



AltitudeAlert

Hello, and thank you for subscribing! **AltitudeAlert** is an advanced altitude management system for Apple Mobile Devices. Please take a moment and review this User Guide to familiarize yourself with its features.

As you know, no User Guide can cover every scenario that you might encounter while flying. So please feel free to contact me either through the app website (altitudealertapp.com), or Facebook (facebook.com/altitudealert).

Let's get started!

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AltitudeAlert iPad Setup:

When AltitudeAlert launches for the first time you will be required to allow access for the app to send you Notifications. Choose “Allow” as the app will not function correctly without allowing this access.

After agreeing to the User Agreement, you will be presented with a settings setup screen or the choice to continue to the AltitudeAlert main page. If you choose to adjust your settings at this time, go to **Notifications and Sounds** below in this section for specifics on setup.

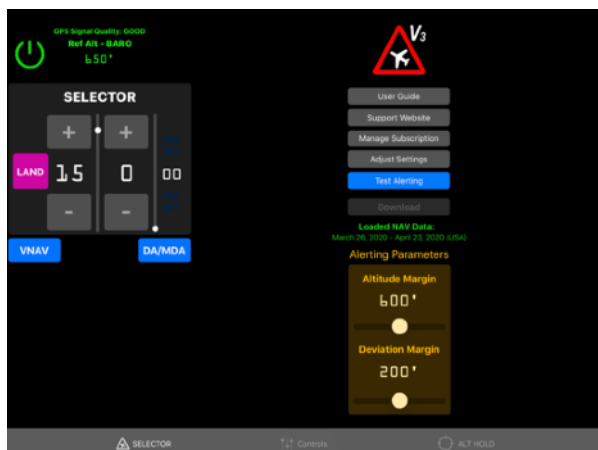
IMPORTANT

Location Services must be enabled before AltitudeAlert will operate correctly. This is simply accomplished by selecting an altitude in the **SELECTOR** (see AltitudeAlert Controls). You will then be asked to allow AltitudeAlert to use your location. Choose “Allow”. After you’ve used the App a few times, You will receive another message asking you to allow AltitudeAlert to use your location at ALL times. For best use, choose “Allow Always” as this allows AltitudeAlert to run in the background while you navigate using your favorite EFB App, i.e ForeFlight, Garmin Pilot, etc. The status bar at the top of the iPad will be highlighted in **BLUE** with the notice **“AltitudeAlert is Actively Using Your Location”** unless you choose always allow your location.

AltitudeAlert runs in TWO display configurations in both landscape and portrait orientations:

- **Stand Alone**
- **Slide In, Slide Out**

Stand Alone:



In **Stand Alone** mode, the AltitudeAlert user interface (Controls) occupy the entire display, all alerts are delivered via the app user interface with corresponding audio alerts. This mode gives the most information about the alert being delivered. It’s also the first screen that you will see when launching the app.

Using this mode:

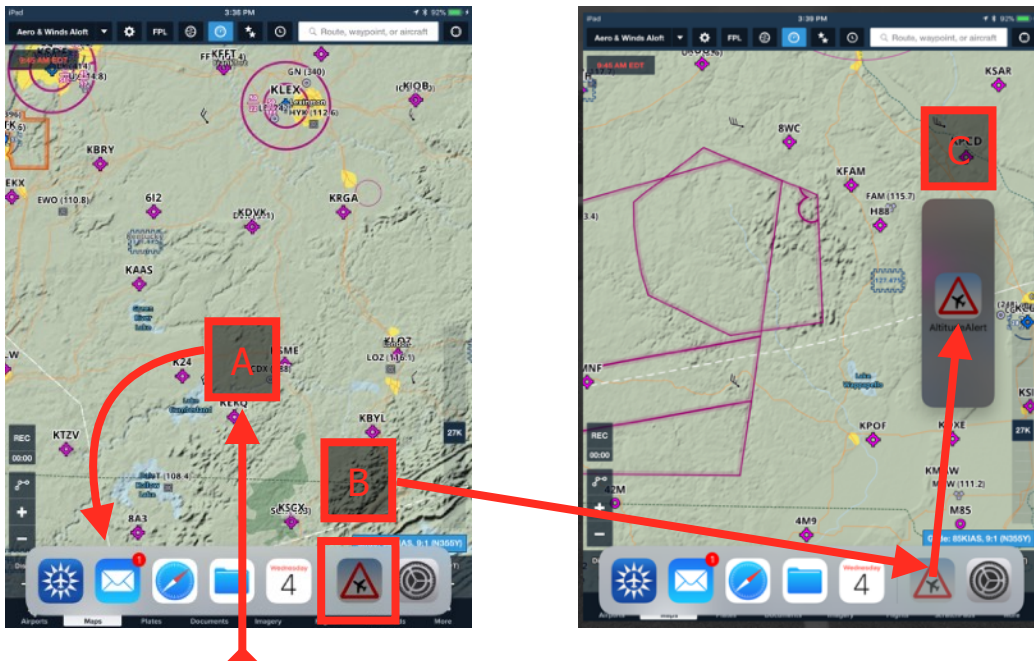
1. Launch your primary EFB Navigation app (Foreflight™, Garmin Pilot™, etc.).

Please follow the following steps whenever the AltitudeAlert is not ACTIVE in the background

- A. Swipe UP from the bottom of the screen to reveal the DOCK.
- B. Touch and Hold the AltitudeAlert Icon. Then DRAG it UP until the App “elongates”.
- C. Release your finger. AltitudeAlert will now be open in “Swiped in” view.

To subsequently “Swipe in/out”, follow steps 2-5 below

PROCEED TO 4



2. With the EFB app open and in view, place your finger at the RIGHT edge of the display and “Swipe” it to the LEFT. A “side view pane” will open up on the right 1/3 of the the display, revealing all of your apps, arranged vertically.

NOTE

If AltitudeAlert was launched previously from this view, it will launch automatically when you “Swipe In” from the right

3. Swipe up/down in the pane until you see the AltitudeAlert app, then launch it. AltitudeAlert will launch into the right 1/3 of the display (as depicted above).
4. After making your adjustments to AltitudeAlert’s controls, then “Swipe” the pane back to the right to close the control panel. AltitudeAlert is now operating in the background.
5. To re-access AltitudeAlert’s controls again, repeat the steps above.

[TAP/CLICK HERE to see a video on how to setup the Slide In/Slide Out mode](#)

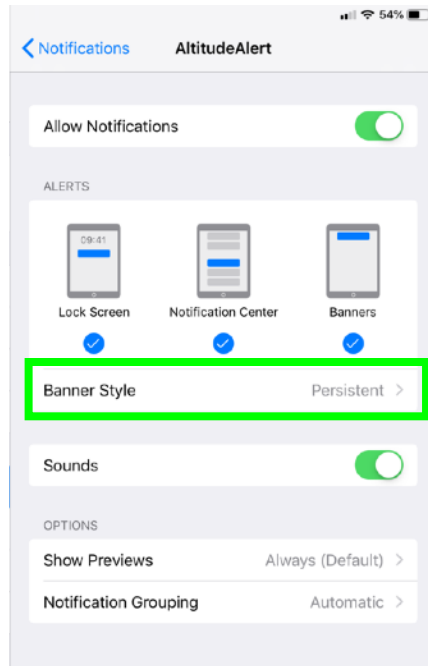
**** This was the mode that AltitudeAlert was designed to operate in when using a SINGLE iPad ****

Notifications and Sounds:

Because the iOS notifications operate separately from AltitudeAlert’s aural and visual user interface notifications, configure the Notifications and Sounds in the SETTINGS app on your iPad as follows:

Notifications:

In my personal testing, I found that the best alerting mechanism was the “PERSISTENT” Banner Style alert. “TEMPORARY” also works well but because they automatically go away after a short period of time, they’re easy to forget when the cockpit gets busy. The “PERSISTENT” style forces you acknowledge the alert before it will go away. That being said, configure the alert style however you desire.



Foreground mode:

If you plan to use AltitudeAlert ONLY in foreground mode, then set the Alert Style to either TEMPORARY or PERSISTENT.

Slide In, Slide Out mode:

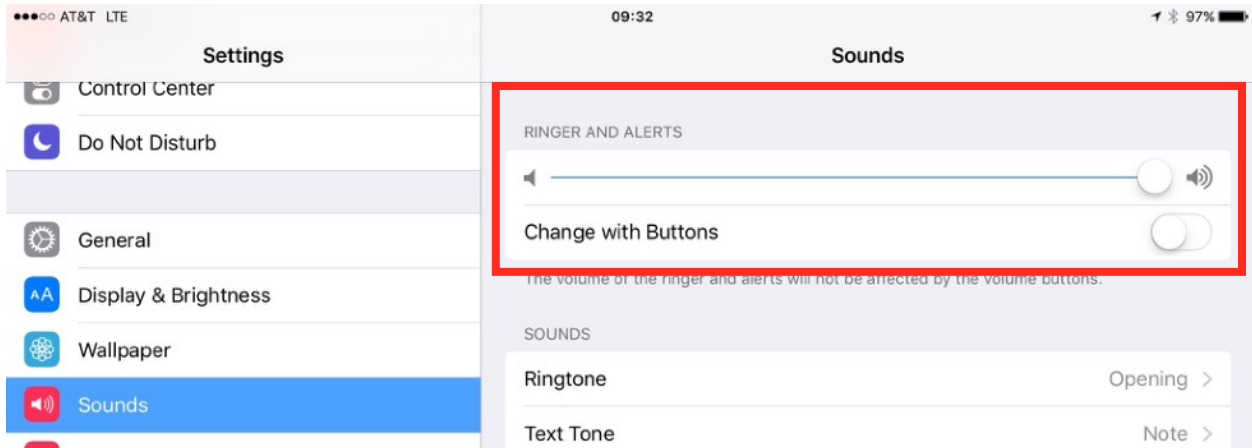
Set the Alert Style to PERSISTENT.

NOTE

The app may generate duplicate alerts when the the AltitudeAlert controls are swiped in (which is a short period of time while changing the SELECTOR or updating atmospheric controls). When swiped out and operating in the background, you will only receive iOS notifications (no duplicates).

Sounds:

To ensure that the the iOS notifications are audible, verify that the RINGER AND ALERTS slider is set to full. For best results, make sure that “Change with Buttons” is NOT enabled (see image below). With “Change with Buttons” enabled, it can be confusing as to which volume you’re actually controlling. In my experience, leaving this setting disabled and having the RINGER AND ALERTS volume slider set to full provided the most consistent results. This is because the iPad’s volume buttons are now set to control the “Master” audio output only.



Headset Connect:

It goes without saying, if your headset is not connected to your iPad you will not hear any of the aural alerts. While this is not a requirement to use the app, it’s the best user experience.

Since there are so many ways to connect your headset to your iPad, I will not cover all of the possible options. In general, the best option is to use an ANR headset with Bluetooth capability to connect to the iPad. Another good option is an ANR headset connected via an external 1/8” stereo audio cable from the iPad to a headset or intercom.

Using AltitudeAlert - iPad:

Using AltitudeAlert is straightforward. There are two operating modes to choose from depending on how you fly...

The **SELECTOR** mode, and the **ALT HOLD** mode.

SELECTOR mode is designed to function as a complete altitude management system with altitude preselect, IFR alerting, and VNAV. Which is ideal for IFR pilots.

ALT HOLD mode is a simple alerter specifically designed for quick use with little or no setup. This mode is ideal for VFR pilots who want to monitor their cruise altitude or for use during training when you want to maintain a specific altitude and be notified when you deviate from it.

Let's take a look at each...

SELECTOR mode (Advanced altitude management for IFR and VFR Pilots):

- Prior to takeoff, **FIRST**, Set the **SELECTOR** to the desired altitude or as cleared by ATC. Then set the altimeter setting (**Altimeter Setting**), **Field Elevation**, (and **Surface Temp**, if visible).
- AltitudeAlert will then monitor the reference altitude (**Ref Alt - BARO or GPS**). As you approach the altitude set in the **SELECTOR**, an aural and visual alert will be generated (or iOS system notification when the app is running in the background. *See iOS Background Alerts Table below*).
- After reaching the selected target altitude, AltitudeAlert then monitors the altitude set in the **SELECTOR**. If you exceed the altitude in the **SELECTOR** by a specified margin (see **Deviation Margin**), an alert is generated (aural and visual) advising you to correct the deviation.
- Prior to descent, set the **Altimeter Setting**, **Field Elevation** (and **Surface Temp**, if visible) for the destination. Then set the **SELECTOR** to the desired lower altitude or as cleared by ATC. AltitudeAlert then generates alerts using the same criteria as above.
- For true altitude control and planning use **VNAV** to place your aircraft precisely where and when you want it to be at a certain altitude.
- If an instrument approach will be accomplished, set the DA or MDA minimums using the **DA/MDA** button. Once entered, tap the **ARM** button to arm the mode. Alerts will be generated at 100' above minimums and when reaching minimums.
- Prior to final descent for landing while VFR, press the **LAND** button to avoid any nuisance alerts during descent for landing. *Tapping **LAND** button is not necessary when the DA/MDA mode is used.*

NOTE

If the **LAND** button is NOT pressed, the Landing Mode will automatically be activated when the **Ref Alt** is within 1000' of the **Field Elevation**.

If using Barometric Altitude Reference (Ref Alt - BARO) - Most Typical

The first time you use AltitudeAlert you may need to “Quick Calibrate” your iPad’s Barometric sensor to the aircraft altimeter. While airborne, with the aircraft level, make sure that the **SELECTOR MATCHES** your aircraft altimeter. Then touch the “Quick Calibrate” Touch Zone. The **Ref Alt - BARO** will calibrate and now zero any error. See “Quick Calibrate” below for more details.

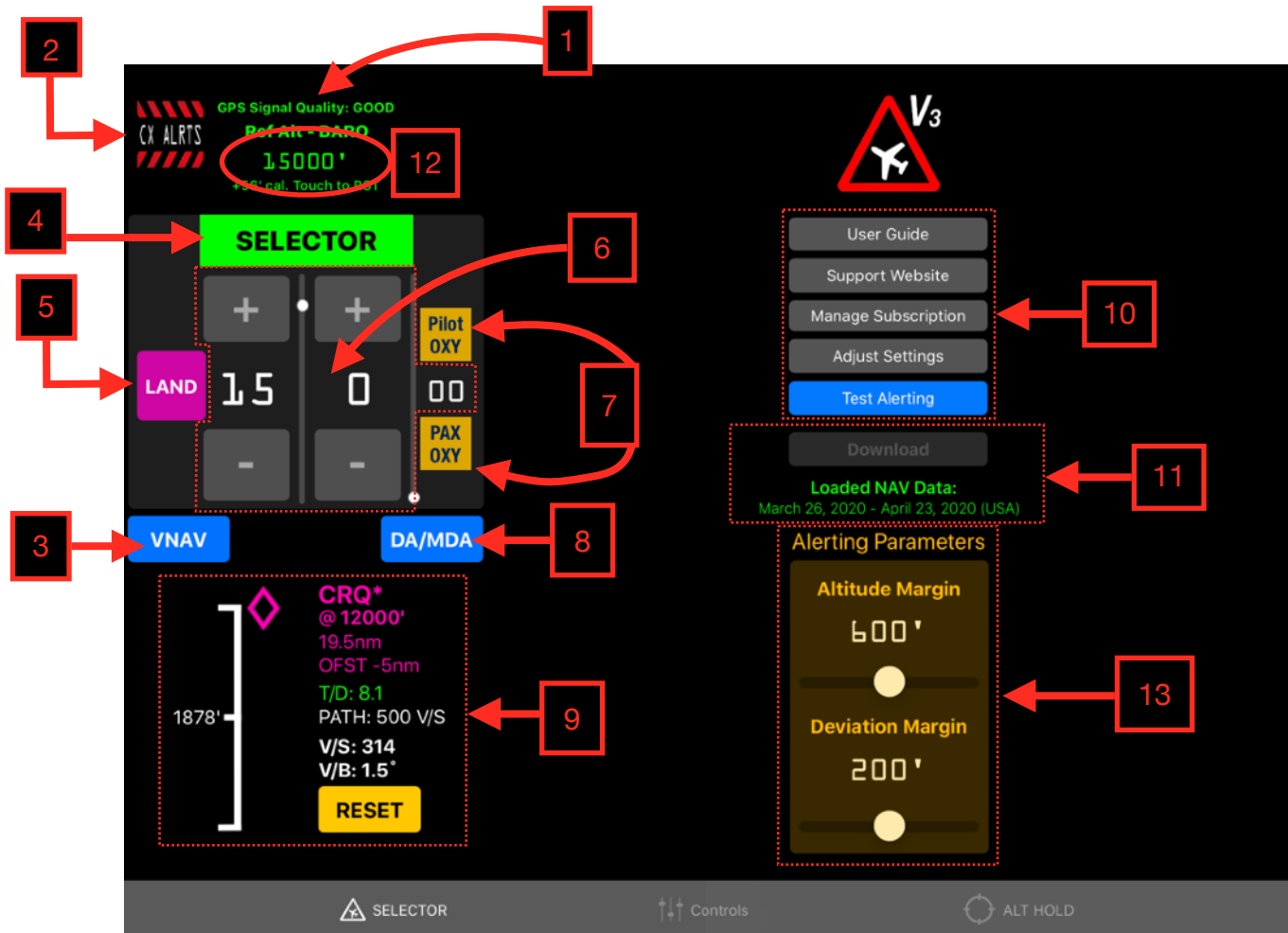
If using GPS Altitude Reference (Ref Alt - GPS) - Not Typical, pressurized aircraft, older iPads

Occasionally, an erroneous alert may be generated. This occurs when the atmospheric conditions at altitude are appreciably different from the surface pressure and temperature being reported. To correct the nuisance alert: First, verify that the outside air temp (Ref OAT) and altimeter setting (**Altimeter Setting**) match the reported conditions. Next, if the settings are verified correct and there is still an error, use the Altitude “Quick Sync” Touch Zone to correct the error.

