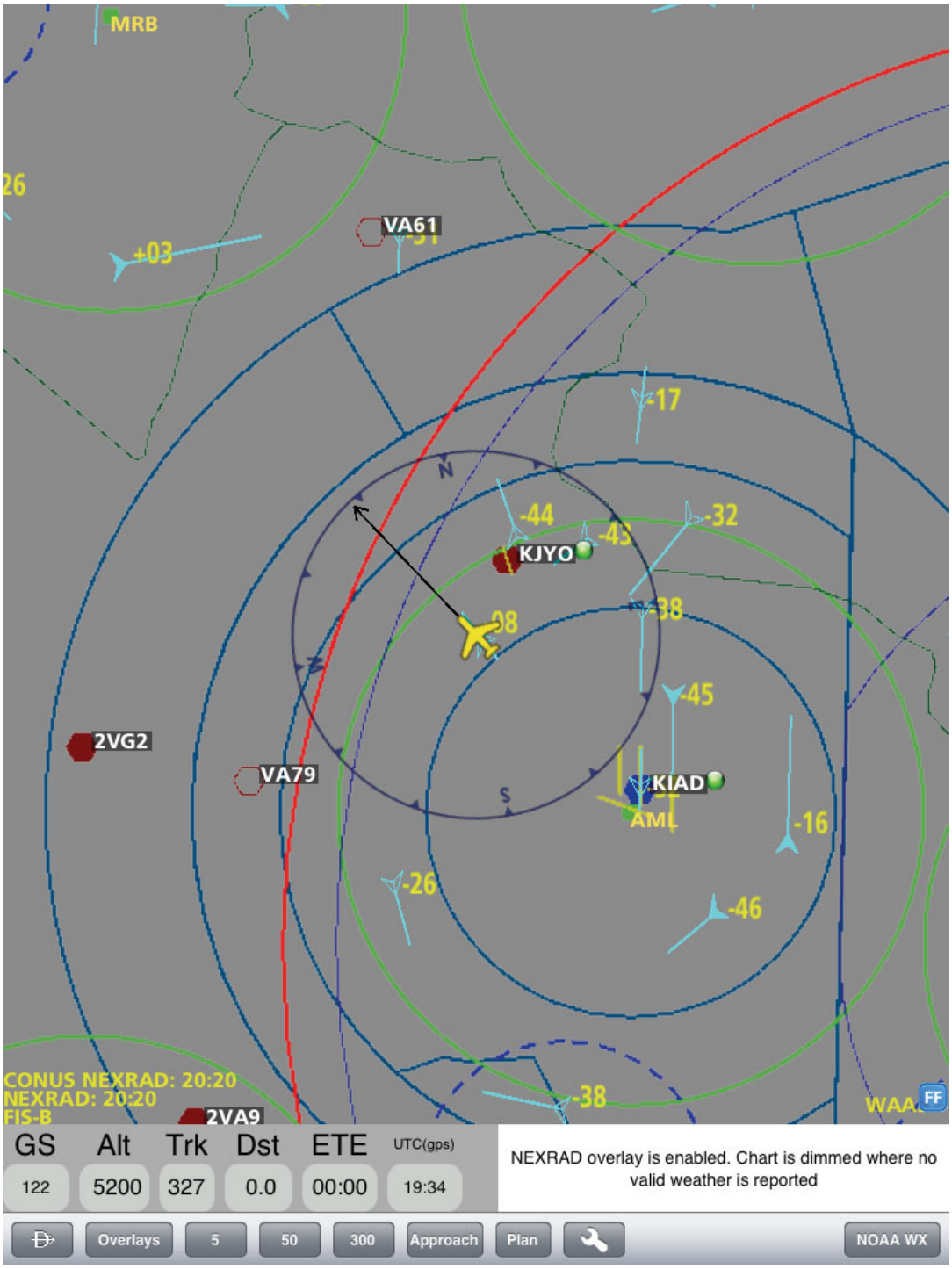
TIS B traffic data is only transmitted on the same frequency that the ADS B Out data is received on. Since any aircraft which flies above FL180 must transmit ADS B Out on 1090 MHz, even if you are in the vicinity of an airliner equipped with ADS B Out, you will not receive traffic data on a single channel SkyRadar receiver.