ALT HOLD mode (Typically for VFR pilots):

There’s really nothing to setup. Just go fly! When you want to start monitoring an altitude tap the ALT HOLD tab at the bottom of the screen (unless you’re already there). Then tap the “TAP TO HOLD ALT” button. That’s it! AltitudeAlert will then alert you when you exceed the Deviation Margin displayed on the page. See the ALT HOLD and Alert Margins Tabs below for more detailed information.

SELECTOR Mode Tab (BARO Altitude Reference) - iPad:



1. Ref Alt - BARO:

Pressure altitude, corrected by the altimeter setting (**Altimeter Setting**) and then rounded to the nearest 10'. Once the altimeter setting is set, it's very precise and the reference altitude should match the aircraft altimeter within a few feet. Once airborne however, it may read a bit higher than aircraft altimeter. This is because of the Venturi effect created around the cockpit when the aircraft is flying. To compensate for this, a -75 ft. adjustment has been added to the reference altitude whenever the aircraft groundspeed is > 80 kts. This adjustment should nearly eliminate the error, however there may still be some residual error due to variations from cockpit to cockpit, and whether the interior vents are open or not. As a result, there's "Quick Calibrate" feature that eliminates any residual error. More on this below.

2. Power/CX ALRTS Button:

On the ground, the Power button is visible. Airborne the CX ALRTS button is visible and cancels all altitude and accuracy alerts (Oxygen Alerts are unaffected). Use this mode if

unwanted altitude and accuracy alerts are being generated. Altitude, Atmospheric, and Field Elevation controls retain their settings. To restart alerts, select a new altitude in the **SELECTOR**.

3. **DA/MDA** Button:

Allows the setting of Decision Altitude(DA) or Minimum Decision Altitude (MDA) instrument approach procedure (IAP) minimums (See DA/MDA Minimums below).

4. **SELECTOR** Alert:

!! ATTENTION !!

Use of the **DA/MDA** alerting feature is for REFERENCE ONLY. You must still verify any/all IFR minimums with a properly installed and certified altimeter. It's HIGHLY RECOMMENDED that you practice with **DA/MDA** in VFR conditions before using it while flying IFR.

When an altitude alert is received, the text turns black and becomes boxed amber. An aural alert is also played depending on the alert received. Additionally, when your altitude reaches the altitude set in the **SELECTOR**, the box will become boxed green.

5. **LAND** Button:

Engages the Landing Mode. When touched, the currently selected Target altitude is zero'd out, and the display turns Magenta. In this mode, AltitudeAlert will generate an aural alert at 1000' AGL and 500' AGL respectively for situational awareness. Additionally, if the "Retractable Landing Gear" option was selected (see #11 below), "Check landing gear down" will be annunciated after the 500' alert. The accuracy of this mode is contingent on setting the correct landing field elevation with the **Field Elevation** controls (Controls Mode Tab below)

NOTE

AltitudeAlert will automatically select Landing Mode when the you descend below 1000' AGL of the selected field elevation set in the **Field Elevation** Controls section.

6. **SELECTOR**:

Separated by thousands and hundreds of feet. You can select any altitude between 0 and 17900'. High altitude alerts are available up to 45900' (FL459) by toggling the Altitude Limit 45900 switch located in the App Settings page* Set the altitude by using the + or - buttons OR touching on the desired slider and sliding it UP or DOWN with your finger.

** Use caution when above 18000' (FL180). Altitude reference algorithms are optimized for alerting below 18000' (FL180).*

7. Supplemental Oxygen Alerts:

Visual and aural alerts are provided when pilot and passenger supplemental oxygen is required. The **Pilot OXY** amber light illuminates above 12500' MSL. The **PAX OXY** amber light illuminates above 14000' MSL. Both lights extinguish upon descent below the respective altitudes.

8. VNAV Button:

Opens the VNAV Configuration page (See VNAV Below).

9. VNAV Display Guidance:

Active VNAV guidance as configured on the VNAV Configuration page (See VNAV Below).

10. Setup & Reference Buttons:

Use these buttons to access this **User Guide**, **Manage Subscription (App Store Version only)**, the **Support Website** (for asking a question or giving feedback), or to access the AltitudeAlert settings page to adjust Notification settings. The **Test Alerting** button runs a test of many of the aural and visual alerts. This is a confidence test that takes about 14 seconds.

11. VNAV NAV Data Currency Status and Download Button:

Display's the status of the loaded NAV Data. When the loaded NAV Data is not current or no file loaded, the DOWNLOAD button will become available. Tap it to download the current file.

12. Barometric Altitude "Quick Calibrate" Touch Zone:

Touching the **Ref Alt - BARO** label "Quick Calibrates" reference altitude to the **SELECTOR**. This is quick and convenient way to sync and correct any residual error from the aircraft altimeter. Once the calibration is applied it will be retained in the app indefinitely until it is either removed (touching the "Touch Zone" again will remove the calibration) or another calibration is applied by repeating the process. The iPad's Barometric Sensor is very sensitive and is effected by the pressure in your cockpit in much the same way your aircraft's altimeter does when the alternate static source is selected. As a result, anytime you open or close outside vents in the cockpit, there will be a change in pressure. Practically speaking, you may have to recalibrate the reference altitude every spring and fall as temperatures change.

NOTE

The "Quick Calibrate" Touch Zone is inhibited until the aircraft is in the air.

13. Alerting Parameters:

The **Alert Margin** and **Deviation Margin** are the margins (or triggers, if you prefer) where the applicable alerts are generated. Both are individually adjustable depending on your flying style. Let's look at both...

- The **Alert Margin** is adjustable between 200' and 1000' (the default is 900'). An altitude alert is generated when the **Alert Margin** is reached from above or below the altitude set in the **SELECTOR**. If "Alert + Alert Margin" is toggled on the App Settings page, the alert margin is spoken along with alert chime.
- The **Deviation Margin** is adjustable between 100' and 300' (the default is 200'). An check altitude alert is generated when the **Deviation Margin** is reached from above or below the altitude set in the **SELECTOR AFTER** the **Ref Alt - BARO** (actual altitude) is within 100' the altitude set in the **SELECTOR**.

Let's look at an example,

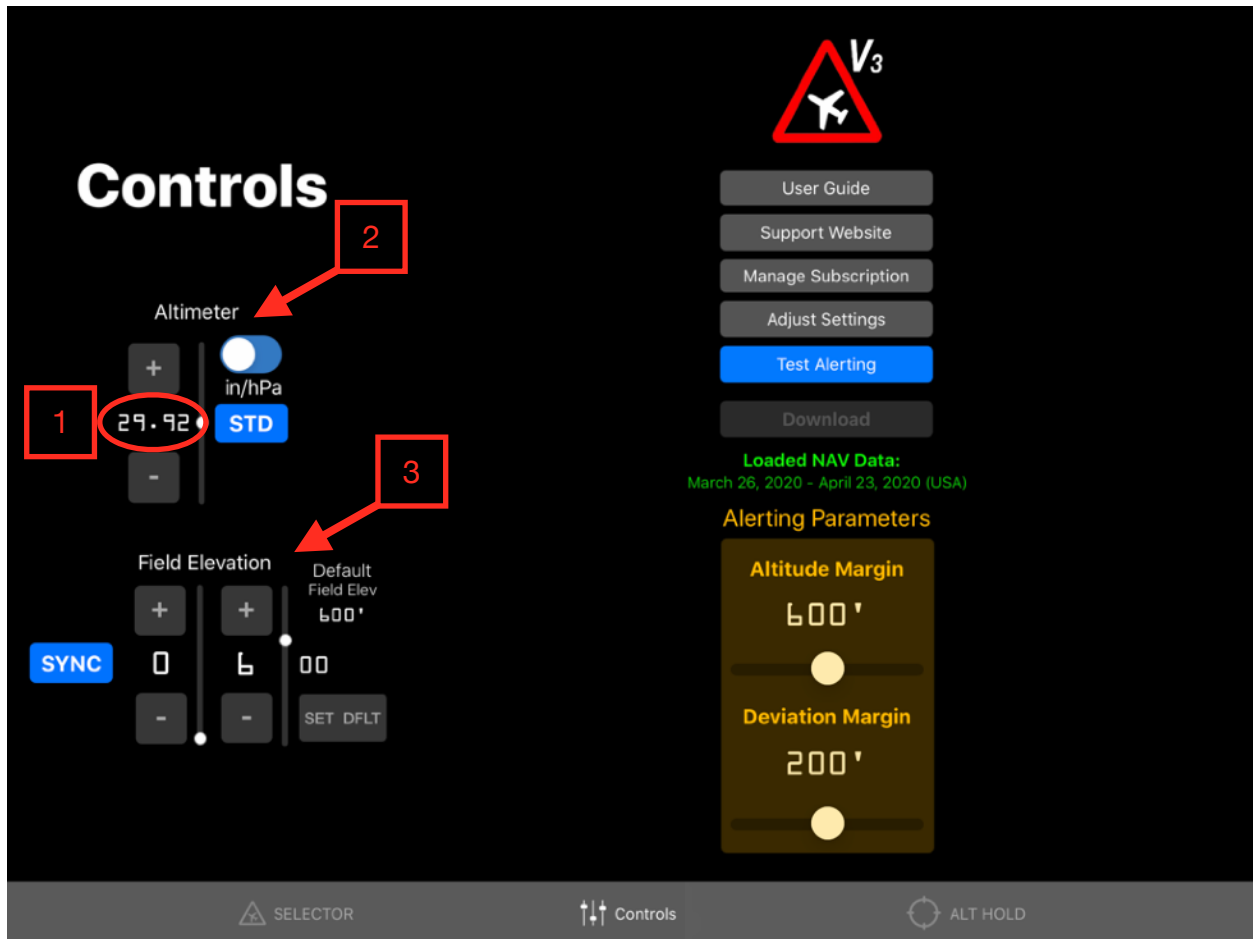
Alert Margin set to 500'
Deviation Margin set to 200'
SELECTOR set to 5000'

The aircraft is climbing, when the you reach 4500', the **Alert Margin** will be reached and the altitude alert (single "C" chime aural alert and amber visual alert, if the app is visible) is generated. Upon reaching 5000', AltitudeAlert begins monitoring your altitude using the **Deviation Margin**, looking for deviations. Let's say you get distracted and you start a slow descent unintentionally. When the you descend below 4800', the **Deviation Margin** will be reached (remember, 200'. $5000' - 200' = 4800'$) and the check altitude alert (single "C" chime with spoken "Check Altitude" aural alert, flashing amber visual alert, if the app is visible) is generated. Correcting the deviation will remove/reset the alert. Or you can select a new altitude in the **SELECTOR**. This will remove the alert as well.

***** CAUTION *****

When the **Alert Margin** is set to 200' and the **Deviation Margin** is set to 100' respectively, nuisance alerts may occur due to the narrow margins. As a result, setting the margins this way is not recommended for extended use.

Controls Mode Tab (BARO Altitude Reference) - iPad:



1. Altimeter Setting Touch Zone:

An alternative way (as opposed to using the +/- buttons or data sliders) to enter data for the corresponding value types. Touch the “Touch Zone” to open the data entry num pad. This allows you to manually enter the desired value. (See image below)



2. Altimeter Setting Controls:

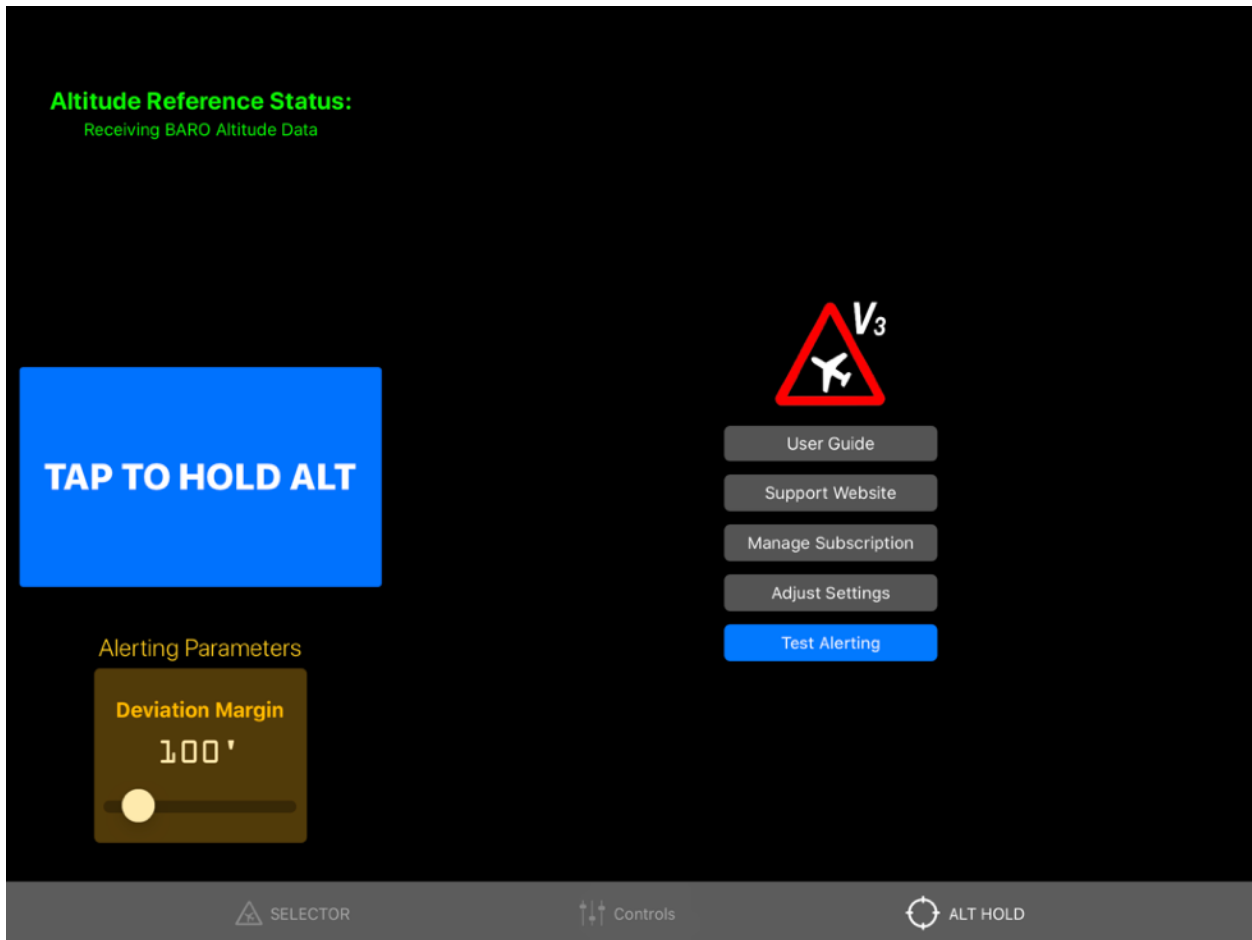
Used to set the current altimeter setting by using the + or - buttons, touching on the slider and sliding it UP or DOWN with your finger, or touching the “Touch Zone” (red circle noted above, also see “Touch Zone” below) to manually input the altimeter setting (see below). A blue **STD** button resets the ALT Setting to standard atmospheric pressure (29.92 in HG or

1013 hPa). The **In/hPa Switch** allows you to set the **Altimeter Setting** using in of HG or hPa as the local altimeter dictates.

3. Field Elevation Controls:

Separated by thousands and hundreds of feet. Set prior to departure field elevation prior takeoff and destination field elevation prior to descent. If you do not set a different destination field elevation, you will be prompted to do so during descent, prior to arming minimums for an approach, or tapping the LAND button. You can set the elevation by using the + or - buttons, touching on the desired slider and sliding it UP or DOWN, or tapping the SET DFLT button to recall the Default Field Elev. The **SYNC** button allows you to sync the field elevation with the indicated reference altitude while on the ground. The Default Field Elev allows you to set a field elevation you use often. To set it, adjust to **Field Elevation** two the desired elevation. Then touch and hold the SET DFLT button. The new default field elevation is displayed and saved. To set a new default, just repeat the process. Again, to recall the Default Field Elev, tap (but do not hold) the SET DFLT button.

ALT HOLD Mode Tab - iPad:

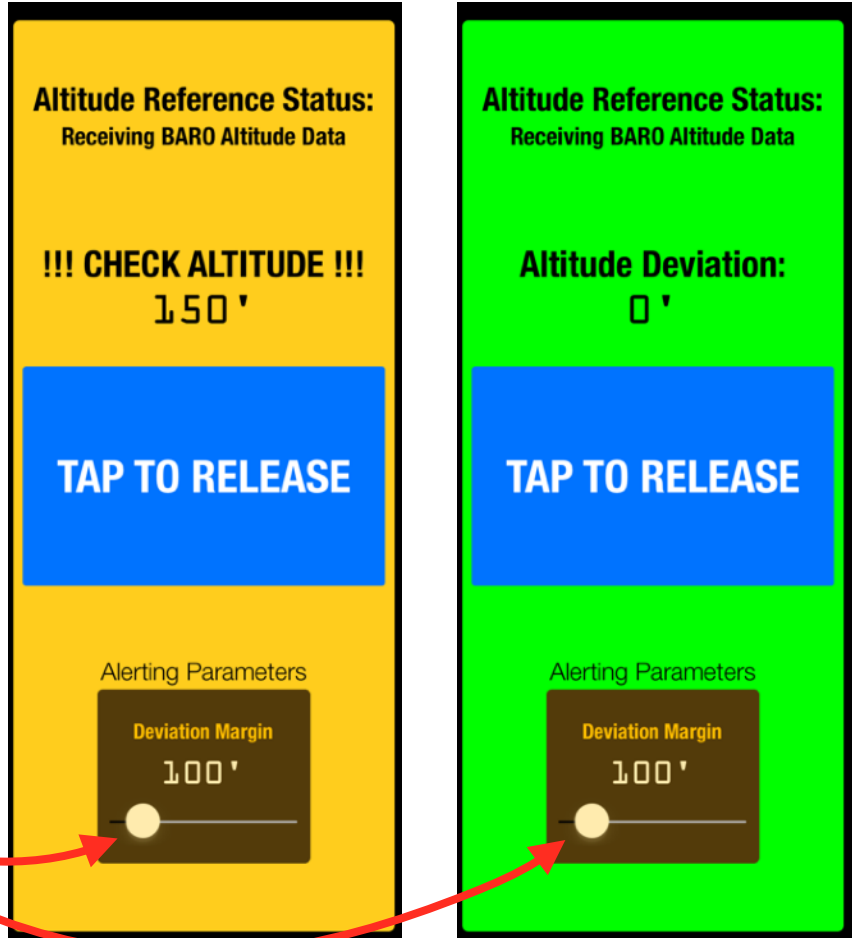


Specifically designed for simplicity, ALT HOLD allows you to quickly hold any altitude without any setup at all. Just tap the “TAP TO HOLD ALT” button and that’s it. AltitudeAlert will monitor that altitude and then alert you if you exceed the Deviation Margin. The Deviation Margin is defaulted to +/- 100’ but can be adjusted to any margin between 50’ and 500’.

ALT HOLD works in all display modes, i.e Full Screen and Slide In/Slide Out

When ready to leave the held altitude, touch the TAP TO RELEASE button. If ALT HOLD mode will be preferred way of using the app. Go to the AltitudeAlert iOS settings page (see iOS Settings below) and toggle the Altitude Hold Mode Primary switch to ON.

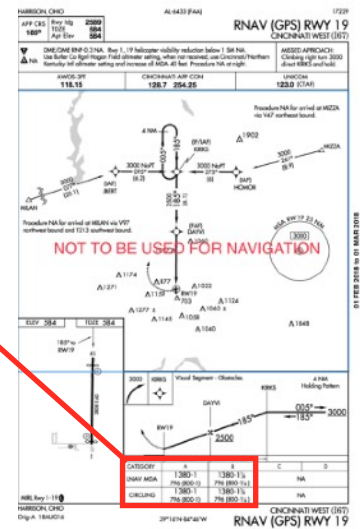
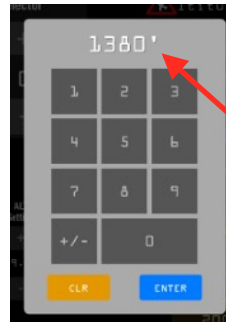
To adjust the Deviation Margin, drag the slider in the Alerting Parameters Box to set a new margin.



Setting DA/MDA Minimums - iPad:

1. Tap the **DA/MDA** button.
2. Set the minimums.

If you need to change the minimums after they're set, either tap the mins displayed in the upper right corner of the screen OR ARM the Mins and then tap DA/MDA button to set them again.



ARM the App for alerting.

- Once armed, standard altitude alerts function normally. However, “CHK ALT” alerts are inhibited.
- Landing Mode is automatically selected at 1000’ AGL (based on the **Field Elevation** setting). Alerts are generated at 1000’ AGL and 500’ AGL* respectively (See LAND mode above).

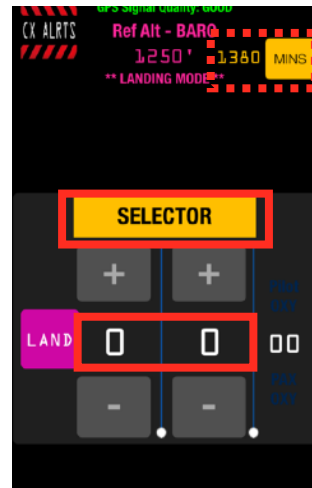
**When the aircraft is at 500’ AGL and the minimums are within 100’, the 500’ LAND mode alert will be inhibited.*

- At 100’ above minimums, “Approaching Minimums”** is stated. Followed by “Minimums” at minimums.

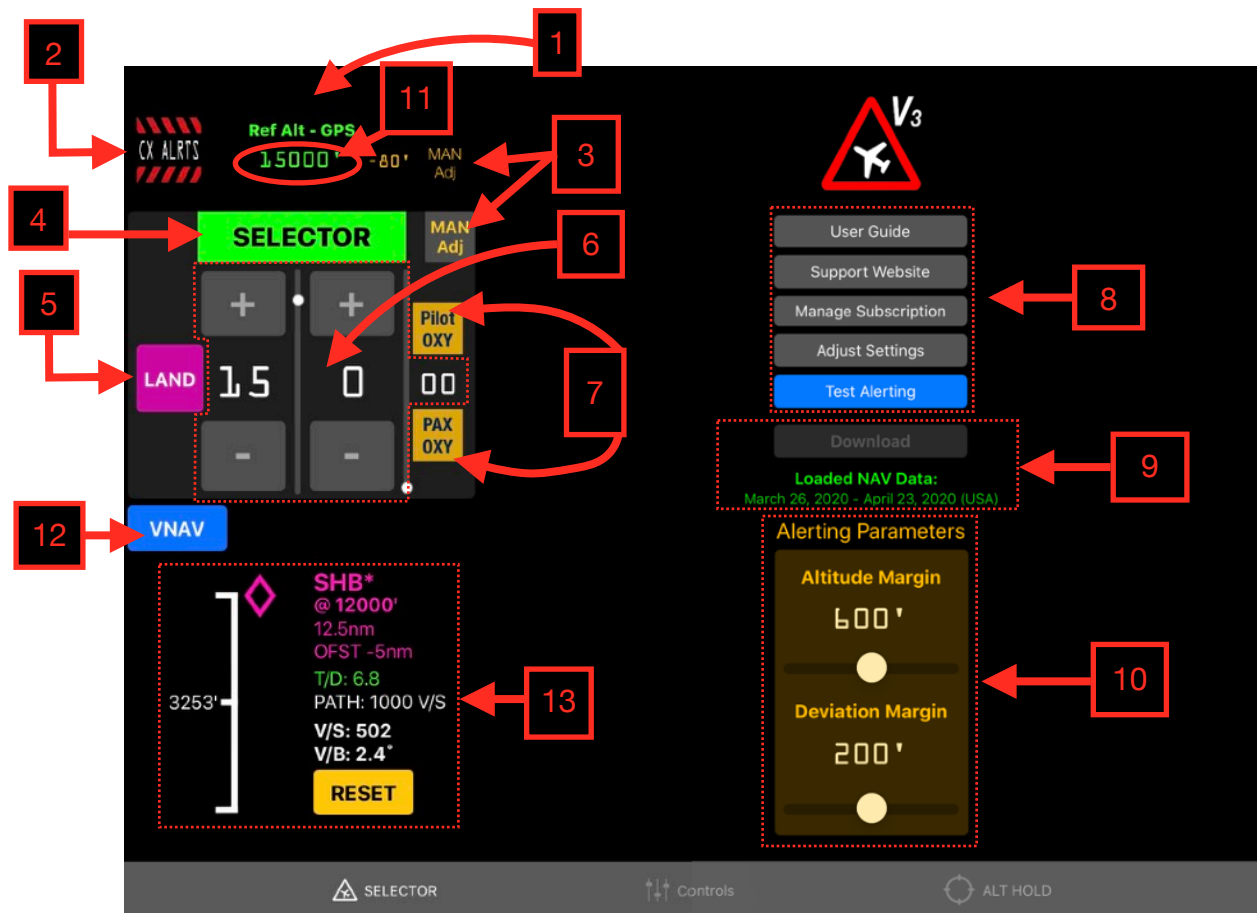
***If the 500’ LAND mode alert was inhibited and the Retractable Landing Gear Switch is ON, the “Approaching Minimums” alert will include “Check Landing Gear Down”.*



3. At minimums, the MINS box and entered minimums turn amber and flash, the SELECTOR Alert turns amber, the SELECTOR “zeros” itself, and the DA/MDA button returns to the unarmed state.
4. If a missed approach is executed, set the missed approach altitude in the SELECTOR. Repeat the steps above to set the minimums for the next approach.



SELECTOR Mode Tab (GPS Altitude Reference) - iPad:



1. Ref Alt - GPS:

The GPS altitude corrected for GPS error, atmospheric conditions, and any manual adjustments applied and then rounded to the nearest 10'.

2. Power/CX ALRTS Button:

On the ground, the Power button is visible. Airborne the CX ALRTS button cancels all altitude and accuracy alerts. Oxygen Alerts are unaffected. Useful if unwanted altitude and accuracy alerts are being generated. Altitude, Atmospheric, and Field Elevation controls retain their settings. To restart alerts, select a new altitude in the SELECTOR.

3. **MAN Adj Button:**

Allows you to adjust the reference altitude (**Ref Alt - GPS**) up/down to correct any deviation from the aircraft altimeter.

NOTE

Usually, the **Ref Alt - GPS** altitude is accurate to within 100' of the barometric altimeter in the aircraft. However, there are times when the altitude will exceed this (typically when the temperatures are very hot or cold, and/or when the atmospheric pressure is not lapsing at a standard rate throughout the atmosphere).

The **MAN Adj** controls allow you to correct for these errors to avoid any nuisance "Check Altitude" alerts. These corrections are the incrementally changed automatically to maintain the correct reference altitude as you climb or descend. It's recommended that you don't make an adjustment until error EXCEEDS +/- 200'. See also Altitude "Quick Sync" below

4. **SELECTOR Alert:**

When an altitude alert is received, the text turns black and becomes boxed amber. An aural alert is also played depending on the alert received. Additionally, when your altitude reaches the altitude set in the SELECTOR, the box will become boxed green.

5. **LAND Button:**

Engages the Landing Mode. When touched, the currently selected Target altitude is zero'd out. and the display turns Magenta. In this mode, AltitudeAlert will generate an aural alert at 1000' AGL and 500' AGL respectively for situational awareness. Additionally, if the "Retractable Landing Gear" option was selected (see #11 below), "Check landing gear down" will be annunciated after the 500' alert. The accuracy of this mode is contingent on setting the correct landing field elevation with the **Field Elevation** controls (see Controls Mode Tab below).

NOTE

AltitudeAlert will automatically select Landing Mode when the you descend to within 1000' AGL of the selected field elevation set in the **Field Elevation** Controls section.

6. SELECTOR:

Separated by thousands and hundreds of feet. You can select any altitude between 0 and 17900'. High altitude alerts are available up to 45900' (FL459) by toggling the Altitude Limit 45900 switch located in the App Settings page* Set the altitude by using the + or - buttons OR touching on the desired slider and sliding it UP or DOWN with your finger.

** Use caution when above 18000' (FL180). Altitude reference algorithms are optimized for alerting below 18000' (FL180)*

7. Supplemental Oxygen Alerts:

Visual and aural alerts are provided when pilot and passenger supplemental oxygen is required. The **Pilot OXY** amber light illuminates above 12500' MSL. The **PAX OXY** amber light illuminates above 14000' MSL. Both lights extinguish upon descent below the respective altitudes.

8. Setup & Reference Buttons:

Use these buttons to access this **User Guide**, **Manage Subscription (App Store Version only)**, the **Support Website** (for asking a question or giving feedback), or to access the **AltitudeAlert settings** page to adjust Notification settings. The **Test Alerting** button runs a test of many of the aural and visual alerts. This is a confidence test that takes about 14 seconds.

9. VNAV NAV Data Currency Status and Download Button:

Display's the status of the loaded NAV Data. When the loaded NAV Data is not current or no file loaded, the DOWNLOAD button will become available. Tap it to download the current file.

10. Alerting Parameters:

The **Alert Margin** and **Deviation Margin** are the margins (or triggers, if you prefer) where the applicable alerts are generated. Both are individually adjustable depending on your flying style. Let's look at both...

- The **Alert Margin** is adjustable between 200' and 1000' (the default is 900'). An altitude alert is generated when the **Alert Margin** is reached from above or below the altitude set in the **SELECTOR**.
- The **Deviation Margin** is adjustable between 100' and 300' (the default is 200'). A check altitude alert is generated when the **Deviation Margin** is reached from above or below the altitude set in the **SELECTOR AFTER** the **Ref Alt - GPS** (actual aircraft altitude) is within 100' the altitude set in the **SELECTOR**.

Let's look at an example,

Alert Margin set to 500'

Deviation Margin set to 200'

SELECTOR set to 5000'

The aircraft is climbing, when the you reach 4500', the **Alert Margin** will be reached and the altitude alert (single "C" chime aural alert and amber visual alert, if the app is visible) is generated. Upon reaching 5000', AltitudeAlert begins monitoring your altitude using the **Deviation Margin**, checking for deviations. Let's say you get distracted and you start a slow descent unintentionally. When the you descend below 4800', the **Deviation Margin** will be reached (remember, 200'. $5000' - 200' = 4800'$) and the check altitude alert (single "C" chime with spoken "Check Altitude" aural alert, flashing amber visual alert, if the app is visible) is generated.

***** CAUTION *****

When the **Alert Margin** is set to 200' and the **Deviation Margin** is set to 100' respectively, nuisance alerts may occur due to the narrow margins. As a result, setting the margins this way are not recommended for extended use.

11. Altitude "Quick Sync" Touch Zone:

Touching the **Ref Alt - GPS** label "Quick Syncs" the Reference Altitude to the SELECTOR using a MAN Adjustment. This is quick and convenient way to sync and correct the reference altitude for any deviations from the actual aircraft altimeter.

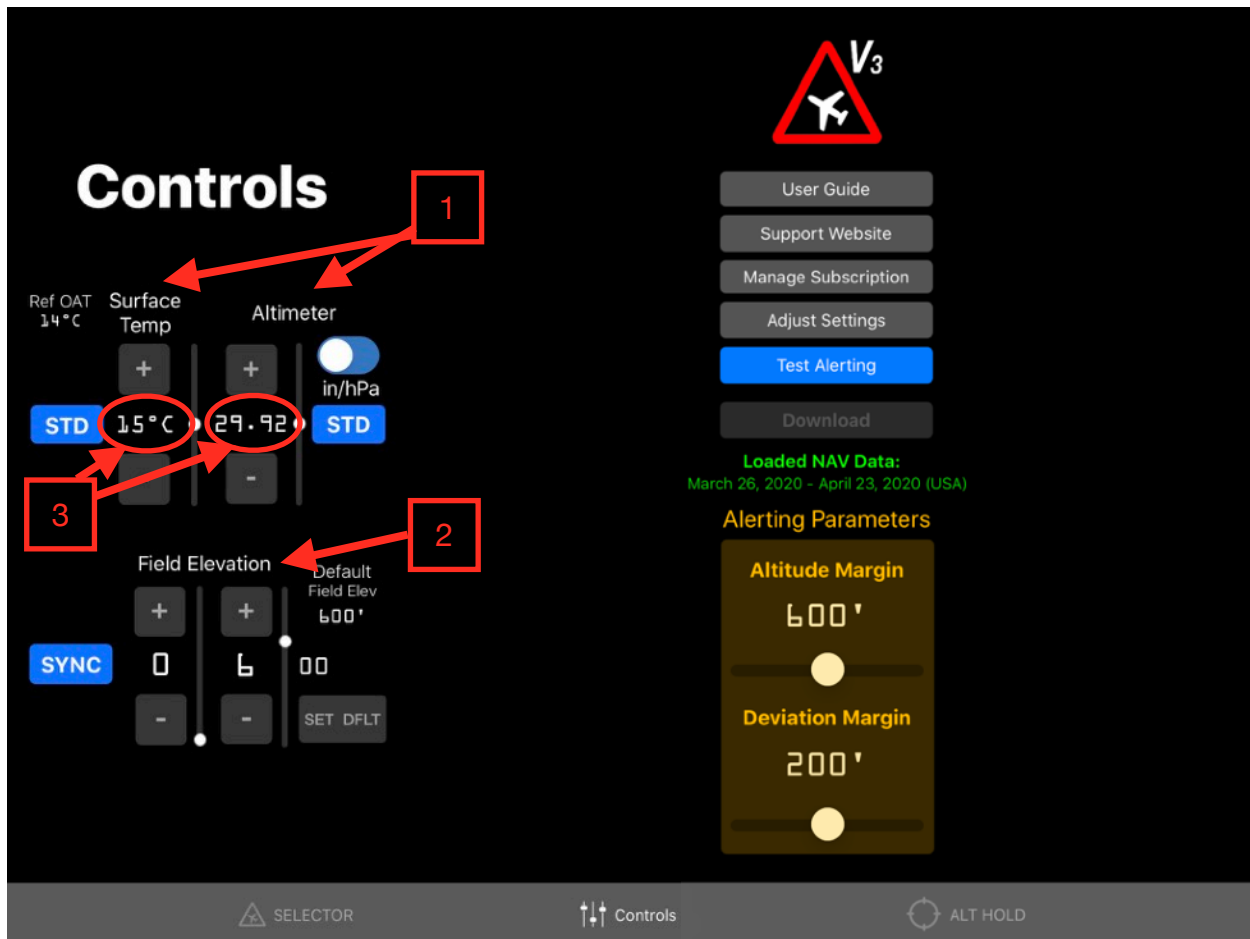
12. VNAV Button:

Opens the VNAV Configuration page (See VNAV Below).