Tap the "**Overlays**" button to access the **Overlays** sub menu. Use the switch icons to turn **ON** the "**Airborne Traffic**" or "**Ground Traffic**" as desired.

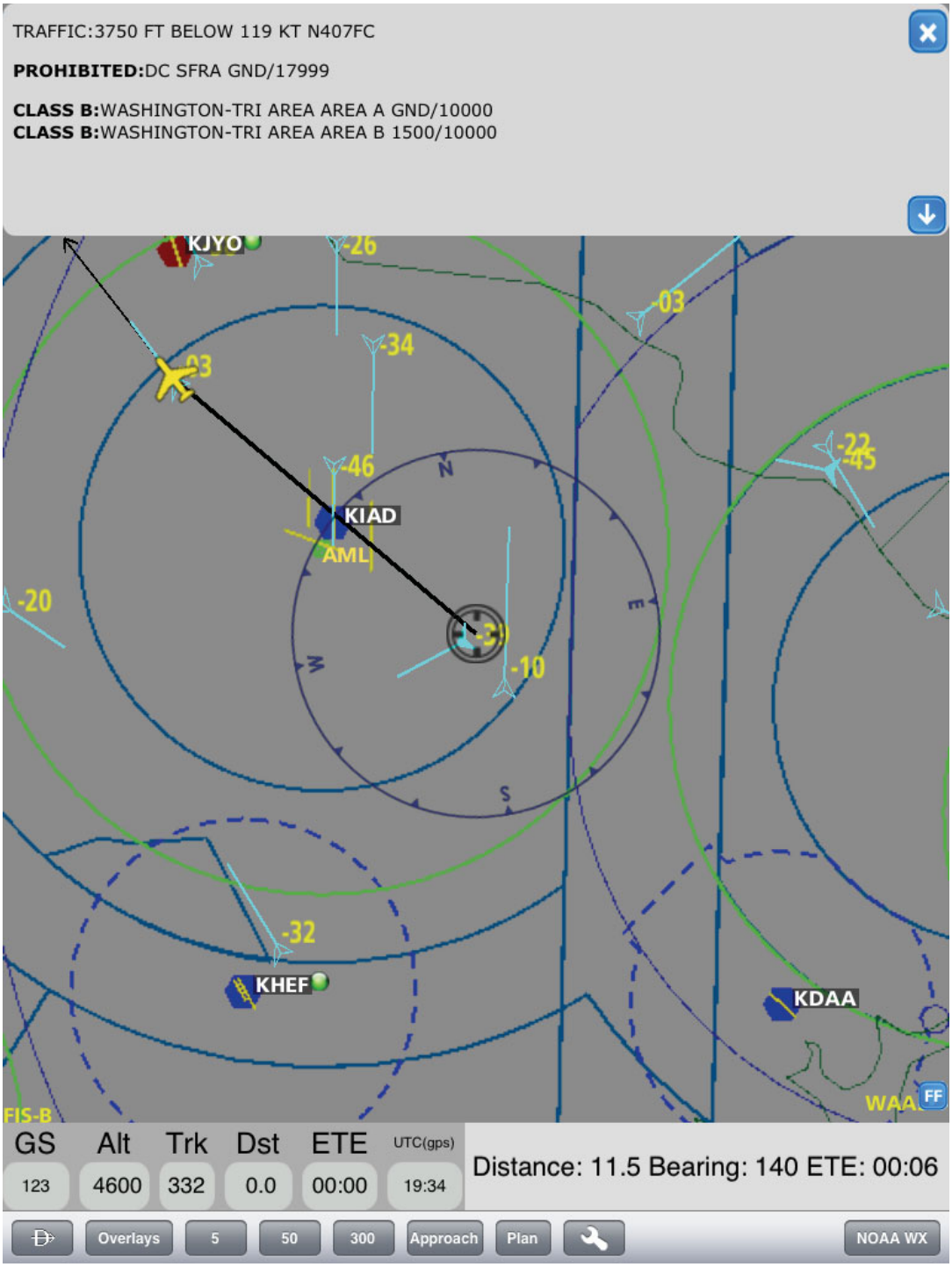
The display shows the ADS B traffic as a solid blue arrow and transponder traffic as a blue wireframe arrow. The blue vector line shows direction and speed. The vector line length is a one minute predictor of the traffic target's position provided there is no change of speed or direction. As long as there are regular position updates on the traffic, the blue arrow will remain at the end of the vector line. The arrow will move up the vector line if no position updates are received. The distance moved indicates how long it has been since an update was received, e.g., half way means no updates received for 30 seconds.