13. VNAV Display Guidance:

Active VNAV guidance as configured on the VNAV Configuration page (See VNAV Below).

Controls Mode Tab (GPS Altitude Reference) - iPad:



1. Atmospheric Controls:

Used to set the surface temperature and the current altimeter setting. Ref OAT is displayed and updates automatically as the **Ref Alt - GPS** changes. Once the cruise altitude has been reached the Ref OAT can be manually updated as necessary using the **Surface Temp** controls for Non Standard temperature changes. You can set the **Surface Temp** and **Altimeter Setting** by using the + or - buttons, touching on the desired slider and sliding it UP or DOWN with your finger, or touching the “Touch Zones” (red circles noted above, also see “Touch Zones” below) to manually input the temperature/altimeter setting (see below). A blue **STD** button for both **Surface Temp** and **Altimeter Setting** reset the respective controls to standard atmospheric conditions (15°C, 29.92 in HG or 1013 hPa). The **In/hPa Switch** allows you to set the **Altimeter Setting** using in of HG or hPa as the local altimeter dictates.

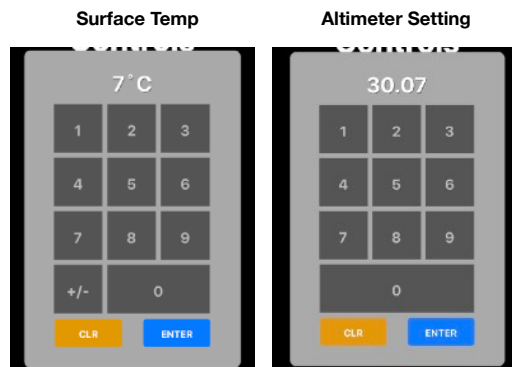
2. Field Elevation Controls:

Separated by thousands and hundreds of feet. Set prior to departure field elevation prior takeoff and destination field elevation prior to descent. If you do not set a different

destination field elevation, you will be prompted to do so during descent, prior to arming minimums for an approach, or tapping the LAND button. You can set the elevation by using the + or - buttons, touching on the desired slider and sliding it UP or DOWN, or tapping the SET DFLT button to recall the Default Field Elev. The **SYNC** button allows you to sync the field elevation with the indicated reference altitude while on the ground. The Default Field Elev allows you to set a field elevation you use often. To set it, adjust to **Field Elevation** two the desired elevation. Then touch and hold the SET DFLT button. The new default field elevation is displayed and saved. To set a new default, just repeat the process. Again, to recall the Default Field Elev, tap (but do not hold) the SET DFLT button.

3. Touch Zones:

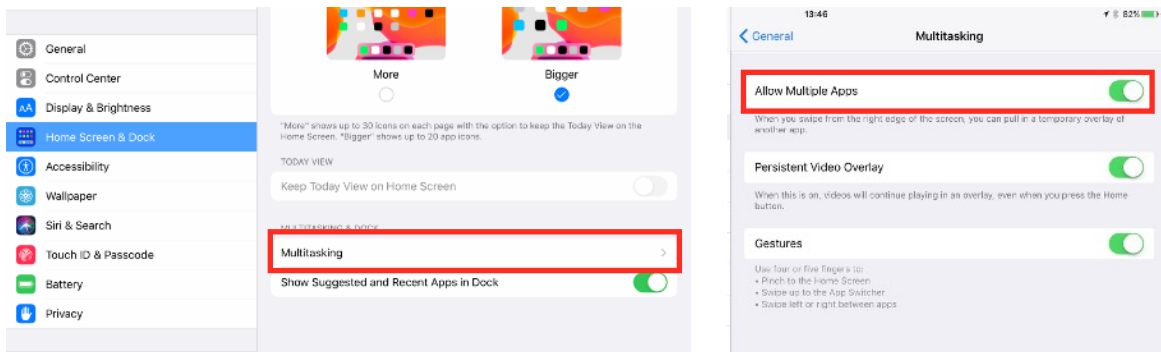
Touch Zones are an alternative way (as opposed to using the +/- buttons or data sliders) to enter data into the corresponding value types. Touch on the corresponding value in the Touch Zone to open a popup window. This allows you to manually enter the desired value. (See image below).



AltitudeAlert Troubleshooting - iPad:

Swipe in/Swipe out mode issues (*iPad Air, iPad iPhone 2, or iPad Pro Required*):

- **Unable to get swiping in to work (the side pane won't open)**
 1. Go to the Settings App (you can also access it from the “Adjust Settings” button) and select “Home Screen & Dock”.
 2. Select “Multitasking” and make sure that “Allow Multiple Apps” is selected (see below)



NOTE

If you don't see the “Multitasking” option, then your iPad doesn't support this mode.

AltitudeAlert Setup - iPhone:

When AltitudeAlert launches for the first time you will be required to allow access for the app to send you Notifications. Choose “Allow” as the app will not function correctly without allowing this access.

After agreeing to the User Agreement, you will be presented with a settings setup screen or the choice to continue to the AltitudeAlert main page. If you choose to adjust your settings at this time, go to **Notifications and Sounds** below in this section for specifics on setup.

IMPORTANT

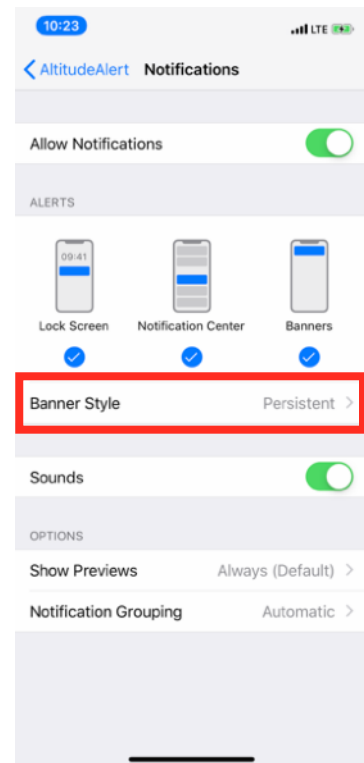
Location Service must be enabled before AltitudeAlert will operate correctly. This is simply accomplished by selecting an altitude in the **SELECTOR** (see SELECTOR Tab). You will then be asked to allow AltitudeAlert to use your location. Choose “Allow”. After you’ve used the App a few times, You will receive another message asking you to allow AltitudeAlert to use your location at ALL times. For best use, choose “Allow Always” as this allows AltitudeAlert to run in the background while you use other Apps on your iPhone. The status bar at the top of the iPhone will be highlighted in **BLUE** with the notice “**AltitudeAlert is Actively Using Your Location**” unless you choose always allow your location. The functionality of the App remains the same either way.

Notifications and Sounds:

Because the iOS notifications operate separately from AltitudeAlert’s aural and visual user interface notifications, configure the Notifications and Sounds in the SETTINGS app on your iPhone as follows:

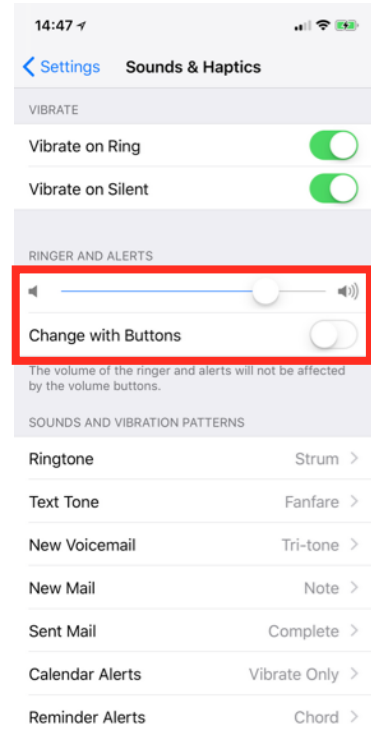
Notifications:

In my personal testing, I found that the best alerting mechanism was the “PERSISTENT” alert style box type alert. “TEMPORARY” worked well but because they automatically go away after a short period of time, they’re easy to forget when the cockpit gets busy. The “ALERTS” box forces you acknowledge the alert before it will go away. That being said, configure the alert style however you desire.



Sounds:

To ensure that the the iOS notifications are audible, verify that the RINGER AND ALERTS slider is set to full. For best results, make sure that “Change with Buttons” is NOT enabled (see image below). With “Change with Buttons” enabled, it can be confusing as to which volume you’re actually controlling. In my experience, leaving this setting disabled and having the RINGER AND ALERTS volume slider set above half provided the most consistent results. This is because the iPhone’s volume buttons are now set to control the “Master” audio output only.



Headset Connect:

It goes without saying, if your headset is not connected to your iPhone you will not hear any of the aural alerts. While this is not a requirement to use the app, it's the best user experience.

Since there are so many ways to connect your headset to your iPhone, I will not cover all of the possible options. In general, the best option is to use an ANR headset with Bluetooth capability and connect it to your iPhone. Another good option is an ANR headset connected via an external 1/8" stereo audio cable from the iPhone* to a headset or intercom.

** an 1/8" adaptor will be required if your iPhone doesn't have one.*

Using AltitudeAlert - iPhone:

Using AltitudeAlert - iPhone is straightforward. There are two operating modes to choose from depending on how you fly...

The **SELECTOR** mode, and the **ALT HOLD** mode.

SELECTOR mode is designed to function as a complete altitude management system with altitude preselect, IFR alerting, and VNAV. Which is ideal for IFR pilots.

ALT HOLD mode is a simple alerter specifically designed for quick use with little or no setup. This mode is ideal for VFR pilots who want to monitor their cruise altitude or for use during training when you want to maintain a specific altitude and be notified when you deviate from it.

Let's take a look at each...

SELECTOR mode (Advanced altitude management for IFR and VFR Pilots):

- Prior to takeoff, FIRST, Set the **SELECTOR** to the desired altitude or as cleared by ATC. Then set the altimeter setting (**Altimeter Setting**), **Field Elevation**, (and **Surface Temp**, if visible).
- AltitudeAlert will then monitor the reference altitude (**Ref Alt - BARO or GPS**). As you approach the altitude set in the **SELECTOR**, an aural and visual alert will be generated (or iOS system notification when the app is running in the background. *See iOS Background Alerts Table below*).
- After reaching the selected target altitude, AltitudeAlert then monitors the altitude set in the **SELECTOR**. If you exceed the altitude in the **SELECTOR** by the specified margin (see **Deviation Margin**), an alert is generated (aural and visual) advising you to correct the deviation.
- Prior to descent, set the **Altimeter Setting**, **Field Elevation** (and **Surface Temp**, if visible) for the destination. Then set the **SELECTOR** to the desired lower altitude or as cleared by ATC. AltitudeAlert then generates alerts using the same criteria as above.
- For true altitude control and planning use **VNAV** to place your aircraft precisely where and when you want it to be at a certain altitude.
- If an instrument approach will be accomplished, set the DA or MDA minimums using the **DA/MDA** button. Once entered, tap the **ARM** button to arm the mode. Alerts will be generated at 100' above minimums and when reaching minimums.
- Prior to final descent for landing when NOT using DA or MDA minimums, press the **LAND** button to avoid any nuisance alerts during descent for landing. *Tapping the **LAND** button is not necessary when the DA/MDA mode is used.*

NOTE

Regardless whether the **LAND** button is pressed or not, the Landing Mode will automatically activate when the Reference Altitude is within 1000' of the **Field Elevation**.

If using Barometric Altitude Reference (Ref Alt - BARO) - Most Typical

The first time you use AltitudeAlert you may need to “Quick Calibrate” your iPhone’s Barometric sensor to the aircraft altimeter. While airborne, with the aircraft level, make sure that the **SELECTOR MATCHES** your aircraft altimeter. Then touch the “Quick Calibrate” Touch Zone. The **Ref Alt - BARO** will calibrate and now zero any error. See “Quick Calibrate” below for more details.

If using GPS Altitude Reference (Ref Alt - GPS) - Not Typical, pressurized aircraft

Occasionally, an erroneous alert may be generated. This occurs when the atmospheric conditions at altitude are appreciably different from the surface pressure and temperature being reported. To correct the nuisance alert: First, verify that the outside air temp (Ref

OAT) and altimeter setting (**Altimeter Setting**) match the reported conditions. Next, if the settings are verified correct and there is still an error, use the Altitude “Quick Sync” Touch Zone to correct the error.

ALT HOLD mode (Typically for VFR pilots):

There’s really nothing to setup. Just go fly! When you want to start monitoring an altitude tap the ALT HOLD tab at the bottom of the screen (unless you’re already there). Then tap the “TAP TO HOLD ALT” button. That’s it! AltitudeAlert will then alert you when you exceed the Deviation Margin displayed on the page. See the ALT HOLD and Alert Margins Tabs below for more detailed information.

SELECTOR Mode Tab (Barometric Altitude Reference) - iPhone:

1. Ref Alt - BARO:

Pressure altitude, corrected by the altimeter setting (**Altimeter Setting**) and then rounded to the nearest 50’. Once the altimeter setting is set, it’s very precise and the reference altitude should match the aircraft altimeter within a few feet. Once airborne however, it may read a bit higher than aircraft altimeter. This is because of the Venturi effect created around the cockpit when the aircraft is flying. To compensate for this, a -75 ft. adjustment has been added to the reference altitude whenever the aircraft groundspeed is > 80 kts. This adjustment should nearly eliminate the error, however there may still be some residual error due to variations from cockpit to cockpit, and whether the interior vents are open or not. As a result, there’s “Quick Calibrate” feature that eliminates any residual error. More on this below.



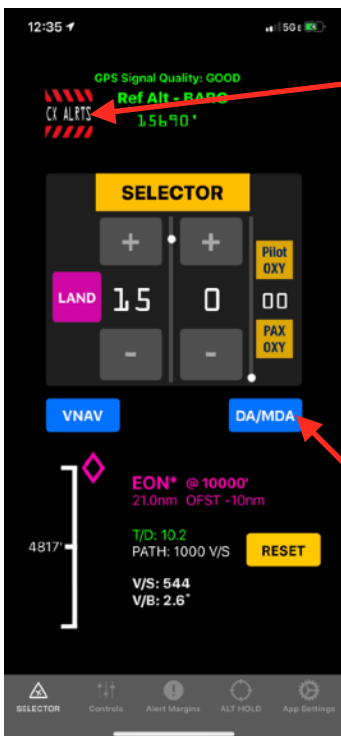
2. Power/CX ALRTS Button:

On the ground, the Power button is visible. Airborne the CX ALRTS button is visible and cancels all altitude and accuracy alerts (Oxygen Alerts are unaffected). Use this mode if unwanted altitude and accuracy alerts are being generated. Altitude, Atmospheric, and Field Elevation controls retain their settings. To restart alerts, select a new altitude in the **SELECTOR**.

3. DA/MDA Button:
The DA/MDA Button allows the setting of

!! ATTENTION !!

Use of the **DA/MDA** alerting feature is for **REFERENCE ONLY**. You must still verify any/all IFR minimums with a properly installed and certified altimeter. It’s **HIGHLY RECOMMENDED** that you practice with **DA/MDA** in VFR conditions before using it while flying IFR.



Decision Altitude(DA) or Minimum Decision Altitude (MDA) instrument approach procedure (IAP) minimums (See DA/MDA Minimums below).

4. **SELECTOR** Alert:

When an altitude alert is received, the text turns black and becomes boxed amber. An aural alert is also played depending on the alert received. Additionally, when your altitude reaches the altitude set in the SELECTOR, the box will become boxed green.

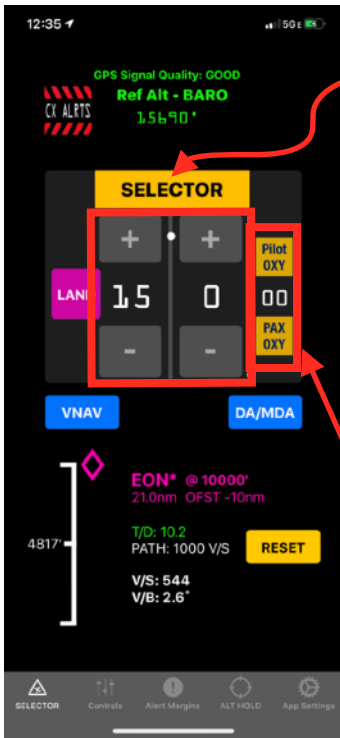
5. **LAND** Button:

Engages the Landing Mode. When touched, the currently selected Target altitude is zero'd out. and the display turns Magenta. In this mode, AltitudeAlert will generate an aural alert at 1000' AGL and 500' AGL respectively for situational awareness. Additionally, if the "Retractable Landing Gear" option was selected (see #11 below), "Check landing gear down" will be annunciated after the 500' alert. The accuracy of this mode is contingent on setting the correct landing field elevation with the **Field Elevation** controls (see Controls Tab below).



NOTE

AltitudeAlert will automatically select Landing Mode when the you descend to within 1000' AGL of the selected field elevation set in the **Field Elevation** Controls section.



6. SELECTOR:

Separated by thousands and hundreds of feet. You can select any altitude between 0 and 17900'. High altitude alerts are available up to 45900' (FL459) by toggling the Altitude Limit 45900' switch located in the App Settings page* Set the altitude by using the + or - buttons OR touching on the desired slider and sliding it UP or DOWN with your finger.

* Use caution when above 18000' (FL180). Altitude reference algorithms are optimized for alerting below 18000' (FL180).

7. Supplemental Oxygen Alerts:

Visual and aural alerts are provided when pilot and passenger supplemental oxygen is required. The **Pilot OXY** amber light illuminates above 12500' MSL. The **PAX OXY** amber light illuminates above 14000' MSL. Both lights extinguish upon descent below the respective altitudes.

8. Barometric Altitude “Quick Calibrate” Touch Zone:

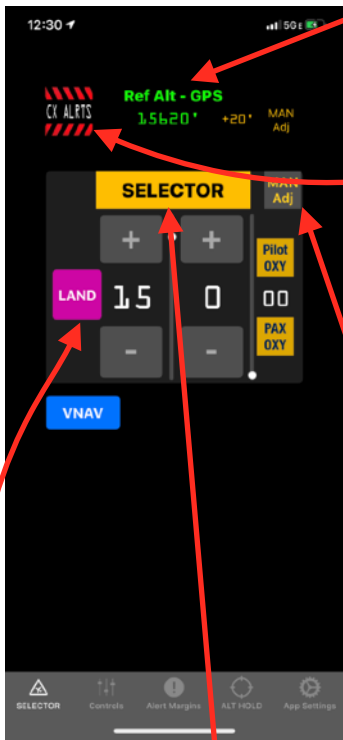
Touching the **Ref Alt** “Quick Calibrates” the **Ref Alt** to the **SELECTOR**. This is quick and convenient way to sync and correct the **Ref Alt** for any residual error from the aircraft altimeter. Once the calibration is applied it will be retained in the app indefinitely until it is either removed (touching the “Touch Zone” again will remove the calibration) or another calibration is applied by repeating the process. The iPad’s Barometric Sensor is very sensitive and is effected by the pressure in your cockpit in much the same way your aircraft’s altimeter does when the alternate static source is selected. As a result, anytime you open or close outside vents in the cockpit, there will be a change in pressure. Practically speaking, you may have to recalibrate the **Ref Alt** every spring and fall as temperatures change.

9. **VNAV** Button:

Opens the VNAV Configuration page (See VNAV Below).



SELECTOR Mode Tab (GPS Altitude Reference) - iPhone:



1. Ref Alt - GPS:

The GPS altitude corrected for GPS error, atmospheric conditions, and any manual adjustments applied.

2. Power/CX ALRTS Button:

On the ground, the Power button is visible. Airborne the CX ALRTS button cancels all altitude and accuracy alerts. Oxygen Alerts are unaffected. Useful if unwanted altitude and accuracy alerts are being generated. Altitude, Atmospheric, and Field Elevation controls retain their settings. To restart alerts, select a new altitude in the **SELECTOR** or field elevation with the **Field Elevation** controls.

3. MAN Adj Button:

Allows you to adjust the Reference Altitude (**Ref Alt - GPS**) up/down when the Reference Altitude is in error.

4. SELECTOR Alert:

When an altitude alert is received, the text turns black and becomes boxed amber. An aural alert is also played depending on the alert received.

Additionally, when your altitude reaches the altitude set in the **SELECTOR**, the box will become boxed green.

5. **LAND** Button:

Engages the Landing Mode. When touched, the currently selected Target altitude is zero'd out. and the display turns Magenta. In this mode, AltitudeAlert will generate an aural alert at 1000' AGL and 500' AGL respectively for situational awareness. Additionally, if the "Retractable Landing Gear" option was selected in App Settings (see below), "Check landing gear down" will be annunciated after the 500' alert. The accuracy of this mode is contingent on setting the correct landing field elevation with the **Field Elevation** controls (see Controls Tab).

NOTE

Usually, the **Ref Alt - GPS** altitude is accurate to within 100' of the barometric altimeter in the aircraft. However, there are times when the altitude will exceed this (typically when the temperatures are very hot or cold, and/or when the atmospheric pressure is not lapsing at a standard rate throughout the atmosphere).

The **MAN Adj** controls allow you to correct for these errors to avoid any nuisance "Check Altitude" alerts. These corrections are the incrementally changed automatically to maintain the correct reference altitude as you climb or descend. It's recommended that you don't make an adjustment until error EXCEEDS +/- 200'. See also Altitude "Quick Sync" below

NOTE

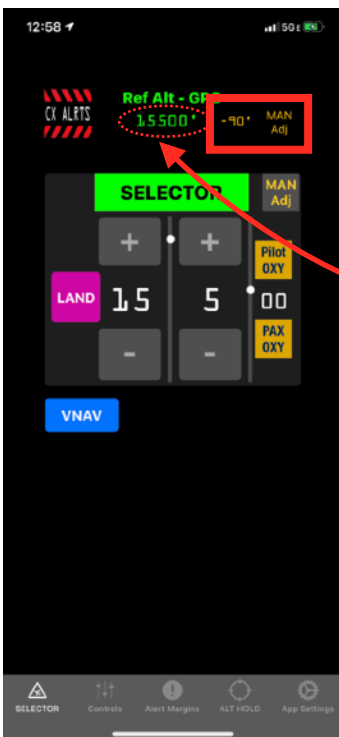
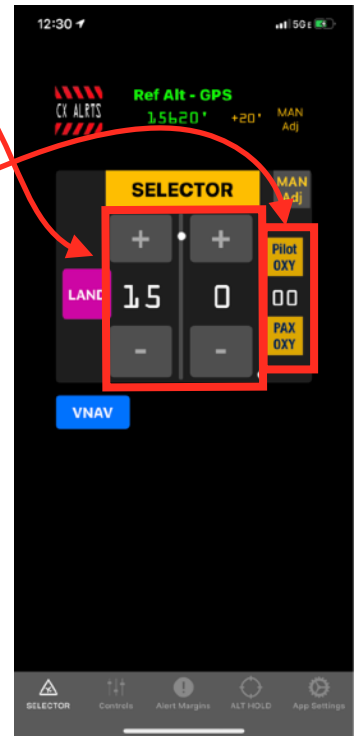
AltitudeAlert will automatically select Landing Mode when the you descend to within 1000' AGL of the selected field elevation set in the **Field Elevation** Controls section.

6. SELECTOR:

Separated by thousands and hundreds of feet. You can select any altitude between 0 and 17900'. You can set the altitude by using the + or - buttons OR touching on the desired slider and sliding it UP or DOWN with your finger.

7. Supplemental Oxygen Alerts:

Visual and aural alerts are provided when pilot and passenger supplemental oxygen is required. The **Pilot OXY** amber light illuminates above 12500' MSL. The **PAX OXY** amber light illuminates above 14000' MSL. Both lights extinguish upon descent below the respective altitudes.



8. Altitude “Quick Sync” Touch Zone:

Touching the **Ref Alt** “Quick Syncs” the **Ref Alt** to the altitude set in the SELECTOR using a MAN Adjustment. This is quick and convenient way to sync and correct the **Ref Alt** for any deviations from the actual aircraft altimeter.

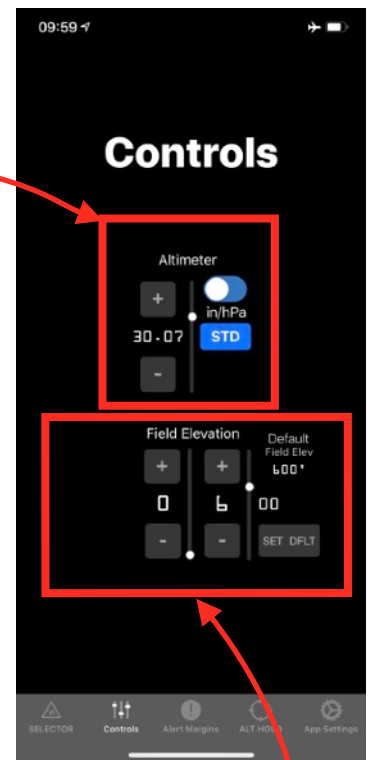
9. **VNAV** Button:

Opens the VNAV Configuration page (See VNAV Below).

Controls Mode Tab - iPhone:

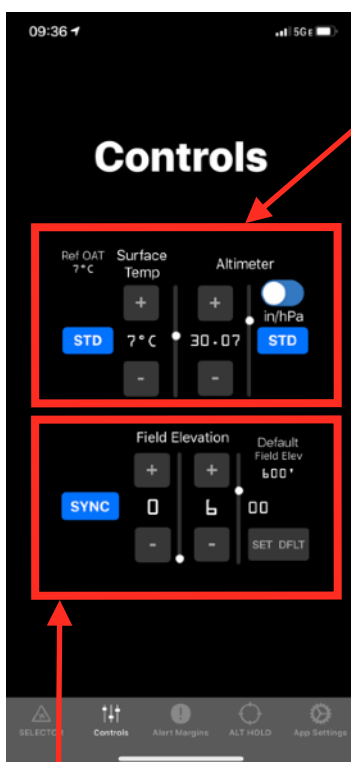
1. Altimeter Setting (Barometric Altitude Reference ONLY):

Used to set the current altimeter setting by using the + or - buttons, touching on the slider and sliding it UP or DOWN with your finger, or touching the “Touch Zone” (red circle noted above, also see “Touch Zone” below) to manually input the altimeter setting (see below). A blue **STD** button resets the ALT Setting to standard atmospheric pressure (29.92 in HG or 1013 hPa). The **In/hPa Switch** allows you to set the **Altimeter Setting** using in of HG or hPa as the local altimeter dictates.



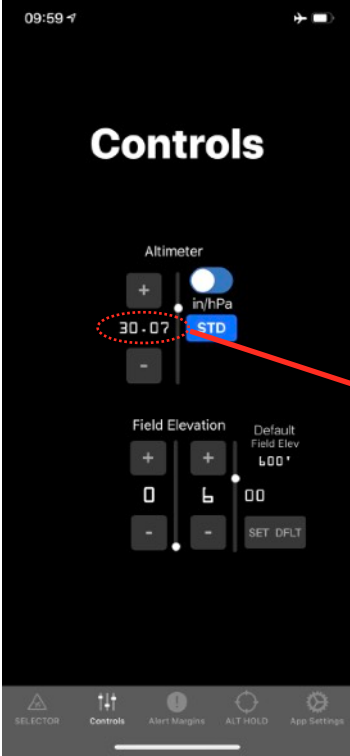
Altimeter Setting and Surface Temp (GPS Altitude Reference):

Used to set the surface temperature and the current altimeter setting. Ref OAT is displayed and updates automatically as the reference altitude changes. Once the cruise altitude has been reached the Ref OAT can be manually updated as necessary using the **Surface Temp** controls for Non Standard temperature changes. You can set the **Surface Temp** and **Altimeter Setting** by using the + or - buttons, touching on the desired slider and sliding it UP or DOWN with your finger, or touching the “Touch Zones” (see “Touch Zones” below) to manually input the temperature/ altimeter setting . A blue **STD** button for both **Surface Temp** and **Altimeter Setting** reset the respective controls to standard atmospheric conditions (15°C, 29.92 in HG or 1013 hPa). The **In/hPa Switch** allows you to set the **Altimeter Setting** using in of HG or hPa as the local altimeter dictates.



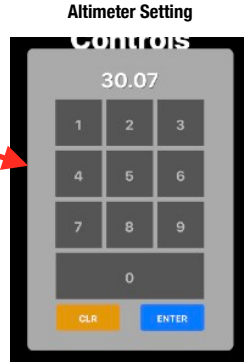
2. Field Elevation Controls:

Separated by thousands and hundreds of feet. Set prior to departure field elevation prior takeoff and destination field elevation prior to descent. If you do not set a different destination field elevation, you will be prompted to do so during descent, prior to arming minimums for an approach, or tapping the LAND button. You can set the elevation by using the + or - buttons, touching on the desired slider and sliding it UP or DOWN, or tapping the SET DFLT button to recall the Default Field Elev. The **SYNC** button allows you to sync the field elevation with the indicated reference altitude while on the ground. The Default Field Elev allows you to set a field elevation you use often. To set it, adjust to **Field Elevation** two the desired elevation. Then touch and hold the SET DFLT button. The new default field elevation is displayed and saved. To set a new default, just repeat the process. Again, to recall the Default Field Elev, tap (but do not hold) the SET DFLT button.



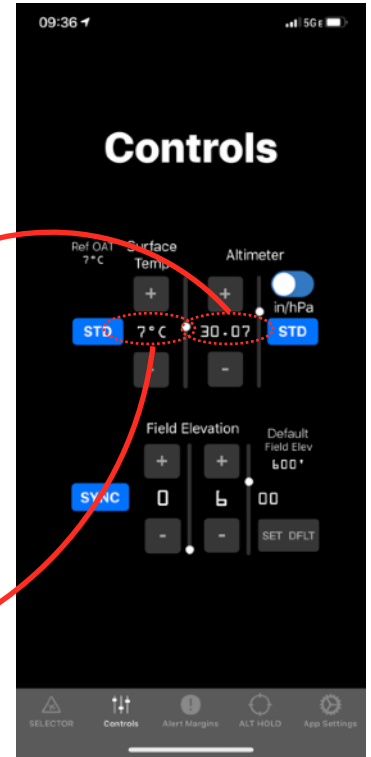
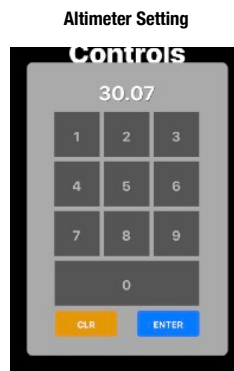
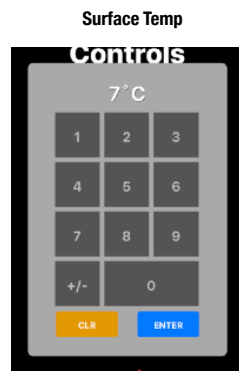
3. Altimeter Setting Touch Zone (Barometric Altitude Reference):

An alternative way (as opposed to using the +/- buttons or data sliders) to enter data for the corresponding value types. Touch the “Touch Zone” to open the data entry num pad. This allows you to manually enter the desired value. (See image below)



4. Altimeter Setting & Surface Temp Touch Zones (GPS Altitude Reference):

Touch Zones are an alternative way (as opposed to using the +/- buttons or data sliders) to enter data into the corresponding value types. Touch on the corresponding value in the Touch Zone to open a popup window. This allows you to manually enter the desired value. (See image below)



Alert Margins Mode Tab - iPhone:



The Alert Margins Tab is context sensitive and will display the alert margins applicable to the mode from which the Alert Margins Tab was tapped.

For example, if you're using AltitudeAlert in the SELECTOR mode and then tap the Alert Margins Tab, the SELECTOR Margins will be displayed.

Conversely, if you're using the ALT HOLD mode and then tap the Alert Margins tab, the ALT HOLD Margin will be displayed.

It's much simpler to do/see than to describe!

SELECTOR Margins (From SELECTOR Mode):

The **Alert Margin** and **Deviation Margin** are the margins (or triggers, if you prefer) where the applicable alerts are generated. Both are individually adjustable depending on your flying style.

Let's look at both...

- The **Alert Margin** is adjustable between 200' and 1000' (the default is 900'). An altitude alert is generated when the **Alert Margin** is reached from above or below the altitude set in the **SELECTOR**. If "Alert + Alert Margin" is toggled on the App Settings page, the alert margin is spoken along with alert chime.
- The **Deviation Margin** is adjustable between 100' and 300' (the default is 200'). A "check altitude" alert is generated when the **Deviation Margin** is reached from above or below the altitude set in the **SELECTOR** AFTER the **Ref Alt** (actual aircraft altitude) is within 100' the altitude set in the **SELECTOR**.

Let's look at an example,

Alert Margin set to 500'
Deviation Margin set to 200'
SELECTOR set to 5000'

The aircraft is climbing, when you reach 4500', the **Alert Margin** will be reached and the altitude alert (single "C" chime aural alert and amber visual alert, if the app is visible) is generated (along with the spoken alert margin, if toggled ON).

Upon reaching 5000', AltitudeAlert begins monitoring your altitude using the **Deviation Margin**, checking for deviations. Let's say you get distracted and you start a slow descent unintentionally. When you descend below 4800', the **Deviation Margin** will be reached (remember, $200' \cdot 5000' - 200' = 4800'$) and a check altitude alert (single "C" chime with spoken "Check Altitude" aural alert, flashing amber visual alert, if the app is visible) is generated. Correcting the deviation will reset/cancel the alert. Or you can select a new altitude in the **SELECTOR**. This will cancel the alert as well.

***** CAUTION *****

When the **Alert Margin** is set to 200' and the **Deviation Margin** is set to 100' respectively, nuisance alerts may occur due to the narrow margins. As a result, setting the margins this way is not recommended for extended use.

ALT HOLD Margin (From Alt HOLD mode):

The **Deviation Margin** (or trigger, if you prefer), defines when you will be alerted to an altitude deviation. The margin is adjustable from 50' to 500' and will generate an alert to any deviation (+/-) from an altitude captured when the "TAP TO HOLD ALT" was tapped in the ALT HOLD mode (See ALT HOLD Tab below).