Altitude referenced to your aircraft is also shown. Go to ***SkyRadar*** **Settings** to set the maximum altitude difference displayed. The altitude reference is removed when the Map range is greater than about 60 miles to declutter the display. Panning a solid arrow under the circular icon will show the altitude difference, speed and N Number of ADS-B Out equipped aircraft. The next two pages show examples of TIS-B data displays.

This example shows traffic near KIAD. Note the solid arrows denoting ADS B equipped aircraft and the wireframe arrows showing Mode C aircraft. The chart overlays have been turned off to declutter the display.



In this example, an ADS B traffic target has been selected. The information shows that the target is N407FC. Again, the chart overlay has been turned off.



Traffic Information Service (TIS-B) Dual Channel (978 MHz + 1090 MHz) Receiver

General

ADS B Out data (aircraft to ground) can be transmitted on either the 978 MHz or the 1090 MHz band. In order to fly in Class A airspace (FL 180 and above), 1090 MHz must be used. Below FL180 either frequency may be used.

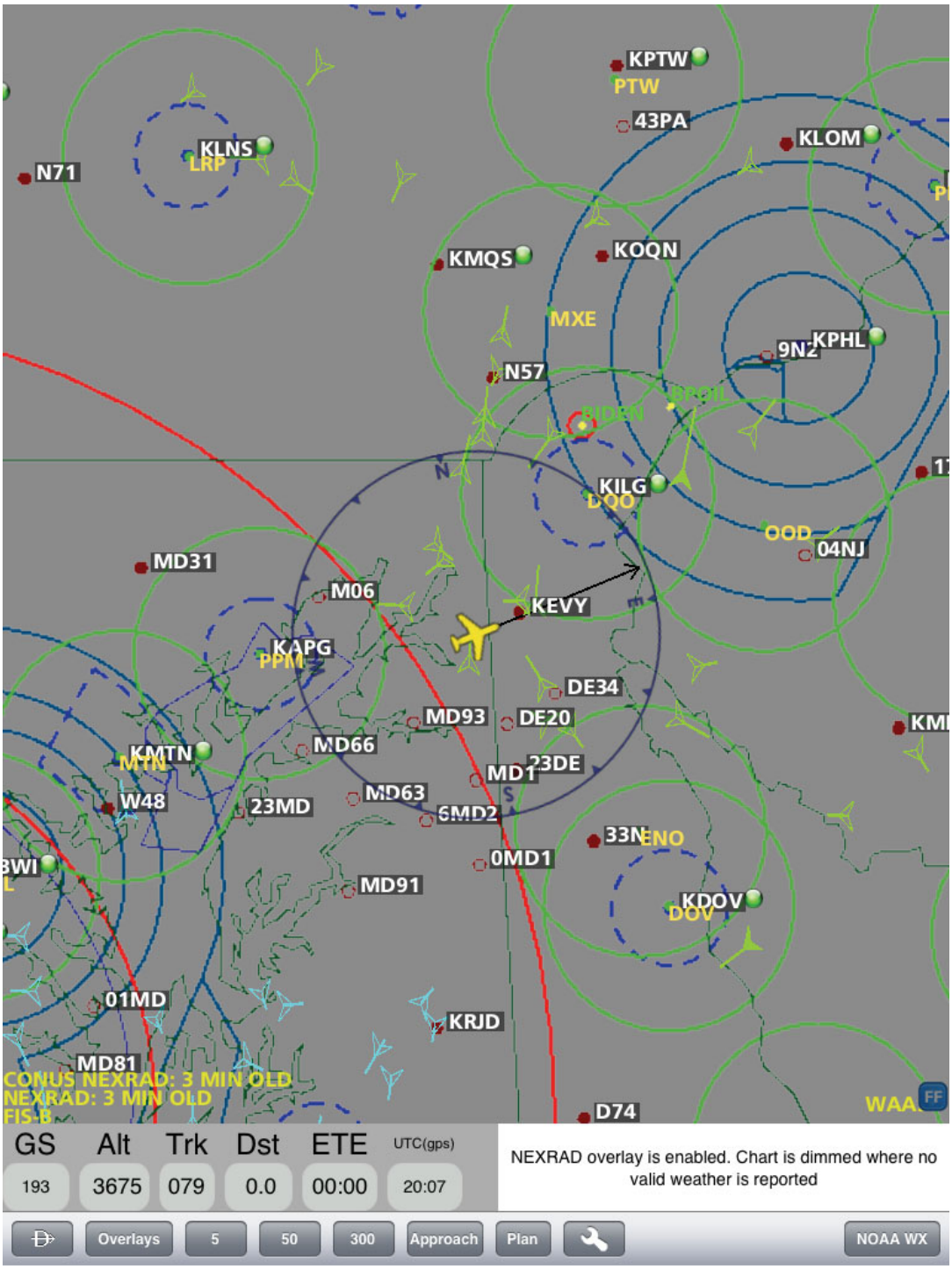
TIS B traffic data is transmitted on the same frequency that the ADS B Out data is received on. Therefore, if you are in the vicinity of an airliner equipped with ADS B Out, you need a Dual channel SkyRadar receiver to receive traffic data.

This receiver detects both 978 MHz and 1090 MHz transmissions. The preceding chapters describe the operation of the Single Channel ***SkyRadar*** receiver. Operation of the 978 MHz channel of the Dual Channel ***SkyRadar*** receiver is identical.

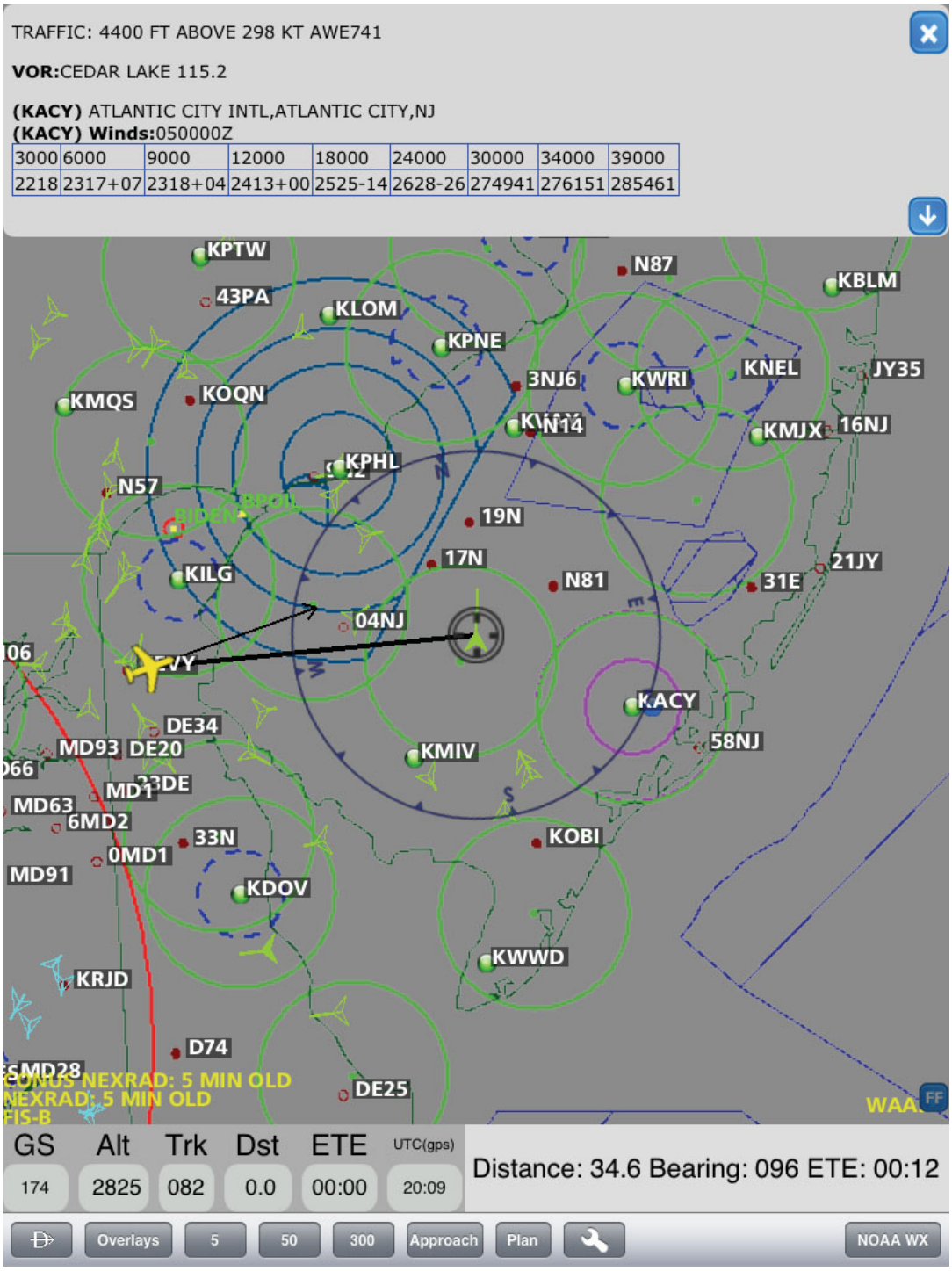
The 1090 MHz channel detects transmissions directly from ADS B equipped aircraft that are transmitting on 1090 MHz. These traffic targets are displayed as solid green arrows. When an ADS B aircraft transmitting on 1090 MHz is detected by a ground station, traffic within 15 miles and +/- 3000 feet of that aircraft is transmitted from the ground on 1090 MHz. The Dual Channel ***SkyRadar*** receiver detects this ground based signal and displays transponder traffic targets as green wireframe arrows.