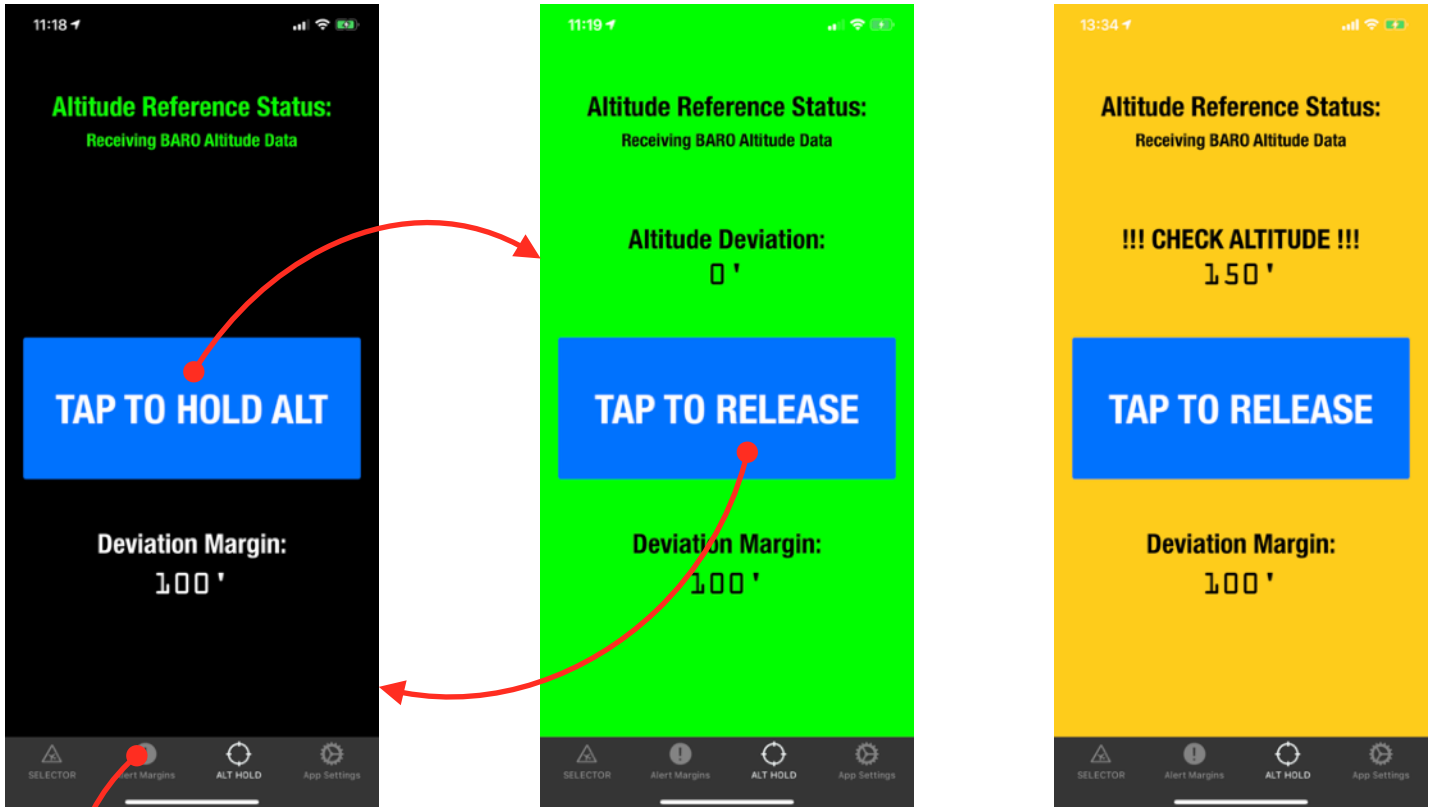
Let's look at an example,

Deviation Margin set to 100'

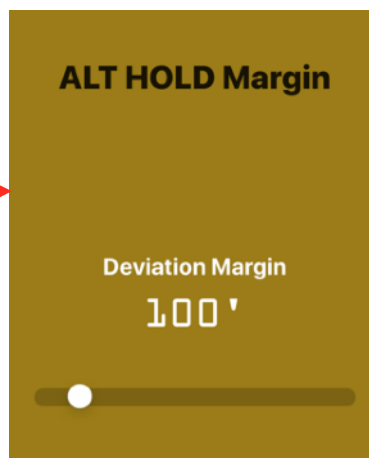
You're flying to Oshkosh for the annual fly in. Flying the Fisk VFR Arrival to OSH approaching Ripon you descend to 1800' MSL and then tap the "TAP TO HOLD ALT" button in the ALT HOLD mode (See ALT HOLD Tab below). AltitudeAlert begins monitoring your current altitude. If you climb or descend more than 100', the **Deviation Margin** is exceeded and a check altitude alert is generated (single "C" chime with spoken "Check Altitude" aural alert and amber visual alert, if the app is visible). Correcting the deviation or tapping the "TAP TO RELEASE" button will reset/cancel the alert.

ALT HOLD Mode Tab - iPhone:

Specifically designed for simplicity, ALT HOLD allows you to quickly hold any altitude without any setup at all. Just tap the “TAP TO HOLD ALT” button and that’s it. AltitudeAlert will monitor that altitude and then alert you if you exceed the Deviation Margin. The Deviation Margin is defaulted to +/- 100’ but can be adjusted to any margin between 50’ and 500’. When ready to leave the held altitude, touch the TAP TO RELEASE button. If ALT HOLD mode will be preferred way of using the app. Go to the AltitudeAlert iOS settings page (see iOS Settings below) and toggle the Altitude Hold Mode Primary switch to ON.



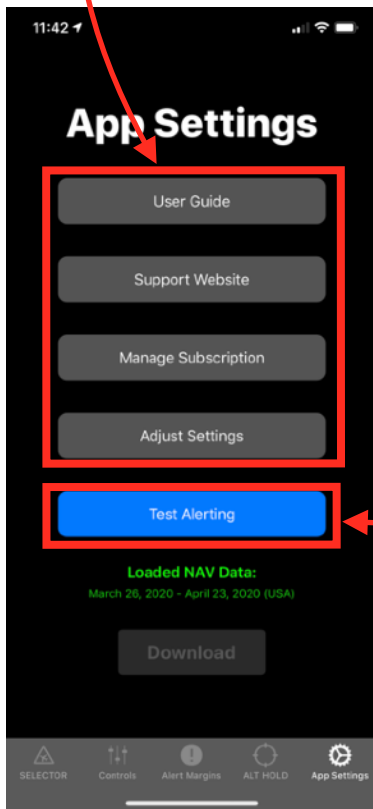
To adjust the Deviation Margin, tap the Alert Margins Tab and adjust the Deviation Margins slider to set a new margin. Then tap the ALT HOLD tab to return to the ALT HOLD mode.



App Settings Mode Tab - iPhone:

1. Setup & Reference Buttons:

Use these buttons to access this **User Guide**, the **Support Website** (for asking a question or giving feedback), **Manage Subscription (App Store version only)**, or **Adjust Settings** to access the AltitudeAlert iOS settings page (see iOS Settings below) to adjust app specific settings.



2. Test Alerting Button:

Runs a test of many of the aural, visual, and tactile (haptic)* alerts. This is a confidence test that takes about 14 seconds. Use this test to verify that your headphones are connected properly and to fine tune the volume level of your iPhone.

**Apple Watch Required.*

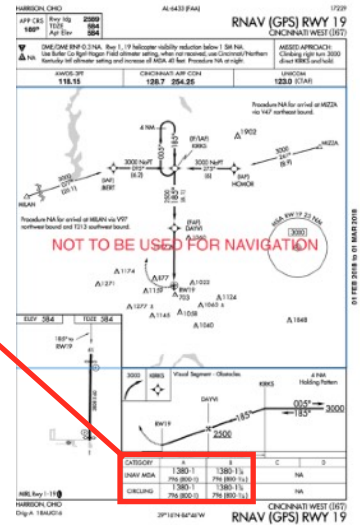
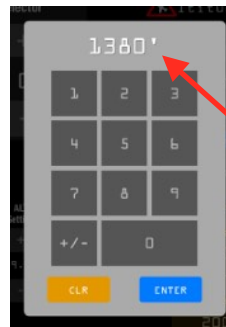
3. Download Button:

Downloads the most current NAV Data file. If the loaded NAV Database is the most current then the button will be dimmed and not selectable.

Setting DA/MDA Minimums - iPhone:

1. Tap the **DA/MDA** button.
2. Set the minimums.

If you need to change the minimums after setting or arming the mode, ARM the Mins and then tap DA/MDA button until you return to the minimums input num pad.



3. **ARM** the App for alerting.

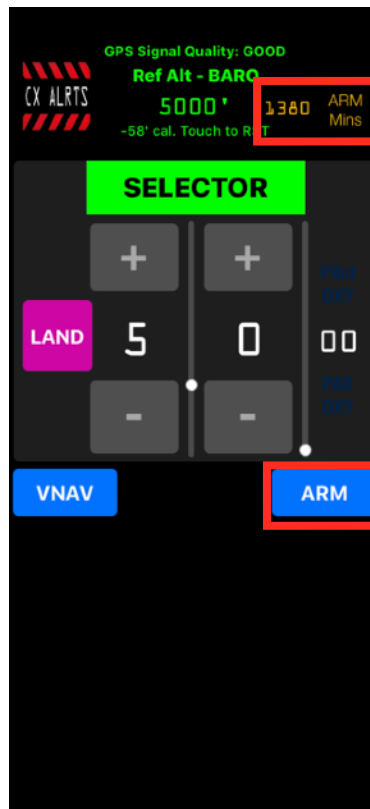
- Once armed, standard altitude alerts function normally. However, “CHK ALT” alerts are inhibited.
- Landing Mode is automatically selected at 1000’ AGL (based on the **Field Elevation** setting). Alerts are generated at 1000’ AGL and 500’ AGL* respectively (See LAND mode above).

**When the aircraft is at 500’ AGL and the minimums are within 100’, the 500’ LAND mode alert will be inhibited.*

- At 100’ above minimums, “Approaching Minimums***” is stated. Followed by “Minimums” at minimums.

***If the 500’ LAND mode alert was inhibited and the Retractable Landing Gear Switch is ON, the “Approaching Minimums” alert will include “Check Landing Gear Down”.*

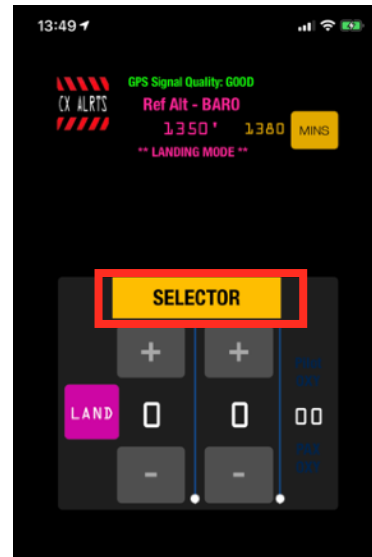
Before



After



4. At minimums, the MINS box and entered minimums turn amber and flash, the SELECTOR Alert turns amber, the SELECTOR “zeros” itself, and the DA/MDA button returns to the unarmed state.
5. If a missed approach is executed, set the missed approach altitude in the SELECTOR. Repeat the steps above to set the minimums for the next approach.



*** CAUTION ***

VNAV Guidance is for REFERENCE ONLY. You must still verify any/all waypoint assigned altitude clearances with a properly installed and certified altimeter. Additionally, the VNAV Guidance feature provides NO TERRAIN or OBSTACLE clearance assurance. Therefore, while using VNAV Guidance you are responsible for maintaining safe and legal terrain and obstacle clearance.

VNAV:

VNAV, or “Vertical Navigation” enables you to navigate vertically from one altitude to another based on a set of conditions that you define. Typically, VNAV is used when ATC assigns an altitude that the aircraft must be at when crossing a certain point over the ground (such as a waypoint, navaid, or airport, etc.). However, VNAV can be used in many more situations. This feature is commonly found in advanced flight management systems on transport category aircraft, integrated flight decks, and some more advanced GPS navigators.

Let dive in...

All of the examples and images used will be from AltitudeAlert - iPhone, however the functionality and usage are IDENTICAL on AltitudeAlert - iPad.

To activate VNAV, start by tapping the VNAV button on the SELECTOR page.



This presents the **VNAV Configuration page**. This page allows you to define the conditions necessary for VNAV to calculate and display the vertical guidance you will use to meet those conditions.

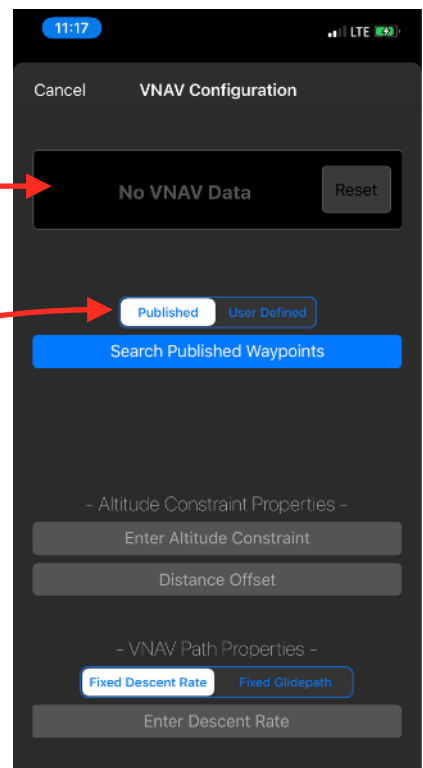
1. VNAV Data Display Window:

This a consolidated display of all of the conditions you entered (and will be displayed). A VNAV Reset button is displayed after VNAV is activated.

2. Published/User Defined Waypoint Selector:

With the initial release of VNAV, AltitudeAlert is configured to download NAV Data for the USA for no additional fee. Other countries and regions require a fee for the Data and as such I've left them out so as not to add an additional fee to the app. There's a workaround however, that I'll cover later. Future app releases will likely include an option to download additional countries and regions for fee.

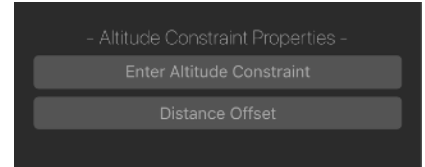
Tap on **Published** or **User Defined** to search for a published waypoint or a waypoint you previously entered manually. VNAV will then use that waypoint for navigation.



3. Altitude Constraint Properties:

There are two properties: the Altitude Constraint and Distance Offset (if any).

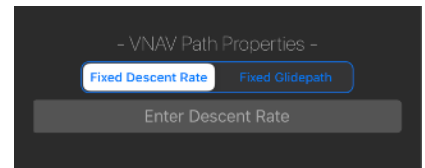
The **Altitude Constraint** is the altitude that VNAV will use to navigate to based on the VNAV Path Property entered (see below).



The **Distance Offset** allows you to create a new waypoint for the altitude constraint that is offset from the waypoint entered above (Published or User Defined). Offsets are set with reference to the entered waypoint (Published or User Defined). A positive offset (+) sets the offset waypoint **AFTER** the entered waypoint. A negative offset (-) sets the offset waypoint **BEFORE** the entered waypoint. For example, if you need to set a new altitude constraint 10 miles **BEFORE** a certain waypoint, you would enter the waypoint and then set the Distance Offset as -10. When an offset is entered, an asterisk(*) is added to the waypoint denoting that an offset has been added and that the displayed distance is to the offset waypoint.

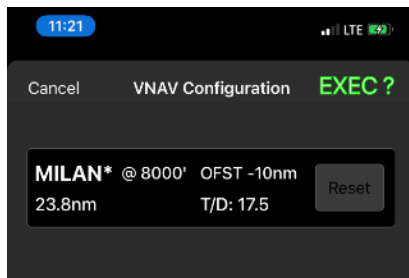
4. VNAV Path Properties:

There are two options for path construction: **Fixed Descent Rate** or **Fixed Glidepath**.

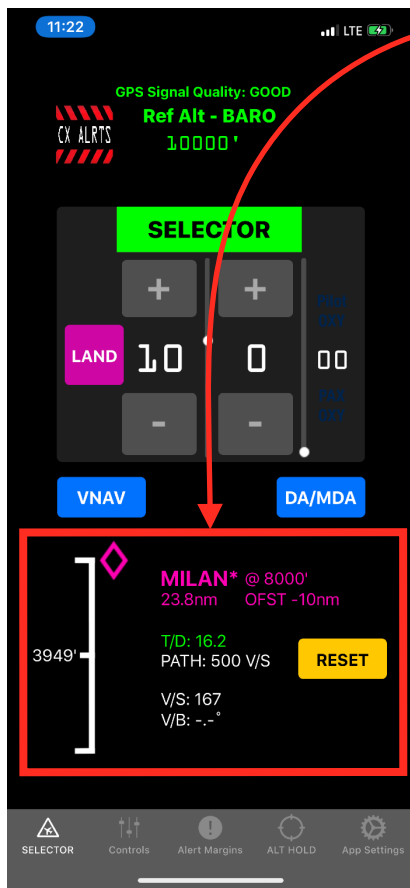


With **Fixed Descent Rate**, you to enter the descent rate you'd like to maintain in order to meet the altitude constraint. This path type is dynamic because your groundspeed is required to compute the descent rate. As such, the path will change as your groundspeed changes. For example, let's say that you begin your VNAV descent and your groundspeed increases due to a wind shift during the descent. VNAV will dynamically correct for this and display the correct path guidance in order to meet the altitude constraint. This may result in an actual descent rate that differs from the fixed descent rate that you entered.

Fixed Glidepath allows you to enter a fixed descent angle you would like to descend on. For example, let's say you're destination is a grass strip and would like to have some guidance during the descent for landing. You enter the airport elevation as the altitude constraint and to account for known obstacles during the descent, you enter 3.5° for the fixed glidepath. VNAV will calculate a glidepath at 3.5° to the airport using the airport elevation as the altitude constraint. This path type is **NOT** dynamic and the path guidance will always maintain the path angle entered.



When a Waypoint, Altitude Constraint (with/without an offset), and a VNAV Path type have been entered, the VNAV Data Display displays the entered data in white along with a green EXEC? prompt. Choose EXEC? to execute VNAV and begin guidance. This will close the VNAV Configuration window and return you to the SELECTOR tab with the active VNAV guidance displayed.