The following two pages show examples of 1090 MHz targets.

This example shows both 978 MHz (blue) and 1090 MHz (green) traffic. Altitudes are not shown because the map scale is greater than 60 miles.



This example shows that Cactus 741 (US Airways) is ADS B Out equipped. Again, altitudes are not shown because of the map scale.



SkyRadar Logs

General

SkyRadar records a log of all flights. At this time, the maximum data for each individual log is 8 Mbits. If a flight lasts longer than an 8 Mbit log can record, ***SkyRadar*** will start a new log with a new date and time stamp. This means that a longer flight will have multiple individual logs, each with its own date and time stamp. A maximum of 40 individual logs can be stored. When 40 logs are stored, no more additional logs will be recorded unless some logs are deleted. These logs can be replayed at normal or fast forward. Overlays can be changed from what they were during the flight. This feature can be used as an instructional aid to become more familiar with the software.

To access the logs, tap the **Details/Settings icon**. Then tap **SkyRadar Logs** on the **Details/Settings** menu. The **Temporary** list of logs will appear. The **Saved** list of logs is selected by tapping the **Saved** button at the bottom of the screen.

Tap the desired log and the following choices will appear:

EMail--Used to email the log. This function allows logs to be sent to support@skyradar.net for troubleshooting purposes. You may also email logs to another Ipad. The log will run on an Ipad with ***SkyRadar software version 2.62 or later.*** When you receive the log in **MAIL,** tap on the "**FlightLog.srl**" icon. Then tap on **"Open in SkyRadar".** ***SkyRadar*** will open and run the log. ***Note: If the attachment is received as a "Logfile", email the file to a Mac or PC, rename it "FlightLog.srl" and email back to the Ipad. Then proceed as described above.***

Replay--Used to replay the log. Tapping the small "**FF**" button at the lower right will run the replayed log in Fast Forward. Tap again to return to normal speed.

Delete--Used to Delete an individual log.