VNAV Display Guidance:

There are three components to VNAV Display Guidance:

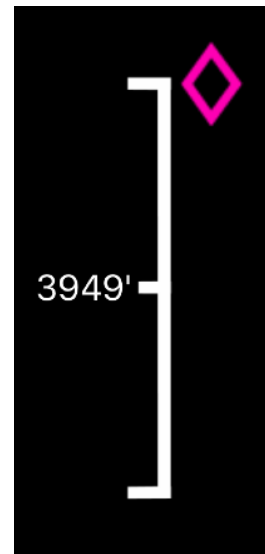
- 1) VGPI
- 2) VNAV Data
- 3) RESET Button

1. VNAV Glidepath Indicator (VGPI):

The VGPI is a visual representation of the calculated VNAV Path. It consists of a **Deviation Value, Reference Scale, and Path Indicator.**

The **Deviation Value** displays the deviation between the calculated VNAV Path and aircraft vertical position (in feet). The maximum deviation displayed is 9999'+. When the deviation is less than that, the Deviation Value will begin dynamically updating itself as the aircraft converges toward the VNAV Path.

The **Reference Scale** has three indices. The center tick is the current aircraft vertical position. The upper and lower indices represent



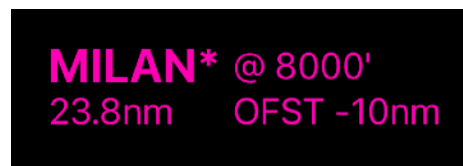
500' above and 500' below it.

The magenta diamond **Path Indicator** is the a representation of the VNAV Path. The path indicator parks itself at the edge of the Reference Scale and is hollow when the aircraft path deviation is more than 500'. When the aircraft deviation is less than 500', the path indicator changes to solid magenta and begins to move toward the center of the Reference Scale.

2. VNAV Data:

VNAV Data is divided into three sections: **Waypoint/Constraint Data, VNAV Path Data,** and **Aircraft to Waypoint/Constraint Reference Data.**

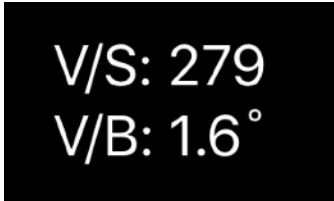
Waypoint/Constraint Data is displayed in magenta indicating that VNAV is active and navigating to the waypoint and constraint entered. If an offset was entered the word OFST is included along with the offset amount. An asterisk(*) is added to the waypoint denoting that an offset has been added and that the displayed distance is to the offset waypoint.



VNAV Path Data includes a green calculated distance (in nm) to Top of Descent (T/D) as calculated from your current aircraft altitude, and the Path type definition (V/S or G/P).



Aircraft to Waypoint/Constraint Reference Data has two components: V/S (Vertical Speed) and V/B (Vertical Bearing). Both components derive their data by comparing the aircraft's current vertical position to the waypoint/constraint position with the data being updated dynamically at all times. V/S indicates the vertical speed required if you were to begin the descent right now. V/B is the vertical bearing (or angle) to the waypoint constraint. In the example to the right, if you were to begin the descent now, descending at 1.6°, you would arrive at your waypoint/constraint as defined. In other words, if you were to define 3° G/P to the waypoint/constraint, when V/B = 3° the VGPI will be very close to center. V/B is an extremely useful tool, especially close to the airport when the airport and airport elevation are set as the waypoint/constraint.

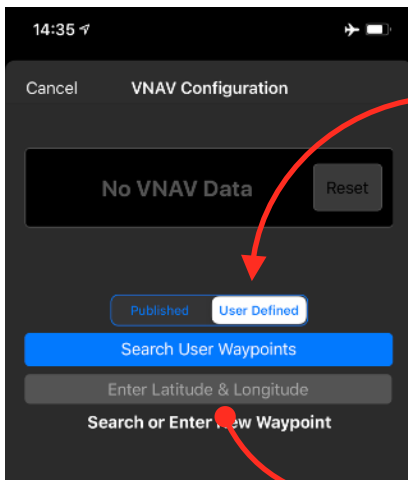


3. RESET Button:

Tap the RESET button to delete the active VNAV waypoint/constraint guidance and reset the VNAV engine.



Adding User Defined Waypoints:



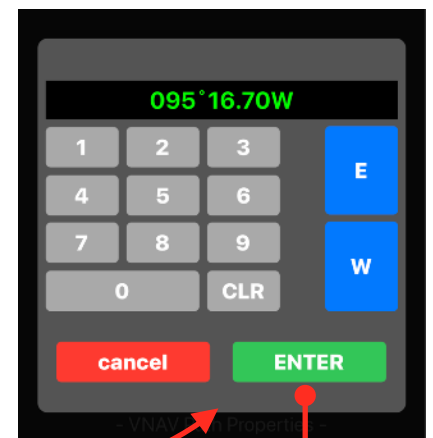
If you wish to add a waypoint that doesn't exist in the Nav Database, go to the VNAV Configuration page and tap the **User Defined** button. This enables you to enter the Latitude and Longitude for the new waypoint and give it a unique 5 digit (XXXXX) name. *The Lat/Lon will auto format as you enter it.

Note
If you fly outside of the USA, you will have to enter ALL waypoints you wish to use for VNAV guidance as User Defined waypoints. I will add other countries and regions to the Nav Database in future updates.

Latitude

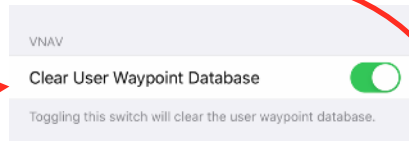
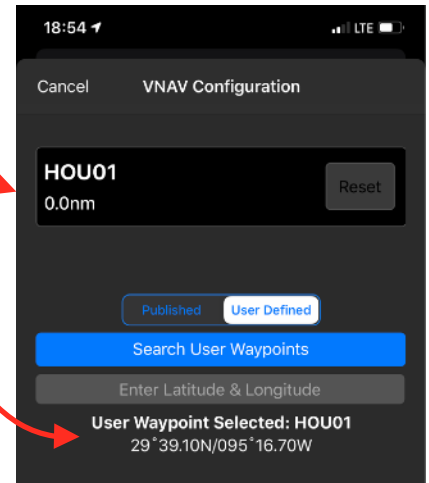
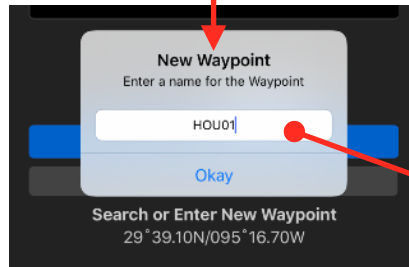


Longitude



Once the new waypoint has been added, it's saved and can be retrieved for future use.

All User Defined waypoints display their Lat/Lon coordinates on the VNAV Configuration page for reference.



If you wish to clear the User Waypoint Database, go to the App Settings page in the iOS Settings app and toggle the switch to ON. The database will be cleared when you return to AltitudeAlert.

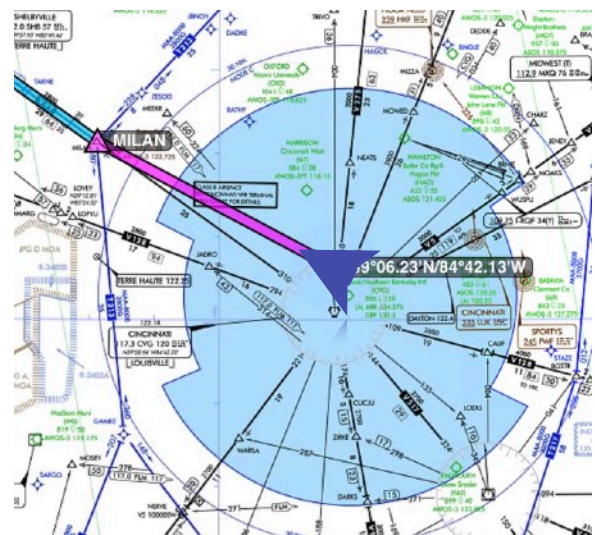
Using VNAV:

There are many ways to use VNAV, however the most common way is in conjunction with an altitude constraint issued over a waypoint by ATC. Let's look at an example...

Your aircraft is cruising at 10000' just north of the CVG VOR, navigating direct to MILAN. ATC issues the following clearance:

“November 12345, cross 10 miles Southeast of MILAN at 8000 ft.”

- 1) Tap the VNAV button.
- 2) Ensure Published waypoint is selected. Then enter “MILAN” in the Search Published Waypoints text field.
- 3) Enter “8000” in the Altitude Constraint text field.
- 4) Tap the Distance Offset button. Enter “-10” since 10 miles Southeast of MILAN is BEFORE you get to MILAN.



- 5) Decide how the VNAV Path will be constructed, i.e Fixed Descent Rate or Fixed Glidepath.

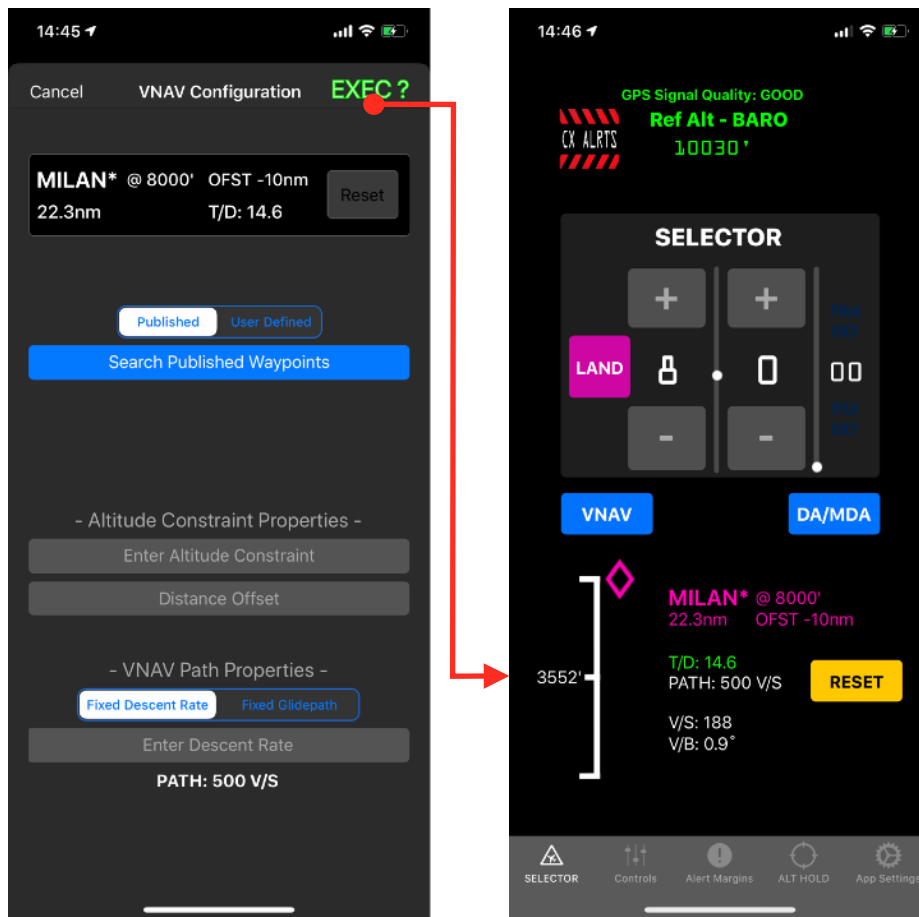
There are reasons for selecting either. In general, pilots new to VNAV will choose the Fixed Descent Rate method because it's easier to relate to. However, The more familiar you become with VNAV and how it relates to your aircraft, the more likely you will choose Fixed Glidepath more often.

In this case, we will choose Fixed Descent Rate and the enter “500” per min. as the descent rate in the text field.

- 6) Verify the waypoint/constraint parameters entered match the clearance issued by ATC:

MILAN* @ 8000' OFST -10nm

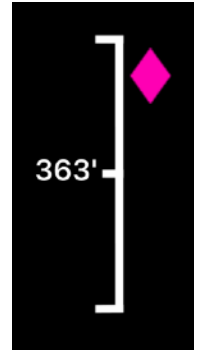
Tap the EXEC? (EXECUTE) button when your satisfied it matches.



VNAV is now active. Approximately 1 minute from the Top-of-Descent (T/D) point of the path you will receive an “Approaching VNAV Descent” notification. Begin the descent when you are within* 500’ of the VNAV Path.

**This will vary with rate of descent/glidepath entered. The higher/steeper the descent rate/glidepath, the earlier you will have to begin your descent to capture the path. The lower/shallower the descent rate/glidepath, the later you will begin the descent.*

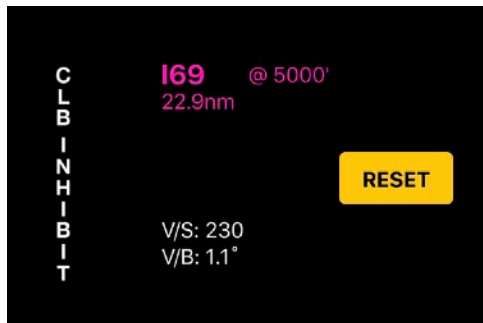
As the descent progresses, monitor the V/S Aircraft to Waypoint/Constraint Reference Data in conjunction with the path indicator. This will give you an idea of the descent rate necessary to maintain the path.



When the aircraft is within **1 nm** of the waypoint (or offset waypoint), VNAV guidance will be cleared and reset.

VNAV Miscellaneous:

VNAV Climbs:



VNAV was primarily designed for descents. However, you can still get limited VNAV data when a climbing altitude constraint is entered. In this case, no path guidance is available but the Aircraft to Waypoint/Constraint Reference Data is. Both V/S and V/B will generate the required climb rate/angle data to meet the constraint. To enter a climb constraint, enter the VNAV altitude on the VNAV Configuration page exactly as you would for a descent. Entering the PATH type (Fixed Descent

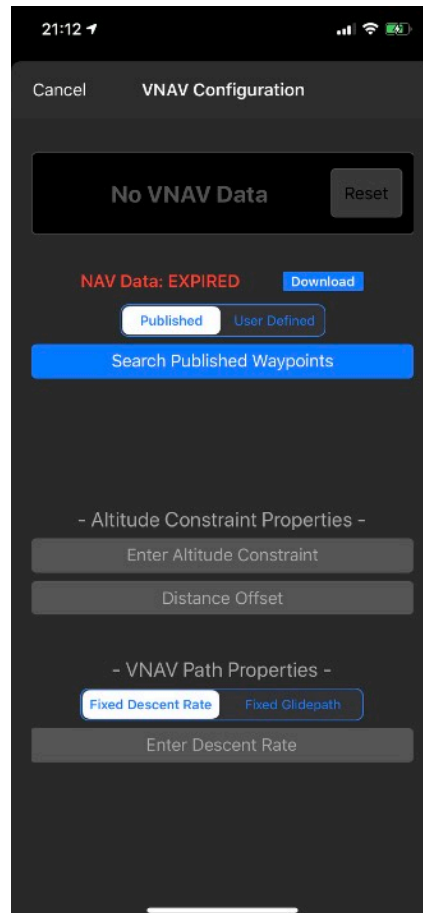
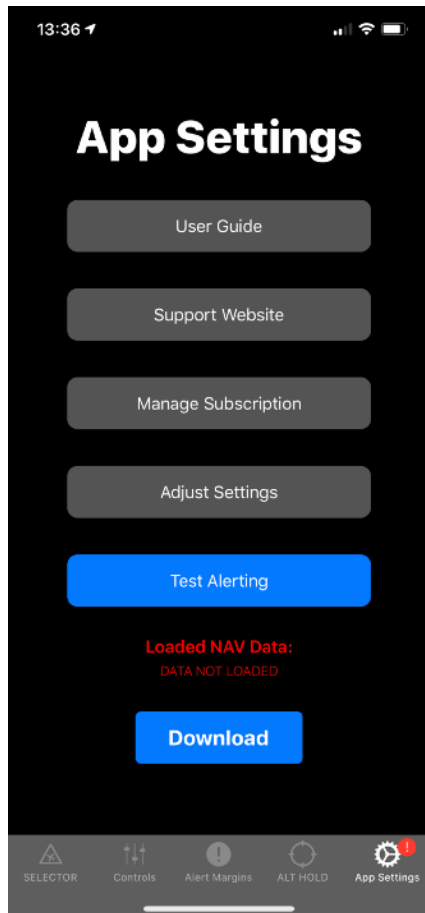
Rate or Fixed Glidepath) specification is required to activate VNAV but will not be used. Therefore you can enter any type and value. Once executed, The waypoint distance and V/S and V/B are the primary data points for reference. In the above example, in order to be over 169 at 5000’ I’ll need to climb at 230’ per min. or greater.

When the aircraft altitude exceeds an active VNAV altitude constraint while climbing and is greater than 1 nm from the waypoint, VNAV will switch to descent logic and the VGPI, calculated distance Top-of-Descent (T/D) and PATH type specification will be displayed.

Please note, when VNAV switches to descent logic, the PATH type specification used when entering the climb constraint is used for calculating the descent path. If an arbitrary PATH type and value was used for the climb, you will need to enter a new PATH type and value on the VNAV Configuration page to set the desired descent path.

Published NAV Database:

The Published NAV Database can be downloaded from either the App Settings Page or the VNAV Configuration page. AltitudeAlert will notify you when the NAV Database needs to be updated. Make sure that you have a strong internet connection prior to downloading the NAV data file.