Show on Map"--Used to show the flight track on a map. No Overlays are active.

Save--Used to move a log from the **Temporary** list to the **Saved** list.

Tap the **Delete All** button to delete the entire **Temporary** or **Saved** log list, whichever is displayed. Tap **Done** at the upper left to return to the Map page.

In Case of Difficulty

Receiver Connection Problems

If the Ipad does not connect to the receiver after following the instructions in ***Connecting the SkyRadar Receiver***, try the following steps:

- Insure that **"Connect to Skyradar Receiver"** is turned **ON** in the **Skyradar Settings** menu.
- Press the "**Home**" button on the Ipad once.
- Tap the Ipad "**Settings**" icon.
- When the **Settings** menu appears, tap "**Wi-Fi".**
- Turn the "**Wi-Fi**" switch icon **OFF**
- Wait until the **Choose a Network** list disappears, the turn the "**Wi-Fi"** switch **ON**.
- When the **Choose a Network** list appears, you should see "**SkyRadar XXXX**". If you do not see this network, check whether the Receiver has power and whether the small antenna is properly connected.
- Tap "**SkyRadar XXXX**", a checkmark appears before the network name when connection is established.
- Press the "Home" button twice. When the list of open icons appears, tap the ***SkyRadar*** icon. When the ***SkyRadar*** Map page opens, verify that the red "**X**" icon in the upper left is extinguished. The ***SkyRadar Receiver*** is now connected.

Note: If you have a receiver shipped before October, 2010, insure that there is only one active Ipad within range of the receiver

Reception Problems

If you are unable to receive FIS-B data at an altitude of at least 2000 feet, and you are sure you are within range of an FAA ADS-B IN transmitter, insure that the long antenna on the receiver is above the window line of the aircraft. An extension cable is available if you have your receiver mounted lower than the windows which will allow the antenna to be mounted above the window line.

Contact support@skyradar.net ***if further assistance is required.***

Changes

Page 3, Added note that FIS-B transmissions are continuous, but TIS-B needs to be triggered by an ADS-B Out equipped aircraft. 7/15/11

Page 3 Updated Map to show ADS B coverage as of July 11, 2012 9/4/12

Page 4 Revised to describe SkyRadar-L, SkyRadar-S and SkyRadar-D. 9/4/12

Page 5 Added note to turn "Location Services" On 9/14/11

Page 6 Changed to show "Airplane Mode" On 3/13/12

Page 8 Added Scratch Pad and Brightness control. 9/4/12

Page 9 Added info on two finger distance measurement. 9/4/12

Page 9, 17, 18, 23, 24, 28, 29 Changed "yellow crosshair" to "circular icon". 7/15/11

Page 9, 26, 27, 31 Changed screen shot to show circular icon. 7/15/11

Page 11 thru 14 rewritten to add SkyRadar Low altitude enroute charts. 9/15/11

Page 11 thru 14 Added availability of SkyRadar High altitude enroute charts. 1/29/12

Page 13 Revised to show Skyradar or Seattle as chart data source. 1/29/12

Page 16 Added note concerning Sectional accuracy. 8/20/11

Page 17 Rewritten to describe the latest route presentation 7/15/11

Page 17 Added Victor airway to route. 1/29/12

Page 17 Rewritten for version 2.84 9/12/12

Page 18 Updated entry of Custom waypoints. 1/29/12

Page 18 Rewritten for version 2.84 9/12/12

Page 19 Added instructions to edit a saved flight plan route. 9/14/11

Page 19 Rewritten for version 2.84 9/12/12

Page 20 Rewritten for version 2.84 9/12/12

Page 24, 25 Added note and screen shots showing explosive Tstorm growth. 7/15/11

Page 24 Added note that panning brings up closest winds aloft. 1/29/12

Page 29 Added description of TIS-B icon. 8/6/11

Page 30, 31 Changed screen shots to show solid and wireframe targets. 2/1/12

Page 32, 33, 34 Added Dual Channel Receiver information. 2/1/12

Page 35 Added instructions concerning replay of emailed logs in version 2.62. 7/15/11

Page 36 Added note to make sure only one Ipad is on with early receivers. 7/15/11