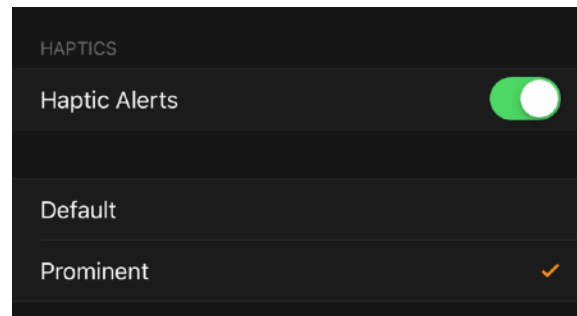
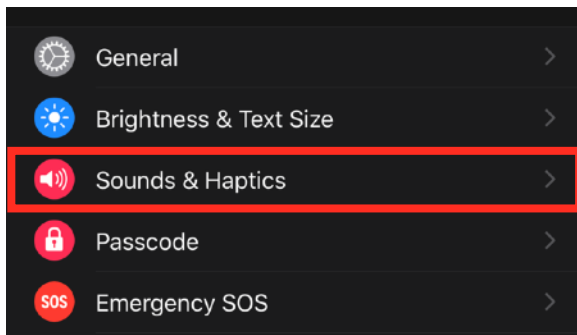
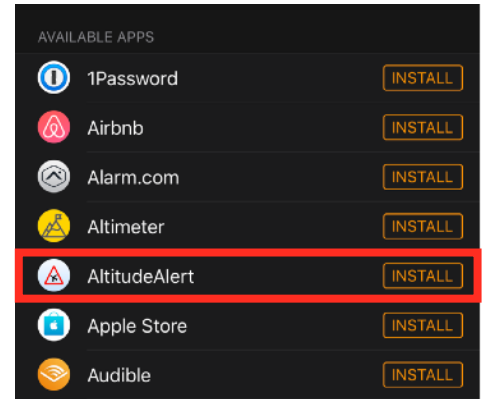
Apple Watch (AltitudeAlert - iPhone ONLY):

AltitudeAlert iPhone supports Apple Watch Series 2 and later.

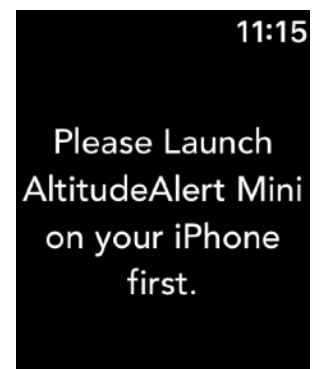
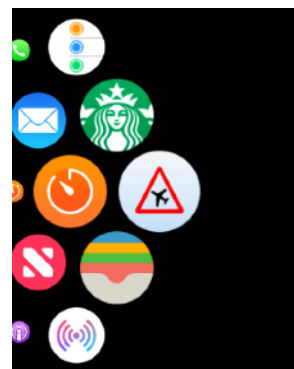
AltitudeAlert for the Apple Watch runs simultaneously with AltitudeAlert iPhone and is essentially a “repeater” for what is displayed on your iPhone. The “magic”, as it were, is when an alert is generated by AltitudeAlert iPhone. One of the key features of the Apple Watch is the tactile feedback generated by the watch. This is known as “Haptic Feedback”, or haptics. The haptic feedback is triggered when AltitudeAlert iPhone generates an alert on your phone, giving you not only an aural and visual alert, but now a tactile alert as well. Let’s dig a little deeper...

Setting up AltitudeAlert for Apple Watch:

1. Install and/or Download the **AltitudeAlert for Apple Watch App** from within your Watch App on your iPhone.
2. Choose Sounds & Haptics from the same screen in the iPhone Watch App that you installed AltitudeAlert in the previous step above. Make sure that Haptic Alerts are selected and PROMINENT is checked.



2. Launch AltitudeAlert iPhone on your iPhone **FIRST**.
3. Then launch AltitudeAlert for Apple Watch. *If you reverse the order, then the App will remind you to launch AltitudeAlert iPhone on your iPhone.*
4. You’re done!

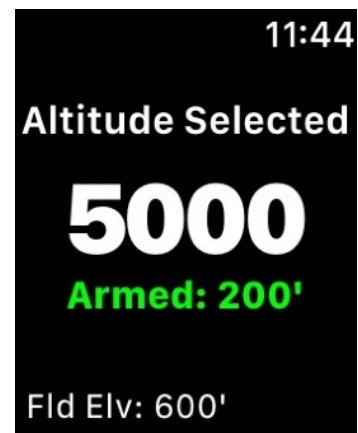
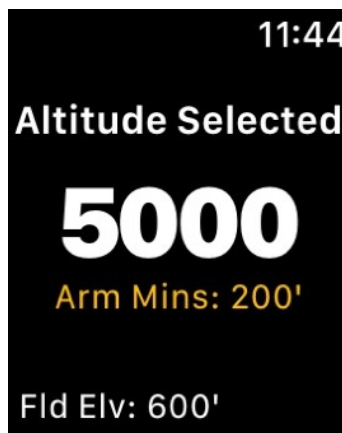
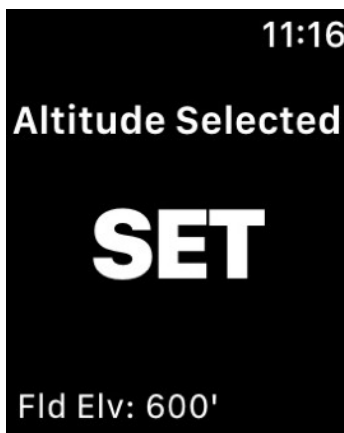


Using AltitudeAlert for Apple Watch:

There are two operating modes on the Apple Watch, SELECTOR and ALT HOLD. Each mode is automatically selected depending on the mode selected on your iPhone. Let's look at both.

Selector Mode:

As mentioned above, the app works as a "repeater" for AltitudeAlert iPhone on your iPhone so there's nothing that you have to know in order to use SELECTOR mode. Once you launch it and begin setting altitudes in the SELECTOR on your iPhone, you will see it mirrored on your watch. Again, the magic occurs when any alert is generated on your phone, triggering haptic feedback on your watch. Below are some screenshots from the App...



SELECTOR Title:

- The title of the SELECTOR changes depending on whether the selected altitude has been acquired or not.

SELECTOR Display:

- Mirrors the selected altitude set in AltitudeAlert iPhone on your iPhone.

DA/MDA Status:

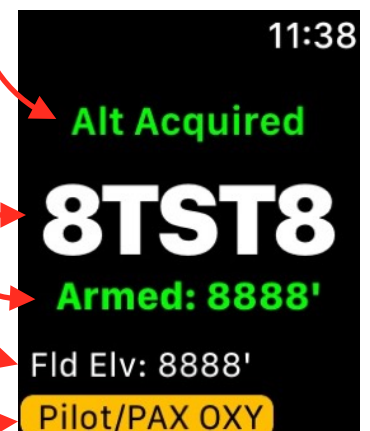
- Reflects the arming status of the DA/MDA Alerts (if applicable).

Fld Elv:

- Mirrors the Field Elevation set in the Controls Tab in the AltitudeAlert iPhone on your iPhone.

Oxygen Alerts:

- Mirrors the oxygen alerts generated by AltitudeAlert iPhone on on your iPhone.



ALT HOLD Mode:

ALT HOLD mode mirrors the simplicity of the phone, with the functionality to activate the mode directly from the watch. Let's take a look...

- Just TAP your watch face and ALT HOLD mode is activated.
- If you deviate from the captured altitude by more than the Deviation Margin (set via your iPhone, see Alert Margins Tab above), a “!! CHECK ALT !!” alert is generated with haptic feedback. Correcting the deviation or tapping the watch face will cancel and reset the alert.
- To cancel altitude holding, TAP the watch face.



Complication:

Complications are small elements of information that are displayed on the main Apple Watch face. Depending on the watch face that you select determines how many complications are available to be displayed.

AltitudeAlert supports nearly all complication types and acts as a “launcher” to quickly open the App directly from the watch face.

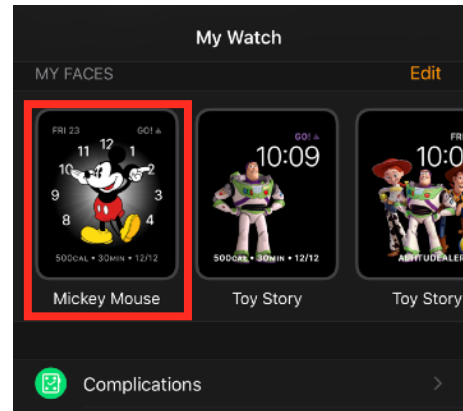
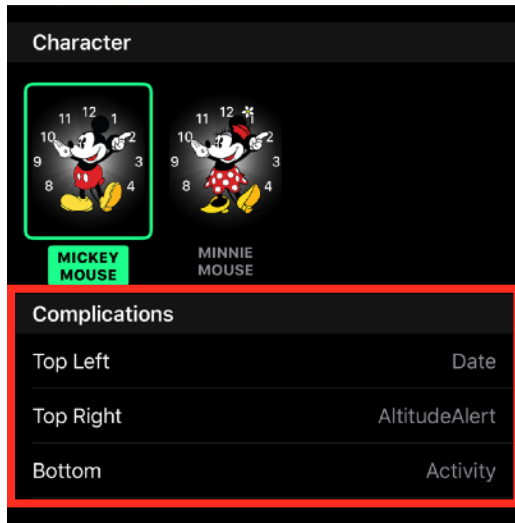
The primary advantage to adding AltitudeAlert's complication to your watch face is it substantially reduces the time it takes your Apple Watch from loading the App. This is because all complications retain a small amount of the App in its memory to allow for quick launching. When launching any App from the home page (without a complication), watchOS has to load the entire App from scratch. When the App is terminated (either by you or the OS), it then dumps the App completely from memory, which makes subsequent App launches take longer because it has to repeat the entire process.

Let's take a look on how to set a complication up...

There are two ways to setup a complication, either via your iPhone or on the Apple Watch directly.

iPhone:

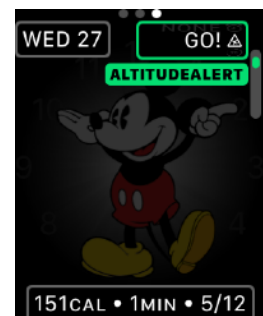
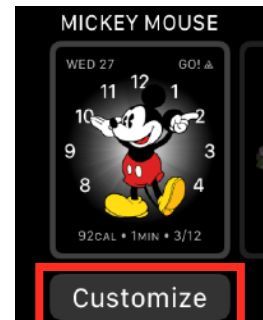
1. On your iPhone go to the Watch App and choose the watch face you wish to add the complication to.

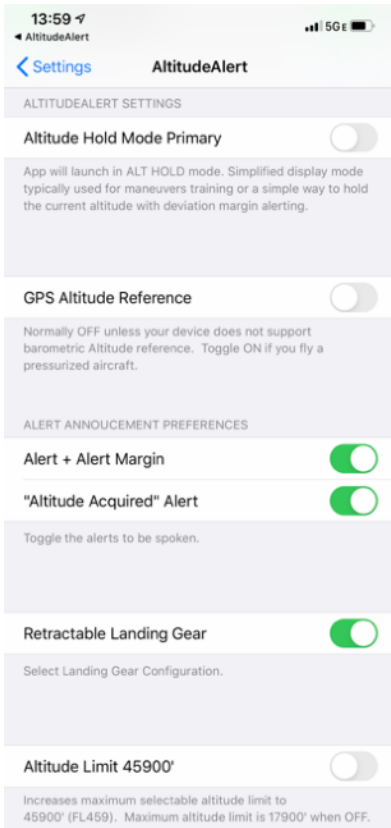


2. Then choose where you would like the complication to appear

Apple Watch:

1. Firmly press down on your Apple Watch face. The Customize screen will be displayed. Touch CUSTOMIZE.
2. Next, swipe to the left to reveal the complications screen (usually the last screen). Touch the complication area where you would like AltitudeAlert to appear and then scroll through the available complications until you see it. Press the digital crown (circular dial) on the side of your watch to save and exit the customize screen.
3. You're done!





iOS Settings Page:

Altitude Hold Mode Primary:

Defaulted to OFF. When toggled ON, AltitudeAlert will launch in Altitude Hold mode. Toggled OFF, AltitudeAlert launches in SELECTOR mode.

GPS Altitude Reference:

If your iPad is equipped with an internal pressure sensor then this toggle switch will be OFF by default. However, you can override the system and force the GPS to be altitude reference source. Practically, the only reason for doing this would be in the case you are flying in a pressurized aircraft. If your iPad does not have an internal pressure sensor, then this setting will always be ON.

Please note, that DA/MDA alerting is not available when GPS Altitude Reference is ON.

ALERT ANNOUNCEMENT PREFERENCES:

Alert + Alert Margin:

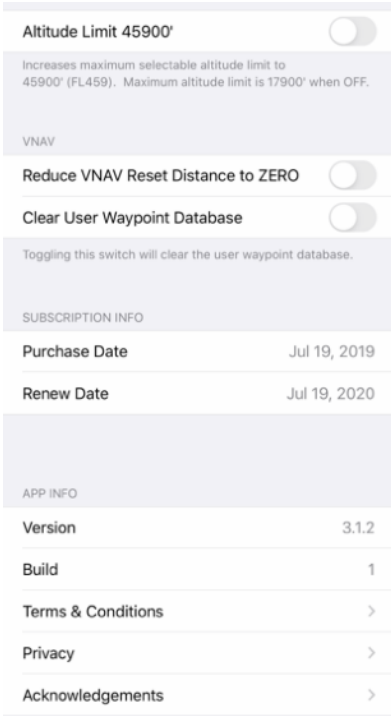
Defaulted to OFF. Toggled ON, when an alert is generated approaching a selected altitude, the alert margin will be announced after the alert chime. For example, if the Alert Margin is set to 600' when an altitude alert is generated, you will hear the alert chime followed by the announcement "600 to go". (see ALT HOLD Tab (iPhone)/ALT HOLD Mode (iPad) above).

"Altitude Acquired" Callout:

Defaulted to ON, turning this mode on will generate the "Altitude Acquired" callout each time the selected altitude is reached in the **SELECTOR**. Additionally, if a "CHK ALT" alert is generated due to an altitude deviation beyond the **Deviation Margin**, "Altitude Acquired" will be annunciated again when returning to the selected altitude.

Retractable Landing Gear:

Defaulted to OFF. Turning this switch ON enables the "Check Landing Gear Down" aural alert when the Landing Mode is engaged (see SELECTOR Tab (iPhone)/SELECTOR Mode (iPad) above).



Altitude Limit 45900':

Defaulted to OFF. When OFF, this limits the altitude selector to a maximum altitude of 17900'. Toggling this switch to ON increases the altitude selector limit to 45900' (FL459). Use caution when selecting altitude above 18000'. The app alerting algorithms are optimized for use below 18000'.

VNAV:

Reduce VNAV Reset Distance to ZERO:

Reduces the distance that VNAV will reset from the active waypoint to 0 NM. Normal (deselected) distance is 1 NM from the active waypoint.

Clear User Waypoint Database:

Toggling this switch clears ALL User Waypoints that have been added to the User Waypoint Database.

SUBSCRIPTION INFO (Apple App Store version only):

Purchase Date:

The purchase date of an active subscription.

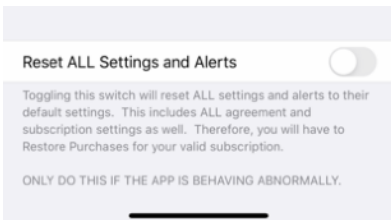
Renew Date:

The last date of an active subscription.

Please note, subscriptions will automatically renew. You can cancel at anytime through your iTunes Account Settings. Apple requires that this be done at least 24 hours before the renew date.

APP INFO:

App Info includes the current App Version, Build Number, Terms & Conditions, Privacy Policy, and Developer Acknowledgements.



Reset ALL Settings and Alerts:

Toggling this switch resets the App to its factory defaults. This includes the subscription status so you will have to use the Restore Purchases button to revalidate your subscription. You should only do this if the App is behaving abnormally.

iOS Background Alerts Table:

The following table outlines how the alerts will be delivered when AltitudeAlert is operating in the background. Visual “Alert/Banner” refers to the style of alert selected in the App Settings.

TYPE ALERT	VISUAL “ALERT/BANNER”	AURAL
Standard Altitude Alert Chime	X	X
“Check Altitude”	X	X
“Altitude Acquired”	X	X
“Pilot Oxygen Required”	X	X
“Passenger Oxygen Required”	X	X
“Approaching VNAV Descent”	X	X
“1000 ft. Above Touchdown”		X
“500 ft. Above Touchdown. Check Landing Gear Down”		X
“500 ft. Above Touchdown”		X
“Approaching Minimums”		X
“Approaching Minimums. Check Landing Gear Down”		X
“Minimums”	X	X
iPad Pressure Sensor Failure	X	X
iPad GPS Accuracy Degradation	X	X
iPad GPS Accuracy Restored		X

Troubleshooting - All Devices:

Reference Altitude Accuracy Issues:

If you are receiving an inordinate amount of accuracy alerts, i.e. “ACCY LOW”, “ALT INVLD”

- Reboot the device
- Complete a “Hard Reset”. Go to <https://support.apple.com/en-us/HT201559> to see how to do this for all models supported.
- If you continue to have accuracy issues, check to make sure that the device is located in a position that has an unobstructed view of the sky.
- Also make sure that the device is not located near a device that emits a strong electrical field, heated windows are the most common culprit.